

<p><b>Content:</b> Science: Weather Conditions</p>	<p><b>Grade:</b> 4<sup>th</sup></p>	<p><b>Timeline:</b> 45 minutes 01/11/16-01/15/16</p>
<p><b>Science Standard(s):</b></p> <p>4.1.1 Observe that results of repeated scientific investigations are seldom exactly the same.</p> <p>4.1.2 Form and support a hypothesis after collecting information by gathering specimens or observing an experiment.</p> <p>4.1.3 Differentiate between evidence gathered through observations and inferences, and use the evidence to develop a line of reasoning.</p> <p>4.4.1 Describe how the location of a place affects its weather and atmospheric conditions. Ex: How does Guam’s location affect its weather and atmospheric conditions?</p> <p>4.4.4 Investigate and explain that air is a substance that surrounds us that takes up space and whose movements we feel as wind.</p> <p><b>CCSS ELA Standards:</b></p> <p>4.RI.5 Describe the overall structure (chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.</p> <p>4.W.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic.</p> <p>4.W.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences</p>		
<p><b>Lesson Overview:</b></p> <p>In this lesson, students will be able to recognize that air masses form, move, and change in predictable ways. Observing these patterns of changes in Earth’s atmosphere is essential to weather prediction.</p>	<p><b>Lesson Objective(s):</b></p> <p>In this lesson, students will be able to</p> <ul style="list-style-type: none"> <li>• Review and analyze theories about processes that take place in Earth’s atmosphere as to their strength and weaknesses using scientific evidence and information.</li> <li>• Describe the composition of the Earth’s atmosphere.</li> <li>• Explain what is meant by air pressure.</li> <li>• Compare and contrast the layers of the atmosphere.</li> <li>• Identify the sun as a major source of energy for Earth and recognize that this star provides the energy needed generate wind and weather.</li> <li>• Explain what causes the greenhouse effect.</li> <li>• Compare and contrast air masses, and explain what happens when they pass over an area.</li> <li>• Construct a device to measure and observe changes in air pressure.</li> <li>• Explain how different weather conditions are measured.</li> <li>• Recognize symbols used on weather maps.</li> </ul>	
<p><b>Vocabulary:</b></p> <p>question, hypothesis, data, collect, analyze, conclusion, prediction, investigation, experiment, support, observation, inference, atmosphere,</p>	<p><b>Focus Question(s):</b></p> <ul style="list-style-type: none"> <li>• In what ways is the earth always changing?</li> <li>• How can atmospheric patterns be used to make predictions about the weather?</li> <li>• How do the location and landforms of Guam affect</li> </ul>	

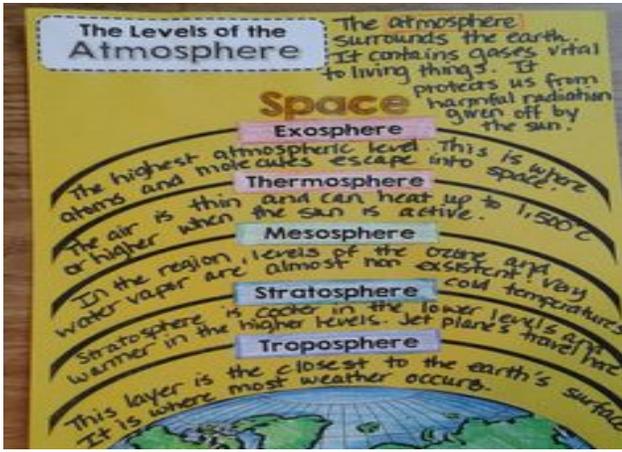
air pressure, troposphere, stratosphere, greenhouse effect, air mass, front, cirrus, cumulus, cumulonimbus, stratus, barometer, humidity, hygrometer	the weather and seasons?
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**Description of Lesson (including instructional strategies):**  
*Day 1: 01/11/16 Chapter 1: What Makes Up the Earth's Surface? p. D4-9*  
 I can describe the composition of the Earth's atmosphere.  
 I can explain what is meant by air pressure.

**Anticipatory Set:**  
 Teacher will explain to students that they will be learning about the earth's atmosphere. Have students scan the chapter. Guide them in identifying the lesson titles and major headings and use them to outline the chapter.

**Instruction and Strategies:**  
 Help students focus on the supporting facts and details for the main idea: The thin blanket of air that surrounds the earth is called the atmosphere. Earth's atmosphere is divided into four layers based on changes in temperature. The layers, starting with the one closest to Earth, are the troposphere, stratosphere, mesosphere, and thermosphere.

- Teacher will lead a whole class discussion; ask the class, what makes up the earth's surface? (The thin blanket of air that surrounds the earth is the atmosphere.)
- Preview the vocabulary terms on p. D6
- Read as a class pages D4-D9.
- Students will take notes as teacher discusses and lectures.
- Teacher will ask comprehension questions throughout the lesson.
- Students will copy and define the vocabulary terms on p. D6.
- Have students copy and answer the review questions on p. D9.
- Have students create the Levels of the Atmosphere diagram.



The diagram, titled "The Levels of the Atmosphere", illustrates the five layers of the atmosphere above Earth's surface. At the top, it states: "The atmosphere surrounds the earth. It contains gases vital to living things. It protects us from harmful radiation given off by the sun." The layers are listed from top to bottom:
 

- Space**: The highest atmospheric level. This is where atoms and molecules escape into space.
- Exosphere**: The air is thin or higher when the sun is active.
- Thermosphere**: In the region, levels of the ozone and almost non-existent. Very cool temperatures.
- Mesosphere**: Stratosphere is cooler in the lower levels and warmer in the higher levels. Jet planes travel here.
- Stratosphere**: This layer is the closest to the earth's surface. It is where most weather occurs.
- Troposphere**: (The bottom-most layer, closest to the surface).

 The diagram includes a globe at the bottom showing the Earth's surface.

***Formative assessment:***

Students will complete the levels of the atmosphere diagram.

**Description of Lesson (including instructional strategies):**

***Day 2: 01/12/16 Investigate: A Property of Air p. D4-D5***

I can explain the property of air.

**Anticipatory Set:**

Teacher will explain to students that they will be investigating a property of air.

Have students scan the investigation. Guide them in identifying the lesson activity purpose.

**Instruction and Strategies:**

Help students focus on the supporting facts and details for the main idea: Everything around you is matter. In this investigation you will observe a property of air. Then you will infer whether air is matter.

- Teacher will lead a whole class discussion; ask the class, what makes up the earth's surface? (The thin blanket of air that surrounds the earth is the atmosphere.)
- Explain the activity procedures.
  1. Students will work with a partner. Use the scissors to carefully cut three equal pieces of string.
  2. Tie one piece of string to the middle of the ruler.
  3. Blow up the balloons about the same size. Seal the balloons. Tie string around the neck of each balloon.
  4. Tie a balloon to each end of the ruler. Hold the middle string up so that the ruler hangs from it. Move the string so that the ruler is balanced.
  5. Use the string pin to pop one of the balloons. Observe what happens to the ruler.

***Formative assessment:***

Students will draw conclusions explaining how the investigation shows that the air takes up space.

**Description of Lesson (including instructional strategies):**

***Day 3: 01/13/16 Chapter 2: How Do Air Masses Affect Weather? p. D12-D17***

I can identify the sun as the major source of energy for Earth and recognize that this star provides the energy needed to generate wind and weather.

**Anticipatory Set:**

Teacher will explain to students that they will be learning about how air masses affect weather.

Have students scan the chapter. Guide them in identifying the lesson titles and major headings and use them to outline the chapter.

**Instruction and Strategies:**

Help students focus on the supporting facts and details for the main idea: The sun provides the energy to make weather. Air masses form over continents and oceans.

- Teacher will lead a whole class discussion; ask the class, what makes up the earth's surface? (The thin blanket of air that surrounds the earth is the atmosphere.)
- Preview the vocabulary terms on p. D12

- Read as a class pages D12-D17.
- Students will take notes as teacher discusses and lectures.
- Teacher will ask comprehension questions throughout the lesson.
- Students will copy and define the vocabulary terms on p. D12.
- Have students copy and answer the review questions on p. D17.

***Formative assessment:***

Students will complete the review questions for the lesson.

**Description of Lesson (including instructional strategies):**

***Day 4: 01/14/16 Investigate: Wind Speed p. D10-D11***

I can investigate wind speed.

**Anticipatory Set:**

Teacher will explain to students that they will be investigating wind speed.

Have students scan the investigation. Guide them in identifying the lesson activity purpose.

**Instruction and Strategies:**

Help students focus on the supporting facts and details for the main idea: What is wind? Wind is air in motion. In this investigation you will make an instrument to measure wind speed.

- Teacher will lead a whole class discussion; ask the class, have you ever flown a kite? (A strong wind makes the kite flutter and soar through the air.)
  - Explain the activity procedures.
1. Form a cylinder with the sheet of construction paper. Tape the edge of the paper to keep the cylinder from opening.
  2. Using a hole punch, make two holes at one end of the cylinder. Punch them on opposite sides of the cylinder. Put two reinforcements on each side of the holes.
  3. Thread yarn through the holes and tie it to form a handle.
  4. Glue strips of tissue paper to the other end of the cylinder.
  5. Hang your windsock outside. Use the wind scale to measure wind speed for several days. Collect data.

***Formative assessment:***

Students will draw conclusions based on their data collected explaining how they determined the speed of wind.

***Day 5: 01/15/16 Chapter 3: How is Weather Predicted? p. D20-D23***

I can explain how different weather conditions are measured.

**Anticipatory Set:**

Teacher will explain to students that they will be learning about how weather is predicted.

Have students scan the chapter. Guide them in identifying the lesson titles and major headings and use them to outline the chapter.

**Instruction and Strategies:**

Help students focus on the supporting facts and details for the main idea: By studying and measuring weather conditions, meteorologists are able to predict the weather.

- Teacher will lead a whole class discussion; ask the class, how is weather predicted? (Meteorologists are scientists who study and measure weather conditions. These conditions include air pressure, air temperature, humidity, and wind speed and direction.)
- Preview the vocabulary terms on p. D20
- Read as a class pages D20-D23.
- Students will take notes as teacher discusses and lectures.
- Teacher will ask comprehension questions throughout the lesson.
- Students will copy and define the vocabulary terms on p. D20.
- Have students copy and answer the review questions on p. D23.

**Formative Assessment:**

Students will complete the review questions from the lesson.

**Closure:**

*Students will share with the rest of the class their understanding of weather conditions.*

**Independent Practice:**

Students will work independently to complete the review questions for each lesson.

**Resources:**

Harcourt Science- 4th Grade	water
Harcourt Science workbook	masking tape
Pencil	scissors
Paper	wire hanger
1-liter bottle, clear plastic	plastic jar

**Accommodations:**

Cooperative groups will consist of students of various levels so they can help each other. If needed, there can be a small group of students on which the teacher focuses his/her attention. Have ESL students learn new words by selecting words in the dictionary and using them in sentences.



<b>Content:</b> Science:	<b>Grade:</b> 4 <sup>th</sup>	<b>Timeline:</b> 45 minutes 01/19/16-01/22/16
<p><b>Science Standard(s):</b></p> <p>4.1.3 Differentiate between evidence gathered through observations and inferences, and use the evidence to develop a line of reasoning.</p> <p>4.4.1 Describe how the location of a place affects its weather and atmospheric conditions. Ex: How does Guam’s location affect its weather and atmospheric conditions?</p> <p><b>CCSS ELA Standards:</b></p> <p>4.RI.5 Describe the overall structure (chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.</p> <p>4.W.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic.</p> <p>4.W.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences</p>		
<p><b>Lesson Overview:</b></p> <p>In this lesson, students will be able to recognize that air masses form, move, and change in predictable ways. Observing these patterns of changes in Earth’s atmosphere is essential to weather prediction.</p>	<p><b>Lesson Objective(s):</b></p> <p>In this lesson, students will be able to</p> <ul style="list-style-type: none"> <li>• Describe the composition of the Earth’s atmosphere.</li> <li>• Explain what is meant by air pressure.</li> <li>• Compare and contrast the layers of the atmosphere.</li> <li>• Identify the sun as a major source of energy for Earth and recognize that this star provides the energy needed generate wind and weather.</li> <li>• Compare and contrast air masses, and explain what happens when they pass over an area.</li> <li>• Explain how different weather conditions are measured.</li> <li>• Describe features of the ocean floor.</li> </ul>	
<p><b>Vocabulary:</b></p> <p>question, hypothesis, data, collect, analyze, conclusion, prediction, investigation, experiment, support, observation, inference, water cycle, evaporation, hurricane, typhoon, tornado, blizzard, humidity, front, meteorologist, barometer, tropical storm, tropical depression, landforms, atmosphere</p>	<p><b>Focus Question(s):</b></p> <ul style="list-style-type: none"> <li>• In what ways is the earth always changing?</li> <li>• How can atmospheric patterns be used to make predictions about the weather?</li> <li>• How do the location and landforms of Guam affect the weather and seasons?</li> <li>• How is it different than other areas of the earth?</li> </ul>	

**Description of Lesson (including instructional strategies):**

***Day 1: 01/19/16***

I can describe how the location of a place affects its weather and atmospheric conditions.

