STATE MATCH SUPPLEMENT

Georgia Performance Standards

Science
Grades 8–12

and

EXPLORE®, PLAN®, the ACT®, and WorkKeys®

January 2008

ACT®

List of Supplement Tables

Preface

This document is a supplement to the *State Match Georgia Performance Standards English Language Arts, Mathematics, and Science Grades 8–12 and ACT's EXPLORE, PLAN, the ACT, and WorkKeys (January 2008)*. This supplement identifies specific ACT College Readiness Standards that correspond to each Georgia Performance Standard in a side-by-side format. The left side of each page presents the Georgia Performance Standards (highlighted if measured by ACT's corresponding testing program). The right side of each page presents the specific ACT College Readiness Standard(s) and WorkKeys Level Skill(s) that correspond to each Georgia Performance Standard.

Georgia standards listed here are from the Georgia Performance Standards as presented on the Georgia Department of Education's website in October 2007.

SUPPLEMENT
TABLES A–Y

SCIENCE

TABLE A

GEORGIA Grade 8 Science Performance Standards	EXPLORE Science College Readiness Standards
HABITS OF MIND	
S8CS1. Students will explore the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works.	
a. Understand the importance of—and keep—honest, clear, and accurate records in science.	
b. Understand that hypotheses can be valuable even if they turn out not to be completely accurate.	
S8CS2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
b. Demonstrate appropriate techniques in all laboratory situations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Follow correct protocol for identifying and reporting safety problems and violations.	
S8CS3. Students will have the computation and estimation skills necessary for analyzing data and following scientific explanations.	
a. Analyze scientific data by using, interpreting, and comparing numbers in several equivalent forms, such as integers, fractions, decimals, and percents.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram
b. Find the mean, median, and mode and use them to analyze a set of scientific data.	**Interpretation of Data:** Identify and/or use a simple (e.g., linear) mathematical relationship between data
c. Apply the metric system to scientific investigations that include metric to metric conversions (i.e., centimeters to meters).	**Interpretation of Data:** Identify and/or use a simple (e.g., linear) mathematical relationship between data
d. Decide what degree of precision is adequate, and round off appropriately.	
e. Address the relationship between accuracy and precision.	

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TABLE A

GEORGIA Grade 8 Science Performance Standards	EXPLORE Science College Readiness Standards
f. Use ratios and proportions, including constant rates, in appropriate problems.	**Interpretation of Data:** Identify and/or use a simple (e.g., linear) mathematical relationship between data
S8CS4. Students will use tools and instruments for observing, measuring, and manipulating equipment and materials in scientific activities utilizing safe laboratory procedures.	
a. Use appropriate technology to store and retrieve scientific information in topical, alphabetical, numerical, and keyword files, and create simple files.	
b. Use appropriate tools and units for measuring objects and/or substances.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Learn and use standard safety practices when conducting scientific investigations.	
S8CS5. Students will use the ideas of system, model, change, and scale in exploring scientific and technological matters.	
a. Observe and explain how parts can be related to other parts in a system such as the role of simple machines in complex machines.	
b. Understand that different models (such as physical replicas, pictures, and analogies) can be used to represent the same thing.	
S8CS6. Students will communicate scientific ideas and activities clearly.	
a. Write clear, step-by-step instructions for conducting scientific investigations, operating a piece of equipment, or following a procedure.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design
b. Write for scientific purposes incorporating information from a circle, bar, or line graph, data tables, diagrams, and symbols.	
c. Organize scientific information in appropriate tables, charts, and graphs, and identify relationships they reveal.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram

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TABLE A

GEORGIA Grade 8 Science Performance Standards	EXPLORE Science College Readiness Standards
	Evaluation of Models, Inferences, and Experimental Results: Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
S8CS7. Students will question scientific claims and arguments effectively.	
a. Question claims based on vague attributions (such as "Leading doctors say...") or on statements made by people outside the area of their particular expertise.	
b. Identify the flaws of reasoning in arguments that are based on poorly designed research (e.g., facts intermingled with opinion, conclusions based on insufficient evidence).	**Evaluation of Models, Inferences, and Experimental Results:** Identify key issues or assumptions in a model Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Identify strengths and weaknesses in one or more models
c. Question the value of arguments based on small samples of data, biased samples, or samples for which there was no control.	
d. Recognize that there may be more than one way to interpret a given set of findings.	
THE NATURE OF SCIENCE	
S8CS8. Students will be familiar with the characteristics of scientific knowledge and how it is achieved. Students will apply the following to scientific concepts:	
a. When similar investigations give different results, the scientific challenge is to judge whether the differences are trivial or significant, which often requires further study. Even with similar results, scientists may wait until an investigation has been repeated many times before accepting the results as meaningful.	
b. When new experimental results are inconsistent with an existing, well-established theory, scientists may pursue further experimentation to determine whether the results are flawed or the theory requires modification.	
c. As prevailing theories are challenged by new information, scientific knowledge may change.	
S8CS9. Students will understand the features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Investigations are conducted for different reasons, which include exploring new phenomena, confirming previous results, testing how well a theory predicts, and comparing different theories.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model Identify key issues or assumptions in a model Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Identify strengths and weaknesses in one or more models Identify similarities and differences between models

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TABLE A

GEORGIA Grade 8 Science Performance Standards	EXPLORE Science College Readiness Standards
	Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
b. Scientific investigations usually involve collecting evidence, reasoning, devising hypotheses, and formulating explanations to make sense of collected evidence.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
c. Scientific experiments investigate the effect of one variable on another. All other variables are kept constant.	**Interpretation of Data:** Determine how the value of one variable changes as the value of another variable changes in a simple data presentation **Scientific Investigation:** Understand a simple experimental design Identify a control in an experiment
d. Scientists often collaborate to design research. To prevent this bias, scientists conduct independent studies of the same questions.	
e. Accurate record keeping, data sharing, and replication of results are essential for maintaining an investigator's credibility with other scientists and society.	
f. Scientists use technology and mathematics to enhance the process of scientific inquiry.	**Interpretation of Data:** Identify and/or use a simple (e.g., linear) mathematical relationship between data **Scientific Investigation:** Understand the methods and tools used in a simple experiment
g. The ethics of science require that special care must be taken and used for human subjects and animals in	

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TABLE A

GEORGIA Grade 8 Science Performance Standards	EXPLORE Science College Readiness Standards
scientific research. Scientists must adhere to the appropriate rules and guidelines when conducting research.	
S8CS10. Students will enhance reading in all curriculum areas by:	
a. Reading in All Curriculum Areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
CO-REQUISITE – CONTENT	
S8P1. Students will examine the scientific view of the nature of matter.	
a. Distinguish between atoms and molecules.	
b. Describe the difference between pure substances (elements and compounds) and mixtures.	
c. Describe the movement of particles in solids, liquids, gases, and plasmas states.	
d. Distinguish between physical and chemical properties of matter as physical (i.e., density, melting point, boiling	

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TABLE A

GEORGIA Grade 8 Science Performance Standards	EXPLORE Science College Readiness Standards
point) or chemical (i.e., reactivity, combustibility).	
e. Distinguish between changes in matter as physical (i.e., physical change) or chemical (development of a gas, formation of precipitate, and change in color).	
f. Recognize that there are more than 100 elements and some have similar properties as shown on the Periodic Table of Elements.	
g. Identify and demonstrate the Law of Conservation of Matter.	
S8P2. Students will be familiar with the forms and transformations of energy.	
a. Explain energy transformation in terms of the Law of Conservation of Energy.	
b. Explain the relationship between potential and kinetic energy.	
c. Compare and contrast the different forms of energy (heat, light, electricity, mechanical motion, sound) and their characteristics.	
d. Describe how heat can be transferred through matter by the collisions of atoms (conduction) or through space (radiation). In a liquid or gas, currents will facilitate the transfer of heat (convection).	
S8P3. Students will investigate relationship between force, mass, and the motion of objects.	
a. Determine the relationship between velocity and acceleration.	
b. Demonstrate the effect of balanced and unbalanced forces on an object in terms of gravity, inertia, and friction.	
c. Demonstrate the effect of simple machines (lever, inclined plane, pulley, wedge, screw, and wheel and axle) on work.	
S8P4. Students will explore the wave nature of sound and electromagnetic radiation.	
a. Identify the characteristics of electromagnetic and mechanical waves.	
b. Describe how the behavior of light waves is manipulated causing reflection, refraction diffraction, and absorption.	
c. Explain how the human eye sees objects and colors in terms of wavelengths.	
d. Describe how the behavior of waves is affected by medium (such as air, water, solids).	
e. Relate the properties of sound to everyday experiences.	
f. Diagram the parts of the wave and explain how the parts are affected by changes in amplitude and pitch.	

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TABLE A

GEORGIA Grade 8 Science Performance Standards	EXPLORE Science College Readiness Standards
S8P5. Students will recognize characteristics of gravity, electricity, and magnetism as major kinds of forces acting in nature.	
a. Recognize that every object exerts gravitational force on every other object and that the force exerted depends on how much mass the objects have and how far apart they are.	
b. Demonstrate the advantages and disadvantages of series and parallel circuits and how they transfer energy.	
c. Investigate and explain that electric currents and magnets can exert force on each other.	

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TABLE B

GEORGIA Biology Performance Standards	EXPLORE Science College Readiness Standards
HABITS Of MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	**Evaluation of Models, Inferences, and Experimental Results:** Identify similarities and differences between models
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	**Evaluation of Models, Inferences, and Experimental Results:** Identify strengths and weaknesses in one or more models Identify similarities and differences between models
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
b. Demonstrate appropriate technique in all laboratory situations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
b. Develop procedures for solving scientific problems.	**Scientific Investigation:** Understand a simple experimental design
c. Collect, organize and record appropriate data.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram

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TABLE B

GEORGIA Biology Performance Standards	EXPLORE Science College Readiness Standards
d. Graphically compare and analyze data points and/or summary statistics.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
e. Develop reasonable conclusions based on data collected.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model

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GEORGIA Biology Performance Standards	EXPLORE Science College Readiness Standards
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model Select a simple hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	**Interpretation of Data:** Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	
a. Trace the source on any large disparity between estimated and calculated answers to problems.	
b. Consider possible effects of measurement errors on calculations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Recognize the relationship between accuracy and precision.	
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.	**Interpretation of Data:** Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Identify and/or use a simple (e.g., linear) mathematical relationship between data
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.	

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TABLE B

GEORGIA Biology Performance Standards	EXPLORE Science College Readiness Standards
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	**Evaluation of Models, Inferences, and Experimental Results:** Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Determine which model(s) is(are) supported or weakened by new information Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE Of SCIENCE	
SCSh7. Students analyze how scientific knowledge is developed. Students recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	**Scientific Investigation:** Understand a simple experimental design Identify a control in an experiment
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	

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TABLE B

GEORGIA Biology Performance Standards	EXPLORE Science College Readiness Standards
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in all curriculum areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
b Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
CO-REQUISITE – CONTENT	
SB1. Students will analyze the nature of the relationships between structures and functions in living cells.	
a. Explain the role of cell organelles for both prokaryotic and eukaryotic cells, including the cell membrane, in maintaining homeostasis and cell reproduction.	
b. Explain how enzymes function as catalysts.	
c. Identify the function of the four major macromolecules (i.e., carbohydrates, proteins, lipids, nucleic acids).	
d. Explain the impact of water on life processes (i.e., osmosis, diffusion).	

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TABLE B

GEORGIA Biology Performance Standards	EXPLORE Science College Readiness Standards
SB2. Students will analyze how biological traits are passed on to successive generations.	
a. Distinguish between DNA and RNA.	
b. Explain the role of DNA in storing and transmitting cellular information.	
c. Using Mendel's laws, explain the role of meiosis in reproductive variability.	
d. Describe the relationships between changes in DNA and potential appearance of new traits including • Alterations during replication. • Insertions • Deletions • Substitutions • Mutagenic factors that can alter DNA. • High energy radiation (x-rays and ultraviolet) • Chemical	
e. Compare the advantages of sexual reproduction and asexual reproduction in different situations.	
f. Examine the use of DNA technology in forensics, medicine, and agriculture.	
SB3. Students will derive the relationship between single-celled and multi-celled organisms and the increasing complexity of systems.	
a. Explain the cycling of energy through the processes of photosynthesis and respiration.	
b. Compare how structures and function vary between the six kingdoms (archaebacteria, eubacteria, protists, fungi, plants, and animals).	
c. Examine the evolutionary basis of modern classification systems.	
d. Compare and contrast viruses with living organisms.	
SB4. Students will assess the dependence of all organisms on one another and the flow of energy and matter within their ecosystems.	
a. Investigate the relationships among organisms, populations, communities, ecosystems, and biomes.	
b. Explain the flow of matter and energy through ecosystems by • Arranging components of a food chain according to energy flow. • Comparing the quantity of energy in the steps of an energy pyramid. • Explaining the need for cycling of major nutrients (C, O, H, N, P).	
c. Relate environmental conditions to successional changes in ecosystems.	

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TABLE B

GEORGIA Biology Performance Standards	EXPLORE Science College Readiness Standards
d. Assess and explain human activities that influence and modify the environment such as global warming, population growth, pesticide use, and water and power consumption.	
e. Relate plant adaptations, including tropisms, to the ability to survive stressful environmental conditions.	
f. Relate animal adaptations, including behaviors, to the ability to survive stressful environmental conditions.	
SB5. Students will evaluate the role of natural selection in the development of the theory of evolution.	
a. Trace the history of the theory.	
b. Explain the history of life in terms of biodiversity, ancestry, and the rates of evolution.	
c. Explain how fossil and biochemical evidence support the theory.	
d. Relate natural selection to changes in organisms.	
e. Recognize the role of evolution to biological resistance (pesticide and antibiotic resistance).	

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TABLE C

GEORGIA Biology Performance Standards	PLAN Science College Readiness Standards
HABITS Of MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	**Evaluation of Models, Inferences, and Experimental Results:** Identify similarities and differences between models
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	**Evaluation of Models, Inferences, and Experimental Results:** Identify strengths and weaknesses in one or more models Identify similarities and differences between models
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
b. Demonstrate appropriate technique in all laboratory situations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
b. Develop procedures for solving scientific problems.	**Scientific Investigation:** Understand a simple experimental design
c. Collect, organize and record appropriate data.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram

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TABLE C

GEORGIA Biology Performance Standards	PLAN Science College Readiness Standards
d. Graphically compare and analyze data points and/or summary statistics.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
e. Develop reasonable conclusions based on data collected.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model

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TABLE C

GEORGIA Biology Performance Standards	PLAN Science College Readiness Standards
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model Select a simple hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	**Interpretation of Data:** Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	
a. Trace the source on any large disparity between estimated and calculated answers to problems.	
b. Consider possible effects of measurement errors on calculations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Recognize the relationship between accuracy and precision.	
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.	**Interpretation of Data:** Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Identify and/or use a simple (e.g., linear) mathematical relationship between data Identify and/or use a complex (e.g., nonlinear) mathematical relationship between data
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	

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TABLE C

GEORGIA Biology Performance Standards	PLAN Science College Readiness Standards
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.	
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	**Evaluation of Models, Inferences, and Experimental Results:** Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Determine which model(s) is(are) supported or weakened by new information Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE Of SCIENCE	
SCSh7. Students analyze how scientific knowledge is developed. Students recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	**Scientific Investigation:** Understand a simple experimental design Identify a control in an experiment
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	

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TABLE C

GEORGIA Biology Performance Standards	PLAN Science College Readiness Standards
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in all curriculum areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
CO-REQUISITE – CONTENT	
SB1. Students will analyze the nature of the relationships between structures and functions in living cells.	
a. Explain the role of cell organelles for both prokaryotic and eukaryotic cells, including the cell membrane, in maintaining homeostasis and cell reproduction.	
b. Explain how enzymes function as catalysts.	
c. Identify the function of the four major macromolecules (i.e., carbohydrates, proteins, lipids, nucleic acids).	

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TABLE C

GEORGIA Biology Performance Standards	PLAN Science College Readiness Standards
d. Explain the impact of water on life processes (i.e., osmosis, diffusion).	
SB2. Students will analyze how biological traits are passed on to successive generations.	
a. Distinguish between DNA and RNA.	
b. Explain the role of DNA in storing and transmitting cellular information.	
c. Using Mendel's laws, explain the role of meiosis in reproductive variability.	
d. Describe the relationships between changes in DNA and potential appearance of new traits including • Alterations during replication. • Insertions • Deletions • Substitutions • Mutagenic factors that can alter DNA. • High energy radiation (x-rays and ultraviolet) • Chemical	
e. Compare the advantages of sexual reproduction and asexual reproduction in different situations.	
f. Examine the use of DNA technology in forensics, medicine, and agriculture.	
SB3. Students will derive the relationship between single-celled and multi-celled organisms and the increasing complexity of systems.	
a. Explain the cycling of energy through the processes of photosynthesis and respiration.	
b. Compare how structures and function vary between the six kingdoms (archaebacteria, eubacteria, protists, fungi, plants, and animals).	
c. Examine the evolutionary basis of modern classification systems.	
d. Compare and contrast viruses with living organisms.	
SB4. Students will assess the dependence of all organisms on one another and the flow of energy and matter within their ecosystems.	
a. Investigate the relationships among organisms, populations, communities, ecosystems, and biomes.	
b. Explain the flow of matter and energy through ecosystems by • Arranging components of a food chain according to energy flow. • Comparing the quantity of energy in the steps of an energy pyramid. • Explaining the need for cycling of major nutrients (C, O, H, N, P).	
c. Relate environmental conditions to successional changes in ecosystems.	

