The Georgia Department of Juvenile Justice

Environmental Science

Units of Instruction Resource Manual

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**Acknowledgements**

The Georgia Department of Juvenile Justice Department of Education owes a deep dept of gratitude to the many educators who have helped to create this Environmental Science Units of Instruction Manual. The educators have been particularly helpful in sharing their ideas and resources to ensure the completion and usefulness of this manual.

Students served by the DJJ require a special effort if they are to become contributing and participating members of their communities. Federal and state laws, regulations, and rules will mean nothing in the absence of professional commitment and dedication by every staff member.

The Georgia Department of Juvenile Justice is very proud of its school system. The school system is Georgia’s 181st and is accredited by the Southern Association of Colleges and Schools (SACS). The DJJ School System has been called exemplary by the US Department of Justice. This didn’t just happen by chance; rather it was the hard work of many teachers, clerks, instructors and administrators that earned DJJ these accolades and accreditations. The DJJ education programs operate well because of the dedicated staff. These dedicated professionals are the heart of our system.

These Content Area Units of Instruction were designed to serve as a much needed tool for delivering meaningful whole group instruction. In addition, this resource will serve as a supplement to the skills and knowledge provided by the Georgia Department of Juvenile Justice Curriculum Activity Packets (CAPs).

I would like to thank all the DJJ Teaching Staff, the Content Area Leadership Teams, Kimberly Harrison, DJJ Special Education/Curriculum Consultant and Martha Patton, Curriculum Director for initiating this project and seeing it through. Thank you all for your hard work and dedication to the youth we serve.

Sincerely yours,

James “Jack” Catrett, Ed.D.

Associate Superintendent

**Mission**

The mission of Department of Juvenile Justice Science Consortium (DJJSC) is to build a multiparty effort statewide to achieve continuous, systemic and sustainable improvements in the education system serving the Science students of the Department of Juvenile Justice (DJJ).

**Vision**

To achieve the mission of the DJJSC, members work collaboratively in examining the Georgia Performance Standards. These guidelines speak specifically to teachers being able to: deliver meaning content pertaining to the Characteristics of Science and its content standards across the Science units of instruction. The DJJSC will master and develop whole-group unit lessons built around Curriculum Activity Packets (CAPs), critique student work, and work as a team to solve the common challenges of teaching within DJJ. Additionally, the DJJSC jointly analyzes student test data in order to: develop strategies to eradicate common academic deficits among students, align curriculum, and create a coherent learning pathway across grade levels. The DJJSC also reviews research articles, attends workshops or courses, and invites consultants to assist in the acquisition of necessary knowledge and skills. Finally, DJJSC members observe one another in the classroom through focus walks.

**Introduction**

The Environmental Science Units of Instruction Resource Manual is a tool that has been created to serve as a much needed tool for delivering meaningful whole group instruction. This manual is a supplement to the skills and knowledge provided by the Georgia Department of Juvenile Justice Curriculum Activity Packets (CAPs). It is imperative that our students learn to identify and investigate problems scientifically, and to work in cooperative learning groups. Best practices in education indicate that teachers should first model new skills for students. Next, teachers should provide opportunities for guided practice. Only then should teachers expect students to successfully complete an activity independently. The Environmental Science Units of Instruction meets that challenge.

|  |  |
| --- | --- |
|  | **The Georgia Department of Juvenile Justice** **Office of Education** **Direct Instruction Lesson Plan** |
| Teacher: |
| Subject:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date:\_\_\_\_\_\_\_\_\_\_\_\_\_to­\_\_\_\_\_\_\_\_\_\_\_­­\_\_\_\_\_\_\_Period □ 1st□ 2nd□ 3rd□ 4th□ 5th□ 6th | Students will engage in: □ Independent activities □ pairing □ Cooperative learning □ hands-on □ Peer tutoring □ Visuals  □ technology integration □ Simulations  □ a project □ centers □ lecture □ Other  |
| Essential Question(s):Standards:CAPs Covered:Grade Level:\_\_\_\_ Unit:\_\_\_\_\_\_RTI Tier for data collection: 2 or 3Tier 2 Students:Tier 3 Students: |
| **Time** | **Procedures Followed:** | **Material/Text**  |
| \_\_\_\_\_\_\_Minutes  | Review of Previously Learned Material/Lesson Connections:Recommended Time: 2 Minutes |  |
|  \_\_\_\_\_\_\_Minutes  | Display the Georgia Performance Standard(s) (project on blackboard via units of instruction located at <http://thevillage411.weebly.com/units-of-instruction2.html>, or print on blackboard) Read the Georgia Performance Standard(s) aloud and explain it to your students. You can rephrase the Georgia Performance Standard to make sure your students understand it.Display the Essential Question(s) (project on blackboard via units of instruction, or print on blackboard). Read the Essential Question (s) aloud and explain it to your students. You can rephrase the Essential Question (s) to make sure your students understand it.Recommended Time: 2 Minutes |  |
| \_\_\_\_\_\_\_Minutes | Introduce task by stating the purpose of today’s lesson. Recommended Time: 2 Minutes |  |
| \_\_\_\_\_\_\_Minutes | Engage students in conversation by asking open ended questions related to the essential question(s). Recommended Time: 2 Minutes |  |
| \_\_\_\_\_\_\_Minutes  | Begin whole group instruction with corrective feedback:Recommended Time: 10 Minutes |  |
| \_\_\_\_\_\_\_Minutes  |  Lesson Review/Reteach:Recommended Time: 2 Minutes |  |
| \_\_\_\_\_\_\_Minutes  | Independent Work CAPs:Recommended Time: 30 Minutes |  |
| Teacher Reflections:  |

The Instructional Rotation Matrix has been designed to assist language arts teachers in providing a balanced approach to utilizing the Science Units of Instruction across all grade levels on a rotating schedule.

|  |  |  |  |
| --- | --- | --- | --- |
| Monday | Tuesday | Wednesday | Thursday |
| 6th Grade ContentMiddle School | 9th Grade ContentHigh School | 7th Grade ContentMiddle School | 10th Grade ContentHigh School |
| 8th Grade ContentMiddle School | 11th Grade ContentHigh School | 6th Grade ContentMiddle School | 12th Grade ContentHigh School |
| 7th Grade ContentMiddle School | 9th Grade ContentHigh School | 8th Grade ContentMiddle School | 10th Grade ContentHigh School |
| 6th Grade ContentMiddle School | 11th Grade ContentHigh School | 7th Grade ContentMiddle School | 12th Grade ContentHigh School |

**Georgia Performance Standards**

**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.

d. Graphically compare and analyze data points and/or summary statistics.

e. Develop reasonable conclusions based on data collected.

f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.

**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.

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.

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.

**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.

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 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.

**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.

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).

f. Describe how political, legal, social, and economic decisions may affect global and local ecosystems.

|  |
| --- |
| DJJ Environmental ScienceGeorgia Performance Standards:  Curriculum Map  |
| **1st Semester** | **2nd Semester** |
| **Intro. to Environmental Science** | **Ecology** | **Populations** | **Water, Air, and Land** | **Mineral and Energy Resources** | **Our Health and our Future** |
| Chapter1 | CAPs1-3 | Chapter4 | CAPs9-12 | Chapter8 | CAPs21-22 | Chapter11 | CAPs28-30 | Chapter16 | CAPs43-45 | Chapter20 | CAPs53-54 |
| 2 | 4-6 | 5 | 13-15 | 9 | 23-24 | 12 | 31-33 | 17 | 46-47 | 21 | 55-58 |
| 3 | 7-8 | 6 | 16-18 | 10 | 25-27 | 13 | 34-36 | 18 | 48-49 |  |  |
|  |  | 7 | 19-20 |  |  | 14 | 37-39 | 19 | 50-52 |  |  |
|  |  |  |  |  |  | 15 | 40-42 |  |  |  |  |
| **GPS:**SEV.1.a,e,dSEV.4.a,d,f SEV.5.d,e,cSCSh.1.a,b,c SCSh.2.b SCSh.3.c,e,a,dSCSh.6.a,d SCSh.7.a,b,e SCSh.8.a,b,c,d,e SCSh.9.c | **GPS:**SCSh.7.c: SEV.2.a,c SEV.3.a,b,d,c,eSCSh.2.a,b SCSh.3.a,c,d,eSCSh.4.aSCSh.6. a,b,c SCSh.9.cSEV.1.a,d,e,b SEV.5.c | **GPS:**SCSh.2.a,bSCSh.3.a,b,c,d,e,fSCSh.4.a,b,cSCSh.5.a,b,e SCSh.6.a,b,c,d SEV.3.e SEV.5.a,bSCSh.2.a,b SCSh.3.a,b,c,d,e,f SCSh.4.a,d,c SCSh.5.a,b SCSh.6.a,b,c, SEV.1.a,d,eSEV.4.f | **GPS:**SCSh.9.d SEV.5.e,a,d,c SCSh.2.a,b. SCSh.3.c,aSCSh.4.a SCSh.5.a SCSh.6.a,d,bSEV.4.f,a,b,c SEV.1.c  | **GPS:**SEV.4.a,c,e,b,f SCSh.3.c,e,dSCSh.6.aSCSh.2.b,d SCSh.3.c,e,d SCSh.4.b,c,ad SEV.5.e | **GPS:**SCSh.2.b,c:. SCSh.3.c,e: SCSh.4.b,c SCSh.6.a,d SCSh.2.b,cSEV.5.f,e,d,c SCSh.5.e,d,c,f  |
| **Focus CAPs:**3,6,8 | **Focus CAPs:**12,15,18,20 | **Focus CAPs:**22,24,27 | Focus CAPs:30,33,36,39,42 | **Focus CAPs:**45,47,49,52 | **Focus CAPs:**54,58 |