**Anticipatory Set:**

- Teacher will ask,  
Describe the weather on Guam?  
Where is Guam located?

**Instruction and Strategies:**

- Guam is located in the northwestern Pacific Ocean.
- Guam is located near the equator.
- The weather is generally very warm and humid with little seasonal temperature variation.
- There are two seasons, the dry and the rainy. The dry season begins in December through June. The rainy season falls within the remaining months.
- Guam experiences tropical storms and typhoons.

***Formative assessment:***

Students will be able to explain their understanding of where Guam is located and how its location affects its weather.

**Description of Lesson (including instructional strategies):**

***Day 2: 01/20/16***

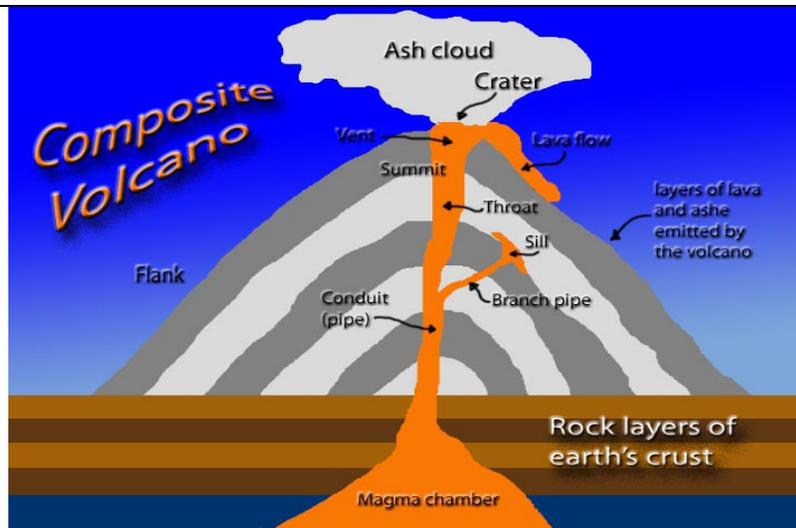
I can explain how Guam was formed.

**Anticipatory Set:**

- Teacher will ask,  
How was Guam formed?

**Instruction and Strategies:**

- The largest island in Micronesia.
- Guam was formed on a volcano. A volcano is a mountain that opens downward to a pool of molten rock below the surface of the earth.
- Volcanoes are formed when magma from within the Earth's upper mantle works its way to the surface.
- Why do volcanoes erupt?  
The Earth's crust is made up of huge slabs called plates, which fit together like a jigsaw puzzle. These plates sometimes move. The friction causes earthquakes and volcanic eruptions near the edges of the plates.



**Formative assessment:**

Students will be able to explain how Guam was formed.

**Description of Lesson (including instructional strategies):**

**Day 3: 01/21/16 What is the Ocean Floor Like? P. D48-D53.**

I can describe the features of the ocean floor.

**Anticipatory Set:**

Teacher will explain to students that they will be learning about the ocean floor.

Have students scan the chapter. Guide them in identifying the lesson titles and major headings and use them to outline the chapter.

**Instruction and Strategies:**

Help students focus on the supporting facts and details for the main idea: Many features found on dry land also are found on the floors of Earth's oceans.

- Teacher will lead a whole class discussion; ask the class, what makes up the ocean's floor?
- Preview the vocabulary terms on p. D48
- Read as a class pages D48-D53.
- Students will take notes as teacher discusses and lectures.
- Teacher will ask comprehension questions throughout the lesson.
- Students will copy and define the vocabulary terms on p. D48.
- Have students copy and answer the review questions on p. D53.

**Formative assessment:**

Students will complete the review questions for the lesson.

**Description of Lesson (including instructional strategies):**

**Day 4: 01/22/16 Investigate: Model of the Ocean Floor p. D46-D47**

I can investigate the ocean floor.

**Anticipatory Set:**

Teacher will explain to students that they will be investigating the ocean floor.  
Have students scan the investigation. Guide them in identifying the lesson activity purpose.

**Instruction and Strategies:**

Help students focus on the supporting facts and details for the main idea: What is wind? Wind is air in motion. In this investigation you will make a model of the ocean floor.

- Explain the activity procedures.
- 1. Set up a graph shown at the top of page D47. Label the horizontal axis Distance East of New Jersey. Label the vertical axis Water Depth.
- 2. Look closely at the graph. The top horizontal mark is labeled 0. This mark stands for the surface of the ocean. The numbers beneath stand for depths below sea level.
- 3. Plot the data on the graph.
- 4. Connect points on your graph. You have now made a profile of the Atlantic Ocean floor.
- 5. Analyze your graph.
- 6. Use clay to make a model of your profile. Vary the height of the clay to model the changing depth of the ocean floor.

**Formative assessment:**

Students will draw conclusions based on their data collected explaining how they determine the changing depth of the ocean floor.

**Closure:**

Students will share with the rest of the class their understanding of how Guam's location affect its weather and the ocean floor.

**Independent Practice:**

Students will work independently to complete the review questions for each lesson.

**Resources:**

Harcourt Science- 4th Grade	shoe box
Harcourt Science workbook	clay
Pencil	
Paper	
Grid paper	

**Accommodations:**

Cooperative groups will consist of students of various levels so they can help each other.  
If needed, there can be a small group of students on which the teacher focuses his/her attention.  
Have ESL students learn new words by selecting words in the dictionary and using them in sentences.



<p><b>Content:</b> Science: Earthquakes and Volcanoes</p>	<p><b>Grade:</b> 4<sup>th</sup></p>	<p><b>Timeline:</b> 45 minutes 01/25/16-01/29/16</p>
<p><b>Science Standard(s):</b></p> <p>4.4.2 Describe how an environment can be changed by typhoons, earthquakes, volcanoes, waves, currents, and floods can change an environment.</p> <p>4.4.3 Describe how islands and reefs are formed and what forces could change them.</p> <p><b>CCSS ELA Standards:</b></p> <p>4.RI.5 Describe the overall structure (chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.</p> <p>4.W.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic.</p> <p>4.W.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences</p>		
<p><b>Lesson Overview:</b></p> <p>In this lesson, students will be able to recognize that Earth’s basic structure gives reasons for the shape of ocean floors and movement of continents. Changes of Earth’s continental plates are the cause of volcanoes and earthquakes.</p>	<p><b>Lesson Objective(s):</b></p> <p>In this lesson, students will be able to</p> <ul style="list-style-type: none"> <li>• Describe the composition of the Earth’s atmosphere.</li> <li>• Explain what is meant by air pressure.</li> <li>• Compare and contrast the layers of the atmosphere.</li> <li>• Identify the sun as a major source of energy for Earth and recognize that this star provides the energy needed generate wind and weather.</li> <li>• Compare and contrast air masses, and explain what happens when they pass over an area.</li> <li>• Explain how different weather conditions are measured.</li> <li>• Describe features of the ocean floor.</li> </ul>	
<p><b>Vocabulary:</b></p> <p>question, hypothesis, data, collect, analyze, conclusion, prediction, investigation, experiment, support, observation, inference, water cycle, evaporation, hurricane, typhoon, tornado, blizzard, humidity, front, meteorologist, barometer, tropical storm, tropical depression, landforms, atmosphere</p>	<p><b>Focus Question(s):</b></p> <ul style="list-style-type: none"> <li>• In what ways is the earth always changing?</li> <li>• How can atmospheric patterns be used to make predictions about the weather?</li> <li>• How do the location and landforms of Guam affect the weather and seasons?</li> <li>• How is it different than other areas of the earth?</li> </ul>	

**Description of Lesson (including instructional strategies):**

*Day 1: 01/25/16 What are the Layers of the Earth? Pp. C6-C11*

I can describe the layers of earth.

**Anticipatory Set:**

Have students scan the chapter. Guide them in identifying the lesson titles and major headings and use them to outline the chapter.

**Instruction and Strategies:**

Help students focus on the supporting facts and details for the main idea: Earth is a planet that is always changing. When Earth's crust moves, earthquakes occur and volcanoes erupt. While both can be dangerous and scary, they are also natural Earth processes that have shaped the surface of our world.

- Teacher will lead a whole class discussion; ask the class How many layers does earth have? (Earth is made up of three main layers.)
- Preview the vocabulary terms on p. C6
- Read as a class pages C6-C11.
- Students will take notes as teacher discusses and lectures.
- Teacher will ask comprehension questions throughout the lesson.
- Students will copy and define the vocabulary terms on p. C6.
- Have students copy and answer the review questions on p. C11.
- Integrate Art: Have students draw and label the layers of the earth.

**Formative assessment:**

Students will complete the review questions for the lesson.

**Description of Lesson (including instructional strategies):**

*Day 2: 01/26/16 What causes earthquakes? Pp. C14-C17*

I can explain what causes an earthquake.

**Anticipatory Set:**

Have students scan the chapter. Guide them in identifying the lesson titles and major headings and use them to outline the chapter.

**Instruction and Strategies:**

Help students focus on the supporting facts and details for the main idea: A fault in Earth's crust is a break along which rocks move.

- Teacher will lead a whole class discussion; ask the class  
What is an earthquake?  
How is an earthquake measured?
- Have students complete the Investigation: Earthquakes p. C12-C13  
Materials: sticky note, small plastic cup, water
- Preview the vocabulary terms on p. C14.
- Read as a class pages C14-C17.
- Students will take notes as teacher discusses and lectures.

- Teacher will ask comprehension questions throughout the lesson.
- Students will copy and define the vocabulary terms on p. C14.
- Have students copy and answer the review questions on p. C17.
- Integrate Art: Have students draw and label the layers of the earth.
- **Stuck on You p. C15 (TE):**
  - Have a student first rub the backs of the sand paper pieces together and describe what happens. Next instruct another student to rub the coarse sides of the papers together and describe what happens.
  - Challenge students to write short paragraphs that describe how this activity models earthquake movement along a fault and a subsequent earthquake.  
Materials: 2 pieces of sand paper

***Formative assessment:***

Students will complete the review questions for the lesson.

**Description of Lesson (including instructional strategies):**

***Day 3: 01/27/16 How Do Volcanoes Form? P. D18-D25.***

I can describe how volcanoes form.

**Anticipatory Set:**

Teacher will explain to students that they will be learning about how volcanoes form.

Have students scan the chapter. Guide them in identifying the lesson titles and major headings and use them to outline the chapter.

**Instruction and Strategies:**

Help students focus on the supporting facts and details for the main idea: A volcano is a mountain that forms when melted rock called lava flows out onto earth's surface.

- Teacher will lead a whole class discussion; ask the class,  
What is a volcano?  
Do you think volcanic eruptions can be useful? Why or why not?
- Have students complete the investigation: Volcanic Eruptions p.C18  
Materials: 1 plastic bottle, small piece of clay, aluminum pie plate, air pump, funnel, puffed rice cereal or plastic foam
- Preview the vocabulary terms on p. C20
- Read as a class pages C20-C25.
- Students will take notes as teacher discusses and lectures.
- Teacher will ask comprehension questions throughout the lesson.
- Students will copy and define the vocabulary terms on p. C20.
- Have students copy and answer the review questions on p. C25.
- **Is it Magma or is it Lava? P. C21 (TE):**
  - Challenge students to use a tube of toothpaste, a clear drinking straw, and a small plastic funnel to demonstrate how magma and lava are related.
  - Invert the funnel, have a volunteer hold the funnel at waist level. Have another put the straw into the funnel from below and hold the straw in place. Instruct a third student to secure the toothpaste tube (magma chamber) to the lower end of the straw and slowly squeeze the paste into the tube until it comes out of the top of the straw. Make sure students are able to pinpoint the spot where the magma becomes lava.