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TABLE C

GEORGIA Biology Performance Standards	PLAN Science College Readiness Standards
d. Assess and explain human activities that influence and modify the environment such as global warming, population growth, pesticide use, and water and power consumption.	
e. Relate plant adaptations, including tropisms, to the ability to survive stressful environmental conditions.	
f. Relate animal adaptations, including behaviors, to the ability to survive stressful environmental conditions.	
SB5. Students will evaluate the role of natural selection in the development of the theory of evolution.	
a. Trace the history of the theory.	
b. Explain the history of life in terms of biodiversity, ancestry, and the rates of evolution.	
c. Explain how fossil and biochemical evidence support the theory.	
d. Relate natural selection to changes in organisms.	
e. Recognize the role of evolution to biological resistance (pesticide and antibiotic resistance).	

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TABLE D

GEORGIA Biology Performance Standards	ACT Science College Readiness Standards
HABITS Of MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	**Evaluation of Models, Inferences, and Experimental Results:** Identify similarities and differences between models
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	**Scientific Investigation:** Identify an additional trial or experiment that could be performed to enhance or evaluate experimental results **Evaluation of Models, Inferences, and Experimental Results:** Identify strengths and weaknesses in one or more models Identify similarities and differences between models
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
b. Demonstrate appropriate technique in all laboratory situations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
b. Develop procedures for solving scientific problems.	**Scientific Investigation:** Understand a simple experimental design
c. Collect, organize and record appropriate data.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table)

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TABLE D

GEORGIA Biology Performance Standards	ACT Science College Readiness Standards
	Translate information into a table, graph, or diagram
d. Graphically compare and analyze data points and/or summary statistics.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
e. Develop reasonable conclusions based on data collected.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design

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GEORGIA Biology Performance Standards	ACT Science College Readiness Standards
	Evaluation of Models, Inferences, and Experimental Results: Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model Select a simple hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	**Interpretation of Data:** Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	
a. Trace the source on any large disparity between estimated and calculated answers to problems.	**Scientific Investigation:** Understand precision and accuracy issues
b. Consider possible effects of measurement errors on calculations.	**Scientific Investigation:** Understand precision and accuracy issues
c. Recognize the relationship between accuracy and precision.	**Scientific Investigation:** Understand precision and accuracy issues
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.	**Interpretation of Data:** Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Identify and/or use a simple (e.g., linear) mathematical relationship between data Identify and/or use a complex (e.g., nonlinear) mathematical relationship between data

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TABLE D

GEORGIA Biology Performance Standards	ACT Science College Readiness Standards
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.	
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	**Evaluation of Models, Inferences, and Experimental Results:** Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Determine which model(s) is(are) supported or weakened by new information Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE Of SCIENCE	
SCSh7. Students analyze how scientific knowledge is developed. Students recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	**Scientific Investigation:** Understand a simple experimental design Identify a control in an experiment
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	

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GEORGIA Biology Performance Standards	ACT Science College Readiness Standards
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in all curriculum areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text

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TABLE D

GEORGIA Biology Performance Standards	ACT Science College Readiness Standards
CO-REQUISITE – CONTENT	
SB1. Students will analyze the nature of the relationships between structures and functions in living cells.	
a. Explain the role of cell organelles for both prokaryotic and eukaryotic cells, including the cell membrane, in maintaining homeostasis and cell reproduction.	
b. Explain how enzymes function as catalysts.	
c. Identify the function of the four major macromolecules (i.e., carbohydrates, proteins, lipids, nucleic acids).	
d. Explain the impact of water on life processes (i.e., osmosis, diffusion).	
SB2. Students will analyze how biological traits are passed on to successive generations.	
a. Distinguish between DNA and RNA.	
b. Explain the role of DNA in storing and transmitting cellular information.	
c. Using Mendel's laws, explain the role of meiosis in reproductive variability.	
d. Describe the relationships between changes in DNA and potential appearance of new traits including • Alterations during replication. • Insertions • Deletions • Substitutions • Mutagenic factors that can alter DNA. • High energy radiation (x-rays and ultraviolet) • Chemical	
e. Compare the advantages of sexual reproduction and asexual reproduction in different situations.	
f. Examine the use of DNA technology in forensics, medicine, and agriculture.	
SB3. Students will derive the relationship between single-celled and multi-celled organisms and the increasing complexity of systems.	
a. Explain the cycling of energy through the processes of photosynthesis and respiration.	
b. Compare how structures and function vary between the six kingdoms (archaebacteria, eubacteria, protists, fungi, plants, and animals).	
c. Examine the evolutionary basis of modern classification systems.	
d. Compare and contrast viruses with living organisms.	
SB4. Students will assess the dependence of all organisms on one another and the flow of energy and matter within their ecosystems.	
a. Investigate the relationships among organisms, populations, communities, ecosystems, and biomes.	

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TABLE D

GEORGIA Biology Performance Standards	ACT Science College Readiness Standards
b. Explain the flow of matter and energy through ecosystems by • Arranging components of a food chain according to energy flow. • Comparing the quantity of energy in the steps of an energy pyramid. • Explaining the need for cycling of major nutrients (C, O, H, N, P).	
c. Relate environmental conditions to successional changes in ecosystems.	
d. Assess and explain human activities that influence and modify the environment such as global warming, population growth, pesticide use, and water and power consumption.	
e. Relate plant adaptations, including tropisms, to the ability to survive stressful environmental conditions.	
f. Relate animal adaptations, including behaviors, to the ability to survive stressful environmental conditions.	
SB5. Students will evaluate the role of natural selection in the development of the theory of evolution.	
a. Trace the history of the theory.	
b. Explain the history of life in terms of biodiversity, ancestry, and the rates of evolution.	
c. Explain how fossil and biochemical evidence support the theory.	
d. Relate natural selection to changes in organisms.	
e. Recognize the role of evolution to biological resistance (pesticide and antibiotic resistance).	

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TABLE E

GEORGIA Biology Standards	WorkKeys Locating Information Level Skills
HABITS Of MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	
b. Demonstrate appropriate technique in all laboratory situations.	
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	
b. Develop procedures for solving scientific problems.	
c. Collect, organize and record appropriate data.	Fill in one or two pieces of information that are missing from a graphic
d. Graphically compare and analyze data points and/or summary statistics.	Compare information and trends from one or more complicated graphics
e. Develop reasonable conclusions based on data collected.	Draw conclusions based on one complicated graphic or several related graphics
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	Summarize information from one or more detailed graphics Identify trends shown in one or more detailed or complicated graphics Compare information and trends from one or more complicated graphics
SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	Fill in one or two pieces of information that are missing from a graphic
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	Summarize information from one or more detailed graphics Identify trends shown in one or more detailed or complicated graphics Compare information and trends from one or more complicated graphics
a. Trace the source on any large disparity between estimated and calculated answers to problems.	

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TABLE E

GEORGIA Biology Standards	WorkKeys Locating Information Level Skills
b. Consider possible effects of measurement errors on calculations.	
c. Recognize the relationship between accuracy and precision.	
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.	
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.	
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE Of SCIENCE	
SCSh7. Students analyze how scientific knowledge is developed. Students recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	

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TABLE E

GEORGIA Biology Standards	WorkKeys Locating Information Level Skills
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in all curriculum areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	

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TABLE E

GEORGIA Biology Standards	WorkKeys Locating Information Level Skills
CO-REQUISITE – CONTENT	
SB1. Students will analyze the nature of the relationships between structures and functions in living cells.	
a. Explain the role of cell organelles for both prokaryotic and eukaryotic cells, including the cell membrane, in maintaining homeostasis and cell reproduction.	
b. Explain how enzymes function as catalysts.	
c. Identify the function of the four major macromolecules (i.e., carbohydrates, proteins, lipids, nucleic acids).	
d. Explain the impact of water on life processes (i.e., osmosis, diffusion).	
SB2. Students will analyze how biological traits are passed on to successive generations.	
a. Distinguish between DNA and RNA.	
b. Explain the role of DNA in storing and transmitting cellular information.	
c. Using Mendel's laws, explain the role of meiosis in reproductive variability.	
d. Describe the relationships between changes in DNA and potential appearance of new traits including • Alterations during replication. • Insertions • Deletions • Substitutions • Mutagenic factors that can alter DNA. • High energy radiation (x-rays and ultraviolet) • Chemical	
e. Compare the advantages of sexual reproduction and asexual reproduction in different situations.	
f. Examine the use of DNA technology in forensics, medicine, and agriculture.	
SB3. Students will derive the relationship between single-celled and multi-celled organisms and the increasing complexity of systems.	
a. Explain the cycling of energy through the processes of photosynthesis and respiration.	
b. Compare how structures and function vary between the six kingdoms (archaebacteria, eubacteria, protists, fungi, plants, and animals).	
c. Examine the evolutionary basis of modern classification systems.	
d. Compare and contrast viruses with living organisms.	
SB4. Students will assess the dependence of all organisms on one another and the flow of energy and matter within their ecosystems.	
a. Investigate the relationships among organisms, populations, communities, ecosystems, and biomes.	

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TABLE E

GEORGIA Biology Standards	WorkKeys Locating Information Level Skills
b. Explain the flow of matter and energy through ecosystems by • Arranging components of a food chain according to energy flow. • Comparing the quantity of energy in the steps of an energy pyramid. • Explaining the need for cycling of major nutrients (C, O, H, N, P).	
c. Relate environmental conditions to successional changes in ecosystems.	
d. Assess and explain human activities that influence and modify the environment such as global warming, population growth, pesticide use, and water and power consumption.	
e. Relate plant adaptations, including tropisms, to the ability to survive stressful environmental conditions.	
f. Relate animal adaptations, including behaviors, to the ability to survive stressful environmental conditions.	
SB5. Students will evaluate the role of natural selection in the development of the theory of evolution.	
a. Trace the history of the theory.	
b. Explain the history of life in terms of biodiversity, ancestry, and the rates of evolution.	
c. Explain how fossil and biochemical evidence support the theory.	
d. Relate natural selection to changes in organisms.	
e. Recognize the role of evolution to biological resistance (pesticide and antibiotic resistance).	

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TABLE F

GEORGIA Environmental Science Performance Standards	EXPLORE Science College Readiness Standards
HABITS Of MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	**Evaluation of Models, Inferences, and Experimental Results:** Identify similarities and differences between models
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	**Evaluation of Models, Inferences, and Experimental Results:** Identify strengths and weaknesses in one or more models Identify similarities and differences between models
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
b. Demonstrate appropriate technique in all laboratory situations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
b. Develop procedures for solving scientific problems.	**Scientific Investigation:** Understand a simple experimental design
c. Collect, organize and record appropriate data.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram

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TABLE F

GEORGIA Environmental Science Performance Standards	EXPLORE Science College Readiness Standards
d. Graphically compare and analyze data points and/or summary statistics.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
e. Develop reasonable conclusions based on data collected.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model

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TABLE F

GEORGIA Environmental Science Performance Standards	EXPLORE Science College Readiness Standards
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model Select a simple hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	**Interpretation of Data:** Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	
a. Trace the source on any large disparity between estimated and calculated answers to problems.	
b. Consider possible effects of measurement errors on calculations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Recognize the relationship between accuracy and precision.	
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.	**Interpretation of Data:** Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Identify and/or use a simple (e.g., linear) mathematical relationship between data
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.	

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TABLE F

GEORGIA Environmental Science Performance Standards	EXPLORE Science College Readiness Standards
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	**Evaluation of Models, Inferences, and Experimental Results:** Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Determine which model(s) is(are) supported or weakened by new information Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE Of SCIENCE	
SCSh7. Students analyze how scientific knowledge is developed. Students recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	**Scientific Investigation:** Understand a simple experimental design Identify a control in an experiment
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	

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TABLE F

GEORGIA Environmental Science Performance Standards	EXPLORE Science College Readiness Standards
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in all curriculum areas Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
CO-REQUISITE – CONTENT	
SEV1. Students will investigate the flow of energy and cycling of matter within an ecosystem and relate these phenomena to human society.	
a. Interpret biogeochemical cycles including hydrologic, nitrogen, phosphorus, oxygen, and carbon cycles. Recognize that energy is not recycled in ecosystems.	
b. Relate energy changes to food chains, food webs, and to trophic levels in a generalized ecosystem, recognizing that entropy is a primary factor in the loss of usable food energy during movement up the trophic levels.	

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TABLE F

GEORGIA Environmental Science Performance Standards	EXPLORE Science College Readiness Standards
c. Relate food production and quality of nutrition to population growth and the trophic levels	
d. Relate the cycling of matter and the flow of energy to the Laws of Conservation of matter and energy. Identify the role and importance of decomposers in the recycling process.	
e. Distinguish between abiotic and biotic factors in an ecosystem and describe how matter and energy move between these.	
SEV2. Students will demonstrate an understanding that the Earth is one interconnected system.	
a. Describe how the abiotic components (water, air, and energy) affect the biosphere.	
b. Recognize and give examples of the hierarchy of the biological entities of the biosphere (organisms, populations, communities, ecosystems, and biosphere).	
c. Characterize the components that define a Biome. • Abiotic Factors – to include precipitation, temperature and soils. • Biotic Factors – plant and animal adaptations that create success in that biome.	
d. Characterize the components that define fresh-water and marine systems. • Abiotic Factors – to include light, dissolved oxygen, phosphorus, nitrogen, pH and substrate. • Biotic Factors – plant and animal adaptations characteristic to that system.	
SEV3. Students will describe stability and change in ecosystems.	
a. Describe interconnections between abiotic and biotic factors, including normal cyclic fluctuations and changes associated with climatic change (i.e. ice ages).	
b. Explain succession in terms of changes in communities through time to include changes in biomass, diversity, and complexity.	
c. Explain how succession may be altered by traumatic events.	
d. Explain how biotic and abiotic factors influence populations.	
e. Describe interactions between individuals (i.e. mutualism, commensalisms, parasitism, predation, and competition).	
SEV4. Students will understand and describe availability, allocation and conservation of energy and other resources	
a. Differentiate between renewable and nonrenewable resources including how different resources are produced, rates of use, renewal rates, and limitations of sources. Distinguish between natural and produced resources.	

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TABLE F

GEORGIA Environmental Science Performance Standards	EXPLORE Science College Readiness Standards
b. Describe how technology is increasing the efficiency of utilization and accessibility of resources.	
c. Describe how energy and other resource utilization impact the environment and recognize that individuals as well as larger entities (businesses, governments, etc.) have impact on energy efficiency.	
d. Describe the relationship of energy consumption and the living standards of societies.	
e. Describe the commonly used fuels (e.g. fossil fuels, nuclear fuels, etc.) and some alternative fuels (e.g. wind, solar, ethanol, etc.) including the required technology, availability, pollution problems and implementation problems. Recognize the origin of fossil fuels and the problems associated with our dependence on this energy source.	
f. Describe the need for informed decision making of resource utilization. (i.e. energy and water usage allocation, conservation, food and land, and long-term depletion)	
SEV5. Students will recognize that human beings are part of the global ecosystem and will evaluate the effects of human activities and technology on ecosystems.	
a. Describe factors affecting population growth of all organisms, including humans. Relate these to factors affecting growth rates and carrying capacity of the environment.	
b. Describe the effects of population growth, demographic transitions, cultural differences, emergent diseases, etc. on societal stability.	
c. Explain how human activities affect global and local sustainability.	
d. Describe the actual and potential effects of habitat destruction, erosion, and depletion of soil fertility associated with human activities.	
e. Describe the effects and potential implications of pollution and resource depletion on the environment at the local and global levels (e.g. air and water pollution, solid waste disposal, depletion of the stratospheric ozone, global warming, and land uses).	
f. Describe how political, legal, social, and economic decisions may affect global and local ecosystems.	

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TABLE G

GEORGIA Environmental Science Performance Standards	PLAN Science College Readiness Standards
HABITS Of MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	**Evaluation of Models, Inferences, and Experimental Results:** Identify similarities and differences between models
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	**Evaluation of Models, Inferences, and Experimental Results:** Identify strengths and weaknesses in one or more models Identify similarities and differences between models
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
b. Demonstrate appropriate technique in all laboratory situations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
b. Develop procedures for solving scientific problems.	**Scientific Investigation:** Understand a simple experimental design
c. Collect, organize and record appropriate data.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram

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TABLE G

GEORGIA Environmental Science Performance Standards	PLAN Science College Readiness Standards
d. Graphically compare and analyze data points and/or summary statistics.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
e. Develop reasonable conclusions based on data collected.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model

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TABLE G

GEORGIA Environmental Science Performance Standards	PLAN Science College Readiness Standards
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model Select a simple hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	**Interpretation of Data:** Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	
a. Trace the source on any large disparity between estimated and calculated answers to problems.	
b. Consider possible effects of measurement errors on calculations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Recognize the relationship between accuracy and precision.	
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.	**Interpretation of Data:** Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Identify and/or use a simple (e.g., linear) mathematical relationship between data Identify and/or use a complex (e.g., nonlinear) mathematical relationship between data
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.	

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TABLE G

GEORGIA Environmental Science Performance Standards	PLAN Science College Readiness Standards
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	**Evaluation of Models, Inferences, and Experimental Results:** Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Determine which model(s) is(are) supported or weakened by new information Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE Of SCIENCE	
SCSh7. Students analyze how scientific knowledge is developed. Students recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	**Scientific Investigation:** Understand a simple experimental design Identify a control in an experiment
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	

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TABLE G

GEORGIA Environmental Science Performance Standards	PLAN Science College Readiness Standards
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in all curriculum areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
CO-REQUISITE – CONTENT	
SEV1. Students will investigate the flow of energy and cycling of matter within an ecosystem and relate these phenomena to human society.	
a. Interpret biogeochemical cycles including hydrologic, nitrogen, phosphorus, oxygen, and carbon cycles. Recognize that energy is not recycled in ecosystems.	
b. Relate energy changes to food chains, food webs, and to trophic levels in a generalized ecosystem, recognizing that entropy is a primary factor in the loss of usable food energy during movement up the trophic levels.	