**Enduring Understandings & Essential Question**

**Introduction to Environmental Science**

**Essential Questions:**

What are the compositions and structure of earth?

What are tectonic plates?

What are the main causes of earthquakes?

What effect does climate change have on volcanic eruptions?

What are the components of Earth’s atmosphere?

What are the three mechanisms of heat transfer in Earth’s atmosphere?

**Ecology**

**Essential Questions:**

What are the biotic and abiotic factors in an ecosystem?

How does a population differ from its species?

Why are habitats important for organisms?

How is energy transferred from the sun to producers and then to consumers?

How do consumers depend on producers?

What are land environments?

Why is vegetation used to classify a biome?

**Populations**

**Essential Questions:**

What are the three main properties of a population?

What is exponential growth

What effect does reproductive behavior of individuals have on the growth rate of their population?

What is biodiversity?

What effect does biodiversity have on the future of humans?

What happens within an ecosystem when a keystone species is driven to extinction?

**Water, Air, and Land**

**Essential Questions:**

What are patterns of global water use?

How is water treated so that it may be used for drinking?

How does the pH of pure water compare to with that of acid precipitation?

What causes acid precipitation?

How might acid precipitation affect humans?

What is the difference between climate and weather?

What factors determine climate?

What cause ozone depletion?

**Mineral and Energy Resources**

**Essential Questions:**

What is a mineral?

How are ore minerals formed?

What are some basic characteristics of mineral?

What is renewable energy?

What are the advantages and disadvantages of renewable energy?

How does renewable energy affect the environment?

What are alternative energy technologies?

What are two advantages of using hydrogen as a fuel source?

**Introduction to Environmental Science**

**Georgia Performance Standards**

**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.

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d. Describe the relationship of energy consumption and the living standards of societies.

f. Describe the need for informed decision making of resource utilization.

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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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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.

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**SCSh8. Students will understand important features of the process of scientific inquiry.**

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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.

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.

**SCSh9. Students will enhance reading in all curriculum areas by:**

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.

**Task: 1**

**Essential Questions:**

What are the compositions and structure of earth?

What are tectonic plates?

**Resources:**

[Where do most earthquake epicenters and volcanoes occur virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/E27/E27.html)

[Earths Plates Concept](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::440::356::/sites/dl/free/0078778220/164155/511_Fig_8.swf::Earths%20Plates)

[Standardized Test Practice](http://glencoe.mcgraw-hill.com/sites/0078778220/student_view0/chapter4/standardized_test_practice.html)

**Teacher’s Place:**

Prior to beginning the performance activity, the teacher should implement the following steps using teaching techniques you have found to be effective for your students.

1. Explain the activity (activity requirements)

2. Display the Georgia Performance Standard(s) (project on blackboard via units of instruction located at <http://thevillage411.weebly.com/units-of-instruction2.html> units of instruction page, or print on blackboard)

3. Read the Georgia Performance Standard(s) aloud and explain it to your students. You can rephrase the Georgia Performance Standard to make sure your students understand it.

4. Display the Essential Question(s) (project on blackboard via units of instruction, or print on blackboard)

5. Read the Essential Question (s) aloud and explain it to your students. You can rephrase the Essential Question (s) to make sure your students understand it.

6. Review unit vocabulary with students.

7. Introduce the following:

a. The Dynamic Earth: The Geosphere p.63

8. Engage students in conversation by asking students the following question: Which of earth’s three layers is liquid? What is the environment? Write answers on the blackboard.

9. Discuss answers with the students using the following questioning techniques as applicable:

**Questioning Techniques:**

**Memory Questions**

 Signal words: who, what, when, where?

 Cognitive operations: naming, defining, identifying, designating

**Convergent Thinking Questions**

 Signal words: who, what, when, where?

Cognitive operations: explaining, stating relationships, comparing and

contrasting

 **Divergent Thinking Questions**

 Signal words: imagine, suppose, predict, if/then

Cognitive operations: predicting, hypothesizing, inferring, reconstructing

 **Evaluative Thinking Questions**

 Signal words: defend, judge, justify (what do you think)?

10. Guide students into the activity utilizing [Where do most earthquake epicenters and volcanoes occur virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/E27/E27.html)

11. Complete the activity with the students (some tasks may require students to work independently, peer to peer, learning circles [2-3 students] or as a whole group [the entire class]. Therefore the teacher may serve as activity leader and or facilitator. When an activity calls for students to work in learning circles you should assign roles to students individually i.e. recorder, discussion leader or presenter)

12. At the end of the **\*whole group learning session**, students will transition into independent CAP assignments.

**\*The phrase, “whole group learning session” is utilized “rather than, the end of the activity” because all of the activities may not be completed in one day.**

**Activity**

The teacher and students will complete [Where do most earthquake epicenters and volcanoes occur virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/E27/E27.html) as a whole group activity. Students will complete the journal activity as a ticket out the door.

The teacher and students will review today’s lesson by completing [Standardized Test Practice](http://glencoe.mcgraw-hill.com/sites/0078778220/student_view0/chapter4/standardized_test_practice.html).

**Task: 2**

**Essential Questions:**

What are the main causes of earthquakes?

**Resources:**

[How do seismographs stations help to determine an earthquakes epicenter virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES09/ES09.html)

[Math across the curriculum test item](http://glencoe.mcgraw-hill.com/sites/0078778220/student_view0/chapter5/math_practice.html)

[Concentration game](http://glencoe.mcgraw-hill.com/sites/dl/free/0078778220/165490/index.html)

**Teacher’s Place:**

Prior to beginning the performance activity, the teacher should implement the following steps using teaching techniques you have found to be effective for your students.

1. Explain the activity (activity requirements)

2. Display the Georgia Performance Standard(s) (project on blackboard via units of instruction located at <http://thevillage411.weebly.com/units-of-instruction2.html> units of instruction page, or print on blackboard)

3. Read the Georgia Performance Standard(s) aloud and explain it to your students. You can rephrase the Georgia Performance Standard to make sure your students understand it.

4. Display the Essential Question(s) (project on blackboard via units of instruction, or print on blackboard)

5. Read the Essential Question (s) aloud and explain it to your students. You can rephrase the Essential Question (s) to make sure your students understand it.

6. Review unit vocabulary with students.

7. Review the following:

a. The Dynamic Earth: The Geosphere p.63

8. Engage students in conversation by asking students the following question: What is meant by the magnitude of an earthquake? Write answers on the blackboard.

9. Discuss answers with the students using the following questioning techniques as applicable:

**Questioning Techniques:**

**Memory Questions**

 Signal words: who, what, when, where?

 Cognitive operations: naming, defining, identifying, designating

**Convergent Thinking Questions**

 Signal words: who, what, when, where?

Cognitive operations: explaining, stating relationships, comparing and

contrasting

 **Divergent Thinking Questions**

 Signal words: imagine, suppose, predict, if/then

Cognitive operations: predicting, hypothesizing, inferring, reconstructing

 **Evaluative Thinking Questions**

 Signal words: defend, judge, justify (what do you think)?

10. Guide students into the activity utilizing [How do seismographs stations help to determine an earthquakes epicenter virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES09/ES09.html)

11. Complete the activity with the students (some tasks may require students to work independently, peer to peer, learning circles [2-3 students] or as a whole group [the entire class]. Therefore the teacher may serve as activity leader and or facilitator. When an activity calls for students to work in learning circles you should assign roles to students individually i.e. recorder, discussion leader or presenter)

12. At the end of the **\*whole group learning session**, students will transition into independent CAP assignments.

**\*The phrase, “whole group learning session” is utilized “rather than, the end of the activity” because all of the activities may not be completed in one day.**

**Activity**

The teacher and students will complete [How do seismographs stations help to determine an earthquakes epicenter virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES09/ES09.html) as a whole group activity. Students will work in cooperative learning groups to complete the journal activity.