Materials: toothpaste tube, funnel, clear drinking straw

**Formative assessment:**

Students will complete the review questions for the lesson.

**Description of Lesson (including instructional strategies):**

**Day 4: 01/28/16 People in Science: Hiroo Kanamori- Seismologist p. C28**

I can connect chapter concepts with the contributions of scientists.

**Anticipatory Set:**

Have students scan the page. Guide them in identifying the lesson purpose. Ask students to write Two or three sentences describing what they think a seismologist does.

**Instruction and Strategies:**

- Read as a class page C28.
- Students will take notes as teacher discusses and lectures.
- Teacher will ask comprehension questions throughout the lesson.
- Have students copy and answer the Think About It questions on p. C28.

**Formative assessment:**

Students will complete the review questions for the lesson.

**Description of Lesson (including instructional strategies):**

**Day 5: 01/29/16 Moving Magma p. C29**

I can investigate moving magma.

**Anticipatory Set:**

Teacher will explain to students that they will be investigating moving magma. Ask the class;  
How does toothpaste in a tube move like magma in a volcano?

**Instruction and Strategies:**

- Have students complete the investigation on p. C29  
Materials: paper towel, half full tub of toothpaste with cap

**Formative assessment:**

Students will draw conclusions based on their investigation explaining how the movement of toothpaste is similar to the movement of magma.

**Closure:**

Students will share with the rest of the class their understanding of how volcanoes and earthquakes are natural earth processes that have shaped the surface of the earth.

**Independent Practice:**

Students will work independently to complete the review questions for each lesson.

**Resources:**

Harcourt Science- 4th Grade, Harcourt Science workbook, clay, pencil ,sticky note, small plastic cup, water, paper, Grid paper, 2 pieces of sand paper, 1 plastic bottle, small piece of clay, aluminum pie plate, air pump, funnel, puffed rice cereal or plastic foam, toothpaste tube, funnel, clear drinking straw, paper towel, half full tub of toothpaste with cap

**Accommodations:**

Cooperative groups will consist of students of various levels so they can help each other.  
If needed, there can be a small group of students on which the teacher focuses his/her attention.  
Have ESL students learn new words by selecting words in the dictionary and using them in sentences.



<p><b>Content:</b> Science: Air and Protecting Ecosystems</p>	<p><b>Grade:</b> 4<sup>th</sup></p>	<p><b>Timeline:</b> 45 minutes 02/1/16-02/05/16</p>
<p><b>Science Standard(s):</b></p> <p>4.4.4 Investigate and explain that air is a substance that surrounds us that takes up space and whose movements we feel as wind.</p> <p>4.4.5 Predict how changes on the earth’s surface will affect local and world ecosystems.</p> <p><b>CCSS ELA Standards:</b></p> <p>4.RI.5 Describe the overall structure (chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.</p> <p>4.W.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic.</p> <p>4.W.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences</p>		
<p><b>Lesson Overview:</b></p> <p>In this lesson, students will be able to recognize that air is a material substance. Although, we cannot observe air directly, we can observe its effects as it interacts with other materials. Ecosystems can change slowly over time. Understanding these changes helps us understand more rapid changes caused by natural disasters and by human actions.</p>	<p><b>Lesson Objective(s):</b></p> <p>In this lesson, students will be able to</p> <ul style="list-style-type: none"> <li>• Explain that air is a real material substance.</li> <li>• Recognize that air is matter.</li> <li>• Describe ways ecosystems change.</li> <li>• Explain how changes affect ecosystems.</li> <li>• Describe how people affect ecosystems.</li> <li>• Give examples of ecosystem changes that people cause.</li> <li>• Describe the ways people can conserve natural resources.</li> <li>• Explain how governments help protect ecosystems.</li> </ul>	
<p><b>Vocabulary:</b></p> <p>question, hypothesis, data, collect, analyze, conclusion, prediction, investigation, experiment, support, observation, inference, succession, reclamation, conservation, redesign, preservation</p>	<p><b>Focus Question(s):</b></p> <ul style="list-style-type: none"> <li>• In what ways is the earth always changing? How do we know?</li> </ul>	

**Description of Lesson (including instructional strategies):**

***Day 1: 02/01/16 What is Air?***

I can explain that air is a substance that surrounds us, takes up space, and whose movements we feel as wind.

**Anticipatory Set:**

Explain to the students that they will be learning about air.

**Instruction and Strategies:**

Help students focus on the supporting facts and details for the main idea: Air is always around us. Just because we cannot see it, does not mean that it is not there. Air is always around us. The movement of air is known as wind. Wind is air in its natural motion.

- Teacher will lead a whole class discussion; ask the class
  - What is air? (Air is a substance that surrounds us, takes up space, and whose movements we feel as wind.)
  - Where is air?
  - Is it touching you right now?
  - When air moves outside what do we call it?
- Students will take notes as teacher discusses and lectures.
- Teacher will ask comprehension questions throughout the lesson.
- Students will copy and define the vocabulary terms.
- Have students complete the Investigation: What is air?  
Materials: chalk, chalkboard, 3-4 balloons, paper, pencils
- Air Movement: Instruct students to take out a piece of paper. Ask, how can you use air to get your paper from one side of the desk to the other?
- Challenge students to test their ideas. Ask, did air move? How do you know? Is air all around us?
- Air takes up space. Ask, do you know how I can make this balloon bigger? There are many ways I can make this balloon bigger, but I am going to try using air.
- Blow air into the balloon. Hold balloon so air does not escape and ask, Is the balloon getting bigger? What is taking up space inside the balloon? How do you know that air is going into the balloon?
- Finish blowing the balloon and tie it off. Compare a deflated balloon and an inflated balloon.

***Formative assessment:***

Students will answer comprehension questions based on their observations.

1. How did air help you move the paper?
2. What else has the wind helped you move? How did you know it was the wind?
3. Why are tires tall and round instead of short and flat? How are tires like balloons?

**Description of Lesson (including instructional strategies):**

***Day 2: 02/02/16 Is Air a real material substance like solids and liquids?***

I can describe that air is a material substance.

**Anticipatory Set:**

Explain to the students that they will be conducting an investigation on air.

- Instruct students to close their eyes pass the 4 plastic baggies filled with each of the 4 substances around for students to feel, ask them not to say anything until you ask. With eyes closed ask then what is in each bag? Have them open their eyes and then the bags.
- After discussions ask how do you know what is in each bag? What is your evidence? In reference to the air bag, since you cannot see, hear, feel, smell, or taste what is in the bag, how do you know that air is really in the bag?
- Explain that you will be talking about evidence that air is a real substance and discussing what evidence is.
- Discuss that although we cannot see air there is still evidence that for its existence.

**Instruction and Strategies:**

Help students focus on the supporting facts and details for the main idea: Air is a substance that surrounds us and takes up space, and whose movements we feel as wind.

- Teacher will lead a whole class discussion; ask the class  
What is air? (Air is a substance that surrounds us, takes up space, and whose movements we feel as wind.)
- Preview the vocabulary terms-  
*air* (Air is a substance that surrounds us, takes up space, and whose movements we feel as wind.)  
*evidence* (observations that we can use to support conclusions)
- Students will take notes as teacher discusses and lectures.
- Teacher will ask comprehension questions throughout the lesson.
- Students will copy and define the vocabulary terms.
- Have students complete the Investigation: Is air a real substance like solid and liquids?  
Materials: 4 plastic food storage baggies, one filled with sand, a second with water, a third with buttons, and a fourth with air, a medicine dropper, a syringe, and a cup of water.
- Break students up into groups. Pass out a medicine dropper or a syringe and a cup of water to each pair. Have them work with these materials to come up with evidence that air is a substance. Have them record ideas, observations, and an explanation/evidence in their science notebooks. Have each group share what they found and how they found it.
- Teacher will discuss the two best principles of air. 1) Air is a real material substance. Although we cannot observe air directly, we can observe its effects as it interacts with other materials. 2) Bubbles in water indicate that air is present. The bubbles are filled with air.

**Formative assessment:**

Students will write evidence that air is a real substance based on their investigation in their science notebooks.

**Description of Lesson (including instructional strategies):**

**Day 3: 02/03/16 What kinds of Changes Occur in Ecosystems? P. B50-B57.**

I can describe ways ecosystems change.

I can explain how changes affect ecosystems.

**Anticipatory Set:**

Teacher will explain to students that they will be learning about how ecosystems change. Have students scan the chapter. Guide them in identifying the lesson titles and major headings and use them to outline the chapter.

**Instruction and Strategies:**

Help students focus on the supporting facts and details for the main idea: Ecosystems can change slowly through the process of succession.

- Teacher will lead a whole class discussion; ask the class,  
How can land be affected by weather?  
How do such changes affect plants, animals, and people?
- Have students complete the investigation: Changes in a Pond? p. B50  
Materials: aluminum foil pan, water, metric ruler, plastic green plants, aquarium gravel
- Preview the vocabulary terms on p. B52
- Read as a class pages B50-B57.
- Students will take notes as teacher discusses and lectures.
- Teacher will ask comprehension questions throughout the lesson.
- Students will copy and define the vocabulary terms on p. B50.
- Have students copy and answer the review questions on p. B57.

**Formative assessment:**

Students will complete the review questions for the lesson.

**Description of Lesson (including instructional strategies):**

**Day 4: 02/04/16 How Do People Change Ecosystems? p. B58-B65**

I can describe how people affect ecosystems.

I can give examples of ecosystem changes that people cause.

**Anticipatory Set:**

Teacher will explain to students that they will be learning about how people affect ecosystems. Have students scan the chapter. Guide them in identifying the lesson titles and major headings and use them to outline the chapter.

**Instruction and Strategies:** Help students focus on the supporting facts and details for the main idea: Ecosystems can be damaged when people use chemicals and clear land to meet human needs.

- Teacher will lead a whole class discussion; ask the class,  
What changes have you seen in your community during the past few years?  
How has the land been affected?
- Have students complete the investigation: Cleaning Up Pond Pollution? p. B58  
Materials: 6 cups and 3 lids, wax pencil, water, safety goggles, plastic gloves, 3 coffee filters, 3 rubber bands, pollutants, food coloring -10 drops, bits of paper, vegetable oil -10 drops, small pieces of bread, green dishwashing detergent- 10 drops, carpet fibers
- Preview the vocabulary terms on p. B60
- Read as a class pages B58-B65.
- Students will take notes as teacher discusses and lectures.
- Teacher will ask comprehension questions throughout the lesson.

- Students will copy and define the vocabulary terms on p. B65.
- Have students copy and answer the review questions on p. B57.

**Formative assessment:**

Students will complete the review questions for the lesson.

**Description of Lesson (including instructional strategies):**

**Day 5: 02/05/16 What is Conservation? B66-B73**

I can describe the ways people can conserve natural resources.

I can explain how governments help protect ecosystems.

**Anticipatory Set:**

Teacher will explain to students that they will be learning about conservation. Have students scan the chapter. Guide them in identifying the lesson titles and major headings and use them to outline the chapter.

**Instruction and Strategies:** Help students focus on the supporting facts and details for the main idea: People can conserve natural resources by reducing their use, and by recycling and reusing materials.

- Teacher will lead a whole class discussion; ask the class,  
What is a natural resource?  
What natural resources do your families use?
- Have students complete the investigation: Using Our National Parks? p. B66  
Materials: 7 index cards, yarn, tape recorder or video camera (optional)
- Preview the vocabulary terms on p. B68
- Read as a class pages B68-B73.
- Students will take notes as teacher discusses and lectures.
- Teacher will ask comprehension questions throughout the lesson.
- Students will copy and define the vocabulary terms on p. B68.
- Have students copy and answer the review questions on p. B73.
- **Conserving Resources at School? P. B69 (TE):**
- Challenge students to find ways to conserve resources at school.
- Have students make a list of resources that may be conserved and then have them explain how they could conserve each resource. Discuss the items with the class and have students determine which ideas are reasonable.