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TABLE G

GEORGIA Environmental Science Performance Standards	PLAN Science College Readiness Standards
c. Relate food production and quality of nutrition to population growth and the trophic levels	
d. Relate the cycling of matter and the flow of energy to the Laws of Conservation of matter and energy. Identify the role and importance of decomposers in the recycling process.	
e. Distinguish between abiotic and biotic factors in an ecosystem and describe how matter and energy move between these.	
SEV2. Students will demonstrate an understanding that the Earth is one interconnected system.	
a. Describe how the abiotic components (water, air, and energy) affect the biosphere.	
b. Recognize and give examples of the hierarchy of the biological entities of the biosphere (organisms, populations, communities, ecosystems, and biosphere).	
c. Characterize the components that define a Biome. • Abiotic Factors – to include precipitation, temperature and soils. • Biotic Factors – plant and animal adaptations that create success in that biome.	
d. Characterize the components that define fresh-water and marine systems. • Abiotic Factors – to include light, dissolved oxygen, phosphorus, nitrogen, pH and substrate. • Biotic Factors – plant and animal adaptations characteristic to that system.	
SEV3. Students will describe stability and change in ecosystems.	
a. Describe interconnections between abiotic and biotic factors, including normal cyclic fluctuations and changes associated with climatic change (i.e. ice ages).	
b. Explain succession in terms of changes in communities through time to include changes in biomass, diversity, and complexity.	
c. Explain how succession may be altered by traumatic events.	
d. Explain how biotic and abiotic factors influence populations.	
e. Describe interactions between individuals (i.e. mutualism, commensalisms, parasitism, predation, and competition).	
SEV4. Students will understand and describe availability, allocation and conservation of energy and other resources	
a. Differentiate between renewable and nonrenewable resources including how different resources are produced, rates of use, renewal rates, and limitations of sources. Distinguish between natural and produced resources.	

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TABLE G

GEORGIA Environmental Science Performance Standards	PLAN Science College Readiness Standards
b. Describe how technology is increasing the efficiency of utilization and accessibility of resources.	
c. Describe how energy and other resource utilization impact the environment and recognize that individuals as well as larger entities (businesses, governments, etc.) have impact on energy efficiency.	
d. Describe the relationship of energy consumption and the living standards of societies.	
e. Describe the commonly used fuels (e.g. fossil fuels, nuclear fuels, etc.) and some alternative fuels (e.g. wind, solar, ethanol, etc.) including the required technology, availability, pollution problems and implementation problems. Recognize the origin of fossil fuels and the problems associated with our dependence on this energy source.	
f. Describe the need for informed decision making of resource utilization. (i.e. energy and water usage allocation, conservation, food and land, and long-term depletion)	
SEV5. Students will recognize that human beings are part of the global ecosystem and will evaluate the effects of human activities and technology on ecosystems.	
a. Describe factors affecting population growth of all organisms, including humans. Relate these to factors affecting growth rates and carrying capacity of the environment.	
b. Describe the effects of population growth, demographic transitions, cultural differences, emergent diseases, etc. on societal stability.	
c. Explain how human activities affect global and local sustainability.	
d. Describe the actual and potential effects of habitat destruction, erosion, and depletion of soil fertility associated with human activities.	
e. Describe the effects and potential implications of pollution and resource depletion on the environment at the local and global levels (e.g. air and water pollution, solid waste disposal, depletion of the stratospheric ozone, global warming, and land uses).	
f. Describe how political, legal, social, and economic decisions may affect global and local ecosystems.	

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TABLE H

GEORGIA Environmental Science Performance Standards	ACT Science College Readiness Standards
HABITS Of MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	**Evaluation of Models, Inferences, and Experimental Results:** Identify similarities and differences between models
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	**Scientific Investigation:** Identify an additional trial or experiment that could be performed to enhance or evaluate experimental results **Evaluation of Models, Inferences, and Experimental Results:** Identify strengths and weaknesses in one or more models Identify similarities and differences between models
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
b. Demonstrate appropriate technique in all laboratory situations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
b. Develop procedures for solving scientific problems.	**Scientific Investigation:** Understand a simple experimental design
c. Collect, organize and record appropriate data.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table)

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TABLE H

GEORGIA Environmental Science Performance Standards	ACT Science College Readiness Standards
	Translate information into a table, graph, or diagram
d. Graphically compare and analyze data points and/or summary statistics.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
e. Develop reasonable conclusions based on data collected.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design

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TABLE H

GEORGIA Environmental Science Performance Standards	ACT Science College Readiness Standards
	Evaluation of Models, Inferences, and Experimental Results: Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model Select a simple hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	**Interpretation of Data:** Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	
a. Trace the source on any large disparity between estimated and calculated answers to problems.	**Scientific Investigation:** Understand precision and accuracy issues
b. Consider possible effects of measurement errors on calculations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Recognize the relationship between accuracy and precision.	**Scientific Investigation:** Understand precision and accuracy issues
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.	**Interpretation of Data:** Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Identify and/or use a simple (e.g., linear) mathematical relationship between data Identify and/or use a complex (e.g., nonlinear) mathematical relationship between data

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TABLE H

GEORGIA Environmental Science Performance Standards	ACT Science College Readiness Standards
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.	
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	**Evaluation of Models, Inferences, and Experimental Results:** Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Determine which model(s) is(are) supported or weakened by new information Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE Of SCIENCE	
SCSh7. Students analyze how scientific knowledge is developed. Students recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	**Scientific Investigation:** Understand a simple experimental design Identify a control in an experiment
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	

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TABLE H

GEORGIA Environmental Science Performance Standards	ACT Science College Readiness Standards
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in all curriculum areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text

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TABLE H

GEORGIA Environmental Science Performance Standards	ACT Science College Readiness Standards
CO-REQUISITE – CONTENT	
SEV1. Students will investigate the flow of energy and cycling of matter within an ecosystem and relate these phenomena to human society.	
a. Interpret biogeochemical cycles including hydrologic, nitrogen, phosphorus, oxygen, and carbon cycles. Recognize that energy is not recycled in ecosystems.	
b. Relate energy changes to food chains, food webs, and to trophic levels in a generalized ecosystem, recognizing that entropy is a primary factor in the loss of usable food energy during movement up the trophic levels.	
c. Relate food production and quality of nutrition to population growth and the trophic levels	
d. Relate the cycling of matter and the flow of energy to the Laws of Conservation of matter and energy. Identify the role and importance of decomposers in the recycling process.	
e. Distinguish between abiotic and biotic factors in an ecosystem and describe how matter and energy move between these.	
SEV2. Students will demonstrate an understanding that the Earth is one interconnected system.	
a. Describe how the abiotic components (water, air, and energy) affect the biosphere.	
b. Recognize and give examples of the hierarchy of the biological entities of the biosphere (organisms, populations, communities, ecosystems, and biosphere).	
c. Characterize the components that define a Biome. • Abiotic Factors – to include precipitation, temperature and soils. • Biotic Factors – plant and animal adaptations that create success in that biome.	
d. Characterize the components that define fresh-water and marine systems. • Abiotic Factors – to include light, dissolved oxygen, phosphorus, nitrogen, pH and substrate. • Biotic Factors – plant and animal adaptations characteristic to that system.	
SEV3. Students will describe stability and change in ecosystems.	
a. Describe interconnections between abiotic and biotic factors, including normal cyclic fluctuations and changes associated with climatic change (i.e. ice ages).	
b. Explain succession in terms of changes in communities through time to include changes in biomass, diversity, and complexity.	
c. Explain how succession may be altered by traumatic events.	

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TABLE H

GEORGIA Environmental Science Performance Standards	ACT Science College Readiness Standards
d. Explain how biotic and abiotic factors influence populations.	
e. Describe interactions between individuals (i.e. mutualism, commensalisms, parasitism, predation, and competition).	
SEV4. Students will understand and describe availability, allocation and conservation of energy and other resources	
a. Differentiate between renewable and nonrenewable resources including how different resources are produced, rates of use, renewal rates, and limitations of sources. Distinguish between natural and produced resources.	
b. Describe how technology is increasing the efficiency of utilization and accessibility of resources.	
c. Describe how energy and other resource utilization impact the environment and recognize that individuals as well as larger entities (businesses, governments, etc.) have impact on energy efficiency.	
d. Describe the relationship of energy consumption and the living standards of societies.	
e. Describe the commonly used fuels (e.g. fossil fuels, nuclear fuels, etc.) and some alternative fuels (e.g. wind, solar, ethanol, etc.) including the required technology, availability, pollution problems and implementation problems. Recognize the origin of fossil fuels and the problems associated with our dependence on this energy source.	
f. Describe the need for informed decision making of resource utilization. (i.e. energy and water usage allocation, conservation, food and land, and long-term depletion)	
SEV5. Students will recognize that human beings are part of the global ecosystem and will evaluate the effects of human activities and technology on ecosystems.	
a. Describe factors affecting population growth of all organisms, including humans. Relate these to factors affecting growth rates and carrying capacity of the environment.	
b. Describe the effects of population growth, demographic transitions, cultural differences, emergent diseases, etc. on societal stability.	
c. Explain how human activities affect global and local sustainability.	
d. Describe the actual and potential effects of habitat destruction, erosion, and depletion of soil fertility associated with human activities.	
e. Describe the effects and potential implications of pollution and resource depletion on the environment at the local and global levels (e.g. air and water pollution, solid waste disposal, depletion of the stratospheric ozone, global warming, and land uses).	

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TABLE H

GEORGIA Environmental Science Performance Standards	ACT Science College Readiness Standards
f. Describe how political, legal, social, and economic decisions may affect global and local ecosystems.	

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TABLE I

GEORGIA Environmental Science Standards	ACT's WorkKeys Locating Information Level Skills
HABITS Of MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	
b. Demonstrate appropriate technique in all laboratory situations.	
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	
b. Develop procedures for solving scientific problems.	
c. Collect, organize and record appropriate data.	Fill in one or two pieces of information that are missing from a graphic
d. Graphically compare and analyze data points and/or summary statistics.	Compare information and trends from one or more complicated graphics
e. Develop reasonable conclusions based on data collected.	Draw conclusions based on one complicated graphic or several related graphics
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	Summarize information from one or more detailed graphics Identify trends shown in one or more detailed or complicated graphics Compare information and trends from one or more complicated graphics
SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	Fill in one or two pieces of information that are missing from a graphic
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	
a. Trace the source on any large disparity between estimated and calculated answers to problems.	

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TABLE I

GEORGIA Environmental Science Standards	ACT's WorkKeys Locating Information Level Skills
b. Consider possible effects of measurement errors on calculations.	
c. Recognize the relationship between accuracy and precision.	
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.	
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.	
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE Of SCIENCE	
SCSh7. Students analyze how scientific knowledge is developed. Students recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	

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TABLE I

GEORGIA Environmental Science Standards	ACT's WorkKeys Locating Information Level Skills
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in all curriculum areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	

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GEORGIA Environmental Science Standards	ACT's WorkKeys Locating Information Level Skills
CO-REQUISITE – CONTENT	
SEV1. Students will investigate the flow of energy and cycling of matter within an ecosystem and relate these phenomena to human society.	
a. Interpret biogeochemical cycles including hydrologic, nitrogen, phosphorus, oxygen, and carbon cycles. Recognize that energy is not recycled in ecosystems.	
b. Relate energy changes to food chains, food webs, and to trophic levels in a generalized ecosystem, recognizing that entropy is a primary factor in the loss of usable food energy during movement up the trophic levels.	
c. Relate food production and quality of nutrition to population growth and the trophic levels	
d. Relate the cycling of matter and the flow of energy to the Laws of Conservation of matter and energy. Identify the role and importance of decomposers in the recycling process.	
e. Distinguish between abiotic and biotic factors in an ecosystem and describe how matter and energy move between these.	
SEV2. Students will demonstrate an understanding that the Earth is one interconnected system.	
a. Describe how the abiotic components (water, air, and energy) affect the biosphere.	
b. Recognize and give examples of the hierarchy of the biological entities of the biosphere (organisms, populations, communities, ecosystems, and biosphere).	
c. Characterize the components that define a Biome. • Abiotic Factors – to include precipitation, temperature and soils. • Biotic Factors – plant and animal adaptations that create success in that biome.	
d. Characterize the components that define fresh-water and marine systems. • Abiotic Factors – to include light, dissolved oxygen, phosphorus, nitrogen, pH and substrate. • Biotic Factors – plant and animal adaptations characteristic to that system.	
SEV3. Students will describe stability and change in ecosystems.	
a. Describe interconnections between abiotic and biotic factors, including normal cyclic fluctuations and changes associated with climatic change (i.e. ice ages).	
b. Explain succession in terms of changes in communities through time to include changes in biomass, diversity, and complexity.	
c. Explain how succession may be altered by traumatic events.	

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TABLE I

GEORGIA Environmental Science Standards	ACT's WorkKeys Locating Information Level Skills
d. Explain how biotic and abiotic factors influence populations.	
e. Describe interactions between individuals (i.e. mutualism, commensalisms, parasitism, predation, and competition).	
SEV4. Students will understand and describe availability, allocation and conservation of energy and other resources	
a. Differentiate between renewable and nonrenewable resources including how different resources are produced, rates of use, renewal rates, and limitations of sources. Distinguish between natural and produced resources.	
b. Describe how technology is increasing the efficiency of utilization and accessibility of resources.	
c. Describe how energy and other resource utilization impact the environment and recognize that individuals as well as larger entities (businesses, governments, etc.) have impact on energy efficiency.	
d. Describe the relationship of energy consumption and the living standards of societies.	
e. Describe the commonly used fuels (e.g. fossil fuels, nuclear fuels, etc.) and some alternative fuels (e.g. wind, solar, ethanol, etc.) including the required technology, availability, pollution problems and implementation problems. Recognize the origin of fossil fuels and the problems associated with our dependence on this energy source.	
f. Describe the need for informed decision making of resource utilization. (i.e. energy and water usage allocation, conservation, food and land, and long-term depletion)	
SEV5. Students will recognize that human beings are part of the global ecosystem and will evaluate the effects of human activities and technology on ecosystems.	
a. Describe factors affecting population growth of all organisms, including humans. Relate these to factors affecting growth rates and carrying capacity of the environment.	
b. Describe the effects of population growth, demographic transitions, cultural differences, emergent diseases, etc. on societal stability.	
c. Explain how human activities affect global and local sustainability.	
d. Describe the actual and potential effects of habitat destruction, erosion, and depletion of soil fertility associated with human activities.	
e. Describe the effects and potential implications of pollution and resource depletion on the environment at the local and global levels (e.g. air and water pollution, solid waste disposal, depletion of the stratospheric ozone, global warming, and land uses).	

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TABLE I

GEORGIA Environmental Science Standards	ACT's WorkKeys Locating Information Level Skills
f. Describe how political, legal, social, and economic decisions may affect global and local ecosystems.	

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TABLE J

GEORGIA Physical Science Performance Standards	EXPLORE Science College Readiness Standards
HABITS Of MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	**Evaluation of Models, Inferences, and Experimental Results:** Identify similarities and differences between models
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	**Evaluation of Models, Inferences, and Experimental Results:** Identify strengths and weaknesses in one or more models Identify similarities and differences between models
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
b. Demonstrate appropriate techniques in all laboratory situations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
b. Develop procedures for solving scientific problems.	**Scientific Investigation:** Understand a simple experimental design
c. Collect, organize and record appropriate data.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram

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TABLE J

GEORGIA Physical Science Performance Standards	EXPLORE Science College Readiness Standards
d. Graphically compare and analyze data points and/or summary statistics.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
e. Develop reasonable conclusions based on data collected.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model

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GEORGIA Physical Science Performance Standards	EXPLORE Science College Readiness Standards
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model Select a simple hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
SCSh4. Students will use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	**Interpretation of Data:** Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	
a. Trace the source on any large disparity between estimated and calculated answers to problems.	
b. Consider possible effects of measurement errors on calculations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Recognize the relationship between accuracy and precision.	
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis, and/or simple algebraic formulas as appropriate.	**Interpretation of Data:** Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Identify and/or use a simple (e.g., linear) mathematical relationship between data
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.	

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TABLE J

GEORGIA Physical Science Performance Standards	EXPLORE Science College Readiness Standards
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	**Evaluation of Models, Inferences, and Experimental Results:** Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Determine which model(s) is(are) supported or weakened by new information Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE OF SCIENCE	
SCSh7. Students will analyze how scientific knowledge is developed. Students will recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	**Scientific Investigation:** Understand a simple experimental design Identify a control in an experiment
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	

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TABLE J

GEORGIA Physical Science Performance Standards	EXPLORE Science College Readiness Standards
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in All Curriculum Areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
CO-REQUISITE – CONTENT	
SPS1. Students will investigate our current understanding of the atom.	
a. Examine the structure of the atom in terms of • proton, electron, and neutron locations. • atomic mass and atomic number. • atoms with different numbers of neutrons (isotopes). • explain the relationship of the proton number to the element's identity.	
b. Compare and contrast ionic and covalent bonds in terms of electron movement.	