The teacher and student will complete [Math across the curriculum test item](http://glencoe.mcgraw-hill.com/sites/0078778220/student_view0/chapter5/math_practice.html)

**Task: 3**

**Essential Questions:**

What effect does climate change have on volcanic eruptions?

**Resources:**

[How does magma's composition affect a volcano’s eruption virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES10/ES10.html)

[Rock virtual lesson](http://glencoe.mcgraw-hill.com/sites/dl/free/0078778220/164213/00044683.html)

[Math across the curriculum](http://glencoe.mcgraw-hill.com/sites/0078778220/student_view0/chapter6/math_practice.html)

[Section Quick Check](http://glencoe.mcgraw-hill.com/sites/0078778220/student_view0/chapter6/section1/self-check_quiz-eng_.html)

**Teacher’s Place:**

Prior to beginning the performance activity, the teacher should implement the following steps using teaching techniques you have found to be effective for your students.

1. Explain the activity (activity requirements)

2. Display the Georgia Performance Standard(s) (project on blackboard via units of instruction located at <http://thevillage411.weebly.com/units-of-instruction2.html> units of instruction page, or print on blackboard)

3. Read the Georgia Performance Standard(s) aloud and explain it to your students. You can rephrase the Georgia Performance Standard to make sure your students understand it.

4. Display the Essential Question(s) (project on blackboard via units of instruction, or print on blackboard)

5. Read the Essential Question (s) aloud and explain it to your students. You can rephrase the Essential Question (s) to make sure your students understand it.

6. Review unit vocabulary with students.

7. Review the following:

a. The Dynamic Earth: The Geosphere p.63

8. Engage students in conversation by asking students the following question: Can animals predict earthquakes? Write answers on the blackboard.

9. Discuss answers with the students using the following questioning techniques as applicable:

**Questioning Techniques:**

**Memory Questions**

 Signal words: who, what, when, where?

 Cognitive operations: naming, defining, identifying, designating

**Convergent Thinking Questions**

 Signal words: who, what, when, where?

Cognitive operations: explaining, stating relationships, comparing and

contrasting

 **Divergent Thinking Questions**

 Signal words: imagine, suppose, predict, if/then

Cognitive operations: predicting, hypothesizing, inferring, reconstructing

 **Evaluative Thinking Questions**

 Signal words: defend, judge, justify (what do you think)?

10. Guide students into the activity utilizing [How does magma's composition affect a volcano’s eruption virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES10/ES10.html)

11. Complete the activity with the students (some tasks may require students to work independently, peer to peer, learning circles [2-3 students] or as a whole group [the entire class]. Therefore the teacher may serve as activity leader and or facilitator. When an activity calls for students to work in learning circles you should assign roles to students individually i.e. recorder, discussion leader or presenter)

12. At the end of the **\*whole group learning session**, students will transition into independent CAP assignments.

**\*The phrase, “whole group learning session” is utilized “rather than, the end of the activity” because all of the activities may not be completed in one day.**

**Activity**

The teacher and students will complete [How does magma's composition affect a volcano’s eruption virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES10/ES10.html) as a whole group activity. Students will work in cooperative learning groups to complete the journal activity.

The teacher and students will review today’s lesson by completing [Section Quick Check](http://glencoe.mcgraw-hill.com/sites/0078778220/student_view0/chapter6/section1/self-check_quiz-eng_.html).

The teacher and student will complete [Math across the curriculum](http://glencoe.mcgraw-hill.com/sites/0078778220/student_view0/chapter6/math_practice.html) as a whole group activity.

**Task: 4**

**Essential Questions:**

What are the components of Earth’s atmosphere?

What are the three mechanisms of heat transfer in Earth’s atmosphere?

**Resources:**

[What is the structure of earth's atmosphere virtual lab](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES14/ES14.html)

[The Water Cycle concept](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::573::356::/sites/dl/free/0078778026/164155/514_Fig_13.swf::The%20Water%20Cycle)

[Standardized Test Practice](http://glencoe.mcgraw-hill.com/sites/0078778026/student_view0/unit5/chapter15/standardized_test_practice.html)

**Teacher’s Place:**

Prior to beginning the performance activity, the teacher should implement the following steps using teaching techniques you have found to be effective for your students.

1. Explain the activity (activity requirements)

2. Display the Georgia Performance Standard(s) (project on blackboard via units of instruction located at <http://thevillage411.weebly.com/units-of-instruction2.html> units of instruction page, or print on blackboard)

3. Read the Georgia Performance Standard(s) aloud and explain it to your students. You can rephrase the Georgia Performance Standard to make sure your students understand it.

4. Display the Essential Question(s) (project on blackboard via units of instruction, or print on blackboard)

5. Read the Essential Question (s) aloud and explain it to your students. You can rephrase the Essential Question (s) to make sure your students understand it.

6. Review unit vocabulary with students.

7. Introduce the following:

a. The Dynamic Earth: The Atmosphere p.71

8. Engage students in conversation by asking students the following question: Why do planes fly so high, often 10km above the ground? Write answers on the blackboard.

9. Discuss answers with the students using the following questioning techniques as applicable:

**Questioning Techniques:**

**Memory Questions**

 Signal words: who, what, when, where?

 Cognitive operations: naming, defining, identifying, designating

**Convergent Thinking Questions**

 Signal words: who, what, when, where?

Cognitive operations: explaining, stating relationships, comparing and

contrasting

 **Divergent Thinking Questions**

 Signal words: imagine, suppose, predict, if/then

Cognitive operations: predicting, hypothesizing, inferring, reconstructing

 **Evaluative Thinking Questions**

 Signal words: defend, judge, justify (what do you think)?

10. Guide students into the activity utilizing [What is the structure of earth's atmosphere virtual lab](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES14/ES14.html)

11. Complete the activity with the students (some tasks may require students to work independently, peer to peer, learning circles [2-3 students] or as a whole group [the entire class]. Therefore the teacher may serve as activity leader and or facilitator. When an activity calls for students to work in learning circles you should assign roles to students individually i.e. recorder, discussion leader or presenter)

12. At the end of the **\*whole group learning session**, students will transition into independent CAP assignments.

**\*The phrase, “whole group learning session” is utilized “rather than, the end of the activity” because all of the activities may not be completed in one day.**

**Activity**

The teacher and students will complete [What is the structure of earth's atmosphere virtual lab](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES14/ES14.html)

 as a whole group activity. Students will work in cooperative learning groups to complete the journal activity.

The teacher and students will review today’s lesson by completing [Standardized Test Practice](http://glencoe.mcgraw-hill.com/sites/0078778026/student_view0/unit5/chapter15/standardized_test_practice.html)

**Ecology**

**Georgia Performance Standards**

**SCSh7. Students analyze how scientific knowledge is developed.**

Students recognize that:

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.

**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.

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.

**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).

**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.

d. Graphically compare and analyze data points and/or summary statistics.

e. Develop reasonable conclusions based on data collected.

**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.

**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.

**SCSh9. Students will enhance reading in all curriculum areas by:**

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.

**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.

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.

**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.**

c. Explain how human activities affect global and local sustainability.

**Task: 1**

**Essential Questions:**

What are the biotic and abiotic factors in an ecosystem?

How does a population differ from its species?

Why are habitats important for organisms?

**Resources:**

[How do organisms react to changes in abiotic changes virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/CT08/CT08.html)

[Ecosystems virtual lesson](http://glencoe.mcgraw-hill.com/sites/dl/free/0078778204/167348/00076707.html)

**Teacher’s Place:**

Prior to beginning the performance activity, the teacher should implement the following steps using teaching techniques you have found to be effective for your students.

1. Explain the activity (activity requirements)

2. Display the Georgia Performance Standard(s) (project on blackboard via units of instruction located at <http://thevillage411.weebly.com/units-of-instruction2.html> units of instruction page, or print on blackboard)

3. Read the Georgia Performance Standard(s) aloud and explain it to your students. You can rephrase the Georgia Performance Standard to make sure your students understand it.

4. Display the Essential Question(s) (project on blackboard via units of instruction, or print on blackboard)

5. Read the Essential Question (s) aloud and explain it to your students. You can rephrase the Essential Question (s) to make sure your students understand it.