Materials: pencil and paper

**Formative assessment:**

Students will complete the review questions for the lesson.

**Closure:**

*Students will share with the rest of the class their understanding of how air is a real substance and how people help protect ecosystems from harmful changes.*

**Independent Practice:**

Students will work independently to complete the review questions for each lesson.

**Resources:**

Harcourt Science- 4th Grade, Harcourt Science workbook, paper, pencil, aluminum foil pan, water, metric ruler, plastic green plants, aquarium gravel, 7 index cards, yarn, tape recorder or video camera (optional), 4 plastic food storage baggies, one filled with sand, a second with water, a third with buttons, and a fourth with air, a medicine dropper, a syringe, and a cup of water, chalk, chalkboard, 3-4 balloons, paper, pencils

**Accommodations:**

Cooperative groups will consist of students of various levels so they can help each other. If needed, there can be a small group of students on which the teacher focuses his/her attention. Have ESL students learn new words by selecting words in the dictionary and using them in sentences.



<p><b>Content:</b> Science: Types of Rocks and Recycling</p>	<p><b>Grade:</b> 4<sup>th</sup></p>	<p><b>Timeline:</b> 45 minutes 02/9/16-02/12/16</p>
<p><b>Science Standard(s):</b></p> <p>4.4.6 List and define geological concepts in the formation of rocks. Example(s): igneous, conglomerates, sedimentary</p> <p>4.5.2 Explain why some products and materials are easier to recycle than others.</p> <p><b>CCSS ELA Standards:</b></p> <p>4.RI.5 Describe the overall structure (chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.</p> <p>4.W.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic.</p> <p>4.W.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences</p>		
<p><b>Lesson Overview:</b></p> <p>In this lesson, students will be able to recognize that Recycling is when used waste and materials are converted into new products, so that it can be used again. This practice ensures that we don't waste perfectly reusable materials. It lowers the demand for new materials to be produced and thereby lowers our energy consumption. Recycling also keeps our non-usable trash from reaching the landfills where they can add to pollution.</p>	<p><b>Lesson Objective(s):</b></p> <p>In this lesson, students will be able to:</p> <ul style="list-style-type: none"> <li>• The concept of recycling</li> <li>• How recycling helps protect the environment</li> <li>• The value and benefits of recycling</li> <li>• Distinguish which materials can be recycled</li> <li>• Associate recyclable materials with daily products</li> <li>• Students will be able to define and describe how the three major types of rocks are formed.</li> </ul>	
<p><b>Vocabulary:</b></p> <p>question, hypothesis, data, collect, analyze, conclusion, prediction, investigation, experiment, support, observation, inference, recycling, greenhouse effect, igneous, sedimentary, metamorphic</p>	<p><b>Focus Question(s):</b></p> <ul style="list-style-type: none"> <li>• In what ways is the earth always changing? How do we know?</li> </ul>	

**Description of Lesson (including instructional strategies):**

***Day 1: 02/09/16 What is Recycling?***

I can explain the process of recycling.

**Anticipatory Set:**

Explain to the students that they will be learning about recycling.

**Instruction and Strategies:**

Help students focus on the supporting facts and details for the main idea: Air is always around us. Just because we cannot see it, does not mean that it is not there. Air is always around us. The movement of air is known as wind. Wind is air in its natural motion.

- Teacher will lead a whole class discussion; ask the class
  - What do you know about recycling?
  - Do you recycle at home or do you avoid it? Why?
  - Do you know what happens to the different materials after putting them in the recycling bin?
- Students will take notes as teacher discusses and lectures.
- Teacher will ask comprehension questions throughout the lesson.
- Students will copy and define the vocabulary terms. Recycling and Greenhouse effect

**Definition**

**Recycling** is the process of collecting and altering old paper, glass, plastic, aluminum and tin, so these materials can be used again.

**The problem**

Our society produces more and more litter every year, which is polluting the environment and threatening our health. This increase in litter causes:

- Dirt
- An increase in microbes and diseases
- Risks to our health
- A threat to animals
- Fires
- Pollution of water, land and air
- Increase of the “greenhouse effect.”

**“Greenhouse Effect”**

Definition: Exhaust gases produced by burning fossil fuels create a thick layer around the earth; these retain the sun’s heat in the atmosphere.

The greenhouse effect causes:

- Increased global temperature
  - Negative effects on forests, animals and agricultural production, water supply and human health
  - Increase of sea levels
  - Increase of air pollutants
  - Climate Change
- At the end of the lesson, the teacher asks the students to solve the following riddle: “It is easy for all of us to take the first step in protecting the planet. Can you think of anywhere “nearby” where we can recycle materials which we used until recently, and do not need anymore, rather than throwing them away?” (***Recycling Bin***)
- Finally, the teacher asks the students to come to the next lesson with a used package from home, which should be empty and clean.

***Formative assessment:***

Students will answer comprehension questions based on their observations.

- What is recycling?
- What is the problem?
- What is the greenhouse effect?

**Description of Lesson (including instructional strategies):**

***Day 2: 02/10/16 Practical Recycling***

I can distinguish which materials can be recycled.

**Anticipatory Set:**

The teacher asks the students to place the used packages they brought from home on the desk. At this point, the teacher informs the students in today’s recycling lesson, the students will learn to distinguish which materials can be placed in the recycling bin and be reused after appropriate treatment.

Draw 4 large circles on the board and gives them the following titles:

Plastic, Glass, Paper, and Metal. Then he asks the children to give examples of each category based on the objects they see on the desks. In the meantime, the teacher gives the children a little more information about these materials.

**Instruction and Strategies:**

**Information on recycling**

**Recyclable materials:**

- Plastic bottles of water and soft drinks, packaging used for food such as yogurt and butter, empty containers of detergents, cleaning products, shower gels, shampoos, toothpastes, deodorants, etc.
- Glass packaging: bottles of water and soft drinks, food jars, etc.
- Paper packaging: milk cartons, cereal packaging, pizza trays, detergents, etc.
- Aluminum packaging of soft drinks and beers
- Tin packaging of condensed milk, tuna cans, coffee cans, etc.

**Non-recyclable materials:**

- Food leftovers
- Batteries
- Electronic equipment

- Construction materials
- Textiles and clothing
- Garden waste
- Objects made of wood, leather etc.
- CDs
- DVDs
- Games of all kinds

### **Create Inspector SuperBin**

The students will make their “Inspector SuperBin” as they imagine it. Its role is to motivate the children to participate in recycling and to make teaching more enjoyable to students. It is “Super”, because it helps us preserve the environment and our quality of life in a simple and effective way.

The teacher divides the children into four groups (Glass, Plastic, Paper, Aluminum and Tin) and gives them the following instructions: Each team will require a large cardboard box, paints and drawings of various objects to decorate their recycling bin. The color blue will be used for metal, green for glass, yellow for paper, red for plastic.

After the creation of the SuperBins, the teacher invites the students to put the packages they brought from home into the recycling bins, by category.

#### ***Formative assessment:***

Students will be able to identify which recyclable materials go into the different recycling bins by category.

### **Description of Lesson (including instructional strategies):**

#### **Day 3: 02/11/16 What are the different types of rocks?**

I can define and describe how the three major types of rocks are formed.

#### **Anticipatory Set:**

- Teacher will explain to students that they will be learning about rocks today.
- Ask your students if they know the three different types of rocks and if they could share with the class.

#### **Instruction and Strategies:**

Help students focus on the supporting facts and details for the main idea: Ecosystems can change slowly through the process of succession.

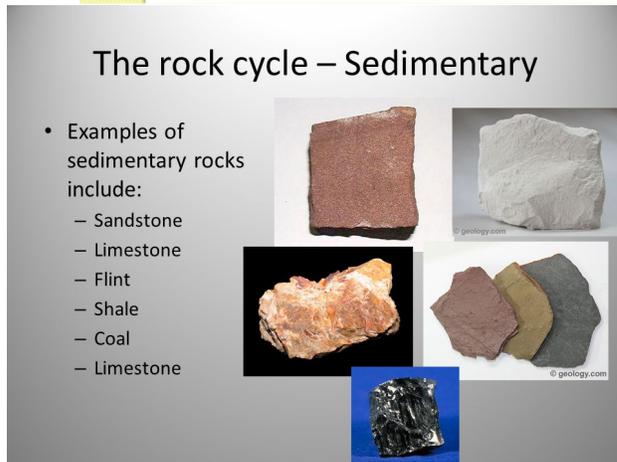
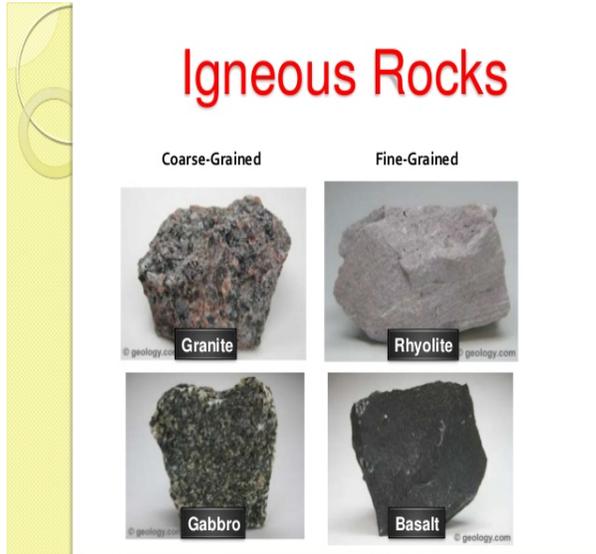
- The slow and fast processes that occur on Earth form different types of rocks. Again, wind, water, and ice (a form of water) change the Earth’s materials.
- Students should be able to list and define the three types of rocks by the processes that create them.
- Tell your students that the first type of rock is called **igneous**. Igneous rocks are composed of melted rock that hardens and cools. Igneous rocks are formed from molten rock.
- A few examples include Obsidian and Pumice. Show your students a picture of each example.
- Tell your students that the second type of rock is called **sedimentary**. They are formed from material that is settled into layers. The layers are squeezed until they harden into rock.

Sedimentary rocks are formed from deposited rock particles that are then compacted.

- A few examples include Limestone, Breccia, and Sandstone. Show your students a picture of each example.
- Tell your students that the third type of rock is called **metamorphic**. They are changed by heat and pressure. Igneous and sedimentary rocks can be transformed into metamorphic rock through extreme heat and pressure over time.
- A few examples include Slate and Marble. Show your students a picture of each example.

**Formative assessment:**

- Ask your students to write how igneous, sedimentary, and metamorphic rocks are formed.
- Tell your students to write an example for each kind.





**Description of Lesson (including instructional strategies):**

**Day 4: 02/12/16 What are the different Types of Rocks? continuation**

I can define and describe how the three major types of rocks are formed.

**Anticipatory Set:**

- Teacher will explain to students that they will continue learning about rocks today.
- Ask your students if they know the three different types of rocks and if they could share with the class.

**Instruction and Strategies:** Help students focus on the supporting facts and details for the main idea: The slow and fast processes that occur on Earth form different types of rocks.

- Students will take notes as teacher discusses and lectures.
- Teacher will ask comprehension questions throughout the lesson.
- Students will copy and define the vocabulary terms.

**Modeling/Guided Practice**

- Get an ice tray. Fill it with water and put it in the freezer. After an hour, show your students that an igneous rock is like a cube of ice. It is originally melted, then hardens after being put in the freezer and is cool when you take it out.
- Give your students the example of an omelet for metamorphic rocks. Tell your students that the egg is mixed with salt, pepper and tomatoes. After that it is cooked. The egg experiences heat and pressure from the flames of the stove. This enables the egg to turn into an omelet.
- Give your students an example of the layers of a cake for sedimentary rock. Tell them the various layers of the cake come together in the oven for it to harden and turn into a cake.

**Formative assessment:**

Students will be able to identify and name the three types of rocks.

**Closure:**

Students will share with the rest of the class their understanding of the three types of rocks and the importance of recycling.

**Independent Practice:**

Students will work independently to complete the review questions for each lesson.

**Resources:**

Harcourt Science- 4th Grade, Harcourt Science workbook, paper, pencil, recycled materials, crayons, scissors

**Accommodations:**

Cooperative groups will consist of students of various levels so they can help each other.  
If needed, there can be a small group of students on which the teacher focuses his/her attention.  
Have ESL students learn new words by selecting words in the dictionary and using them in sentences.



