



The 5E Model of Teaching  
Grade 4

## Students' Role and Actions in the 5E Model

"5E's"	Consistent with Model	Inconsistent with Model
Engage	<ul style="list-style-type: none"> <li>● Asks question such as "why did this happen? What do I already know about this?"</li> <li>● Shows interest in the topic</li> </ul>	<ul style="list-style-type: none"> <li>● Asks for the "right" answer</li> <li>● Offers the "right" answer</li> <li>● Insists on answers or explanations</li> <li>● Seeks on solution</li> </ul>
Explore	<ul style="list-style-type: none"> <li>● Thinks freely but within limits of the activity</li> <li>● Tests predictions and hypotheses</li> <li>● Forms new predictions and hypotheses</li> <li>● Tries alternatives and discusses them with others</li> <li>● Records observations and ideas</li> <li>● Suspends judgement</li> </ul>	<ul style="list-style-type: none"> <li>● Passive involvement</li> <li>● Works quietly with little or no interaction with others</li> <li>● "Plays around" indiscriminately with no goal in mind</li> <li>● Stops with one solution</li> </ul>
Explain	<ul style="list-style-type: none"> <li>● Explains possible solutions or answers to others</li> <li>● Listens critically to others' explanations</li> <li>● Questions others' explanations</li> <li>● Listens to and tries to comprehend explanations offered by teacher</li> <li>● Refers to previous activities</li> <li>● Uses recorded observations in explanations</li> </ul>	<ul style="list-style-type: none"> <li>● Proposes explanations from "thin air", with no relationship to previous experiences</li> <li>● Brings up irrelevant experiences and examples</li> <li>● Accepts explanations without justification</li> <li>● Does not attend to other plausible explanations</li> </ul>
Elaborate	<ul style="list-style-type: none"> <li>● Applies new labels, definitions, explanations and skills in a new but similar situation</li> <li>● Uses previous information to ask questions, propose solutions, make decisions and design experiments</li> <li>● Draws reasonable conclusions from evidence</li> <li>● Records observations and explanations</li> <li>● Checks for understanding among peers</li> </ul>	<ul style="list-style-type: none"> <li>● "Plays around" with no goal in mind</li> <li>● Ignores previous information or evidence</li> <li>● Draws conclusions from "thin air"</li> <li>● In discussion, uses only labels provided by teacher</li> </ul>
Evaluate	<ul style="list-style-type: none"> <li>● Answers open-ended questions by using observations, evidence, and previously accepted explanations</li> <li>● Demonstrates understanding or knowledge of concept or skill</li> <li>● Evaluates his or her own progress and knowledge</li> <li>● Asks related questions that would encourage future investigations</li> </ul>	<ul style="list-style-type: none"> <li>● Draws conclusions without using evidence or previously accepted explanation</li> <li>● Offers only "yes" or "no" answers and memorized definitions or explanations as answers</li> <li>● Fails to express satisfactory explanations in his or her own words</li> <li>● Introduces new, irrelevant topics</li> </ul>

**THE STANDARDS FOR SCIENTIFIC INQUIRY, LITERACY AND NUMERACY ARE INTEGRAL PARTS OF THE CONTENT STANDARDS FOR EACH GRADE LEVEL IN THIS CLUSTER.**