6. Review unit vocabulary with students.

7. Introduce the following:

a. The Organization of Life: Ecosystems; Everything is Connected p.99

8. Engage students in conversation by asking students the following question: What are some of the things you need for survival? Then, ask the students what kinds of ecosystems they think might produce their necessities?.

Write answers on the blackboard.

9. Discuss answers with the students using the following questioning techniques as applicable:

**Questioning Techniques:**

**Memory Questions**

 Signal words: who, what, when, where?

 Cognitive operations: naming, defining, identifying, designating

**Convergent Thinking Questions**

 Signal words: who, what, when, where?

Cognitive operations: explaining, stating relationships, comparing and

contrasting

 **Divergent Thinking Questions**

 Signal words: imagine, suppose, predict, if/then

Cognitive operations: predicting, hypothesizing, inferring, reconstructing

 **Evaluative Thinking Questions**

 Signal words: defend, judge, justify (what do you think)?

10. Guide students into the activity utilizing [**How do organisms react to changes in abiotic changes virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/CT08/CT08.html)

11. Complete the activity with the students (some tasks may require students to work independently, peer to peer, learning circles [2-3 students] or as a whole group [the entire class]. Therefore the teacher may serve as activity leader and or facilitator. When an activity calls for students to work in learning circles you should assign roles to students individually i.e. recorder, discussion leader or presenter)

12. At the end of the **\*whole group learning session**, students will transition into independent CAP assignments.

**\*The phrase, “whole group learning session” is utilized “rather than, the end of the activity” because all of the activities may not be completed in one day.**

**Activity**

The teacher and students will complete [**How do organisms react to changes in abiotic changes virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/CT08/CT08.html) as a whole group activity. Students will work in peer to peer pairs to complete the journal activity.

**Task: 2**

**Essential Questions:**

How is energy transferred from the sun to producers and then to consumers?

How do consumers depend on producers?

**Resources:**

[**How is energy transferred through a community of organisms virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/CT06/CT06.html)

**Teacher’s Place:**

Prior to beginning the performance activity, the teacher should implement the following steps using teaching techniques you have found to be effective for your students.

1. Explain the activity (activity requirements)

2. Display the Georgia Performance Standard(s) (project on blackboard via units of instruction located at <http://thevillage411.weebly.com/units-of-instruction2.html> units of instruction page, or print on blackboard)

3. Read the Georgia Performance Standard(s) aloud and explain it to your students. You can rephrase the Georgia Performance Standard to make sure your students understand it.

4. Display the Essential Question(s) (project on blackboard via units of instruction, or print on blackboard)

5. Read the Essential Question (s) aloud and explain it to your students. You can rephrase the Essential Question (s) to make sure your students understand it.

6. Review unit vocabulary with students.

7. Introduce the following:

a. How Ecosystems Work: Energy Flow in Ecosystems p.125

8. Engage students in conversation by asking students to write down three plants or animals and the animals that eat them. Also, have students to write down any plants they know that eat animals. Have volunteers list their answers on the blackboard. Write answers on the blackboard.

9. Discuss answers with the students using the following questioning techniques as applicable:

**Questioning Techniques:**

**Memory Questions**

 Signal words: who, what, when, where?

 Cognitive operations: naming, defining, identifying, designating

**Convergent Thinking Questions**

 Signal words: who, what, when, where?

Cognitive operations: explaining, stating relationships, comparing and

contrasting

 **Divergent Thinking Questions**

 Signal words: imagine, suppose, predict, if/then

Cognitive operations: predicting, hypothesizing, inferring, reconstructing

 **Evaluative Thinking Questions**

 Signal words: defend, judge, justify (what do you think)?

10. Guide students into the activity utilizing [**How is energy transferred through a community of organisms virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/CT06/CT06.html)

11. Complete the activity with the students (some tasks may require students to work independently, peer to peer, learning circles [2-3 students] or as a whole group [the entire class]. Therefore the teacher may serve as activity leader and or facilitator. When an activity calls for students to work in learning circles you should assign roles to students individually i.e. recorder, discussion leader or presenter)

12. At the end of the **\*whole group learning session**, students will transition into independent CAP assignments.

**\*The phrase, “whole group learning session” is utilized “rather than, the end of the activity” because all of the activities may not be completed in one day.**

**Activity**

The teacher and students will complete [**How is energy transferred through a community of organisms virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/CT06/CT06.html) as a whole group activity. Students will work in peer to peer pairs to complete the journal activity.

**Task: 3**

**Essential Questions:**

What are land environments?

Why is vegetation used to classify a biome?

**Resources:**

[What are the different types of land environments virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/LS19/LS19.html)

[Land Biomes of the World concept](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::519::356::/sites/dl/free/0078778204/164155/434_Fig_5.swf::Land%20Biomes%20of%20the%20World)

**Teacher’s Place:**

Prior to beginning the performance activity, the teacher should implement the following steps using teaching techniques you have found to be effective for your students.

1. Explain the activity (activity requirements)

2. Display the Georgia Performance Standard(s) (project on blackboard via units of instruction located at <http://thevillage411.weebly.com/units-of-instruction2.html> units of instruction page, or print on blackboard)

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4. Display the Essential Question(s) (project on blackboard via units of instruction, or print on blackboard)

5. Read the Essential Question (s) aloud and explain it to your students. You can rephrase the Essential Question (s) to make sure your students understand it.

6. Review unit vocabulary with students.

7. Introduce the following:

a. Biomes: What is a Biome? p.153

8. Engage students in conversation by asking students the following question: How are ecosystems related to Biomes. Write answers on the blackboard.

9. Discuss answers with the students using the following questioning techniques as applicable:

**Questioning Techniques:**

**Memory Questions**

 Signal words: who, what, when, where?

 Cognitive operations: naming, defining, identifying, designating

**Convergent Thinking Questions**

 Signal words: who, what, when, where?

Cognitive operations: explaining, stating relationships, comparing and

contrasting

 **Divergent Thinking Questions**

 Signal words: imagine, suppose, predict, if/then

Cognitive operations: predicting, hypothesizing, inferring, reconstructing

 **Evaluative Thinking Questions**

 Signal words: defend, judge, justify (what do you think)?

10. Guide students into the activity utilizing [What are the different types of land environments virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/LS19/LS19.html)

11. Complete the activity with the students (some tasks may require students to work independently, peer to peer, learning circles [2-3 students] or as a whole group [the entire class]. Therefore the teacher may serve as activity leader and or facilitator. When an activity calls for students to work in learning circles you should assign roles to students individually i.e. recorder, discussion leader or presenter)

12. At the end of the **\*whole group learning session**, students will transition into independent CAP assignments.

**\*The phrase, “whole group learning session” is utilized “rather than, the end of the activity” because all of the activities may not be completed in one day.**

**Activity**

The teacher and students will complete [What are the different types of land environments virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/LS19/LS19.html) as a whole group activity. Students will work in learning circles to complete the journal activity.

**Population**

**Georgia Performance Standards**

**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.

**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.

d. Graphically compare and analyze data points and/or summary statistics.

e. Develop reasonable conclusions based on data collected.

f. Evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.

**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.

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.

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.

**SEV3. Students will describe stability and change in ecosystems.**

e. Describe interactions between individuals (*i.e.* mutualism, commensalisms, parasitism, predation, and competition).

 **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.

**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.

**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.

 d. Graphically compare and analyze data points and/or summary statistics.

 e. Develop reasonable conclusions based on data collected.

 f. Evaluate whether conclusions are reasonable by reviewing the process and

 checking against other available information.

**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.

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.

**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.

**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.

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.

**SEV4. Students will understand and describe availability, allocation and conservation**

**of energy and other resources**

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)

**Task: 1**

**Essential Questions:**

What are the three main properties of a population?

What is exponential growth

What effect does reproductive behavior of individuals have on the growth rate of their population?

**Resources:**

[**Competition within a population virtual lesson**](http://glencoe.mcgraw-hill.com/sites/dl/free/0078802849/383928/BL_04.html)

[**Carrying capacity concept**](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=avi::240::320::/sites/dl/free/0078802849/383928/LogisticPopulationGrowth.avi::Logistic%20Population%20Growth)

[Population Growth Rates of Countries](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::550::400::/sites/dl/free/0078802849/383912/table04_1.swf::Population%20Growth%20Rates%20of%20Countries)

**Teacher’s Place:**

Prior to beginning the performance activity, the teacher should implement the following steps using teaching techniques you have found to be effective for your students.