<p><b>Content:</b> Science: STEM Inventions</p>	<p><b>Grade:</b> 4<sup>th</sup></p>	<p><b>Timeline:</b> 45 minutes 02/15/16-02/19/16</p>
<p><b>Science Standard(s):</b></p> <p>4.1.1 Observe that results of repeated scientific investigations are seldom exactly the same. When differences occur, propose an explanation for them using recorded information from the investigations.</p> <p>4.1.2 Form and support a hypothesis after collecting information and gathering specimens or observing an experiment.</p> <p><b>CCSS ELA Standards:</b></p> <p>4.W.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic.</p> <p>4.W.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences</p>		
<p><b>Lesson Overview:</b></p> <p>In this lesson, students will be able to explain their understanding of the scientific method and design an experiment utilizing this method. Through project-based learning, students are encouraged to find their own answers and draw their own conclusions.</p>	<p><b>Lesson Objective(s):</b> In this lesson, students will be able to:</p> <ul style="list-style-type: none"> <li>• Explain the steps of the scientific investigation</li> <li>• Apply the scientific method to plan and conduct a study/experiment.</li> <li>• Improve performance in a task through improved communication and cooperation.</li> <li>• Form and support a hypothesis.</li> <li>• Develop a standard operating procedure.</li> <li>• Reflect on learning</li> <li>• Learn about engineering design</li> </ul>	
<p><b>Vocabulary:</b> question, hypothesis, data, collect, analyze, conclusion, prediction, investigation, experiment, support, observation, inference, variable, measure, compare, scientific method, classify</p>	<p><b>Focus Question(s):</b></p> <ul style="list-style-type: none"> <li>• What makes the use of the scientific method so universal?</li> </ul>	

**Description of Lesson (including instructional strategies):**

**Day 1: 02/15/16 Monday Planning an Investigation pp. x-xii**

**Anticipatory Set:**

Ask students, “How do scientists plan and conduct investigations?”

Read pp. x-xii as a whole group. Discuss the steps of the scientific method.

**Instruction and Strategies:**

Help students focus on the supporting facts and details for the main idea: Scientists use the scientific method to plan and conduct a study. They use the scientific process skills to help them gather, organize, analyze, and present their information.

Review the steps of the *scientific method*.

Observe, and ask questions.

Form a hypothesis.

Plan an experiment.

Conduct the hypothesis.

Draw conclusions and communicate results.

**Guided Practice:**

Students will work together in cooperative groups (Marzano, Cooperative Learning) to understand the process of the scientific method.

**Formative Assessment:**

Have students answer the focus question about the experiment and what they could do to improve

their experiment. Provide feedback based on their understanding of the lesson learned.

(Marzano: Providing Feedback).

**Closure:**

Groups will share with the rest of the class their understanding of the scientific method and its processes.

**Independent Practice:**

Students will work independently to write down the steps to the scientific method.

**Description of Lesson (including instructional strategies):**

**Day 2: 02/16/16 How to make a Pinball Machine from a Cardboard Box**

The goal is to design and construct a cardboard box pinball machine on which a ball can travel through the obstacles.

**Instruction and strategies:**

Help students focus on the supporting facts and details for the main idea: Building a pinball machine is a fun hands-on science activity and a great way to get students involved in an exciting engineering challenge—one that has clear and immediate results. The ball/object should be able to travel through the pinball machine through the obstacles.

**Guided Practice:**

Students will work together in cooperative groups (Marzano, Cooperative Learning) to design and construct a cardboard pinball machine.

**Materials:**

- a box
- wooden tongue depressors or popsicle sticks
- tape
- various items for obstacles eg. toilet paper rolls, cottage cheese containers, cd's
- decorating items eg. stickers

**Instructions:**

1. Take a cardboard box, cut off the front and tape up all the sides.
2. Use a scissors or craft knife to cut holes in the sides for your levers. Cut them as low as possible.
3. Tape two sticks together to form the desired length for each lever.
4. Use toilet paper rolls to achieve the desired angle for the machine by taping/gluing them to the back of the box.
5. Tape or glue a long paper towel tube for the ball dispenser
6. Tape or glue obstacles
7. Decorate and enjoy playing!

**Formative Assessment:**

Q&A and the final product of the pinball machine. Provide feedback based on

their understanding of the lesson learned. (Marzano: Providing Feedback).

Did the object travel through the pinball machine and make it through the obstacles?

What design modifications might increase the ball/objects speed?

What could you have done differently?

**Closure:**

*Groups will share with the rest of the class their conclusions of the pinball machine and that the design and construction will determine how quickly a ball/object can enter and pass through the maze successfully.*

**Independent Practice:**

Students will work independently to make a prediction and answer the evaluation questions.

**Description of Lesson (including instructional strategies):**

*Day 3: 02/17/16 Mini Ferris Wheel*

The goal is to design a functional wheel, construct their wheel, and present their reflections to the class.

**Instruction and strategies:**

Explain to students that they will work cooperatively in a mini ferris wheel building challenge. Allow enough time for them to brainstorm, design, construct and test their models. (You may wish to require weights such as tea bags which can be tied onto the wheel.)

Students discuss and develop a plan for their wheel. They must agree on materials they will need, write or draw their plan, and then present their plan to the class. They should consider the stages of construction.

Questions to prompt *discussion with the students:*

What design do you think will work best for this activity?

**Guided Practice:**

Students will work together in cooperative groups (Marzano, Cooperative Learning) to design and construct a mini ferris wheel.

Materials:

Straws, ruler, scissors, mini muffin papers, tape, string, glue, string, paperclips, paper, cardboard, cardboard tubes (such as paper towel or toilet paper rolls), and dry tea bags (optional)

Instructions

Step 1: Cut 24 straws in 5 1/2" lengths.

Step 2: Threading string through 3 of the straws, form a triangle and tie the string to keep the straws in a tight triangle.

Step 3: Thread a new piece of string into one side of the first triangle and add 2 new straws to form an attached triangle, finishing it off as in step 2.

Step 4: Continue attaching triangles in this way until you have a hexagon made of 6 triangles. Then repeat steps 2-4 to form a second identical hexagon.

Step 5: Cut 6 straws into 3" lengths. Thread string through an edge of one hexagon, add 1 short straw, thread through an edge of the other hexagon, add another short straw, and tie the string tight as usual. The two hexagons should now be connected.

Step 6: Continue to connect the two hexagons as in step 5; thread through a hexagon edge, the attached short straw, another hexagon edge, add on a new short straw, and twist. Do this until all sides are attached, as shown below.

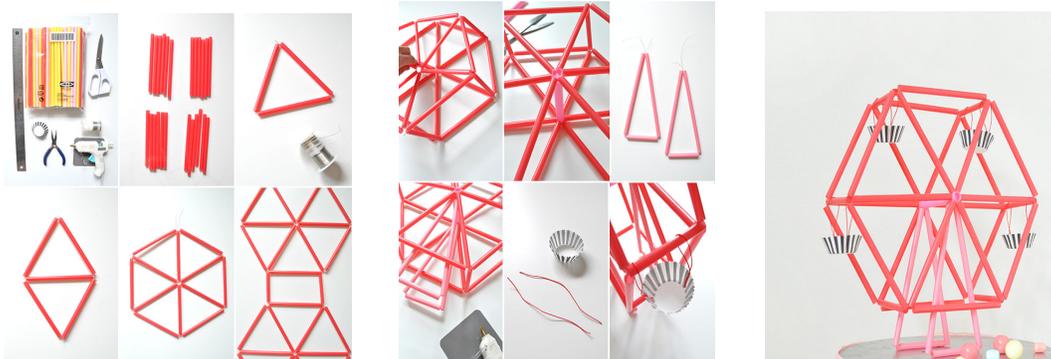
Step 7: Cut another 3" straw and glue/tape it into the center of the hexagons. This will keep the structure much more secure.

Step 8: Cut 4 straws in 7" lengths and 2 straws in 3" lengths. Use the string to form two triangles, as shown below.

Step 9: Apply glue to the top of one triangle and attach to the center-post of the ferris wheel. Hold it in place until secure, and repeat for the second triangle.

Step 10: Cut 8 lengths of string in 5" lengths, two for each mini muffin paper.

Step 11: Loop two pieces of string over one of the 3" straws and glue into opposite sides of a muffin paper. Repeat for the remaining strings and muffin papers



**Description of Lesson (including instructional strategies):**

***Day 4: 02/18/16 Recycled Suspension Bridge***

The goal is to design, construct a functional suspension bridge and present their reflections to the class.

**Instruction and strategies:**

Explain to students that they will work cooperatively in a recycled suspension bridge challenge. Allow enough time for them to brainstorm, design, construct and test their models.

They must agree on materials they will need, write or draw their plan, and then present their plan to the class. They should consider the stages of construction.

Questions to prompt *discussion with the students*:

What design do you think will work best for this activity?

How does geometry help engineers build bridges?

What do we need to build a successful bridge?

**Guided Practice:**

Students will work together in cooperative groups (Marzano, Cooperative Learning) to design and construct a recycled suspension bridge.

Materials:

- Cereal box
- 4 empty toilet paper tubes
- **Blue** and **green** painter's tape
- **twine**
- Small rubber bands/loom bands
- Hole punch
- Scissors

Challenge students to use what they learned about bridges to build a bridge that will hold the most weight.

Instructions:

1. Cut a strip of cardboard out of a flattened cereal box to make your bridge. You can tape on extra sections if you want to make a really long bridge.
2. Punch holes along the sides of the cardboard leaving a few inches on each end without holes. The un-holed section serves as the ramp to the "ground". Try to approximately line up the holes across the cardboard to help increase stability in the bridge.
3. Thread a rubber band through each hole and loop back through itself to hold in place
4. Create bridge towers by cutting two 1/2" slits in one end of the each tube. The slits should be slightly off the center and across from each other. See the blue lines in the picture above for guidance.
5. Start taping your race track and river. Your river should be a bit narrower than the length of your bridge so the bridge ends can touch the "ground."
6. Tape down your towers. This was the trickiest part because these towers support all the weight on the bridge just like a real suspension bridge. Also be sure that the slits line up with the direction of the bridge. All I have to say is thank you for repositionable tape!
7. Cut your cables out of a length of baker's twine. Cut them about twice as long as your bridge because you can always cut the extra off later.
8. Feed each piece first through the slits in the towers and then through each of the

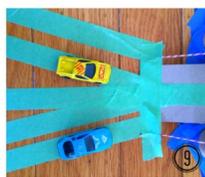
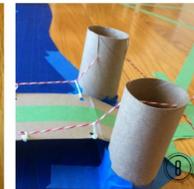
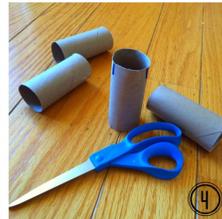
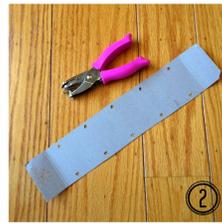
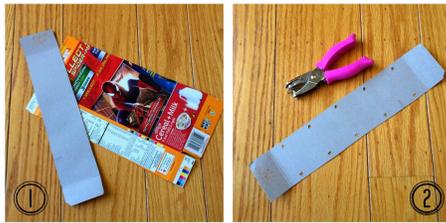
rubber bands. Then pull the twine taut until the rubber bands stretch some and the bridge feels secure. Tape the ends of the twine to the floor.

9. Tape your road connectors over the bridge.

Assessment:

**Structural Test (5-10 minutes)**

Have each group present their bridge and test it using increasingly heavy weights. As each group presents their bridge, students discuss which elements of bridge construction they incorporated and why.



**Description of Lesson (including instructional strategies):**

***Day 5: 02/19/16 Angry Bird Project***

The goal is to design, construct a functional suspension bridge, 3D solid, and catapult. Students must present their reflections to the class.

**Instruction and strategies:**

Explain to students that they will work cooperatively in an angry birds project challenge. Allow enough time for them to brainstorm, design, construct and test their models.

They must agree on materials they will need, write or draw their plan, and then present their plan to the class. They should consider the stages of construction.

Questions to prompt *discussion with the students:*

What design do you think will work best for this activity?

How does geometry help engineers build bridges?