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GEORGIA Physical Science Performance Standards	EXPLORE Science College Readiness Standards
SPS2. Students will explore the nature of matter, its classifications, and its system for naming types of matter.	
a. Calculate density when given a means to determine a substance's mass and volume.	
b. Predict formulas for stable binary ionic compounds based on balance of charges.	
c. Use IUPAC nomenclature for transition between chemical names and chemical formulas of • binary ionic compounds (containing representative elements) • binary covalent compounds (i.e. carbon dioxide, carbon tetrachloride).	
d. Demonstrate the Law of Conservation of Matter in a chemical reaction.	
e. Apply the Law of Conservation of Matter by balancing the following types of chemical equations: • Synthesis • Decomposition • Single Replacement • Double Replacement	
SPS3. Students will distinguish the characteristics and components of radioactivity.	
a. Differentiate among alpha and beta particles and gamma radiation.	
b. Differentiate between fission and fusion.	
c. Explain the process half-life as related to radioactive decay.	
d. Describe nuclear energy, its practical application as an alternative energy source, and its potential problems.	
SPS4. Students will investigate the arrangement of the Periodic Table.	
a. Determine the trends of the following: • Number of valence electrons • Types of ions formed by representative elements • Location of metals, nonmetals, and metalloids • Phases at room temperature	
b. Use the Periodic Table to predict the above properties for representative elements.	
SPS5. Students will compare and contrast the phases of matter as they relate to atomic and molecular motion.	
a. Compare and contrast the atomic/molecular motion of solids, liquids, gases and plasmas.	
b. Relate temperature, pressure, and volume of gases to the behavior of gases.	

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GEORGIA Physical Science Performance Standards	EXPLORE Science College Readiness Standards
SPS6. Students will investigate the properties of solutions.	
a. Describe solutions in terms of • solute/solvent • conductivity • concentration	
b. Observe factors affecting the rate a solute dissolves in a specific solvent.	
c. Demonstrate that solubility is related to temperature by constructing a solubility curve.	
d. Compare and contrast the components and properties of acids and bases.	
e. Determine whether common household substances are acidic, basic, or neutral.	
SPS7. Students will relate transformations and flow of energy within a system.	
a. Identify energy transformations within a system (e.g. lighting of a match).	
b. Investigate molecular motion as it relates to thermal energy changes in terms of conduction, convection, and radiation.	
c. Determine the heat capacity of a substance using mass, specific heat, and temperature.	
d. Explain the flow of energy in phase changes through the use of a phase diagram.	
SPS8. Students will determine relationships among force, mass, and motion.	
a. Calculate velocity and acceleration.	
b. Apply Newton's three laws to everyday situations by explaining the following: • Inertia • Relationship between force, mass and acceleration • Equal and opposite forces	
c. Relate falling objects to gravitational force	
d. Explain the difference in mass and weight.	
e. Calculate amounts of work and mechanical advantage using simple machines.	
SPS9. Students will investigate the properties of waves.	
a. Recognize that all waves transfer energy.	
b. Relate frequency and wavelength to the energy of different types of electromagnetic waves and mechanical waves.	
c. Compare and contrast the characteristics of electromagnetic and mechanical (sound) waves.	
d. Investigate the phenomena of reflection, refraction, interference, and diffraction.	
e. Relate the speed of sound to different mediums.	

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TABLE J

GEORGIA Physical Science Performance Standards	EXPLORE Science College Readiness Standards
f. Explain the Doppler Effect in terms of everyday interactions.	
SPS10. Students will investigate the properties of electricity and magnetism.	
a. Investigate static electricity in terms of • friction • induction • conduction	
b. Explain the flow of electrons in terms of • alternating and direct current. • the relationship among voltage, resistance and current. • simple series and parallel circuits.	
c. Investigate applications of magnetism and/or its relationship to the movement of electrical charge as it relates to • electromagnets • simple motors • permanent magnets	

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TABLE K

GEORGIA Physical Science Performance Standards	PLAN Science College Readiness Standards
HABITS Of MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	**Evaluation of Models, Inferences, and Experimental Results:** Identify similarities and differences between models
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	**Evaluation of Models, Inferences, and Experimental Results:** Identify strengths and weaknesses in one or more models Identify similarities and differences between models
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
b. Demonstrate appropriate techniques in all laboratory situations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
b. Develop procedures for solving scientific problems.	**Scientific Investigation:** Understand a simple experimental design
c. Collect, organize and record appropriate data.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram

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TABLE K

GEORGIA Physical Science Performance Standards	PLAN Science College Readiness Standards
d. Graphically compare and analyze data points and/or summary statistics.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
e. Develop reasonable conclusions based on data collected.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model

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TABLE K

GEORGIA Physical Science Performance Standards	PLAN Science College Readiness Standards
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model Select a simple hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
SCSh4. Students will use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	**Interpretation of Data:** Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	
a. Trace the source on any large disparity between estimated and calculated answers to problems.	
b. Consider possible effects of measurement errors on calculations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Recognize the relationship between accuracy and precision.	
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis, and/or simple algebraic formulas as appropriate.	**Interpretation of Data:** Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Identify and/or use a simple (e.g., linear) mathematical relationship between data Identify and/or use a complex (e.g., nonlinear) mathematical relationship between data
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.	

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TABLE K

GEORGIA Physical Science Performance Standards	PLAN Science College Readiness Standards
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	**Evaluation of Models, Inferences, and Experimental Results:** Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Determine which model(s) is(are) supported or weakened by new information Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE OF SCIENCE	
SCSh7. Students will analyze how scientific knowledge is developed. Students will recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	**Scientific Investigation:** Understand a simple experimental design Identify a control in an experiment
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	

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TABLE K

GEORGIA Physical Science Performance Standards	PLAN Science College Readiness Standards
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in All Curriculum Areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
CO-REQUISITE – CONTENT	
SPS1. Students will investigate our current understanding of the atom.	
a. Examine the structure of the atom in terms of • proton, electron, and neutron locations. • atomic mass and atomic number. • atoms with different numbers of neutrons (isotopes). • explain the relationship of the proton number to the element's identity.	
b. Compare and contrast ionic and covalent bonds in terms of electron movement.	

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TABLE K

GEORGIA Physical Science Performance Standards	PLAN Science College Readiness Standards
SPS2. Students will explore the nature of matter, its classifications, and its system for naming types of matter.	
a. Calculate density when given a means to determine a substance's mass and volume.	
b. Predict formulas for stable binary ionic compounds based on balance of charges.	
c. Use IUPAC nomenclature for transition between chemical names and chemical formulas of • binary ionic compounds (containing representative elements) • binary covalent compounds (i.e. carbon dioxide, carbon tetrachloride).	
d. Demonstrate the Law of Conservation of Matter in a chemical reaction.	
e. Apply the Law of Conservation of Matter by balancing the following types of chemical equations: • Synthesis • Decomposition • Single Replacement • Double Replacement	
SPS3. Students will distinguish the characteristics and components of radioactivity.	
a. Differentiate among alpha and beta particles and gamma radiation.	
b. Differentiate between fission and fusion.	
c. Explain the process half-life as related to radioactive decay.	
d. Describe nuclear energy, its practical application as an alternative energy source, and its potential problems.	
SPS4. Students will investigate the arrangement of the Periodic Table.	
a. Determine the trends of the following: • Number of valence electrons • Types of ions formed by representative elements • Location of metals, nonmetals, and metalloids • Phases at room temperature	
b. Use the Periodic Table to predict the above properties for representative elements.	
SPS5. Students will compare and contrast the phases of matter as they relate to atomic and molecular motion.	
a. Compare and contrast the atomic/molecular motion of solids, liquids, gases and plasmas.	
b. Relate temperature, pressure, and volume of gases to the behavior of gases.	

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TABLE K

GEORGIA Physical Science Performance Standards	PLAN Science College Readiness Standards
SPS6. Students will investigate the properties of solutions.	
a. Describe solutions in terms of • solute/solvent • conductivity • concentration	
b. Observe factors affecting the rate a solute dissolves in a specific solvent.	
c. Demonstrate that solubility is related to temperature by constructing a solubility curve.	
d. Compare and contrast the components and properties of acids and bases.	
e. Determine whether common household substances are acidic, basic, or neutral.	
SPS7. Students will relate transformations and flow of energy within a system.	
a. Identify energy transformations within a system (e.g. lighting of a match).	
b. Investigate molecular motion as it relates to thermal energy changes in terms of conduction, convection, and radiation.	
c. Determine the heat capacity of a substance using mass, specific heat, and temperature.	
d. Explain the flow of energy in phase changes through the use of a phase diagram.	
SPS8. Students will determine relationships among force, mass, and motion.	
a. Calculate velocity and acceleration.	
b. Apply Newton's three laws to everyday situations by explaining the following: • Inertia • Relationship between force, mass and acceleration • Equal and opposite forces	
c. Relate falling objects to gravitational force	
d. Explain the difference in mass and weight.	
e. Calculate amounts of work and mechanical advantage using simple machines.	
SPS9. Students will investigate the properties of waves.	
a. Recognize that all waves transfer energy.	
b. Relate frequency and wavelength to the energy of different types of electromagnetic waves and mechanical waves.	
c. Compare and contrast the characteristics of electromagnetic and mechanical (sound) waves.	
d. Investigate the phenomena of reflection, refraction, interference, and diffraction.	
e. Relate the speed of sound to different mediums.	

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TABLE K

GEORGIA Physical Science Performance Standards	PLAN Science College Readiness Standards
f. Explain the Doppler Effect in terms of everyday interactions.	
SPS10. Students will investigate the properties of electricity and magnetism.	
a. Investigate static electricity in terms of • friction • induction • conduction	
b. Explain the flow of electrons in terms of • alternating and direct current. • the relationship among voltage, resistance and current. • simple series and parallel circuits.	
c. Investigate applications of magnetism and/or its relationship to the movement of electrical charge as it relates to • electromagnets • simple motors • permanent magnets	

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TABLE L

GEORGIA Physical Science Performance Standards	ACT Science College Readiness Standards
HABITS Of MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	**Evaluation of Models, Inferences, and Experimental Results:** Identify similarities and differences between models
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	**Scientific Investigation:** Identify an additional trial or experiment that could be performed to enhance or evaluate experimental results **Evaluation of Models, Inferences, and Experimental Results:** Identify strengths and weaknesses in one or more models Identify similarities and differences between models
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
b. Demonstrate appropriate techniques in all laboratory situations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
b. Develop procedures for solving scientific problems.	**Scientific Investigation:** Understand a simple experimental design
c. Collect, organize and record appropriate data.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table)

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TABLE L

GEORGIA Physical Science Performance Standards	ACT Science College Readiness Standards
	Translate information into a table, graph, or diagram
d. Graphically compare and analyze data points and/or summary statistics.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
e. Develop reasonable conclusions based on data collected.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design

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TABLE L

GEORGIA Physical Science Performance Standards	ACT Science College Readiness Standards
	Evaluation of Models, Inferences, and Experimental Results: Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model Select a simple hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
SCSh4. Students will use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	**Interpretation of Data:** Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	
a. Trace the source on any large disparity between estimated and calculated answers to problems.	**Scientific Investigation:** Understand precision and accuracy issues
b. Consider possible effects of measurement errors on calculations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Recognize the relationship between accuracy and precision.	**Scientific Investigation:** Understand precision and accuracy issues
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis, and/or simple algebraic formulas as appropriate.	**Interpretation of Data:** Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Identify and/or use a simple (e.g., linear) mathematical relationship between data Identify and/or use a complex (e.g., nonlinear) mathematical relationship between data

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TABLE L

GEORGIA Physical Science Performance Standards	ACT Science College Readiness Standards
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.	
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	**Evaluation of Models, Inferences, and Experimental Results:** Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Determine which model(s) is(are) supported or weakened by new information Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE OF SCIENCE	
SCSh7. Students will analyze how scientific knowledge is developed. Students will recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	**Scientific Investigation:** Understand a simple experimental design Identify a control in an experiment
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	

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TABLE L

GEORGIA Physical Science Performance Standards	ACT Science College Readiness Standards
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in All Curriculum Areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text

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TABLE L

GEORGIA Physical Science Performance Standards	ACT Science College Readiness Standards
CO-REQUISITE – CONTENT	
SPS1. Students will investigate our current understanding of the atom.	
a. Examine the structure of the atom in terms of • proton, electron, and neutron locations. • atomic mass and atomic number. • atoms with different numbers of neutrons (isotopes). • explain the relationship of the proton number to the element's identity.	
b. Compare and contrast ionic and covalent bonds in terms of electron movement.	
SPS2. Students will explore the nature of matter, its classifications, and its system for naming types of matter.	
a. Calculate density when given a means to determine a substance's mass and volume.	
b. Predict formulas for stable binary ionic compounds based on balance of charges.	
c. Use IUPAC nomenclature for transition between chemical names and chemical formulas of • binary ionic compounds (containing representative elements) • binary covalent compounds (i.e. carbon dioxide, carbon tetrachloride).	
d. Demonstrate the Law of Conservation of Matter in a chemical reaction.	
e. Apply the Law of Conservation of Matter by balancing the following types of chemical equations: • Synthesis • Decomposition • Single Replacement • Double Replacement	
SPS3. Students will distinguish the characteristics and components of radioactivity.	
a. Differentiate among alpha and beta particles and gamma radiation.	
b. Differentiate between fission and fusion.	
c. Explain the process half-life as related to radioactive decay.	
d. Describe nuclear energy, its practical application as an alternative energy source, and its potential problems.	

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TABLE L

GEORGIA Physical Science Performance Standards	ACT Science College Readiness Standards
SPS4. Students will investigate the arrangement of the Periodic Table.	
a. Determine the trends of the following: • Number of valence electrons • Types of ions formed by representative elements • Location of metals, nonmetals, and metalloids • Phases at room temperature	
b. Use the Periodic Table to predict the above properties for representative elements.	
SPS5. Students will compare and contrast the phases of matter as they relate to atomic and molecular motion.	
a. Compare and contrast the atomic/molecular motion of solids, liquids, gases and plasmas.	
b. Relate temperature, pressure, and volume of gases to the behavior of gases.	
SPS6. Students will investigate the properties of solutions.	
a. Describe solutions in terms of • solute/solvent • conductivity • concentration	
b. Observe factors affecting the rate a solute dissolves in a specific solvent.	
c. Demonstrate that solubility is related to temperature by constructing a solubility curve.	
d. Compare and contrast the components and properties of acids and bases.	
e. Determine whether common household substances are acidic, basic, or neutral.	
SPS7. Students will relate transformations and flow of energy within a system.	
a. Identify energy transformations within a system (e.g. lighting of a match).	
b. Investigate molecular motion as it relates to thermal energy changes in terms of conduction, convection, and radiation.	
c. Determine the heat capacity of a substance using mass, specific heat, and temperature.	
d. Explain the flow of energy in phase changes through the use of a phase diagram.	
SPS8. Students will determine relationships among force, mass, and motion.	
a. Calculate velocity and acceleration.	

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TABLE L

GEORGIA Physical Science Performance Standards	ACT Science College Readiness Standards
b. Apply Newton's three laws to everyday situations by explaining the following: • Inertia • Relationship between force, mass and acceleration • Equal and opposite forces	
c. Relate falling objects to gravitational force	
d. Explain the difference in mass and weight.	
e. Calculate amounts of work and mechanical advantage using simple machines.	
SPS9. Students will investigate the properties of waves.	
a. Recognize that all waves transfer energy.	
b. Relate frequency and wavelength to the energy of different types of electromagnetic waves and mechanical waves.	
c. Compare and contrast the characteristics of electromagnetic and mechanical (sound) waves.	
d. Investigate the phenomena of reflection, refraction, interference, and diffraction.	
e. Relate the speed of sound to different mediums.	
f. Explain the Doppler Effect in terms of everyday interactions.	
SPS10. Students will investigate the properties of electricity and magnetism.	
a. Investigate static electricity in terms of • friction • induction • conduction	
b. Explain the flow of electrons in terms of • alternating and direct current. • the relationship among voltage, resistance and current. • simple series and parallel circuits.	
c. Investigate applications of magnetism and/or its relationship to the movement of electrical charge as it relates to • electromagnets • simple motors • permanent magnets	

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TABLE M

GEORGIA Physical Science Standards	ACT's WorkKeys Locating Information Level Skills
HABITS Of MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	
b. Demonstrate appropriate techniques in all laboratory situations.	
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	
b. Develop procedures for solving scientific problems.	
c. Collect, organize and record appropriate data.	Fill in one or two pieces of information that are missing from a graphic
d. Graphically compare and analyze data points and/or summary statistics.	Compare information and trends from one or more complicated graphics
e. Develop reasonable conclusions based on data collected.	Draw conclusions based on one complicated graphic or several related graphics
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	Summarize information from one or more detailed graphics Identify trends shown in one or more detailed or complicated graphics Compare information and trends from one or more complicated graphics
SCSh4 Students will use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	Fill in one or two pieces of information that are missing from a graphic
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	Summarize information from one or more detailed graphics Identify trends shown in one or more detailed or complicated graphics Compare information and trends from one or more complicated graphics
a. Trace the source on any large disparity between estimated and calculated answers to problems.	

= Measured by WorkKeys Locating Information Test
_____ = Content sampled by WorkKeys Locating Information Test

TABLE M

GEORGIA Physical Science Standards	ACT's WorkKeys Locating Information Level Skills
b. Consider possible effects of measurement errors on calculations.	
c. Recognize the relationship between accuracy and precision.	
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis, and/or simple algebraic formulas as appropriate.	
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.	
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE OF SCIENCE	
SCSh7. Students will analyze how scientific knowledge is developed. Students will recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	

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TABLE M

GEORGIA Physical Science Standards	ACT's WorkKeys Locating Information Level Skills
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in All Curriculum Areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	

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TABLE M

GEORGIA Physical Science Standards	ACT's WorkKeys Locating Information Level Skills
CO-REQUISITE – CONTENT	
SPS1. Students will investigate our current understanding of the atom.	
a. Examine the structure of the atom in terms of • proton, electron, and neutron locations. • atomic mass and atomic number. • atoms with different numbers of neutrons (isotopes). • explain the relationship of the proton number to the element's identity.	
b. Compare and contrast ionic and covalent bonds in terms of electron movement.	
SPS2. Students will explore the nature of matter, its classifications, and its system for naming types of matter.	
a. Calculate density when given a means to determine a substance's mass and volume.	
b. Predict formulas for stable binary ionic compounds based on balance of charges.	
c. Use IUPAC nomenclature for transition between chemical names and chemical formulas of • binary ionic compounds (containing representative elements) • binary covalent compounds (i.e. carbon dioxide, carbon tetrachloride).	
d. Demonstrate the Law of Conservation of Matter in a chemical reaction.	
e. Apply the Law of Conservation of Matter by balancing the following types of chemical equations: • Synthesis • Decomposition • Single Replacement • Double Replacement	
SPS3. Students will distinguish the characteristics and components of radioactivity.	
a. Differentiate among alpha and beta particles and gamma radiation.	
b. Differentiate between fission and fusion.	
c. Explain the process half-life as related to radioactive decay.	
d. Describe nuclear energy, its practical application as an alternative energy source, and its potential problems.	