**Grades 3-5 Core Scientific Inquiry, Literacy and Numeracy**

*How is scientific knowledge created and communicated?*

Content Standards	Expected Performances
<p><b>SCIENTIFIC INQUIRY</b></p> <ul style="list-style-type: none"> <li>◆ Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena.</li> </ul> <p><b>SCIENTIFIC LITERACY</b></p> <ul style="list-style-type: none"> <li>◆ Scientific literacy includes speaking, listening, presenting, interpreting, reading and writing about science.</li> </ul> <p><b>SCIENTIFIC NUMERACY</b></p> <ul style="list-style-type: none"> <li>◆ Mathematics provides useful tools for the description, analysis and presentation of scientific data and ideas.</li> </ul>	<p><b>B INQ.1</b> Make observations and ask questions about objects, organisms and the environment.</p> <p><b>B INQ.2</b> Seek relevant information in books, magazines and electronic media.</p> <p><b>B INQ.3</b> Design and conduct simple investigations.</p> <p><b>B INQ.4</b> Employ simple equipment and measuring tools to gather data and extend the senses.</p> <p><b>B INQ.5</b> Use data to construct reasonable explanations.</p> <p><b>B INQ.6</b> Analyze, critique and communicate investigations using words, graphs and drawings.</p> <p><b>B INQ.7</b> Read and write a variety of science-related fiction and nonfiction texts.</p> <p><b>B INQ.8</b> Search the Web and locate relevant science information.</p> <p><b>B INQ.9</b> Use measurement tools and standard units (e.g., centimeters, meters, grams, kilograms) to describe objects and materials.</p> <p><b>B INQ.10</b> Use mathematics to analyze, interpret and present data.</p>

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Grade 4  
Physical Science

Forces and Motion

Content Standard

The student will understand that pushing or pulling can change the position and motion of objects.

Focus Questions:

How do things move?

How does the strength of the force that acts upon an object affect its motion?

How does the size of an object affect its movement when pushed or pulled?

Essential Understandings:

- Objects move in various ways; forward, backward, sideways, slowly, quickly, etc.
- A push or a pull will change the position/motion of an object at different rates depending upon the strength and rate of the force.
- An object's motion is a change in position over time.
- The larger the force that acts upon an object, the larger the change in movement.
- The larger the mass of an object, the larger the force needed to change its position.
- Equilibrium exists when the forces exerted on an object are the same in all directions.
- Work is the amount of effort exerted on an object in order to cause movement.

Suggested Activities:

Modify unequal systems to reach equilibrium (see-saw, balance, etc.).

Compare rolling systems with different sized wheels.

Throw a variety of balls (sizes and weights) to measure and compare distances.

Same thrower-different sized balls.

Same ball-different sized thrower.

Perform egg drop experiment.

Create a journal to record the findings from the egg drop experiment.

Observe how a push or a pull changes the way an object moves.

Explore internet to acquire relevant data and to implement suggested activities.

## SCIENTIFIC THINKING PROCESSES

Observing:	Observe objects in motion
Comparing:	Describe the ways things move
Inferring:	Predict the distance an object will travel, knowing its mass
Applying:	Build and test egg drop parachute
Predicting:	Predict whether or not the weight of an object affects its amount of movement

## EMBEDDED TASK

All students will perform the Egg Drop experiment in order to assess understanding of inquiry and the nature of Science through questioning using the 5E Model of Teaching.

# Teacher Notes

Additional Focus Questions:

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Additional Scientific Thinking Processes:

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Additional Essential Understandings:

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Additional Suggested Activities:

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Grade 4  
Life Science  
Matter and Energy in Ecosystems  
Ecosystems

Content Standard

The student will understand that all organisms depend on the living and nonliving features of the environment for survival.

Focus Questions:

How do environmental changes affect organisms?

How do animals depend on plants for survival?

How do natural occurrences and human activity change habitats?

Essential Understandings:

- Environmental changes can affect an organism's ability to survive and reproduce.
- Environmental changes can be caused by natural phenomena (tsunami, hurricane, volcanic eruption, wildfire, tornado, etc.) and/or human activity.
- Plants are called producers.
- Animals, directly or indirectly, depend on plants for food and energy.
- There are primary and secondary consumers.

Suggested Activities:

Visit the Naromi Land Trust to investigate different habitats.

Identify various plants and animals native to each region of the U.S. and the adaptations that enable them to survive.

Create a food chain showing producers, primary consumers and secondary consumers within each region.

Design an imaginary creature that could survive in a given region of the U.S. Investigate the effect of logging on habitats.

Read The Lorax by Dr. Seuss and discuss its implications for the environment.

Create a journal discussing the implications of The Lorax on the environment.

Map recent natural phenomena and describe their effect on the organisms of that area.

Explore internet to acquire relevant data and to implement suggested activities.