What do we need to build a successful bridge?

**Guided Practice:**

Students will work together in cooperative groups (Marzano, Cooperative Learning) to design and construct a recycled suspension bridge.

Materials:

For the Catapult:

- Popsicle sticks
- Tape
- Plastic Spoon
- Rubber bands
- Cup
- Rolled up paper

The goal is to design and construct a working catapult.

For the Structural Tower:

30 popsicle sticks  
7 straws  
masking tape  
10 paper clips  
one piece of paper

Your structure/tower will be tested against the forces of: gravity, hurricane winds, and an earthquake.

Both the structure and the 3D solids will be made into an angry bird diorama in the

shoebox.

- Construct a 3D solid made of construction paper
- Decorate the solids so they resemble the actual birds
- Build a structure/ tower with the materials

The structure must be:

At least 30 cm tall

Have a platform on the top that is 10 cm x 10 cm

Use structural elements (post, pyramid, column) and withstand forces you can explain (gravity, tension)

**Formative Assessment:**

Q&A and the final product of the angry bird project. Provide feedback based on their understanding of the lesson learned. (Marzano: Providing Feedback).

Did the object travel properly and make it through the obstacles?

What design modifications might increase the objects speed?

What could you have done differently?

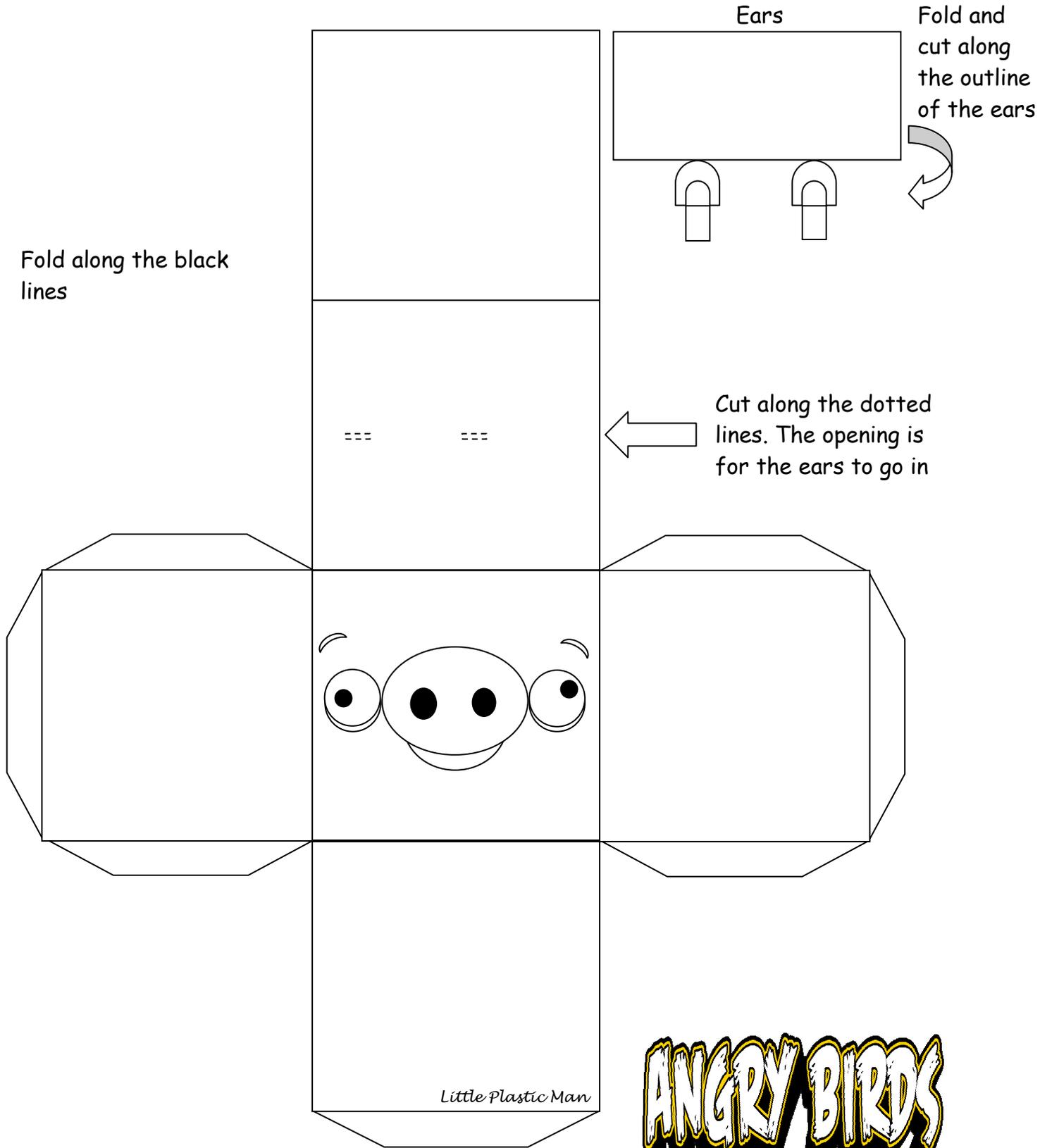


**Resources:**

Harcourt Science- 4th Grade, paper, pencil, 30 popsicle sticks, 7 straws, masking tape, 10 paper clips, one piece of paper, Popsicle sticks, Tape, Plastic Spoon, Rubber bands, Cup, Rolled up paper, Cereal box, 4 empty toilet paper tubes, **Blue** and **green** painter's Tape, **twine**, Small rubber bands/loom bands, Hole punch, Scissors, Straws, ruler, scissors, mini muffin papers, tape, string, glue, string, paperclips, paper, cardboard, cardboard tubes (such as paper towel or toilet paper rolls), and dry tea bags (optional), a box, wooden tongue depressors or popsicle sticks, tape, various items for obstacles eg. toilet paper rolls, cottage cheese containers, cd's, decorating items eg. stickers

**Accommodations:**

Cooperative groups will consist of students of various levels so they can help each other. If needed, there can be a small group of students on which the teacher focuses his/her attention. Have ESL students learn new words by selecting words in the dictionary and using them in sentences.



Fold along the black lines

Ears

Fold and cut along the outline of the ears

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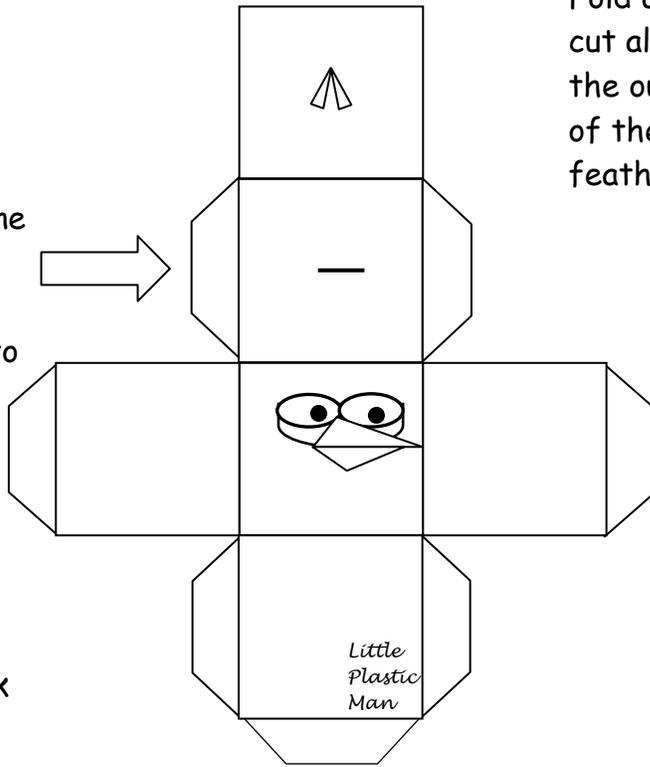
Cut along the dotted lines. The opening is for the ears to go in

Little Plastic Man

**ANGRY BIRDS**

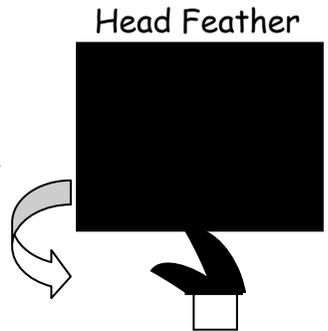
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Cut along the outline of the black line. The opening is for the head feather to go in



Fold along the black lines

Fold and cut along the outline of the feather

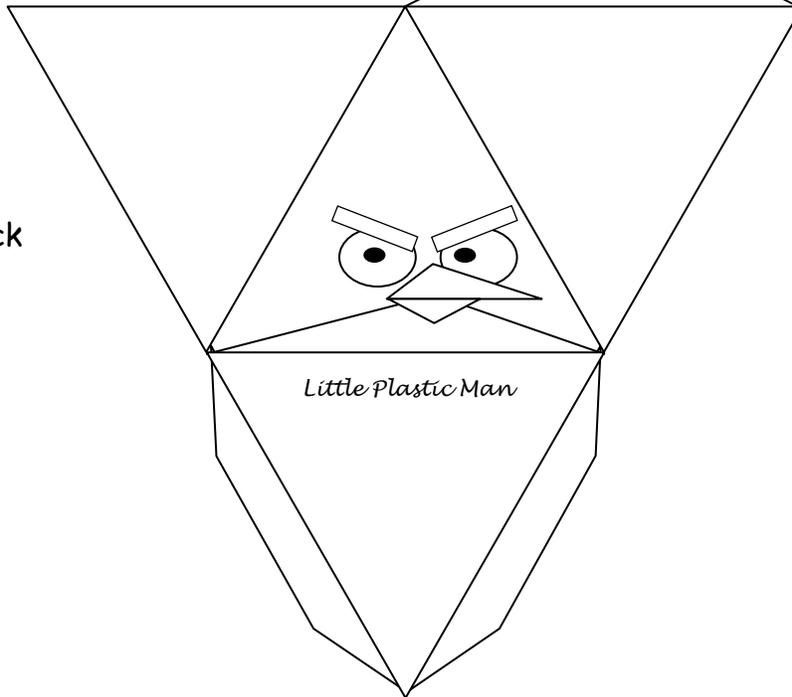
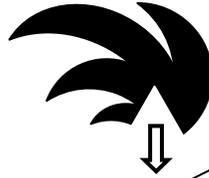


# ANGRY BIRDS

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Glue Head Feather  
onto Head