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GEORGIA Physical Science Standards	ACT's WorkKeys Locating Information Level Skills
SPS4. Students will investigate the arrangement of the Periodic Table.	
a. Determine the trends of the following: • Number of valence electrons • Types of ions formed by representative elements • Location of metals, nonmetals, and metalloids • Phases at room temperature	Identify trends shown in one or more detailed or complicated graphics
b. Use the Periodic Table to predict the above properties for representative elements.	Apply information from one or more complicated graphics to specific situations
SPS5. Students will compare and contrast the phases of matter as they relate to atomic and molecular motion.	
a. Compare and contrast the atomic/molecular motion of solids, liquids, gases and plasmas.	
b. Relate temperature, pressure, and volume of gases to the behavior of gases.	
SPS6. Students will investigate the properties of solutions.	
a. Describe solutions in terms of • solute/solvent • conductivity • concentration	
b. Observe factors affecting the rate a solute dissolves in a specific solvent.	
c. Demonstrate that solubility is related to temperature by constructing a solubility curve.	
d. Compare and contrast the components and properties of acids and bases.	
e. Determine whether common household substances are acidic, basic, or neutral.	
SPS7. Students will relate transformations and flow of energy within a system.	
a. Identify energy transformations within a system (e.g. lighting of a match).	
b. Investigate molecular motion as it relates to thermal energy changes in terms of conduction, convection, and radiation.	
c. Determine the heat capacity of a substance using mass, specific heat, and temperature.	
d. Explain the flow of energy in phase changes through the use of a phase diagram.	
SPS8. Students will determine relationships among force, mass, and motion.	
a. Calculate velocity and acceleration.	

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GEORGIA Physical Science Standards	ACT's WorkKeys Locating Information Level Skills
b. Apply Newton's three laws to everyday situations by explaining the following: • Inertia • Relationship between force, mass and acceleration • Equal and opposite forces	
c. Relate falling objects to gravitational force	
d. Explain the difference in mass and weight.	
e. Calculate amounts of work and mechanical advantage using simple machines.	
SPS9. Students will investigate the properties of waves.	
a. Recognize that all waves transfer energy.	
b. Relate frequency and wavelength to the energy of different types of electromagnetic waves and mechanical waves.	
c. Compare and contrast the characteristics of electromagnetic and mechanical (sound) waves.	
d. Investigate the phenomena of reflection, refraction, interference, and diffraction.	
e. Relate the speed of sound to different mediums.	
f. Explain the Doppler Effect in terms of everyday interactions.	
SPS10. Students will investigate the properties of electricity and magnetism.	
a. Investigate static electricity in terms of • friction • induction • conduction	
b. Explain the flow of electrons in terms of • alternating and direct current. • the relationship among voltage, resistance and current. • simple series and parallel circuits.	
c. Investigate applications of magnetism and/or its relationship to the movement of electrical charge as it relates to • electromagnets • simple motors • permanent magnets	

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TABLE N

GEORGIA Earth Systems Performance Standards	EXPLORE Science College Readiness Standards
HABITS OF MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	**Evaluation of Models, Inferences, and Experimental Results:** Identify similarities and differences between models
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	**Evaluation of Models, Inferences, and Experimental Results:** Identify strengths and weaknesses in one or more models Identify similarities and differences between models
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
b. Demonstrate appropriate technique in all laboratory situations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
b. Develop procedures for solving scientific problems.	**Scientific Investigation:** Understand a simple experimental design
c. Collect, organize and record appropriate data.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram

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GEORGIA Earth Systems Performance Standards	EXPLORE Science College Readiness Standards
d. Graphically compare and analyze data points and/or summary statistics.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
e. Develop reasonable conclusions based on data collected.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model

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GEORGIA Earth Systems Performance Standards	EXPLORE Science College Readiness Standards
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model Select a simple hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	**Interpretation of Data:** Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	
a. Trace the source on any large disparity between estimated and calculated answers to problems.	
b. Consider possible effects of measurement errors on calculations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Recognize the relationship between accuracy and precision.	
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.	**Interpretation of Data:** Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Identify and/or use a simple (e.g., linear) mathematical relationship between data
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.	

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GEORGIA Earth Systems Performance Standards	EXPLORE Science College Readiness Standards
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	**Evaluation of Models, Inferences, and Experimental Results:** Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Determine which model(s) is(are) supported or weakened by new information Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE OF SCIENCE	
SCSh7. Students analyze how scientific knowledge is developed. Students recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	**Scientific Investigation:** Understand a simple experimental design Identify a control in an experiment
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	

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GEORGIA Earth Systems Performance Standards	EXPLORE Science College Readiness Standards
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in All Curriculum Areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
CO-REQUISITE – CONTENT	
SES1. Students will investigate the composition and formation of Earth systems, including the Earth's relationship to the solar system.	
a. Describe the early evolution of the Earth and solar system, including the formation of Earth's solid layers (core, mantle, crust), the distribution of major elements, the origin of internal heat sources, and the mechanism by which heat transfer drives plate tectonics.	
b. Explain how the composition of the Earth's crust, mantle and core is determined and compare it to that of other solar system objects.	

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TABLE N

GEORGIA Earth Systems Performance Standards	EXPLORE Science College Readiness Standards
c. Describe how the decay of radioactive isotopes is used to determine the age of rocks, Earth, and solar system.	
d. Describe how the Earth acquired its initial oceans and atmosphere.	
e. Identify the transformations and major reservoirs that make up the rock cycle, hydrologic cycle, carbon cycle, and other important geochemical cycles.	
SES2. Students will understand how plate tectonics creates certain geologic features, materials, and hazards.	
a. Distinguish among types of plate tectonic settings produced by plates diverging, converging, and sliding past each other.	
b. Relate modern and ancient geologic features to each kind of plate tectonic setting.	
c. Relate certain geologic hazards to specific plate tectonic settings.	
d. Associate specific plate tectonic settings with the production of particular groups of igneous and metamorphic rocks and mineral resources.	
e. Explain how plate tectonics creates and destroys sedimentary basins through time.	
SES3. Students will explore the actions of water, wind, ice, and gravity that create landforms and systems of landforms (landscapes).	
a. Describe how surface water and groundwater act as the major agents of physical and chemical weathering.	
b. Explain how soil results from weathering and biological processes acting on parent rock.	
c. Describe the processes and hazards associated with both sudden and gradual mass wasting.	
d. Relate the past and present actions of ice, wind, and water to landform distribution and landscape evolution.	
e. Explain the processes that transport and deposit material in terrestrial and marine sedimentary basins, which result, over time, in sedimentary rock.	
SES4. Students will understand how rock relationships and fossils are used to reconstruct the Earth's past.	
a. Describe and apply principles of relative age (superposition, original horizontality, cross-cutting relations, and original lateral continuity) and describe how unconformities form.	
b. Interpret the geologic history of a succession of rocks and unconformities.	
c. Apply the principle of uniformitarianism to relate sedimentary rock associations and their fossils to the environments in which the rocks were deposited.	
d. Explain how sedimentary rock units are correlated within and across regions by a variety of methods (e.g., geologic map relationships, the principle of fossil succession, radiometric dating, and paleomagnetism).	

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GEORGIA Earth Systems Performance Standards	EXPLORE Science College Readiness Standards
e. Use geologic maps and stratigraphic relationships to interpret major events in Earth history (e.g., mass extinction, major climatic change, tectonic events).	
SES5. Students will investigate the interaction of insolation and Earth systems to produce weather and climate.	
a. Explain how latitudinal variations in solar heating create atmospheric and ocean currents that redistribute heat globally.	
b. Explain the relationship between air masses and the surfaces over which they form.	
c. Relate weather patterns to interactions among ocean currents, air masses, and topography.	
d. Describe how temperature and precipitation produce the pattern of climate regions (classes) on Earth.	
e. Describe the hazards associated with extreme weather events and climate change (e.g., hurricanes, tornadoes, El Niño/La Niña, global warming).	
f. Relate changes in global climate to variation in Earth/Sun relationships and to natural and anthropogenic modification of atmospheric composition.	
SES6. Students will explain how life on Earth responds to and shapes Earth systems.	
a. Relate the nature and distribution of life on Earth, including humans, to the chemistry and availability of water.	
b. Relate the distribution of biomes (terrestrial, freshwater, and marine) to climate regions through time.	
c. Explain how geological and ecological processes interact through time to cycle matter and energy, and how human activity alters the rates of these processes (e.g., fossil fuel formation and combustion).	
d. Describe how fossils provide a record of shared ancestry, evolution, and extinction that is best explained by the mechanism of natural selection.	
e. Identify the evolutionary innovations that most profoundly shaped Earth systems: photosynthetic prokaryotes and the atmosphere; multicellular animals and marine environments; land plants and terrestrial environments.	

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GEORGIA Earth Systems Performance Standards	PLAN Science College Readiness Standards
HABITS OF MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	**Evaluation of Models, Inferences, and Experimental Results:** Identify similarities and differences between models
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SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
b. Demonstrate appropriate technique in all laboratory situations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
b. Develop procedures for solving scientific problems.	**Scientific Investigation:** Understand a simple experimental design
c. Collect, organize and record appropriate data.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram

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GEORGIA Earth Systems Performance Standards	PLAN Science College Readiness Standards
d. Graphically compare and analyze data points and/or summary statistics.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
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GEORGIA Earth Systems Performance Standards	PLAN Science College Readiness Standards
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a. Develop and use systematic procedures for recording and organizing information.	**Interpretation of Data:** Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram
b. Use technology to produce tables and graphs.	
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SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	
a. Trace the source on any large disparity between estimated and calculated answers to problems.	
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c. Recognize the relationship between accuracy and precision.	
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.	**Interpretation of Data:** Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Identify and/or use a simple (e.g., linear) mathematical relationship between data Identify and/or use a complex (e.g., nonlinear) mathematical relationship between data
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	

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GEORGIA Earth Systems Performance Standards	PLAN Science College Readiness Standards
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.	
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	**Evaluation of Models, Inferences, and Experimental Results:** Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Determine which model(s) is(are) supported or weakened by new information Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE OF SCIENCE	
SCSh7. Students analyze how scientific knowledge is developed. Students recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	**Scientific Investigation:** Understand a simple experimental design Identify a control in an experiment
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	
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SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in All Curriculum Areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
CO-REQUISITE – CONTENT	
SES1. Students will investigate the composition and formation of Earth systems, including the Earth's relationship to the solar system.	
a. Describe the early evolution of the Earth and solar system, including the formation of Earth's solid layers (core, mantle, crust), the distribution of major elements, the origin of internal heat sources, and the mechanism by which heat transfer drives plate tectonics.	

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_____ = Content sampled by PLAN Science Test

TABLE O

GEORGIA Earth Systems Performance Standards	PLAN Science College Readiness Standards
b. Explain how the composition of the Earth's crust, mantle and core is determined and compare it to that of other solar system objects.	
c. Describe how the decay of radioactive isotopes is used to determine the age of rocks, Earth, and solar system.	
d. Describe how the Earth acquired its initial oceans and atmosphere.	
e. Identify the transformations and major reservoirs that make up the rock cycle, hydrologic cycle, carbon cycle, and other important geochemical cycles.	
SES2. Students will understand how plate tectonics creates certain geologic features, materials, and hazards.	
a. Distinguish among types of plate tectonic settings produced by plates diverging, converging, and sliding past each other.	
b. Relate modern and ancient geologic features to each kind of plate tectonic setting.	
c. Relate certain geologic hazards to specific plate tectonic settings.	
d. Associate specific plate tectonic settings with the production of particular groups of igneous and metamorphic rocks and mineral resources.	
e. Explain how plate tectonics creates and destroys sedimentary basins through time.	
SES3. Students will explore the actions of water, wind, ice, and gravity that create landforms and systems of landforms (landscapes).	
a. Describe how surface water and groundwater act as the major agents of physical and chemical weathering.	
b. Explain how soil results from weathering and biological processes acting on parent rock.	
c. Describe the processes and hazards associated with both sudden and gradual mass wasting.	
d. Relate the past and present actions of ice, wind, and water to landform distribution and landscape evolution.	
e. Explain the processes that transport and deposit material in terrestrial and marine sedimentary basins, which result, over time, in sedimentary rock.	
SES4. Students will understand how rock relationships and fossils are used to reconstruct the Earth's past.	
a. Describe and apply principles of relative age (superposition, original horizontality, cross-cutting relations, and original lateral continuity) and describe how unconformities form.	
b. Interpret the geologic history of a succession of rocks and unconformities.	
c. Apply the principle of uniformitarianism to relate sedimentary rock associations and their fossils to the environments in which the rocks were deposited.	

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TABLE O

GEORGIA Earth Systems Performance Standards	PLAN Science College Readiness Standards
d. Explain how sedimentary rock units are correlated within and across regions by a variety of methods (e.g., geologic map relationships, the principle of fossil succession, radiometric dating, and paleomagnetism).	
e. Use geologic maps and stratigraphic relationships to interpret major events in Earth history (e.g., mass extinction, major climatic change, tectonic events).	
SES5. Students will investigate the interaction of insolation and Earth systems to produce weather and climate.	
a. Explain how latitudinal variations in solar heating create atmospheric and ocean currents that redistribute heat globally.	
b. Explain the relationship between air masses and the surfaces over which they form.	
c. Relate weather patterns to interactions among ocean currents, air masses, and topography.	
d. Describe how temperature and precipitation produce the pattern of climate regions (classes) on Earth.	
e. Describe the hazards associated with extreme weather events and climate change (e.g., hurricanes, tornadoes, El Niño/La Niña, global warming).	
f. Relate changes in global climate to variation in Earth/Sun relationships and to natural and anthropogenic modification of atmospheric composition.	
SES6. Students will explain how life on Earth responds to and shapes Earth systems.	
a. Relate the nature and distribution of life on Earth, including humans, to the chemistry and availability of water.	
b. Relate the distribution of biomes (terrestrial, freshwater, and marine) to climate regions through time.	
c. Explain how geological and ecological processes interact through time to cycle matter and energy, and how human activity alters the rates of these processes (e.g., fossil fuel formation and combustion).	
d. Describe how fossils provide a record of shared ancestry, evolution, and extinction that is best explained by the mechanism of natural selection.	
e. Identify the evolutionary innovations that most profoundly shaped Earth systems: photosynthetic prokaryotes and the atmosphere; multicellular animals and marine environments; land plants and terrestrial environments.	

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TABLE P

GEORGIA Earth Systems Performance Standards	ACT Science College Readiness Standards
HABITS OF MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	**Evaluation of Models, Inferences, and Experimental Results:** Identify similarities and differences between models
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	**Scientific Investigation:** Identify an additional trial or experiment that could be performed to enhance or evaluate experimental results **Evaluation of Models, Inferences, and Experimental Results:** Identify strengths and weaknesses in one or more models Identify similarities and differences between models
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
b. Demonstrate appropriate technique in all laboratory situations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
b. Develop procedures for solving scientific problems.	**Scientific Investigation:** Understand a simple experimental design
c. Collect, organize and record appropriate data.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table)

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TABLE P

GEORGIA Earth Systems Performance Standards	ACT Science College Readiness Standards
	Translate information into a table, graph, or diagram
d. Graphically compare and analyze data points and/or summary statistics.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
e. Develop reasonable conclusions based on data collected.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design

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TABLE P

GEORGIA Earth Systems Performance Standards	ACT Science College Readiness Standards
	Evaluation of Models, Inferences, and Experimental Results: Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model Select a simple hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	**Interpretation of Data:** Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh4. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	
a. Trace the source on any large disparity between estimated and calculated answers to problems.	**Scientific Investigation:** Understand precision and accuracy issues
b. Consider possible effects of measurement errors on calculations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Recognize the relationship between accuracy and precision.	**Scientific Investigation:** Understand precision and accuracy issues
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.	**Interpretation of Data:** Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Identify and/or use a simple (e.g., linear) mathematical relationship between data Identify and/or use a complex (e.g., nonlinear) mathematical relationship between data

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TABLE P

GEORGIA Earth Systems Performance Standards	ACT Science College Readiness Standards
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.	
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	**Evaluation of Models, Inferences, and Experimental Results:** Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Determine which model(s) is(are) supported or weakened by new information Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE OF SCIENCE	
SCSh7. Students analyze how scientific knowledge is developed. Students recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	**Scientific Investigation:** Understand a simple experimental design Identify a control in an experiment
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	

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TABLE P

GEORGIA Earth Systems Performance Standards	ACT Science College Readiness Standards
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in All Curriculum Areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text

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TABLE P

GEORGIA Earth Systems Performance Standards	ACT Science College Readiness Standards
CO-REQUISITE – CONTENT	
SES1. Students will investigate the composition and formation of Earth systems, including the Earth's relationship to the solar system.	
a. Describe the early evolution of the Earth and solar system, including the formation of Earth's solid layers (core, mantle, crust), the distribution of major elements, the origin of internal heat sources, and the mechanism by which heat transfer drives plate tectonics.	
b. Explain how the composition of the Earth's crust, mantle and core is determined and compare it to that of other solar system objects.	
c. Describe how the decay of radioactive isotopes is used to determine the age of rocks, Earth, and solar system.	
d. Describe how the Earth acquired its initial oceans and atmosphere.	
e. Identify the transformations and major reservoirs that make up the rock cycle, hydrologic cycle, carbon cycle, and other important geochemical cycles.	
SES2. Students will understand how plate tectonics creates certain geologic features, materials, and hazards.	
a. Distinguish among types of plate tectonic settings produced by plates diverging, converging, and sliding past each other.	
b. Relate modern and ancient geologic features to each kind of plate tectonic setting.	
c. Relate certain geologic hazards to specific plate tectonic settings.	
d. Associate specific plate tectonic settings with the production of particular groups of igneous and metamorphic rocks and mineral resources.	
e. Explain how plate tectonics creates and destroys sedimentary basins through time.	
SES3. Students will explore the actions of water, wind, ice, and gravity that create landforms and systems of landforms (landscapes).	
a. Describe how surface water and groundwater act as the major agents of physical and chemical weathering.	
b. Explain how soil results from weathering and biological processes acting on parent rock.	
c. Describe the processes and hazards associated with both sudden and gradual mass wasting.	
d. Relate the past and present actions of ice, wind, and water to landform distribution and landscape evolution.	
e. Explain the processes that transport and deposit material in terrestrial and marine sedimentary basins, which result, over time, in sedimentary rock.	