## SCIENTIFIC THINKING PROCESSES

Observing:	Observe the effects of natural phenomena on habitats
Communicating:	Describe the characteristics of the imaginary creature that enable it to survive in its habitat
Comparing:	Compare and contrast organisms in one region to another
Inferring:	Infer the effect of a natural occurrence on a given area
Applying:	Create a model of a food chain including producers and consumers
Predicting:	Predict the effects logging will have on habitats

## Teacher Notes

Additional Focus Questions:

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Additional Scientific Thinking Processes:

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Additional Essential Understandings:

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Additional Suggested Activities:

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Resources:

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Grade 4  
Earth Science  
Energy in the Earth's Systems  
Water Movement  
Content Standard

The student will understand that water has a major role in shaping the Earth's surface.

**Focus Questions:**

What are the layers of the Earth?

What are the Earth's major water sources?

How does the water cycle help to replenish the Earth's supply of water?

How does water change the surface of the Earth?

**Essential Understandings:**

- The Earth consists of 3 layers: crust, mantle and core.
- Earth's water sources are located on the crust.
- Water is deposited in various receptacles (ponds, lakes, oceans, etc.)
- The water cycle is the circulation of water through the Earth's crust, oceans and atmosphere.
- The sun's energy impacts the water cycle through heating and cooling the atmosphere.
- Water movement changes the surface of the Earth.
- Erosion is the wearing away of material from the Earth's surface.
- Erosion changes the contours of the Earth.

**Suggested Activities:**

Complete the Make it Rain Activity.

Create a journal to record the findings from Make it Rain.

Create a model of the water cycle.

Perform evaporation experiments (example: place the same amount of water in different sized/shaped containers and record rate of evaporation).

Perform condensation experiments.

Create a closed terrarium to show the water cycle.

Create models using different soils to demonstrate river formation.

Write a commentary about the water cycle for a news program.

Identify processes to explain what happened to create famous landforms (ie. Grand Canyon, Monument Valley, etc.).

Explore internet to acquire relevant data and to implement suggested activities.

### SCIENTIFIC THINKING PROCESSES

Observing:	Observe the water cycle in a closed system
Communicating:	Share news stories about the water cycle
Comparing:	Compare the rate of erosion on different types of soil Compare the effects of varying degrees of heat on evaporation
Applying:	Apply knowledge of water cycle to explain formation of landforms
Predicting:	Predict how the size of a body of water affects the rate of evaporation

## Teacher Notes

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Additional Scientific Thinking Processes:

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Additional Essential Understandings:

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Grade 4  
Physical Science  
Energy Transfer and Transformation  
Magnetism and Electricity

Content Standard

The student will understand that electrical and magnetic energy can be transferred and transformed.

Focus Questions:

What can a magnet do?

What is the relationship between magnets and electricity?

How can electricity be transformed?

What causes an electric current to flow?

Essential Understandings:

- Magnets are objects that attract metals such as iron and steel.
- Magnets attract and repel.
- All magnets have both a North and a South pole.
- Magnetic poles that are alike repel while magnetic poles that are not alike attract.
- Magnets attract specific materials.
- Magnets have different strengths.
- Static electricity is caused by friction.
- A complete circuit is closed, an incomplete circuit is open.
- There are different sources of electricity.

Suggested Activities:

Make a telegraph unit.

Construct a complete circuit to show light, heat, sound and magnetic effects.

Discover the pattern of a magnetic field by surrounding a magnet with iron filings.

Make an electromagnet.

Use a magnet as a compass.

Test the magnetic strength of paper, water, glass, plastic, and wood.

Create a journal to record the affect of magnets on various materials.

Explore internet to acquire relevant data and to implement suggested activities.

### SCIENTIFIC THINKING PROCESSES

Observing:	Observe objects attracted by a magnet Observe the effects of static electricity
Communicating:	Describe what a magnet does Describe the sources of electricity
Comparing:	Compare the strength of different magnets
Relating:	Classify magnetic and non-magnetic materials
Inferring:	Verify magnetic strength through different materials
Predicting:	Predict which materials will conduct electricity

### EMBEDDED TASK

All students will perform the Go With the Flow experiment in order to assess understanding of inquiry and the nature of science through questioning using the 5E Model of Teaching.

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Additional Scientific Thinking Processes:

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