Glue Tail Feather  
here



Fold along the black  
lines

*Little Plastic Man*

Head Feather

Tail Feather



Fold and  
cut along  
the outline  
of the  
feather



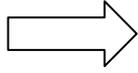
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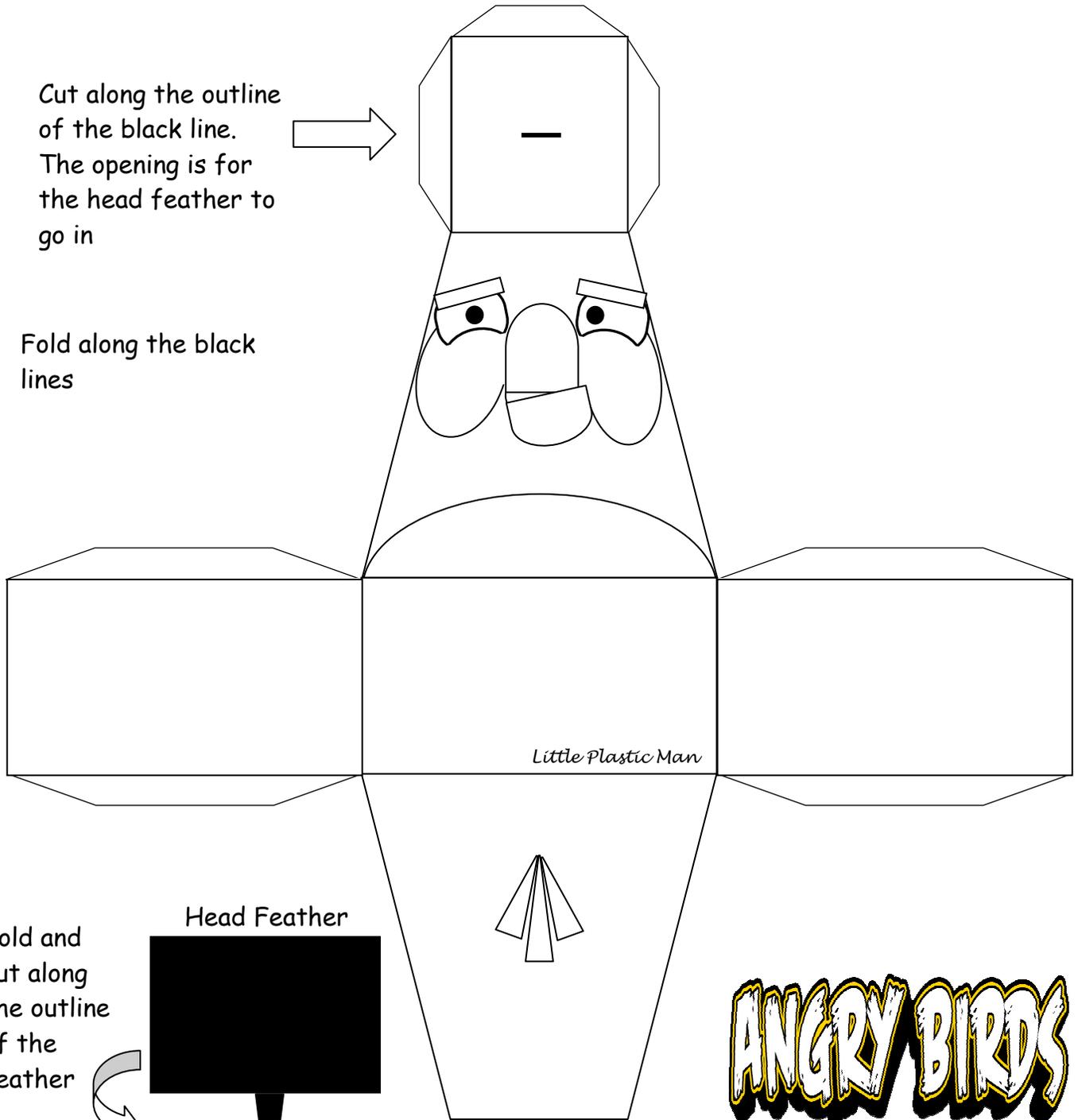
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Cut along the outline of the black line.  
The opening is for the head feather to go in



Fold along the black lines

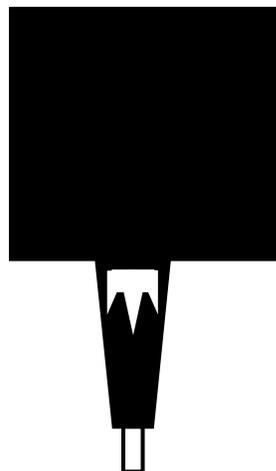


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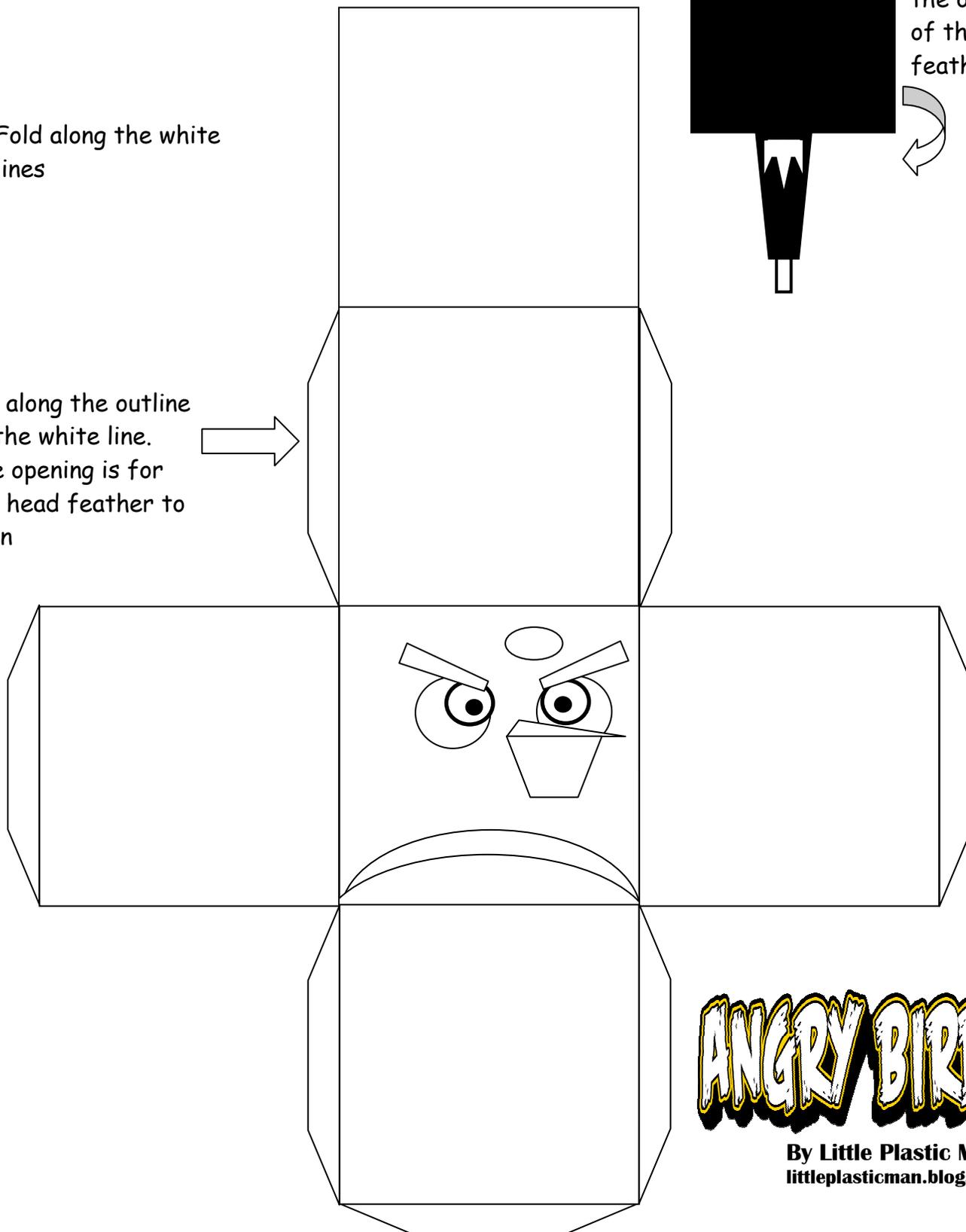
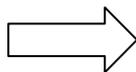
Head Feather

Fold and cut along the outline of the feather



Fold along the white lines

Cut along the outline of the white line. The opening is for the head feather to go in

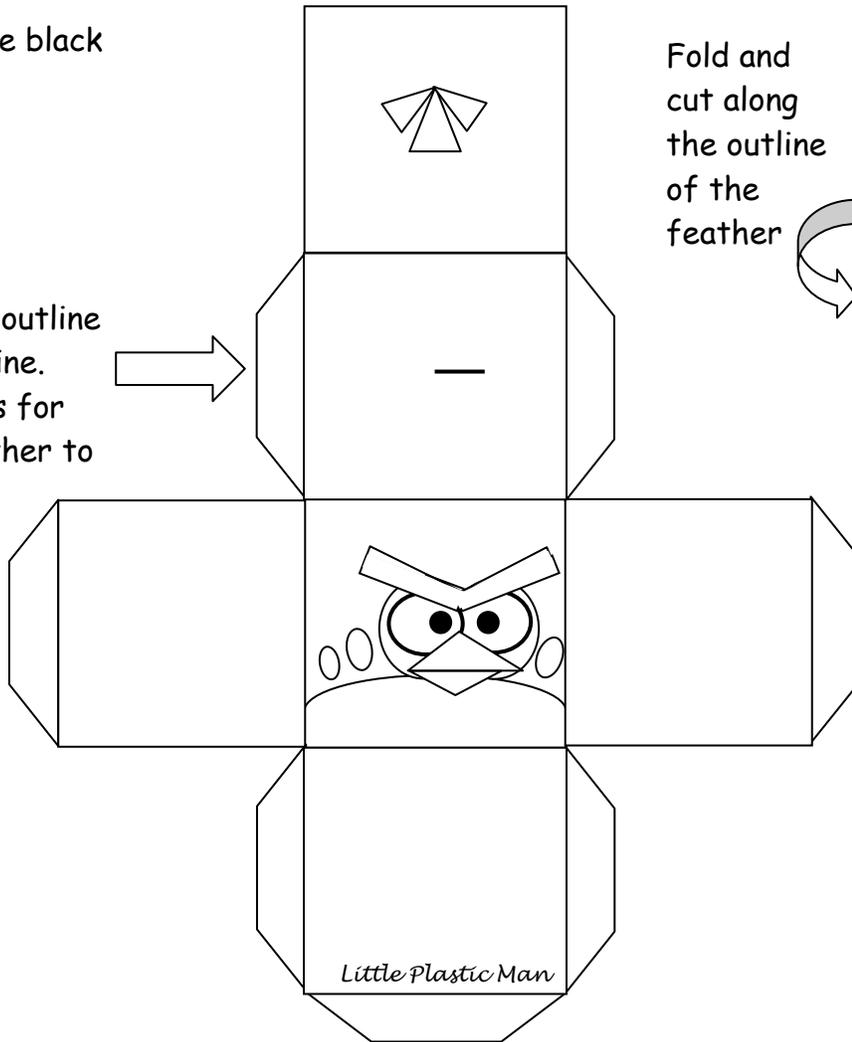


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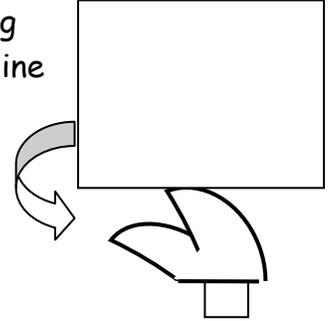
Fold along the black lines

Cut along the outline of the black line. The opening is for the head feather to go in



Fold and cut along the outline of the feather

Head Feather



**ANGRY BIRDS**

By Little Plastic Man  
[littleplasticman.blogspot.com](http://littleplasticman.blogspot.com)

<b>Content:</b> Science: Technology	<b>Grade:</b> 4 <sup>th</sup>	<b>Timeline:</b> 45 minutes 02/22/16-02/26/16
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<p><b>Science Standard(s):</b></p> <p>4.1.3 Differentiate between evidence gathered through observations and inferences, and use the evidence to develop a line of reasoning.</p> <p>4.5.1 Describe how the use of technology has changed the way people live on Guam and around the world.</p> <p><b>CCSS ELA Standards:</b></p> <p>4.W.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic.</p> <p>4.W.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences</p>
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<p><b>Lesson Overview:</b></p> <p>In this lesson, students will consider both the benefits and the hazards of technology in today’s world through the lens of the environment. Students will realize that, while human inventions have made our lives infinitely more healthy, convenient and enjoyable, they have also introduced new threats, such as toxic pollution, that affect both human health and the health of our environment. The challenge confronting our society – and our students – is identifying the proper use of technology to improve our lives while still protecting the quality of the natural world.</p>	<p><b>Lesson Objective(s):</b> In this lesson, students will be able to:</p> <ul style="list-style-type: none"> <li>• Explain the steps of the scientific investigation</li> <li>• Apply the scientific method to plan and conduct a study/experiment.</li> <li>• Improve performance in a task through improved communication and cooperation.</li> <li>• Form and support a hypothesis.</li> <li>• Develop a standard operating procedure.</li> <li>• Reflect on learning</li> <li>• Learn about engineering design</li> <li>• Students will compare and contrast how the use of technology has changed human behavior over time</li> </ul>
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<p><b>Vocabulary:</b> question, hypothesis, data, collect, analyze, conclusion, prediction, investigation, experiment, support, observation, inference, variable, measure, compare, scientific method, classify, technology, impact, support</p>	<p><b>Focus Question(s):</b></p> <ul style="list-style-type: none"> <li>• How do the various levels of technological development affect different cultures?</li> <li>• How does technology impact our lives?</li> <li>• How will technology change our future lives?</li> <li>• Consider how we can maximize the benefits of technology</li> <li>• Reflect on how modern electronics are changing how we relate to the natural world</li> </ul>
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**Description of Lesson (including instructional strategies):**

**Day 1: 02/22/16 Monday What is Technology?**

- I can explain what is technology.