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TABLE P

GEORGIA Earth Systems Performance Standards	ACT Science College Readiness Standards
SES4. Students will understand how rock relationships and fossils are used to reconstruct the Earth's past.	
a. Describe and apply principles of relative age (superposition, original horizontality, cross-cutting relations, and original lateral continuity) and describe how unconformities form.	
b. Interpret the geologic history of a succession of rocks and unconformities.	
c. Apply the principle of uniformitarianism to relate sedimentary rock associations and their fossils to the environments in which the rocks were deposited.	
d. Explain how sedimentary rock units are correlated within and across regions by a variety of methods (e.g., geologic map relationships, the principle of fossil succession, radiometric dating, and paleomagnetism).	
e. Use geologic maps and stratigraphic relationships to interpret major events in Earth history (e.g., mass extinction, major climatic change, tectonic events).	
SES5. Students will investigate the interaction of insolation and Earth systems to produce weather and climate.	
a. Explain how latitudinal variations in solar heating create atmospheric and ocean currents that redistribute heat globally.	
b. Explain the relationship between air masses and the surfaces over which they form.	
c. Relate weather patterns to interactions among ocean currents, air masses, and topography.	
d. Describe how temperature and precipitation produce the pattern of climate regions (classes) on Earth.	
e. Describe the hazards associated with extreme weather events and climate change (e.g., hurricanes, tornadoes, El Niño/La Niña, global warming).	
f. Relate changes in global climate to variation in Earth/Sun relationships and to natural and anthropogenic modification of atmospheric composition.	
SES6. Students will explain how life on Earth responds to and shapes Earth systems.	
a. Relate the nature and distribution of life on Earth, including humans, to the chemistry and availability of water.	
b. Relate the distribution of biomes (terrestrial, freshwater, and marine) to climate regions through time.	
c. Explain how geological and ecological processes interact through time to cycle matter and energy, and how human activity alters the rates of these processes (e.g., fossil fuel formation and combustion).	
d. Describe how fossils provide a record of shared ancestry, evolution, and extinction that is best explained by the mechanism of natural selection.	

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TABLE P

GEORGIA Earth Systems Performance Standards	ACT Science College Readiness Standards
e. Identify the evolutionary innovations that most profoundly shaped Earth systems: photosynthetic prokaryotes and the atmosphere; multicellular animals and marine environments; land plants and terrestrial environments.	

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TABLE Q

GEORGIA Earth Systems Standards	ACT's WorkKeys Locating Information Level Skills
HABITS OF MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	
b. Demonstrate appropriate technique in all laboratory situations.	
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	
b. Develop procedures for solving scientific problems.	
c. Collect, organize and record appropriate data.	Fill in one or two pieces of information that are missing from a graphic
d. Graphically compare and analyze data points and/or summary statistics.	Compare information and trends from one or more complicated graphics
e. Develop reasonable conclusions based on data collected.	Draw conclusions based on one complicated graphic or several related graphics
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	Summarize information from one or more detailed graphics Identify trends shown in one or more detailed or complicated graphics Compare information and trends from one or more complicated graphics
SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	Fill in one or two pieces of information that are missing from a graphic
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh4. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	Summarize information from one or more detailed graphics Identify trends shown in one or more detailed or complicated graphics Compare information and trends from one or more complicated graphics
a. Trace the source on any large disparity between estimated and calculated answers to problems.	

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TABLE Q

GEORGIA Earth Systems Standards	ACT's WorkKeys Locating Information Level Skills
b. Consider possible effects of measurement errors on calculations.	
c. Recognize the relationship between accuracy and precision.	
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.	
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.	
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE OF SCIENCE	
SCSh7. Students analyze how scientific knowledge is developed. Students recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	

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TABLE Q

GEORGIA Earth Systems Standards	ACT's WorkKeys Locating Information Level Skills
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in All Curriculum Areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	

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TABLE Q

GEORGIA Earth Systems Standards	ACT's WorkKeys Locating Information Level Skills
CO-REQUISITE – CONTENT	
SES1. Students will investigate the composition and formation of Earth systems, including the Earth's relationship to the solar system.	
a. Describe the early evolution of the Earth and solar system, including the formation of Earth's solid layers (core, mantle, crust), the distribution of major elements, the origin of internal heat sources, and the mechanism by which heat transfer drives plate tectonics.	
b. Explain how the composition of the Earth's crust, mantle and core is determined and compare it to that of other solar system objects.	
c. Describe how the decay of radioactive isotopes is used to determine the age of rocks, Earth, and solar system.	
d. Describe how the Earth acquired its initial oceans and atmosphere.	
e. Identify the transformations and major reservoirs that make up the rock cycle, hydrologic cycle, carbon cycle, and other important geochemical cycles.	
SES2. Students will understand how plate tectonics creates certain geologic features, materials, and hazards.	
a. Distinguish among types of plate tectonic settings produced by plates diverging, converging, and sliding past each other.	
b. Relate modern and ancient geologic features to each kind of plate tectonic setting.	
c. Relate certain geologic hazards to specific plate tectonic settings.	
d. Associate specific plate tectonic settings with the production of particular groups of igneous and metamorphic rocks and mineral resources.	
e. Explain how plate tectonics creates and destroys sedimentary basins through time.	
SES3. Students will explore the actions of water, wind, ice, and gravity that create landforms and systems of landforms (landscapes).	
a. Describe how surface water and groundwater act as the major agents of physical and chemical weathering.	
b. Explain how soil results from weathering and biological processes acting on parent rock.	
c. Describe the processes and hazards associated with both sudden and gradual mass wasting.	
d. Relate the past and present actions of ice, wind, and water to landform distribution and landscape evolution.	
e. Explain the processes that transport and deposit material in terrestrial and marine sedimentary basins, which result, over time, in sedimentary rock.	

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TABLE Q

GEORGIA Earth Systems Standards	ACT's WorkKeys Locating Information Level Skills
SES4. Students will understand how rock relationships and fossils are used to reconstruct the Earth's past.	
a. Describe and apply principles of relative age (superposition, original horizontality, cross-cutting relations, and original lateral continuity) and describe how unconformities form.	
b. Interpret the geologic history of a succession of rocks and unconformities.	
c. Apply the principle of uniformitarianism to relate sedimentary rock associations and their fossils to the environments in which the rocks were deposited.	
d. Explain how sedimentary rock units are correlated within and across regions by a variety of methods (e.g., geologic map relationships, the principle of fossil succession, radiometric dating, and paleomagnetism).	
e. Use geologic maps and stratigraphic relationships to interpret major events in Earth history (e.g., mass extinction, major climatic change, tectonic events).	Summarize information from one or more detailed graphics Compare information and trends from one or more complicated graphics
SES5. Students will investigate the interaction of insolation and Earth systems to produce weather and climate.	
a. Explain how latitudinal variations in solar heating create atmospheric and ocean currents that redistribute heat globally.	
b. Explain the relationship between air masses and the surfaces over which they form.	
c. Relate weather patterns to interactions among ocean currents, air masses, and topography.	
d. Describe how temperature and precipitation produce the pattern of climate regions (classes) on Earth.	
e. Describe the hazards associated with extreme weather events and climate change (e.g., hurricanes, tornadoes, El Niño/La Niña, global warming).	
f. Relate changes in global climate to variation in Earth/Sun relationships and to natural and anthropogenic modification of atmospheric composition.	
SES6. Students will explain how life on Earth responds to and shapes Earth systems.	
a. Relate the nature and distribution of life on Earth, including humans, to the chemistry and availability of water.	
b. Relate the distribution of biomes (terrestrial, freshwater, and marine) to climate regions through time.	
c. Explain how geological and ecological processes interact through time to cycle matter and energy, and how human activity alters the rates of these processes (e.g., fossil fuel formation and combustion).	
d. Describe how fossils provide a record of shared ancestry, evolution, and extinction that is best explained by the mechanism of natural selection.	

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TABLE Q

GEORGIA Earth Systems Standards	ACT's WorkKeys Locating Information Level Skills
e. Identify the evolutionary innovations that most profoundly shaped Earth systems: photosynthetic prokaryotes and the atmosphere; multicellular animals and marine environments; land plants and terrestrial environments.	

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TABLE R

GEORGIA Chemistry Performance Standards	PLAN Science College Readiness Standards
HABITS OF MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	**Evaluation of Models, Inferences, and Experimental Results:** Identify similarities and differences between models
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	**Evaluation of Models, Inferences, and Experimental Results:** Identify strengths and weaknesses in one or more models Identify similarities and differences between models
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
b. Demonstrate appropriate techniques in all laboratory situations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
b. Develop procedures for solving scientific problems.	**Scientific Investigation:** Understand a simple experimental design
c. Collect, organize and record appropriate data.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram

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TABLE R

GEORGIA Chemistry Performance Standards	PLAN Science College Readiness Standards
d. Graphically compare and analyze data points and/or summary statistics.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
e. Develop reasonable conclusions based on data collected.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model

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TABLE R

GEORGIA Chemistry Performance Standards	PLAN Science College Readiness Standards
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model Select a simple hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
SCSh4. Students will use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	**Interpretation of Data:** Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	
a. Trace the source on any large disparity between estimated and calculated answers to problems.	
b. Consider possible effects of measurement errors on calculations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Recognize the relationship between accuracy and precision.	
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.	**Interpretation of Data:** Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Identify and/or use a simple (e.g., linear) mathematical relationship between data Identify and/or use a complex (e.g., nonlinear) mathematical relationship between data
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	

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TABLE R

GEORGIA Chemistry Performance Standards	PLAN Science College Readiness Standards
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data	
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	**Evaluation of Models, Inferences, and Experimental Results:** Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Determine which model(s) is(are) supported or weakened by new information Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE OF SCIENCE	
SCSh7. Students will analyze how scientific knowledge is developed. Students recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	**Scientific Investigation:** Understand a simple experimental design Identify a control in an experiment
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	

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TABLE R

GEORGIA Chemistry Performance Standards	PLAN Science College Readiness Standards
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in All Curriculum Areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
CO-REQUISITE - CONTENT	
SC1. Students will analyze the nature of matter and its classifications.	
a. Relate the role of nuclear fusion in producing essentially all elements heavier than helium.	
b. Identify substances based on chemical and physical properties.	
c. Predict formulas for stable ionic compounds (binary and tertiary) based on balance of charges.	

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TABLE R

GEORGIA Chemistry Performance Standards	PLAN Science College Readiness Standards
d. Use IUPAC nomenclature for both chemical names and formulas: • Ionic compounds (Binary and tertiary) • Covalent compounds (Binary and tertiary) • Acidic compounds (Binary and tertiary)	
SC2. Students will relate how the Law of Conservation of Matter is used to determine chemical composition in compounds and chemical reactions.	
a. Identify and balance the following types of chemical equations: • Synthesis • Decomposition • Single Replacement • Double Replacement • Combustion	
b. Experimentally determine indicators of a chemical reaction specifically precipitation, gas evolution, water production, and changes in energy to the system.	
c. Apply concepts of the mole and Avogadro's number to conceptualize and calculate • Empirical/molecular formulas, • Mass, moles and molecules relationships, • Molar volumes of gases.	
d. Identify and solve different types of stoichiometry problems, specifically relating mass to moles and mass to mass.	
e. Demonstrate the conceptual principle of limiting reactants.	
f. Explain the role of equilibrium in chemical reactions.	
SC3. Students will use the modern atomic theory to explain the characteristics of atoms.	
a. Discriminate between the relative size, charge, and position of protons, neutrons, and electrons in the atom.	
b. Use the orbital configuration of neutral atoms to explain its effect on the atom's chemical properties.	
c. Explain the relationship of the proton number to the element's identity.	
d. Explain the relationship of isotopes to the relative abundance of atoms of a particular element.	
e. Compare and contrast types of chemical bonds (i.e. ionic, covalent).	
f. Relate light emission and the movement of electrons to element identification.	

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TABLE R

GEORGIA Chemistry Performance Standards	PLAN Science College Readiness Standards
SC4. Students will use the organization of the Periodic Table to predict properties of elements.	
a. Use the Periodic Table to predict periodic trends including atomic radii, ionic radii, ionization energy, and electronegativity of various elements.	
b. Compare and contrast trends in the chemical and physical properties of elements and their placement on the Periodic Table.	
SC5. Students will understand that the rate at which a chemical reaction occurs can be affected by changing concentration, temperature, or pressure and the addition of a catalyst.	
a. Demonstrate the effects of changing concentration, temperature, and pressure on chemical reactions.	
b. Investigate the effects of a catalyst on chemical reactions and apply it to everyday examples.	
c. Explain the role of activation energy and degree of randomness in chemical reactions.	
SC6. Students will understand the effects motion of atoms and molecules in chemical and physical processes.	
a. Compare and contrast atomic/molecular motion in solids, liquids, gases, and plasmas.	
b. Collect data and calculate the amount of heat given off or taken in by chemical or physical processes.	
c. Analyzing (both conceptually and quantitatively) flow of energy during change of state (phase).	
SC7. Students will characterize the properties that describe solutions and the nature of acids and bases.	
a. Explain the process of dissolving in terms of solute/solvent interactions: • Observe factors that effect the rate at which a solute dissolves in a specific solvent, • Express concentrations as molarities, • Prepare and properly label solutions of specified molar concentration, • Relate molality to colligative properties.	
b. Compare, contrast, and evaluate the nature of acids and bases: • Arrhenius, Bronsted-Lowry Acid/Bases • Strong vs. weak acids/bases in terms of percent dissociation • Hydronium ion concentration • pH • Acid-Base neutralization	

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TABLE S

GEORGIA Chemistry Performance Standards	ACT Science College Readiness Standards
HABITS OF MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	**Evaluation of Models, Inferences, and Experimental Results:** Identify similarities and differences between models
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	**Scientific Investigation:** Identify an additional trial or experiment that could be performed to enhance or evaluate experimental results **Evaluation of Models, Inferences, and Experimental Results:** Identify strengths and weaknesses in one or more models Identify similarities and differences between models
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
b. Demonstrate appropriate techniques in all laboratory situations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
b. Develop procedures for solving scientific problems.	**Scientific Investigation:** Understand a simple experimental design
c. Collect, organize and record appropriate data.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table)

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TABLE S

GEORGIA Chemistry Performance Standards	ACT Science College Readiness Standards
	Translate information into a table, graph, or diagram
d. Graphically compare and analyze data points and/or summary statistics.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
e. Develop reasonable conclusions based on data collected.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design

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TABLE S

GEORGIA Chemistry Performance Standards	ACT Science College Readiness Standards
	Evaluation of Models, Inferences, and Experimental Results: Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model Select a simple hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
SCSh4. Students will use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	**Interpretation of Data:** Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh4. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	
a. Trace the source on any large disparity between estimated and calculated answers to problems.	**Scientific Investigation:** Understand precision and accuracy issues
b. Consider possible effects of measurement errors on calculations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Recognize the relationship between accuracy and precision.	**Scientific Investigation:** Understand precision and accuracy issues
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.	**Interpretation of Data:** Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Identify and/or use a simple (e.g., linear) mathematical relationship between data Identify and/or use a complex (e.g., nonlinear) mathematical relationship between data

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TABLE S

GEORGIA Chemistry Performance Standards	ACT Science College Readiness Standards
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data	
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	**Evaluation of Models, Inferences, and Experimental Results:** Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Determine which model(s) is(are) supported or weakened by new information Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE OF SCIENCE	
SCSh7. Students will analyze how scientific knowledge is developed. Students recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	**Scientific Investigation:** Understand a simple experimental design Identify a control in an experiment
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	

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TABLE S

GEORGIA Chemistry Performance Standards	ACT Science College Readiness Standards
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in All Curriculum Areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
CO-REQUISITE - CONTENT	
SC1. Students will analyze the nature of matter and its classifications.	
a. Relate the role of nuclear fusion in producing essentially all elements heavier than helium.	