1. Explain the activity (activity requirements)

2. Display the Georgia Performance Standard(s) (project on blackboard via units of instruction located at <http://thevillage411.weebly.com/units-of-instruction2.html> units of instruction page, or print on blackboard)

3. Read the Georgia Performance Standard(s) aloud and explain it to your students. You can rephrase the Georgia Performance Standard to make sure your students understand it.

4. Display the Essential Question(s) (project on blackboard via units of instruction, or print on blackboard)

5. Read the Essential Question (s) aloud and explain it to your students. You can rephrase the Essential Question (s) to make sure your students understand it.

6. Review unit vocabulary with students.

7. Introduce the following:

a. Understanding Populations: What limits population growth p. 214

8. Engage students in conversation by asking students to do the following: Describe one example of competition among members of a population. Write answers on the blackboard.

9. Discuss answers with the students using the following questioning techniques as applicable:

**Questioning Techniques:**

**Memory Questions**

 Signal words: who, what, when, where?

 Cognitive operations: naming, defining, identifying, designating

**Convergent Thinking Questions**

 Signal words: who, what, when, where?

Cognitive operations: explaining, stating relationships, comparing and

contrasting

 **Divergent Thinking Questions**

 Signal words: imagine, suppose, predict, if/then

Cognitive operations: predicting, hypothesizing, inferring, reconstructing

 **Evaluative Thinking Questions**

 Signal words: defend, judge, justify (what do you think)?

10. Guide students into the activity utilizing [**Carrying capacity concept**](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=avi::240::320::/sites/dl/free/0078802849/383928/LogisticPopulationGrowth.avi::Logistic%20Population%20Growth)and[**Competition within a population virtual lesson**](http://glencoe.mcgraw-hill.com/sites/dl/free/0078802849/383928/BL_04.html)

11. Complete the activity with the students (some tasks may require students to work independently, peer to peer, learning circles [2-3 students] or as a whole group [the entire class]. Therefore the teacher may serve as activity leader and or facilitator. When an activity calls for students to work in learning circles you should assign roles to students individually i.e. recorder, discussion leader or presenter)

12. At the end of the **\*whole group learning session**, students will transition into independent CAP assignments.

**\*The phrase, “whole group learning session” is utilized “rather than, the end of the activity” because all of the activities may not be completed in one day.**

**Activity**

The teacher and students will complete [**Competition within a population virtual lesson**](http://glencoe.mcgraw-hill.com/sites/dl/free/0078802849/383928/BL_04.html)

as a whole group activity. Students will work in cooperative learning groups to complete the journal activity.

The teacher and students will also complete the [Population Growth Rates of Countries](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::550::400::/sites/dl/free/0078802849/383912/table04_1.swf::Population%20Growth%20Rates%20of%20Countries) as a group activity.

**Task: 2**

**Essential Questions:**

What is biodiversity?

What effect does biodiversity have on the future of humans?

**Resources:**

[**Population changes virtual lesson**](http://glencoe.mcgraw-hill.com/sites/dl/free/0078757134/383929/BL_09.html)

**Teacher’s Place:**

Prior to beginning the performance activity, the teacher should implement the following steps using teaching techniques you have found to be effective for your students.

1. Explain the activity (activity requirements)

2. Display the Georgia Performance Standard(s) (project on blackboard via units of instruction located at <http://thevillage411.weebly.com/units-of-instruction2.html> units of instruction page, or print on blackboard)

3. Read the Georgia Performance Standard(s) aloud and explain it to your students. You can rephrase the Georgia Performance Standard to make sure your students understand it.

4. Display the Essential Question(s) (project on blackboard via units of instruction, or print on blackboard)

5. Read the Essential Question (s) aloud and explain it to your students. You can rephrase the Essential Question (s) to make sure your students understand it.

6. Review unit vocabulary with students.

7. Introduce the following:

a. Biodiversity: Biodiversity at risk p. 263

8. Engage students in conversation by asking students to think about what would happen if the population in their city or town doubled but the number of schools, roads, stores, and houses remained the same. Write answers on the blackboard.

9. Discuss answers with the students using the following questioning techniques as applicable:

**Questioning Techniques:**

**Memory Questions**

 Signal words: who, what, when, where?

 Cognitive operations: naming, defining, identifying, designating

**Convergent Thinking Questions**

 Signal words: who, what, when, where?

Cognitive operations: explaining, stating relationships, comparing and

contrasting

 **Divergent Thinking Questions**

 Signal words: imagine, suppose, predict, if/then

Cognitive operations: predicting, hypothesizing, inferring, reconstructing

 **Evaluative Thinking Questions**

 Signal words: defend, judge, justify (what do you think)?

10. Guide students into the activity utilizing [**Population changes virtual lesson**](http://glencoe.mcgraw-hill.com/sites/dl/free/0078757134/383929/BL_09.html)

11. Complete the activity with the students (some tasks may require students to work independently, peer to peer, learning circles [2-3 students] or as a whole group [the entire class]. Therefore the teacher may serve as activity leader and or facilitator. When an activity calls for students to work in learning circles you should assign roles to students individually i.e. recorder, discussion leader or presenter)

12. At the end of the **\*whole group learning session**, students will transition into independent CAP assignments.

**\*The phrase, “whole group learning session” is utilized “rather than, the end of the activity” because all of the activities may not be completed in one day.**

**Activity**

The teacher and students will complete [**Population changes virtual lesson**](http://glencoe.mcgraw-hill.com/sites/dl/free/0078757134/383929/BL_09.html)as a whole group activity. Students will work in peer to peer pairs to complete the journal activity.

**Task: 3**

**Essential Questions:**

What happens within an ecosystem when a keystone species is driven to extinction?

**Resources:**

[**Five Most Recent Mass Extinctions Concepts**](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::550::400::/sites/dl/free/0078757134/383912/table05_1.swf::Five%20Most%20Recent%20Mass%20Extinctions)

[**Estimated Number of Extinctions Since 1600**](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::550::400::/sites/dl/free/0078757134/383912/table05_2.swf::Estimated%20Number%20of%20Extinctions%20Since%201600)

[**Visualizing Biodiversity Hot Spots**](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::550::400::/sites/dl/free/0078757134/383915/Visualizing_Biodiversity_Hot_Spots_Script.swf::Visualizing%20Biodiversity%20Hot%20Spots)

[Standardized Test Practice](http://glencoe.mcgraw-hill.com/sites/0078757134/student_view0/unit1/chapter5/standardized_test_practice.html)

[Give it a try chapter review](http://glencoe.mcgraw-hill.com/sites/0078757134/student_view0/unit1/chapter5/chapter_test_practice.html)

**Teacher’s Place:**

Prior to beginning the performance activity, the teacher should implement the following steps using teaching techniques you have found to be effective for your students.

1. Explain the activity (activity requirements)

2. Display the Georgia Performance Standard(s) (project on blackboard via units of instruction located at <http://thevillage411.weebly.com/units-of-instruction2.html> units of instruction page, or print on blackboard)

3. Read the Georgia Performance Standard(s) aloud and explain it to your students. You can rephrase the Georgia Performance Standard to make sure your students understand it.

4. Display the Essential Question(s) (project on blackboard via units of instruction, or print on blackboard)

5. Read the Essential Question (s) aloud and explain it to your students. You can rephrase the Essential Question (s) to make sure your students understand it.

6. Review unit vocabulary with students.

7. Review the following:

a. Biodiversity: Biodiversity at risk p. 263

8. Engage students in conversation by asking students the following question: How many species do you think you see or interact with on an average day? Then ask students to name at least two endangered species. Write answers on the blackboard.

9. Discuss answers with the students using the following questioning techniques as applicable:

**Questioning Techniques:**

**Memory Questions**

 Signal words: who, what, when, where?

 Cognitive operations: naming, defining, identifying, designating

**Convergent Thinking Questions**

 Signal words: who, what, when, where?

Cognitive operations: explaining, stating relationships, comparing and

contrasting

 **Divergent Thinking Questions**

 Signal words: imagine, suppose, predict, if/then

Cognitive operations: predicting, hypothesizing, inferring, reconstructing

 **Evaluative Thinking Questions**

 Signal words: defend, judge, justify (what do you think)?