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TABLE S

GEORGIA Chemistry Performance Standards	ACT Science College Readiness Standards
b. Identify substances based on chemical and physical properties.	
c. Predict formulas for stable ionic compounds (binary and tertiary) based on balance of charges.	
d. Use IUPAC nomenclature for both chemical names and formulas: • Ionic compounds (Binary and tertiary) • Covalent compounds (Binary and tertiary) • Acidic compounds (Binary and tertiary)	
SC2. Students will relate how the Law of Conservation of Matter is used to determine chemical composition in compounds and chemical reactions.	
a. Identify and balance the following types of chemical equations: • Synthesis • Decomposition • Single Replacement • Double Replacement • Combustion	
b. Experimentally determine indicators of a chemical reaction specifically precipitation, gas evolution, water production, and changes in energy to the system.	
c. Apply concepts of the mole and Avogadro's number to conceptualize and calculate • Empirical/molecular formulas, • Mass, moles and molecules relationships, • Molar volumes of gases.	
d. Identify and solve different types of stoichiometry problems, specifically relating mass to moles and mass to mass.	
e. Demonstrate the conceptual principle of limiting reactants.	
f. Explain the role of equilibrium in chemical reactions.	
SC3. Students will use the modern atomic theory to explain the characteristics of atoms.	
a. Discriminate between the relative size, charge, and position of protons, neutrons, and electrons in the atom.	
b. Use the orbital configuration of neutral atoms to explain its effect on the atom's chemical properties.	
c. Explain the relationship of the proton number to the element's identity.	
d. Explain the relationship of isotopes to the relative abundance of atoms of a particular element.	
e. Compare and contrast types of chemical bonds (i.e. ionic, covalent).	
f. Relate light emission and the movement of electrons to element identification.	

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TABLE S

GEORGIA Chemistry Performance Standards	ACT Science College Readiness Standards
SC4. Students will use the organization of the Periodic Table to predict properties of elements.	
a. Use the Periodic Table to predict periodic trends including atomic radii, ionic radii, ionization energy, and electronegativity of various elements.	
b. Compare and contrast trends in the chemical and physical properties of elements and their placement on the Periodic Table.	
SC5. Students will understand that the rate at which a chemical reaction occurs can be affected by changing concentration, temperature, or pressure and the addition of a catalyst.	
a. Demonstrate the effects of changing concentration, temperature, and pressure on chemical reactions.	
b. Investigate the effects of a catalyst on chemical reactions and apply it to everyday examples.	
c. Explain the role of activation energy and degree of randomness in chemical reactions.	
SC6. Students will understand the effects motion of atoms and molecules in chemical and physical processes.	
a. Compare and contrast atomic/molecular motion in solids, liquids, gases, and plasmas.	
b. Collect data and calculate the amount of heat given off or taken in by chemical or physical processes.	
c. Analyzing (both conceptually and quantitatively) flow of energy during change of state (phase).	
SC7. Students will characterize the properties that describe solutions and the nature of acids and bases.	
a. Explain the process of dissolving in terms of solute/solvent interactions: • Observe factors that effect the rate at which a solute dissolves in a specific solvent, • Express concentrations as molarities, • Prepare and properly label solutions of specified molar concentration, • Relate molality to colligative properties.	
b. Compare, contrast, and evaluate the nature of acids and bases: • Arrhenius, Bronsted-Lowry Acid/Bases • Strong vs. weak acids/bases in terms of percent dissociation • Hydronium ion concentration • pH • Acid-Base neutralization	

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TABLE T

GEORGIA Chemistry Standards	WorkKeys Locating Information Level Skills
HABITS OF MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	
b. Demonstrate appropriate techniques in all laboratory situations.	
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	
b. Develop procedures for solving scientific problems.	
c. Collect, organize and record appropriate data.	Fill in one or two pieces of information that are missing from a graphic
d. Graphically compare and analyze data points and/or summary statistics.	Compare information and trends from one or more complicated graphics
e. Develop reasonable conclusions based on data collected.	Draw conclusions based on one complicated graphic or several related graphics
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	Summarize information from one or more detailed graphics Identify trends shown in one or more detailed or complicated graphics Compare information and trends from one or more complicated graphics
SCSh4. Students will use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	Fill in one or two pieces of information that are missing from a graphic
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	
a. Trace the source on any large disparity between estimated and calculated answers to problems.	Fill in one or two pieces of information that are missing from a graphic
b. Consider possible effects of measurement errors on calculations.	Compare information and trends from one or more complicated graphics

= Measured by WorkKeys Locating Information Test

_____ = Content sampled by WorkKeys Locating Information Test

TABLE T

GEORGIA Chemistry Standards	WorkKeys Locating Information Level Skills
c. Recognize the relationship between accuracy and precision.	Draw conclusions based on one complicated graphic or several related graphics
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.	
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data	
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE OF SCIENCE	
SCSh7. Students will analyze how scientific knowledge is developed. Students recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	

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TABLE T

GEORGIA Chemistry Standards	WorkKeys Locating Information Level Skills
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in All Curriculum Areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	
CO-REQUISITE - CONTENT	
SC1. Students will analyze the nature of matter and its classifications.	
a. Relate the role of nuclear fusion in producing essentially all elements heavier than helium.	

= Measured by WorkKeys Locating Information Test

_____ = Content sampled by WorkKeys Locating Information Test

TABLE T

GEORGIA Chemistry Standards	WorkKeys Locating Information Level Skills
b. Identify substances based on chemical and physical properties.	
c. Predict formulas for stable ionic compounds (binary and tertiary) based on balance of charges.	
d. Use IUPAC nomenclature for both chemical names and formulas: • Ionic compounds (Binary and tertiary) • Covalent compounds (Binary and tertiary) • Acidic compounds (Binary and tertiary)	
SC2. Students will relate how the Law of Conservation of Matter is used to determine chemical composition in compounds and chemical reactions.	
a. Identify and balance the following types of chemical equations: • Synthesis • Decomposition • Single Replacement • Double Replacement • Combustion	
b. Experimentally determine indicators of a chemical reaction specifically precipitation, gas evolution, water production, and changes in energy to the system.	
c. Apply concepts of the mole and Avogadro's number to conceptualize and calculate • Empirical/molecular formulas, • Mass, moles and molecules relationships, • Molar volumes of gases.	
d. Identify and solve different types of stoichiometry problems, specifically relating mass to moles and mass to mass.	
e. Demonstrate the conceptual principle of limiting reactants.	
f. Explain the role of equilibrium in chemical reactions.	
SC3. Students will use the modern atomic theory to explain the characteristics of atoms.	
a. Discriminate between the relative size, charge, and position of protons, neutrons, and electrons in the atom.	
b. Use the orbital configuration of neutral atoms to explain its effect on the atom's chemical properties.	
c. Explain the relationship of the proton number to the element's identity.	
d. Explain the relationship of isotopes to the relative abundance of atoms of a particular element.	
e. Compare and contrast types of chemical bonds (i.e. ionic, covalent).	
f. Relate light emission and the movement of electrons to element identification.	

= Measured by WorkKeys Locating Information Test

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TABLE T

GEORGIA Chemistry Standards	WorkKeys Locating Information Level Skills
SC4. Students will use the organization of the Periodic Table to predict properties of elements.	
a. Use the Periodic Table to predict periodic trends including atomic radii, ionic radii, ionization energy, and electronegativity of various elements.	Identify trends shown in one or more detailed or complicated graphics
b. Compare and contrast trends in the chemical and physical properties of elements and their placement on the Periodic Table.	Summarize information from one or more detailed graphics Identify trends shown in one or more detailed or complicated graphics Compare information and trends from one or more complicated graphics
SC5. Students will understand that the rate at which a chemical reaction occurs can be affected by changing concentration, temperature, or pressure and the addition of a catalyst.	
a. Demonstrate the effects of changing concentration, temperature, and pressure on chemical reactions.	
b. Investigate the effects of a catalyst on chemical reactions and apply it to everyday examples.	
c. Explain the role of activation energy and degree of randomness in chemical reactions.	
SC6. Students will understand the effects motion of atoms and molecules in chemical and physical processes.	
a. Compare and contrast atomic/molecular motion in solids, liquids, gases, and plasmas.	
b. Collect data and calculate the amount of heat given off or taken in by chemical or physical processes.	
c. Analyzing (both conceptually and quantitatively) flow of energy during change of state (phase).	
SC7. Students will characterize the properties that describe solutions and the nature of acids and bases.	
a. Explain the process of dissolving in terms of solute/solvent interactions: • Observe factors that effect the rate at which a solute dissolves in a specific solvent, • Express concentrations as molarities, • Prepare and properly label solutions of specified molar concentration, • Relate molality to colligative properties.	
b. Compare, contrast, and evaluate the nature of acids and bases: • Arrhenius, Bronsted-Lowry Acid/Bases • Strong vs. weak acids/bases in terms of percent dissociation • Hydronium ion concentration • pH • Acid-Base neutralization	

= Measured by WorkKeys Locating Information Test

_____ = Content sampled by WorkKeys Locating Information Test

TABLE U

GEORGIA Human Anatomy and Physiology Performance Standards	PLAN Science College Readiness Standards
HABITS OF MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	**Evaluation of Models, Inferences, and Experimental Results:** Identify similarities and differences between models
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	**Evaluation of Models, Inferences, and Experimental Results:** Identify strengths and weaknesses in one or more models Identify similarities and differences between models
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
b. Demonstrate appropriate technique in all laboratory situations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
b. Develop procedures for solving scientific problems.	**Scientific Investigation:** Understand a simple experimental design
c. Collect, organize and record appropriate data.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram

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_____ = Content sampled by PLAN Science Test

TABLE U

GEORGIA Human Anatomy and Physiology Performance Standards	PLAN Science College Readiness Standards
d. Graphically compare and analyze data points and/or summary statistics.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
e. Develop reasonable conclusions based on data collected.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model

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_____ = Content sampled by PLAN Science Test

TABLE U

GEORGIA Human Anatomy and Physiology Performance Standards	PLAN Science College Readiness Standards
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model Select a simple hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	**Interpretation of Data:** Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	
a. Trace the source on any large disparity between estimated and calculated answers to problems.	
b. Consider possible effects of measurement errors on calculations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Recognize the relationship between accuracy and precision.	
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.	**Interpretation of Data:** Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Identify and/or use a simple (e.g., linear) mathematical relationship between data Identify and/or use a complex (e.g., nonlinear) mathematical relationship between data
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	

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_____ = Content sampled by PLAN Science Test

TABLE U

GEORGIA Human Anatomy and Physiology Performance Standards	PLAN Science College Readiness Standards
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.	
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	**Evaluation of Models, Inferences, and Experimental Results:** Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Determine which model(s) is(are) supported or weakened by new information Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE OF SCIENCE	
SCSh7. Students analyze how scientific knowledge is developed. Students recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	**Scientific Investigation:** Understand a simple experimental design Identify a control in an experiment
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	

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TABLE U

GEORGIA Human Anatomy and Physiology Performance Standards	PLAN Science College Readiness Standards
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in All Curriculum Areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
CO-REQUISITE – CONTENT	
SAP1. Students will analyze anatomical structures in relationship to their physiological functions.	
a. Apply correct terminology when explaining the orientation of body parts and regions.	
b. Investigate the interdependence of the various body systems to each other and to the body as a whole.	
c. Explain the role of homeostasis and its mechanisms as these relate to the body as a whole and predict the consequences of the failure to maintain homeostasis.	

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TABLE U

GEORGIA Human Anatomy and Physiology Performance Standards	PLAN Science College Readiness Standards
d. Relate cellular metabolism and transport to homeostasis and cellular reproduction.	
e. Describe how structure and function are related in terms of cell and tissue types.	
SAP2. Students will analyze the interdependence of the integumentary, skeletal, and muscular systems as these relate to the protection, support and movement of the human body.	
a. Relate the structure of the integumentary system to its functional role in protecting the body and maintaining homeostasis.	
b. Explain how the skeletal structures provide support and protection for tissues, and function together with the muscular system to make movements possible.	
SAP3. Students will assess the integration and coordination of body functions and their dependence on the endocrine and nervous systems to regulate physiological activities.	
a. Interpret interactions among hormones, senses, and nerves which make possible the coordination of functions of the body.	
b. Investigate the physiology of electrochemical impulses and neural integration and trace the pathway of an impulse, relating biochemical changes involved in the conduction of the impulse.	
c. Describe how the body perceives internal and external stimuli and responds to maintain a stable internal environment, as it relates to biofeedback.	
SAP4. Students will analyze the physical, chemical, and biological properties of process systems as these relate to transportation, absorption and excretion, including the cardiovascular, respiratory, digestive, excretory and immune systems.	
a. Describe the chemical and physical mechanisms of digestion, elimination, transportation, and absorption within the body to change food and derive energy.	
b. Analyze, and explain the relationships between the respiratory and cardiovascular systems as they obtain oxygen needed for the oxidation of nutrients and removal of carbon dioxide.	
c. Relate the role of the urinary system to regulation of body wastes (i.e. waterelectrolyte balance, volume of body fluids).	
d. Examine various conditions that change normal body functions (e.g. tissue rejection, allergies, injury, diseases and disorders) and how the body responds.	
e. Describe the effects of aging on body systems.	
SAP5. Students will analyze the role of the reproductive system as it pertains to the growth and development of humans.	
a. Explain how the functions of the reproductive organs are regulated by hormonal interactions.	

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TABLE U

GEORGIA Human Anatomy and Physiology Performance Standards	PLAN Science College Readiness Standards
b. Describe the stages of human embryology and gestation including investigation of gestational and congenital disorders (e.g. ectopic pregnancy, miscarriage, cleft palate, hydrocephaly, fetal alcohol syndrome).	
c. Describe the stages of development from birth to adulthood (i.e. neonatal period, infancy, childhood, adolescence and puberty, and maturity).	

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TABLE V

GEORGIA Human Anatomy and Physiology Performance Standards	ACT Science College Readiness Standards
HABITS OF MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	**Evaluation of Models, Inferences, and Experimental Results:** Identify similarities and differences between models
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	**Scientific Investigation:** Identify an additional trial or experiment that could be performed to enhance or evaluate experimental results **Evaluation of Models, Inferences, and Experimental Results:** Identify strengths and weaknesses in one or more models Identify similarities and differences between models
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
b. Demonstrate appropriate technique in all laboratory situations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
b. Develop procedures for solving scientific problems.	**Scientific Investigation:** Understand a simple experimental design
c. Collect, organize and record appropriate data.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table)

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TABLE V

GEORGIA Human Anatomy and Physiology Performance Standards	ACT Science College Readiness Standards
	Translate information into a table, graph, or diagram
d. Graphically compare and analyze data points and/or summary statistics.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
e. Develop reasonable conclusions based on data collected.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design

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TABLE V

GEORGIA Human Anatomy and Physiology Performance Standards	ACT Science College Readiness Standards
	Evaluation of Models, Inferences, and Experimental Results: Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model Select a simple hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	**Interpretation of Data:** Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	
a. Trace the source on any large disparity between estimated and calculated answers to problems.	**Scientific Investigation:** Understand precision and accuracy issues
b. Consider possible effects of measurement errors on calculations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Recognize the relationship between accuracy and precision.	**Scientific Investigation:** Understand precision and accuracy issues
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.	**Interpretation of Data:** Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Identify and/or use a simple (e.g., linear) mathematical relationship between data Identify and/or use a complex (e.g., nonlinear) mathematical relationship between data

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TABLE V

GEORGIA Human Anatomy and Physiology Performance Standards	ACT Science College Readiness Standards
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.	
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	**Evaluation of Models, Inferences, and Experimental Results:** Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Determine which model(s) is(are) supported or weakened by new information Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE OF SCIENCE	
SCSh7. Students analyze how scientific knowledge is developed. Students recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	**Scientific Investigation:** Understand a simple experimental design Identify a control in an experiment
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	

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TABLE V

GEORGIA Human Anatomy and Physiology Performance Standards	ACT Science College Readiness Standards
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in All Curriculum Areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
CO-REQUISITE – CONTENT	
SAP1. Students will analyze anatomical structures in relationship to their physiological functions.	
a. Apply correct terminology when explaining the orientation of body parts and regions.	

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_____ = Content sampled by ACT Science Test

TABLE V

GEORGIA Human Anatomy and Physiology Performance Standards	ACT Science College Readiness Standards
b. Investigate the interdependence of the various body systems to each other and to the body as a whole.	
c. Explain the role of homeostasis and its mechanisms as these relate to the body as a whole and predict the consequences of the failure to maintain homeostasis.	
d. Relate cellular metabolism and transport to homeostasis and cellular reproduction.	
e. Describe how structure and function are related in terms of cell and tissue types.	
SAP2. Students will analyze the interdependence of the integumentary, skeletal, and muscular systems as these relate to the protection, support and movement of the human body.	
a. Relate the structure of the integumentary system to its functional role in protecting the body and maintaining homeostasis.	
b. Explain how the skeletal structures provide support and protection for tissues, and function together with the muscular system to make movements possible.	
SAP3. Students will assess the integration and coordination of body functions and their dependence on the endocrine and nervous systems to regulate physiological activities.	
a. Interpret interactions among hormones, senses, and nerves which make possible the coordination of functions of the body.	
b. Investigate the physiology of electrochemical impulses and neural integration and trace the pathway of an impulse, relating biochemical changes involved in the conduction of the impulse.	
c. Describe how the body perceives internal and external stimuli and responds to maintain a stable internal environment, as it relates to biofeedback.	
SAP4. Students will analyze the physical, chemical, and biological properties of process systems as these relate to transportation, absorption and excretion, including the cardiovascular, respiratory, digestive, excretory and immune systems.	
a. Describe the chemical and physical mechanisms of digestion, elimination, transportation, and absorption within the body to change food and derive energy.	
b. Analyze, and explain the relationships between the respiratory and cardiovascular systems as they obtain oxygen needed for the oxidation of nutrients and removal of carbon dioxide.	
c. Relate the role of the urinary system to regulation of body wastes (i.e. waterelectrolyte balance, volume of body fluids).	
d. Examine various conditions that change normal body functions (e.g. tissue rejection, allergies, injury, diseases and disorders) and how the body responds.	
e. Describe the effects of aging on body systems.	