10. Guide students into the activity utilizing

11. Complete the activity with the students (some tasks may require students to work independently, peer to peer, learning circles [2-3 students] or as a whole group [the entire class]. Therefore the teacher may serve as activity leader and or facilitator. When an activity calls for students to work in learning circles you should assign roles to students individually i.e. recorder, discussion leader or presenter)

12. At the end of the **\*whole group learning session**, students will transition into independent CAP assignments.

**\*The phrase, “whole group learning session” is utilized “rather than, the end of the activity” because all of the activities may not be completed in one day.**

**Activity**

The teacher and students will view [Visualizing Biodiversity Hot Spots](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::550::400::/sites/dl/free/0078757134/383915/Visualizing_Biodiversity_Hot_Spots_Script.swf::Visualizing%20Biodiversity%20Hot%20Spots) as a whole group activity. The teacher and students will then complete the [Five Most Recent Mass Extinctions Concepts](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::550::400::/sites/dl/free/0078757134/383912/table05_1.swf::Five%20Most%20Recent%20Mass%20Extinctions) and the [Estimated Number of Extinctions Since 1600](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::550::400::/sites/dl/free/0078757134/383912/table05_2.swf::Estimated%20Number%20of%20Extinctions%20Since%201600) as whole group activities . Students will then answer the essential question independently as a ticket out the door.

**Water, Air, and Land**

**SCSh9. Students will enhance reading in all curriculum areas by:**

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 wards.

**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.

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).

**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.

**SCSh3. Students will identify and investigate problems scientifically.**

a. Suggest reasonable hypotheses for identified problems.

c. Collect, organize and record appropriate data.

**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.

**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.

**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.

d. Participate in group discussions of scientific investigation and current scientific issues.

**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.

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)

**SEV1. Students will investigate the flow of energy and cycling of matter within an**

**ecosystem and relate these phenomena to human society.**

c. Relate food production and quality of nutrition to population growth and the trophic levels

**Task: 1**

**Georgia Performance Standards:**

**Essential Questions:**

What are patterns of global water use?

How is water treated so that it may be used for drinking?

**Resources:**

[How can we conserve water virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES20/ES20.html)

[Concentration game](http://glencoe.mcgraw-hill.com/sites/dl/free/0078778026/165511/index.html%20)

[Math across the curriculum](http://glencoe.mcgraw-hill.com/sites/0078778026/student_view0/unit6/chapter21/math_practice.html)

[Test Prep](http://glencoe.mcgraw-hill.com/sites/0078778026/student_view0/unit6/chapter21/standardized_test_practice.html)

**Teacher’s Place:**

Prior to beginning the performance activity, the teacher should implement the following steps using teaching techniques you have found to be effective for your students.

1. Explain the activity (activity requirements)

2. Display the Georgia Performance Standard(s) (project on blackboard via units of instruction located at <http://thevillage411.weebly.com/units-of-instruction2.html> units of instruction page, or print on blackboard)

3. Read the Georgia Performance Standard(s) aloud and explain it to your students. You can rephrase the Georgia Performance Standard to make sure your students understand it.

4. Display the Essential Question(s) (project on blackboard via units of instruction, or print on blackboard)

5. Read the Essential Question (s) aloud and explain it to your students. You can rephrase the Essential Question (s) to make sure your students understand it.

6. Review unit vocabulary with students.

7. Introduce the following:

a. Water Use and Management: Water Conservation p.301

8. Engage students in conversation by asking students to think about where water comes from. Then ask students is there more or less water on Earth than there was 1 billion years ago? Write answers on the blackboard.

9. Discuss answers with the students using the following questioning techniques as applicable:

**Questioning Techniques:**

**Memory Questions**

 Signal words: who, what, when, where?

 Cognitive operations: naming, defining, identifying, designating

**Convergent Thinking Questions**

 Signal words: who, what, when, where?

Cognitive operations: explaining, stating relationships, comparing and

contrasting

 **Divergent Thinking Questions**

 Signal words: imagine, suppose, predict, if/then

Cognitive operations: predicting, hypothesizing, inferring, reconstructing

 **Evaluative Thinking Questions**

 Signal words: defend, judge, justify (what do you think)?

10. Guide students into the activity utilizing [**How can we conserve water virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES20/ES20.html)

11. Complete the activity with the students (some tasks may require students to work independently, peer to peer, learning circles [2-3 students] or as a whole group [the entire class]. Therefore the teacher may serve as activity leader and or facilitator. When an activity calls for students to work in learning circles you should assign roles to students individually i.e. recorder, discussion leader or presenter)

12. At the end of the **\*whole group learning session**, students will transition into independent CAP assignments.

**\*The phrase, “whole group learning session” is utilized “rather than, the end of the activity” because all of the activities may not be completed in one day.**

**Activity**

The teacher and students will complete [**How can we conserve water virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES20/ES20.html)

as a whole group activity. Students will work in cooperative learning groups to complete the journal activity.

The teacher and students will play [concentration game](http://glencoe.mcgraw-hill.com/sites/dl/free/0078778026/165511/index.html%20) as a whole group lesson wrap up.

**Water BELLRINGER TRANSPARENCY**

**Task: 2**

**Essential Questions:**

How does the pH of pure water compare to with that of acid precipitation?

What causes acid precipitation?

How might acid precipitation affect humans?

**Resources:**

[**Where in the U.S. is acid rain most severe virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/CT11/CT11.html)

**Teacher’s Place:**

Prior to beginning the performance activity, the teacher should implement the following steps using teaching techniques you have found to be effective for your students.

1. Explain the activity (activity requirements)

2. Display the Georgia Performance Standard(s) (project on blackboard via units of instruction located at <http://thevillage411.weebly.com/units-of-instruction2.html> units of instruction page, or print on blackboard)

3. Read the Georgia Performance Standard(s) aloud and explain it to your students. You can rephrase the Georgia Performance Standard to make sure your students understand it.

4. Display the Essential Question(s) (project on blackboard via units of instruction, or print on blackboard)

5. Read the Essential Question (s) aloud and explain it to your students. You can rephrase the Essential Question (s) to make sure your students understand it.

6. Review unit vocabulary with students.

7. Introduce the following:

a. Air: Acid Precipitation p.336

8. Engage students in conversation by explaining to students that regions directly downwind from major producers of particulate pollutants often have greater rainfall than the areas that are upwind. Then ask what could be the reason for this? Write answers on the blackboard.

9. Discuss answers with the students using the following questioning techniques as applicable:

**Questioning Techniques:**

**Memory Questions**

 Signal words: who, what, when, where?

 Cognitive operations: naming, defining, identifying, designating

**Convergent Thinking Questions**

 Signal words: who, what, when, where?

Cognitive operations: explaining, stating relationships, comparing and

contrasting

 **Divergent Thinking Questions**

 Signal words: imagine, suppose, predict, if/then

Cognitive operations: predicting, hypothesizing, inferring, reconstructing

 **Evaluative Thinking Questions**

 Signal words: defend, judge, justify (what do you think)?

10. Guide students into the activity utilizing [Where in the U.S. is acid rain most severe virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/CT11/CT11.html)

11. Complete the activity with the students (some tasks may require students to work independently, peer to peer, learning circles [2-3 students] or as a whole group [the entire class]. Therefore the teacher may serve as activity leader and or facilitator. When an activity calls for students to work in learning circles you should assign roles to students individually i.e. recorder, discussion leader or presenter)

12. At the end of the **\*whole group learning session**, students will transition into independent CAP assignments.

**\*The phrase, “whole group learning session” is utilized “rather than, the end of the activity” because all of the activities may not be completed in one day.**

**Activity**

The teacher and students will complete [Where in the U.S. is acid rain most severe virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/CT11/CT11.html) as a whole group activity. Students will work in peer to peer pairs to complete the journal activity.

Students will select one essential question to answer as a ticket out the door.

**Task: 3**

**Essential Questions:**

What is the difference between climate and weather?

What factors determine climate?

What cause ozone depletion?

**Resources:**

[How can locations be identified by their climate and topography virtual lab](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES16/ES16.html)

[Ozone Depletion Concept](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::573::356::/sites/dl/free/007877828x/164155/539_Fig_8.swf::Ozone%20Depletion)

[Climate Types concept](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::573::356::/sites/dl/free/0078778026/164155/516_Fig_5.swf::Climate%20Types%20)

**Teacher’s Place:**

Prior to beginning the performance activity, the teacher should implement the following steps using teaching techniques you have found to be effective for your students.

1. Explain the activity (activity requirements)

2. Display the Georgia Performance Standard(s) (project on blackboard via units of instruction located at <http://thevillage411.weebly.com/units-of-instruction2.html> units of instruction page, or print on blackboard)

3. Read the Georgia Performance Standard(s) aloud and explain it to your students. You can rephrase the Georgia Performance Standard to make sure your students understand it.

4. Display the Essential Question(s) (project on blackboard via units of instruction, or print on blackboard)

5. Read the Essential Question (s) aloud and explain it to your students. You can rephrase the Essential Question (s) to make sure your students understand it.

6. Review unit vocabulary with students.

7. Introduce the following:

a. Atmosphere and Climate Change: Climate and Climate Change p. 351 and Ozone Shield p. 359

8. Engage students in conversation by asking students to think of a place on Earth where they each would like to live or visit some day. Then ask students to give a description of what the climate would be like there and the various factors that might influence that climate. Write answers on the blackboard.

9. Discuss answers with the students using the following questioning techniques as applicable:

**Questioning Techniques:**

**Memory Questions**

 Signal words: who, what, when, where?

 Cognitive operations: naming, defining, identifying, designating

**Convergent Thinking Questions**

 Signal words: who, what, when, where?

Cognitive operations: explaining, stating relationships, comparing and

contrasting

 **Divergent Thinking Questions**

 Signal words: imagine, suppose, predict, if/then

Cognitive operations: predicting, hypothesizing, inferring, reconstructing

 **Evaluative Thinking Questions**

 Signal words: defend, judge, justify (what do you think)?

10. Guide students into the activity utilizing [How can locations be identified by their climate and topography virtual lab](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES16/ES16.html)

11. Complete the activity with the students (some tasks may require students to work independently, peer to peer, learning circles [2-3 students] or as a whole group [the entire class]. Therefore the teacher may serve as activity leader and or facilitator. When an activity calls for students to work in learning circles you should assign roles to students individually i.e. recorder, discussion leader or presenter)

12. At the end of the **\*whole group learning session**, students will transition into independent CAP assignments.

**\*The phrase, “whole group learning session” is utilized “rather than, the end of the activity” because all of the activities may not be completed in one day.**

**Activity**

The teacher and students will complete [How can locations be identified by their climate and topography virtual lab](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES16/ES16.html) as a whole group activity. Students will work in cooperative learning groups to complete the journal activity.

The teacher and students will view [Ozone Depletion Concept](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::573::356::/sites/dl/free/007877828x/164155/539_Fig_8.swf::Ozone%20Depletion) and [Climate Types concept](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::573::356::/sites/dl/free/0078778026/164155/516_Fig_5.swf::Climate%20Types%20) as a lesson wrap up.

**Take it a step further**

**Quick Lab**

Investigating Prevailing Winds

Procedure

1. Cut 20 cm diameter disk out of cardboard.
2. Insert a pencil through the center of the disk. Place the tip of the eraser on the table so that the cardboard is tilted slightly.
3. Place a few drops of water near the center of the cardboard, and spin the cardboard on the pencil tip. What happens?

Analysis

1. How is the motion of the water related to the prevailing winds?

Answer

1. The water simulates the direction of the prevailing winds because both the cardboard and the Earth spin around an axis.

**Mineral and Energy Resources**

**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.

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)

 **SCSh3. Students will identify and investigate problems scientifically.**

c. Collect, organize and record appropriate data.

d. Graphically compare and analyze data points and/or summary statistics.

e. Develop reasonable conclusions based on data collected.

**SCSh6. Students will communicate scientific investigations and information clearly.**

a. Write clear, coherent laboratory reports related to scientific investigations.

**SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.**

b. Demonstrate appropriate technique in all laboratory situations.

**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.

b. Use technology to produce tables and graphs.

 c. Use technology to develop, test, and revise experimental or mathematical models

**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.**

 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).

**Task: 1**

**Essential Questions:**

What is a mineral?

How are ore minerals formed?

What are some basic characteristics of mineral?

**Resources:**

[**Minerals and their properties virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES03/ES03.html)

[**Quick Check**](CK6th%20grade%20earth%20science%202.doc)

[**Virtual Lesson Overview**](http://glencoe.mcgraw-hill.com/sites/dl/free/0078778026/164213/00044674.html)

**Teacher’s Place:**

Prior to beginning the performance activity, the teacher should implement the following steps using teaching techniques you have found to be effective for your students.

1. Explain the activity (activity requirements)

2. Display the Georgia Performance Standard(s) (project on blackboard via units of instruction located at <http://thevillage411.weebly.com/units-of-instruction2.html> units of instruction page, or print on blackboard)

3. Read the Georgia Performance Standard(s) aloud and explain it to your students. You can rephrase the Georgia Performance Standard to make sure your students understand it.

4. Display the Essential Question(s) (project on blackboard via units of instruction, or print on blackboard)

5. Read the Essential Question (s) aloud and explain it to your students. You can rephrase the Essential Question (s) to make sure your students understand it.

6. Review unit vocabulary with students.

7. Introduce the following:

a. Mining and Mineral Resources: Minerals p. 441

8. Engage students in conversation by asking students the following question: What are some everyday items that are made from minerals? Also, ask what are some everyday items that are not made from minerals? Write answers on the blackboard.

9. Discuss answers with the students using the following questioning techniques as applicable:

**Questioning Techniques:**

**Memory Questions**

 Signal words: who, what, when, where?

 Cognitive operations: naming, defining, identifying, designating

**Convergent Thinking Questions**

 Signal words: who, what, when, where?

Cognitive operations: explaining, stating relationships, comparing and

contrasting

 **Divergent Thinking Questions**

 Signal words: imagine, suppose, predict, if/then

Cognitive operations: predicting, hypothesizing, inferring, reconstructing

 **Evaluative Thinking Questions**

 Signal words: defend, judge, justify (what do you think)?

10. Guide students into the activity utilizing [**Minerals and their properties virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES03/ES03.html)

11. Complete the activity with the students (some tasks may require students to work independently, peer to peer, learning circles [2-3 students] or as a whole group [the entire class]. Therefore the teacher may serve as activity leader and or facilitator. When an activity calls for students to work in learning circles you should assign roles to students individually i.e. recorder, discussion leader or presenter)

12. At the end of the **\*whole group learning session**, students will transition into independent CAP assignments.

**\*The phrase, “whole group learning session” is utilized “rather than, the end of the activity” because all of the activities may not be completed in one day.**

**Activity**

The teacher and students will complete [**Minerals and their properties virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES03/ES03.html)as a whole group activity. Students will work in peer to peer pairs to complete the journal activity.

The teacher and students will also view mineral [**Virtual Lesson Overview**](http://glencoe.mcgraw-hill.com/sites/dl/free/0078778026/164213/00044674.html)as a whole group activity.

**Ticket out the door**

Students will complete one of the writing prompts below

 “The meek shall inherit the Earth but not the mineral rights.” Write a short paragraph that summarizes what you think this statement means.

What would you do if valuable minerals were discovered on land that you owned?

**Task: 2**

**Georgia Performance Standards:**

**Essential Questions:**

What is renewable energy?

What are the advantages and disadvantages of renewable energy?

How does renewable energy affect the environment?

**Resources:**

[**Kinetic and Potential Energy virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/PS05/PS05.html)

**Teacher’s Place:**

Prior to beginning the performance activity, the teacher should implement the following steps using teaching techniques you have found to be effective for your students.

1. Explain the activity (activity requirements)

2. Display the Georgia Performance Standard(s) (project on blackboard via units of instruction located at <http://thevillage411.weebly.com/units-of-instruction2.html> units of instruction page, or print on blackboard)

3. Read the Georgia Performance Standard(s) aloud and explain it to your students. You can rephrase the Georgia Performance Standard to make sure your students understand it.

4. Display the Essential Question(s) (project on blackboard via units of instruction, or print on blackboard)

5. Read the Essential Question (s) aloud and explain it to your students. You can rephrase the Essential Question (s) to make sure your students understand it.

6. Review unit vocabulary with students.

7. Introduce the following:

a. Renewable Energy: Hydroelectricity Power from Moving Water p. 497

8. Engage students in conversation by asking students the following question: How do you think your great grandparents met their energy needs and? Then ask students which of the resources were renewable and which were nonrenewable? Write answers on the blackboard.

9. Discuss answers with the students using the following questioning techniques as applicable:

**Questioning Techniques:**

**Memory Questions**

 Signal words: who, what, when, where?

 Cognitive operations: naming, defining, identifying, designating

**Convergent Thinking Questions**

 Signal words: who, what, when, where?

Cognitive operations: explaining, stating relationships, comparing and

contrasting

 **Divergent Thinking Questions**

 Signal words: imagine, suppose, predict, if/then

Cognitive operations: predicting, hypothesizing, inferring, reconstructing

 **Evaluative Thinking Questions**

 Signal words: defend, judge, justify (what do you think)?