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_____ = Content sampled by ACT Science Test

TABLE V

GEORGIA Human Anatomy and Physiology Performance Standards	ACT Science College Readiness Standards
SAP5. Students will analyze the role of the reproductive system as it pertains to the growth and development of humans.	
a. Explain how the functions of the reproductive organs are regulated by hormonal interactions.	
b. Describe the stages of human embryology and gestation including investigation of gestational and congenital disorders (e.g. ectopic pregnancy, miscarriage, cleft palate, hydrocephaly, fetal alcohol syndrome).	
c. Describe the stages of development from birth to adulthood (i.e. neonatal period, infancy, childhood, adolescence and puberty, and maturity).	

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TABLE W

GEORGIA Human Anatomy and Physiology Standards	ACT's WorkKeys Locating Information Level Skills
HABITS OF MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	
b. Demonstrate appropriate technique in all laboratory situations.	
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	
b. Develop procedures for solving scientific problems.	
c. Collect, organize and record appropriate data.	Fill in one or two pieces of information that are missing from a graphic
d. Graphically compare and analyze data points and/or summary statistics.	Compare information and trends from one or more complicated graphics
e. Develop reasonable conclusions based on data collected.	Draw conclusions based on one complicated graphic or several related graphics
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	Summarize information from one or more detailed graphics Identify trends shown in one or more detailed or complicated graphics Compare information and trends from one or more complicated graphics
SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	Fill in one or two pieces of information that are missing from a graphic
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	
a. Trace the source on any large disparity between estimated and calculated answers to problems.	Fill in one or two pieces of information that are missing from a graphic
b. Consider possible effects of measurement errors on calculations.	

= Measured by the WorkKeys Locating Information Test
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TABLE W

GEORGIA Human Anatomy and Physiology Standards	ACT's WorkKeys Locating Information Level Skills
c. Recognize the relationship between accuracy and precision.	
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.	
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data.	
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE OF SCIENCE	
SCSh7. Students analyze how scientific knowledge is developed. Students recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	

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TABLE W

GEORGIA Human Anatomy and Physiology Standards	ACT's WorkKeys Locating Information Level Skills
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in All Curriculum Areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	
CO-REQUISITE – CONTENT	
SAP1. Students will analyze anatomical structures in relationship to their physiological functions.	
a. Apply correct terminology when explaining the orientation of body parts and regions.	

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TABLE W

GEORGIA Human Anatomy and Physiology Standards	ACT's WorkKeys Locating Information Level Skills
b. Investigate the interdependence of the various body systems to each other and to the body as a whole.	
c. Explain the role of homeostasis and its mechanisms as these relate to the body as a whole and predict the consequences of the failure to maintain homeostasis.	
d. Relate cellular metabolism and transport to homeostasis and cellular reproduction.	
e. Describe how structure and function are related in terms of cell and tissue types.	
SAP2. Students will analyze the interdependence of the integumentary, skeletal, and muscular systems as these relate to the protection, support and movement of the human body.	
a. Relate the structure of the integumentary system to its functional role in protecting the body and maintaining homeostasis.	
b. Explain how the skeletal structures provide support and protection for tissues, and function together with the muscular system to make movements possible.	
SAP3. Students will assess the integration and coordination of body functions and their dependence on the endocrine and nervous systems to regulate physiological activities.	
a. Interpret interactions among hormones, senses, and nerves which make possible the coordination of functions of the body.	
b. Investigate the physiology of electrochemical impulses and neural integration and trace the pathway of an impulse, relating biochemical changes involved in the conduction of the impulse.	
c. Describe how the body perceives internal and external stimuli and responds to maintain a stable internal environment, as it relates to biofeedback.	
SAP4. Students will analyze the physical, chemical, and biological properties of process systems as these relate to transportation, absorption and excretion, including the cardiovascular, respiratory, digestive, excretory and immune systems.	
a. Describe the chemical and physical mechanisms of digestion, elimination, transportation, and absorption within the body to change food and derive energy.	
b. Analyze, and explain the relationships between the respiratory and cardiovascular systems as they obtain oxygen needed for the oxidation of nutrients and removal of carbon dioxide.	
c. Relate the role of the urinary system to regulation of body wastes (i.e. waterelectrolyte balance, volume of body fluids).	
d. Examine various conditions that change normal body functions (e.g. tissue rejection, allergies, injury, diseases and disorders) and how the body responds.	
e. Describe the effects of aging on body systems.	

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TABLE W

GEORGIA Human Anatomy and Physiology Standards	ACT's WorkKeys Locating Information Level Skills
SA5. Students will analyze the role of the reproductive system as it pertains to the growth and development of humans.	
a. Explain how the functions of the reproductive organs are regulated by hormonal interactions.	
b. Describe the stages of human embryology and gestation including investigation of gestational and congenital disorders (e.g. ectopic pregnancy, miscarriage, cleft palate, hydrocephaly, fetal alcohol syndrome).	
c. Describe the stages of development from birth to adulthood (i.e. neonatal period, infancy, childhood, adolescence and puberty, and maturity).	

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TABLE X

GEORGIA Physics Performance Standards	ACT Science College Readiness Standards
HABITS OF MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	**Evaluation of Models, Inferences, and Experimental Results:** Identify similarities and differences between models
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	**Scientific Investigation:** Identify an additional trial or experiment that could be performed to enhance or evaluate experimental results **Evaluation of Models, Inferences, and Experimental Results:** Identify strengths and weaknesses in one or more models Identify similarities and differences between models
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
b. Demonstrate appropriate technique in all laboratory situations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
b. Develop procedures for solving scientific problems.	**Scientific Investigation:** Understand a simple experimental design
c. Collect, organize and record appropriate data.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table)

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TABLE X

GEORGIA Physics Performance Standards	ACT Science College Readiness Standards
	Translate information into a table, graph, or diagram
d. Graphically compare and analyze data points and/or summary statistics.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design **Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
e. Develop reasonable conclusions based on data collected.	**Interpretation of Data:** Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram **Scientific Investigation:** Understand the methods and tools used in a simple experiment Understand a simple experimental design

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TABLE X

GEORGIA Physics Performance Standards	ACT Science College Readiness Standards
	Evaluation of Models, Inferences, and Experimental Results: Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	**Evaluation of Models, Inferences, and Experimental Results:** Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model Select a simple hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
SCSh4. Students will use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
a. Develop and use systematic procedures for recording and organizing information.	**Interpretation of Data:** Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels) Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	
a. Trace the source on any large disparity between estimated and calculated answers to problems.	**Scientific Investigation:** Understand precision and accuracy issues
b. Consider possible effects of measurement errors on calculations.	**Scientific Investigation:** Understand the methods and tools used in a simple experiment
c. Recognize the relationship between accuracy and precision.	**Scientific Investigation:** Understand precision and accuracy issues
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.	**Interpretation of Data:** Determine how the value of one variable changes as the value of another variable changes in a simple data presentation Identify and/or use a simple (e.g., linear) mathematical relationship between data Identify and/or use a complex (e.g., nonlinear) mathematical relationship between data

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TABLE X

GEORGIA Physics Performance Standards	ACT Science College Readiness Standards
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	
b. Write clear, coherent accounts of current scientific issues, including possible alternative interpretations of the data	
c. Use data as evidence to support scientific arguments and claims in written or oral presentations.	**Evaluation of Models, Inferences, and Experimental Results:** Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Determine which model(s) is(are) supported or weakened by new information Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
d. Participate in group discussions of scientific investigation and current scientific issues.	
THE NATURE OF SCIENCE	
SCSh7. Students will analyze how scientific knowledge is developed. Students will recognize that:	
a. The universe is a vast single system in which the basic principles are the same everywhere.	
b. Universal principles are discovered through observation and experimental verification.	
c. From time to time, major shifts occur in the scientific view of how the world works. More often, however, the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. Major shifts in scientific views typically occur after the observation of a new phenomenon or an insightful interpretation of existing data by an individual or research group.	
d. Hypotheses often cause scientists to develop new experiments that produce additional data.	
e. Testing, revising, and occasionally rejecting new and old theories never ends.	
SCSh8. Students will understand important features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:	
a. Scientific investigators control the conditions of their experiments in order to produce valuable data.	**Scientific Investigation:** Understand a simple experimental design Identify a control in an experiment
b. Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations' hypotheses, observations, data analyses, and interpretations.	
c. Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.	

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TABLE X

GEORGIA Physics Performance Standards	ACT Science College Readiness Standards
d. The merit of a new theory is judged by how well scientific data are explained by the new theory.	
e. The ultimate goal of science is to develop an understanding of the natural universe which is free of biases.	
f. Science disciplines and traditions differ from one another in what is studied, techniques used, and outcomes sought.	
SCSh9. Students will enhance reading in all curriculum areas by:	
a. Reading in All Curriculum Areas • Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas. • Read both informational and fictional texts in a variety of genres and modes of discourse. • Read technical texts related to various subject areas.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
c. Building vocabulary knowledge • Demonstrate an understanding of contextual vocabulary in various subjects. • Use content vocabulary in writing and speaking. • Explore understanding of new words found in subject area texts.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	**Interpretation of Data:** Understand basic scientific terminology Find basic information in a brief body of text
CO-REQUISITE – CONTENT	
SP1. Students will analyze the relationships between force, mass, gravity, and the motion of objects.	
a. Calculate average velocity, instantaneous velocity, and acceleration in a given frame of reference.	

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TABLE X

GEORGIA Physics Performance Standards	ACT Science College Readiness Standards
b. Compare and contrast scalar and vector quantities.	
c. Compare graphically and algebraically the relationships among position, velocity, acceleration, and time.	
d. Measure and calculate the magnitude of frictional forces and Newton's three Laws of Motion.	
e. Measure and calculate the magnitude of gravitational forces.	
f. Measure and calculate two-dimensional motion (projectile and circular) by using component vectors.	
g. Measure and calculate centripetal force.	
h. Determine the conditions required to maintain a body in a state of static equilibrium.	
SP2. Students will evaluate the significance of energy in understanding the structure of matter and the universe.	
a. Relate the energy produced through fission and fusion by stars as a driving force in the universe.	
b. Explain how the instability of radioactive isotopes results in spontaneous nuclear reactions.	
SP3. Students will evaluate the forms and transformations of energy.	
a. Analyze, evaluate, and apply the principle of conservation of energy and measure the components of work-energy theorem by • describing total energy in a closed system. • identifying different types of potential energy. • calculating kinetic energy given mass and velocity. • relating transformations between potential and kinetic energy.	
b. Explain the relationship between matter and energy.	
c. Measure and calculate the vector nature of momentum.	
d. Compare and contrast elastic and inelastic collisions.	
e. Demonstrate the factors required to produce a change in momentum.	
f. Analyze the relationship between temperature, internal energy, and work done in a physical system.	
g. Analyze and measure power.	
SP4. Students will analyze the properties and applications of waves.	
a. Explain the processes that results in the production and energy transfer of electromagnetic waves.	
b. Experimentally determine the behavior of waves in various media in terms of reflection, refraction, and diffraction of waves.	
c. Explain the relationship between the phenomena of interference and the principle of superposition.	
d. Demonstrate the transfer of energy through different mediums by mechanical waves.	

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TABLE X

GEORGIA Physics Performance Standards	ACT Science College Readiness Standards
e. Determine the location and nature of images formed by the reflection or refraction of light.	
SP5. Students will evaluate relationships between electrical and magnetic forces.	
a. Describe the transformation of mechanical energy into electrical energy and the transmission of electrical energy.	
b. Determine the relationship among potential difference, current, and resistance in a direct current circuit.	
c. Determine equivalent resistances in series and parallel circuits.	
d. Determine the relationship between moving electric charges and magnetic fields.	
SP6. The student will describe the corrections to Newtonian physics given by quantum mechanics and relativity when matter is very small, moving fast compared to the speed of light, or very large.	
a. Explain matter as a particle and as a wave.	
b. Describe the Uncertainty Principle.	
c. Explain the differences in time, space, and mass measurements by two observers when one is in a frame of reference moving at constant velocity parallel to one of the coordinate axes of the other observer's frame of reference if the constant velocity is greater than one tenth the speed of light.	
d. Describe the gravitational field surrounding a large mass and its effect on a ray of light.	

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TABLE Y

GEORGIA Physics Standards	ACT's WorkKeys Locating Information Level Skills
HABITS OF MIND	
SCSh1. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.	
a. Exhibit the above traits in their own scientific activities.	
b. Recognize that different explanations often can be given for the same evidence.	
c. Explain that further understanding of scientific problems relies on the design and execution of new experiments which may reinforce or weaken opposing explanations.	
SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.	
a. Follow correct procedures for use of scientific apparatus.	
b. Demonstrate appropriate technique in all laboratory situations.	
c. Follow correct protocol for identifying and reporting safety problems and violations.	
SCSh3. Students will identify and investigate problems scientifically.	
a. Suggest reasonable hypotheses for identified problems.	
b. Develop procedures for solving scientific problems.	
c. Collect, organize and record appropriate data.	Fill in one or two pieces of information that are missing from a graphic
d. Graphically compare and analyze data points and/or summary statistics.	Compare information and trends from one or more complicated graphics
e. Develop reasonable conclusions based on data collected.	Draw conclusions based on one complicated graphic or several related graphics
f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.	Summarize information from one or more detailed graphics Identify trends shown in one or more detailed or complicated graphics Compare information and trends from one or more complicated graphics
SCSh4. Students will use tools and instruments for observing, measuring, and manipulating scientific equipment and materials.	
a. Develop and use systematic procedures for recording and organizing information.	Fill in one or two pieces of information that are missing from a graphic
b. Use technology to produce tables and graphs.	
c. Use technology to develop, test, and revise experimental or mathematical models.	
SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.	
a. Trace the source on any large disparity between estimated and calculated answers to problems.	
b. Consider possible effects of measurement errors on calculations.	

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TABLE Y

GEORGIA Physics Standards	ACT's WorkKeys Locating Information Level Skills
c. Recognize the relationship between accuracy and precision.	
d. Express appropriate numbers of significant figures for calculated data, using scientific notation where appropriate.	
e. Solve scientific problems by substituting quantitative values, using dimensional analysis and/or simple algebraic formulas as appropriate.	
SCSh6. Students will communicate scientific investigations and information clearly.	
a. Write clear, coherent laboratory reports related to scientific investigations.	
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THE NATURE OF SCIENCE	
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b. Discussing books • Discuss messages and themes from books in all subject areas. • Respond to a variety of texts in multiple modes of discourse. • Relate messages and themes from one subject area to messages and themes in another area. • Evaluate the merit of texts in every subject discipline. • Examine author's purpose in writing. • Recognize the features of disciplinary texts.	
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d. Establishing context • Explore life experiences related to subject area content. • Discuss in both writing and speaking how certain words are subject area related. • Determine strategies for finding content and contextual meaning for unknown words.	
CO-REQUISITE – CONTENT	
SP1. Students will analyze the relationships between force, mass, gravity, and the motion of objects.	
a. Calculate average velocity, instantaneous velocity, and acceleration in a given frame of reference.	

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TABLE Y

GEORGIA Physics Standards	ACT's WorkKeys Locating Information Level Skills
b. Compare and contrast scalar and vector quantities.	
c. Compare graphically and algebraically the relationships among position, velocity, acceleration, and time.	Compare information and trends from one or more complicated graphics
d. Measure and calculate the magnitude of frictional forces and Newton's three Laws of Motion.	
e. Measure and calculate the magnitude of gravitational forces.	
f. Measure and calculate two-dimensional motion (projectile and circular) by using component vectors.	
g. Measure and calculate centripetal force.	
h. Determine the conditions required to maintain a body in a state of static equilibrium.	
SP2. Students will evaluate the significance of energy in understanding the structure of matter and the universe.	
a. Relate the energy produced through fission and fusion by stars as a driving force in the universe.	
b. Explain how the instability of radioactive isotopes results in spontaneous nuclear reactions.	
SP3. Students will evaluate the forms and transformations of energy.	
a. Analyze, evaluate, and apply the principle of conservation of energy and measure the components of work-energy theorem by • describing total energy in a closed system. • identifying different types of potential energy. • calculating kinetic energy given mass and velocity. • relating transformations between potential and kinetic energy.	
b. Explain the relationship between matter and energy.	
c. Measure and calculate the vector nature of momentum.	
d. Compare and contrast elastic and inelastic collisions.	
e. Demonstrate the factors required to produce a change in momentum.	
f. Analyze the relationship between temperature, internal energy, and work done in a physical system.	
g. Analyze and measure power.	
SP4. Students will analyze the properties and applications of waves.	
a. Explain the processes that results in the production and energy transfer of electromagnetic waves.	
b. Experimentally determine the behavior of waves in various media in terms of reflection, refraction, and diffraction of waves.	
c. Explain the relationship between the phenomena of interference and the principle of superposition.	
d. Demonstrate the transfer of energy through different mediums by mechanical waves.	

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TABLE Y

GEORGIA Physics Standards	ACT's WorkKeys Locating Information Level Skills
e. Determine the location and nature of images formed by the reflection or refraction of light.	
SP5. Students will evaluate relationships between electrical and magnetic forces.	
a. Describe the transformation of mechanical energy into electrical energy and the transmission of electrical energy.	
b. Determine the relationship among potential difference, current, and resistance in a direct current circuit.	
c. Determine equivalent resistances in series and parallel circuits.	
d. Determine the relationship between moving electric charges and magnetic fields.	
SP6. The student will describe the corrections to Newtonian physics given by quantum mechanics and relativity when matter is very small, moving fast compared to the speed of light, or very large.	
a. Explain matter as a particle and as a wave.	
b. Describe the Uncertainty Principle.	
c. Explain the differences in time, space, and mass measurements by two observers when one is in a frame of reference moving at constant velocity parallel to one of the coordinate axes of the other observer's frame of reference if the constant velocity is greater than one tenth the speed of light.	
d. Describe the gravitational field surrounding a large mass and its effect on a ray of light.	

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