10. Guide students into the activity utilizing [**Kinetic and Potential Energy virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/PS05/PS05.html)

11. Complete the activity with the students (some tasks may require students to work independently, peer to peer, learning circles [2-3 students] or as a whole group [the entire class]. Therefore the teacher may serve as activity leader and or facilitator. When an activity calls for students to work in learning circles you should assign roles to students individually i.e. recorder, discussion leader or presenter)

12. At the end of the **\*whole group learning session**, students will transition into independent CAP assignments.

**\*The phrase, “whole group learning session” is utilized “rather than, the end of the activity” because all of the activities may not be completed in one day.**

**Activity**

The teacher and students will complete [**Kinetic and Potential Energy virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/PS05/PS05.html)

as a whole group activity. Students will work in cooperative learning groups to complete the journal activity.

The teacher and students will construct a concept map that identifies the difference between renewable and nonrenewable energy sources as lesson wrap up.

**Task: 3**

**Essential Questions:**

What are alternative energy technologies?

What are two advantages of using hydrogen as a fuel source?

**Resources:**

[**The advantages of alternative energy sources virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/CT13/CT13.html)

**Teacher’s Place:**

Prior to beginning the performance activity, the teacher should implement the following steps using teaching techniques you have found to be effective for your students.

1. Explain the activity (activity requirements)

2. Display the Georgia Performance Standard(s) (project on blackboard via units of instruction located at <http://thevillage411.weebly.com/units-of-instruction2.html> units of instruction page, or print on blackboard)

3. Read the Georgia Performance Standard(s) aloud and explain it to your students. You can rephrase the Georgia Performance Standard to make sure your students understand it.

4. Display the Essential Question(s) (project on blackboard via units of instruction, or print on blackboard)

5. Read the Essential Question (s) aloud and explain it to your students. You can rephrase the Essential Question (s) to make sure your students understand it.

6. Review unit vocabulary with students.

7. Introduce the following:

a. Renewable Energy: Alternative Energy p. 500

8. Engage students in conversation by asking students to look around the classroom to see if you can find any instances where energy is being wasted. Then ask students what could be done differently to save energy? Write answers on the blackboard.

9. Discuss answers with the students using the following questioning techniques as applicable:

**Questioning Techniques:**

**Memory Questions**

 Signal words: who, what, when, where?

 Cognitive operations: naming, defining, identifying, designating

**Convergent Thinking Questions**

 Signal words: who, what, when, where?

Cognitive operations: explaining, stating relationships, comparing and

contrasting

 **Divergent Thinking Questions**

 Signal words: imagine, suppose, predict, if/then

Cognitive operations: predicting, hypothesizing, inferring, reconstructing

 **Evaluative Thinking Questions**

 Signal words: defend, judge, justify (what do you think)?

10. Guide students into the activity utilizing [**The advantages of alternative energy sources virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/CT13/CT13.html)

11. Complete the activity with the students (some tasks may require students to work independently, peer to peer, learning circles [2-3 students] or as a whole group [the entire class]. Therefore the teacher may serve as activity leader and or facilitator. When an activity calls for students to work in learning circles you should assign roles to students individually i.e. recorder, discussion leader or presenter)

12. At the end of the **\*whole group learning session**, students will transition into independent CAP assignments.

**\*The phrase, “whole group learning session” is utilized “rather than, the end of the activity” because all of the activities may not be completed in one day.**

**Activity**

The teacher and students will complete [**The advantages of alternative energy sources virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/CT13/CT13.html)as a whole group activity. Students will complete the journal activity as a ticket out the door.

Task Websites

<http://thevillage411.weebly.com/units-of-instruction2.html>

Unit 1

[Where do most earthquake epicenters and volcanoes occur virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/E27/E27.html)

[Earths Plates Concept](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::440::356::/sites/dl/free/0078778220/164155/511_Fig_8.swf::Earths%20Plates)

[Standardized Test Practice](http://glencoe.mcgraw-hill.com/sites/0078778220/student_view0/chapter4/standardized_test_practice.html)

[How do seismographs stations help to determine an earthquakes epicenter virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES09/ES09.html)

[Math across the curriculum test item](http://glencoe.mcgraw-hill.com/sites/0078778220/student_view0/chapter5/math_practice.html)

[Concentration game](http://glencoe.mcgraw-hill.com/sites/dl/free/0078778220/165490/index.html)

[How does magma's composition affect a volcanoe's eruption virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES10/ES10.html)

[Rock virtual lesson](http://glencoe.mcgraw-hill.com/sites/dl/free/0078778220/164213/00044683.html)

[Math across the curriculum](http://glencoe.mcgraw-hill.com/sites/0078778220/student_view0/chapter6/math_practice.html)

[Section Quick Check](http://glencoe.mcgraw-hill.com/sites/0078778220/student_view0/chapter6/section1/self-check_quiz-eng_.html)

[What is the structure of earth's atmosphere virtual lab](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES14/ES14.html)

[The Water Cycle concept](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::573::356::/sites/dl/free/0078778026/164155/514_Fig_13.swf::The%20Water%20Cycle)

[Standardized Test Practice](http://glencoe.mcgraw-hill.com/sites/0078778026/student_view0/unit5/chapter15/standardized_test_practice.html)

Unit 2

[How do organisms react to changes in abiotic changes virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/CT08/CT08.html)

[Ecosystems virtual lesson](http://glencoe.mcgraw-hill.com/sites/dl/free/0078778204/167348/00076707.html)

[**How is energy transferred through a community of organisms virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/CT06/CT06.html)

[What are the different types of land environments virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/LS19/LS19.html)

[Land Biomes of the World concept](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::519::356::/sites/dl/free/0078778204/164155/434_Fig_5.swf::Land%20Biomes%20of%20the%20World)

Unit 3

[**Competition within a population virtual lesson**](http://glencoe.mcgraw-hill.com/sites/dl/free/0078802849/383928/BL_04.html)

[**Carrying capacity concept**](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=avi::240::320::/sites/dl/free/0078802849/383928/LogisticPopulationGrowth.avi::Logistic%20Population%20Growth)

[Population Growth Rates of Countries](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::550::400::/sites/dl/free/0078802849/383912/table04_1.swf::Population%20Growth%20Rates%20of%20Countries)

[**Population changes virtual lesson**](http://glencoe.mcgraw-hill.com/sites/dl/free/0078757134/383929/BL_09.html)

[**Five Most Recent Mass Extinctions Concepts**](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::550::400::/sites/dl/free/0078757134/383912/table05_1.swf::Five%20Most%20Recent%20Mass%20Extinctions)

[**Estimated Number of Extinctions Since 1600**](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::550::400::/sites/dl/free/0078757134/383912/table05_2.swf::Estimated%20Number%20of%20Extinctions%20Since%201600)

[**Visualizing Biodiversity Hot Spots**](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::550::400::/sites/dl/free/0078757134/383915/Visualizing_Biodiversity_Hot_Spots_Script.swf::Visualizing%20Biodiversity%20Hot%20Spots)

[Standardized Test Practice](http://glencoe.mcgraw-hill.com/sites/0078757134/student_view0/unit1/chapter5/standardized_test_practice.html)

[Give it a try chapter review](http://glencoe.mcgraw-hill.com/sites/0078757134/student_view0/unit1/chapter5/chapter_test_practice.html)

Unit 4

[How can we conserve water virtual lesson](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES20/ES20.html)

[Concentration game](http://glencoe.mcgraw-hill.com/sites/dl/free/0078778026/165511/index.html%20)

[Math across the curriculum](http://glencoe.mcgraw-hill.com/sites/0078778026/student_view0/unit6/chapter21/math_practice.html)

[Test Prep](http://glencoe.mcgraw-hill.com/sites/0078778026/student_view0/unit6/chapter21/standardized_test_practice.html)

[**Where in the U.S. is acid rain most severe virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/CT11/CT11.html)

[How can locations be identified by their climate and topography virtual lab](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES16/ES16.html)

[Ozone Depletion Concept](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::573::356::/sites/dl/free/007877828x/164155/539_Fig_8.swf::Ozone%20Depletion)

[Climate Types concept](http://glencoe.mcgraw-hill.com/olcweb/cgi/pluginpop.cgi?it=swf::573::356::/sites/dl/free/0078778026/164155/516_Fig_5.swf::Climate%20Types%20)

Unit 5

[**Minerals and their properties virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES03/ES03.html)

[**Quick Check**](CK6th%20grade%20earth%20science%202.doc)

[**Virtual Lesson Overview**](http://glencoe.mcgraw-hill.com/sites/dl/free/0078778026/164213/00044674.html)

[**Kinetic and Potential Energy virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/PS05/PS05.html)

[**The advantages of alternative energy sources virtual lesson**](http://www.glencoe.com/sites/common_assets/science/virtual_labs/CT13/CT13.html)