**Anticipatory Set:**

Ask students,

- “What is technology?”
- Why is technology always changing?
- Why do people want to make daily chores easier?
- Why do you think the pioneers did not travel by airplane or train?
- How else might you travel across the country on land or in the air today?
- Why do you think the railroad lines were so important?
- How have planes changed? Bicycles? Trains? Boats/ships?

**Instruction and Strategies:**

After discussing the meaning of technology, present and discuss the following definitions. The Merriam-Webster Dictionary actually has two separate meanings for the word:

- 1** : the use of science in solving problems (as in industry or engineering)
- 2** : a technical method of doing something

1. Ask your students to consider advances in technology over the past several hundred years, and discuss with them ways in which these advances have benefited human beings. Examples you might start out with are the electricity, the telephone, the automobile and airplane, and of course, the computer.
2. Before continuing the discussion, begin a chart on the chalkboard with three column headings: "Increasing Production of Goods and Services," "Reducing Amount of Labor Needed to Produce Goods and Services," and "Providing Higher Living Standards." Tell students that as they continue discussing the benefits of technology, they will be classifying the benefits under these headings.
3. As students discuss the benefits of technology, list them on the chart. For example, if students say that the telephone has made it easier to talk to friends, list "telephone" under "Providing Higher Living Standards." If they say that the dishwasher has made it easier to wash dishes, list "dishwasher" under "Reducing Amount of Labor Needed to Produce Goods and Services." Students may decide to include some technologies under more than one heading.

**Homework:** Students should understand that inventions make everyday life easier. They should be able to classify objects as belonging to the past or present. Brainstorm with children the various household appliances in their homes. Students will make a collage using drawing paper to draw or cut out and paste pictures of household appliances in their homes that have made everyday life easier. Students should be able to explain how these tools and appliances have changed how families live today.

**Description of Lesson (including instructional strategies):**

**Day 2: 02/23/16 Tuesday Technology in the Classroom**

- I can explain the importance technology plays in the classroom.

Students develop their understanding of the role technology plays in their lives by considering how it is commonly used in the classroom.

**Instruction and strategies:**

1. Once your class has settled on the meaning of the word, have students examine the classroom to find examples of technology. Have them consider both electronics and also the products that were manufactured through applied science (also technology). List their discoveries on the board. Challenge students to think beyond their most immediate examples

of technology. Technology actually has been used in the manufacture of virtually everything in the room.

2. Ask students if they know how these classroom examples were manufactured. Might their

production have emitted pollution in the air, water, or soil (e.g. through smokestacks, transportation exhaust, or pipes dumping waste in waterways)? Does anyone know the environmental impact caused by the manufacture of the items in the room? How aware are most people about the environmental impact of common objects and behaviors?

3. Technology is also applied in the generation and distribution of energy. Ask your students to

identify all of the features in the room that require, or that have required, the use of energy.

Answers will include, of course, the lights, computers, and other appliances being powered by electricity, along with any cell phones and other electronics. In addition, energy was used in the manufacture of basically everything in the room. Do your students know how the room's electricity is being generated?

**Guided Practice:**

4. Follow up with a discussion about energy. The simplest definition of energy is "the ability to do work". Energy is how things change and move. It's everywhere around us and takes all sorts of forms. It takes energy to cook food, to drive to school, and to jump in the air. How is energy generated in the United States? Examples will include the power generated from hydroelectric, wind, solar, geothermal and nuclear sources and from the burning of coal, petroleum and natural gas. What do your students know about the environmental impact of utilizing these energy sources? Typically, renewable energy sources, such as

solar and wind, have a substantially smaller environmental impact compared to non-renewable energy sources, such as fossil fuels (coal, oil and natural gas)

**Description of Lesson (including instructional strategies):**

**Day 3: 02/24/16 Wednesday *The Promise of Technology***

- I can compare and contrast how technology has helped change our lives over time.

Students should consider differences in societies and compare both the technological advancements and the environmental quality of both.

**Instruction and strategies:**

1. Have students consider two types of societies. Society A is similar to what we envision long ago or in various parts of the world today – it uses simpler forms of technology and lacks many of the large-scale systems in place today, such as sanitation systems or the internet. In Society A, if a citizen wants a drink of water, s/he must walk to the closest freshwater source to fill their container with enough water to last until the next time s/he is able to walk the distance. This is a society where people do not have the same conveniences many people have today. They live closely with nature and have simpler tools. Society B is quite different from the first, and more similar to the students' own lives – full of the many technological inventions and modern conveniences. If a citizen of this society desires a drink of water, s/he walks over to the faucet, turns it on, and clean water immediately flows out. Ask students to use their imagination or prior knowledge to fill out Reproducible #1 – A Tale of Two Societies Worksheet, considering the technology available to each person. They will compare the following:

- Heating the living quarters
- Making tools for hunting, procuring food, and sewing clothing
- Obtaining clean drinking water
- Getting rid of wastes and garbage
- Diagnosing and curing illness
- Transporting people and goods

**Guided Practice:**

2. Now, ask students to compare the peoples' connections with the environment in Society A

compared with Society B. Would either group know more about:

- Where drinking water would come from?
- Where food would come from?
- What would happen to wastes?
- What would be required to make tools?
- Where cures for illness would come from?

Most of human history was based around a society that functioned more like Society A. Previous to industrialization, all humans were directly involved with collecting water, making tools, transporting goods, etc. They would know where their water and food came from because they would have gathered such resources themselves. They would have disposed of their own wastes, made their own tools, and found the medicinal plants

needed to cure afflictions. In contrast, many of us live somewhere akin to Society B, mostly removed from these activities. We don't see where our food is grown and processed, we watch our trash disappear on trucks, our sewage disappear down the toilet, and we buy tools and medicines that were made somewhere else. The upshot is that most of us have a greater amount of free time and efficiency in our lives.

3. What would be various pros and cons to living in each of these societies? Answers will vary but may include the following. Inhabitants of Society A spend much of their day taking care of individual needs and daily tasks. They have less leisure time or time for additional activities. Yet, they have the benefit of intimate knowledge about the natural world around them and are more likely to get fresh air and exercise. Inhabitants of Society B have many daily tasks organized or taken care of through increased efficiency and advanced technology, leaving them more time to invest in other activities. They have more conveniences, comforts, and shelter, yet they lack intimate knowledge about their natural world.

4. The class can wrap up the activity by considering the following questions in a class discussion:

- How do Societies A and B relate to human experiences past and present? Think about the experiences of prehistoric people versus modern humans. Society B may be most familiar to many of us today and Society A is more representative of much of human history before the last few centuries. Many areas of the world today fall somewhere in between these two examples, but it is difficult to find a society living completely in isolation of modern technology and its effects.
- How clean was the prehistoric environment compared with the world today? What chemicals were in the air, water, and soil during prehistoric times? What chemicals were in the prehistoric people themselves? Did prehistoric people have to worry about toxic chemicals? Were they concerned with nuclear waste? Was there any significant pollution at all? *Answers will vary, but there were many fewer chemicals, waste and pollution in prehistoric times.*

#### A Tale of Two Societies

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Activity	Society A	Society B
Heat the living quarters:		
Make tools for hunting, get food and create clothing:		
Obtain drinking water:	Walk to the closest freshwater source, fill container with enough water to last until next time, and carry it home.	Turn on the faucet.
Get rid of wastes and garbage:		
Diagnose and cure illness:		

Transport people and goods:		
Explain natural phenomena (experiences):		

**Description of Lesson (including instructional strategies):**

**Day 4: 02/25/16 Thursday Technology Poster**

- I can create an illustration describing the benefits of modern technology.

Art Integration: Have students illustrate pictures that show the benefits of modern technology into our daily lives. Then ask students to include a description on their illustrations and explain what is happening in their picture and the effect(s) it may have on the environment. At the end, students are to present their illustrations to the class.

**Description of Lesson (including instructional strategies):**

**Day 5: 02/26/16 Friday Review of Technology**

Review the lessons of the week.

Questions to prompt *discussion with the students*:

- What is technology?
- What important role does technology play in our lives today?

Technology can be an important solution in helping humans reduce our impact on the environment and use resources more wisely and efficiently. Have students brainstorm, discuss, illustrate or present on ideas of technology (already in existence or not) that might be solutions to many of the environmental problems we face today (for example, clean energy technology, innovations in efficiency, improved methods of transportation, etc.). Encourage creativity! Make sure students weigh the benefits of these inventions against their consequences of production, transport, energy use and output.

**Closure:**

The lesson helped students consider the impact that technology is having on the environment, as well as their lives.

**Independent Practice:**

Integration with Art: Students are to create a visual illustrating the benefits of modern technology to our daily lives.

**Formative Assessment:**

Q&A and the completion of visual illustrating benefits of modern technology. Provide feedback based on their understanding of the lesson learned. (Marzano: Providing Feedback).

**Resources:**

Harcourt Science- 4th Grade, paper, pencil, a Tale of Two Societies worksheet

**Accommodations:**

Cooperative groups will consist of students of various levels so they can help each other.

If needed, there can be a small group of students on which the teacher focuses his/her attention.

Have ESL students learn new words by selecting words in the dictionary and using them in sentences.

## A Tale of Two Societies

Name:

Date:

<b>Activity</b>	<b>Society A</b>	<b>Society B</b>
Heat the living quarters:		
Make tools for hunting, get food and create clothing:		
Obtain drinking water:	Walk to the closest freshwater source, fill container with enough water to last until next time, and carry it home.	Turn on the faucet.
Get rid of wastes and garbage:		
Diagnose and cure illness:		
Transport people and goods:		
Explain natural phenomena (experiences):		

<p><b>Content:</b> Science: STEM/Scientific Method</p>	<p><b>Grade:</b> 4<sup>th</sup></p>	<p><b>Timeline:</b> 45 minutes 02/29/16-03/04/16</p>
<p><b>Science Standard(s):</b></p> <p>4.1.3 Differentiate between evidence gathered through observations and inferences, and use the evidence to develop a line of reasoning.</p> <p>4.5.1 Describe how the use of technology has changed the way people live on Guam and around the world.</p> <p><b>CCSS ELA Standards:</b></p> <p>4.W.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic.</p> <p>4.W.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences</p>		
<p><b>Lesson Overview:</b></p> <p>In this lesson, students will be able to explain their understanding of the scientific method and design an experiment utilizing this method.</p>	<p><b>Lesson Objective(s):</b> In this lesson, students will be able to:</p> <ul style="list-style-type: none"> <li>• Explain the steps of the scientific investigation</li> <li>• Apply the scientific method to plan and conduct a study/experiment.</li> <li>• Improve performance in a task through improved communication and cooperation.</li> <li>• Form and support a hypothesis.</li> <li>• Develop a standard operating procedure.</li> <li>• Reflect on learning</li> <li>• Learn about engineering design</li> </ul>	
<p><b>Vocabulary:</b> question, hypothesis, data, collect, analyze, conclusion, prediction, investigation, experiment, support, observation, inference, variable, measure, compare, scientific method, classify, technology, impact, support</p>	<p><b>Focus Question(s):</b></p> <ul style="list-style-type: none"> <li>• How do the various levels of technological development affect different cultures?</li> <li>• How does technology impact our lives?</li> <li>• How will technology change our future lives?</li> <li>• Consider how we can maximize the benefits of technology</li> <li>• Reflect on how modern electronics are changing how we relate to the natural world</li> </ul>	

**Description of Lesson (including instructional strategies):**

**Anticipatory Set:**

Review the steps of the Scientific Method. Explain to students that they will be conducting an experiment. Encourage students to make a prediction. *I think \_\_\_\_\_ because \_\_\_\_\_*. Have students write down their data as they observe and conduct each experiment.

**Day 1 & Day 2: 02/29/16 & 03/02/16 Index Card Tower Challenge**

Teacher will ask the students the following question:

How can a tower be sturdy?

**Instruction & Strategies:**

Help students focus on the supporting facts and details for the main idea: the base of the tower needs to be sturdy so that it can be self-supporting.

Questions to prompt *discussion with the students:*

What is your design for your tower?

Are you going to build a tower with a wide base or a thin base?

Have students work in teams to design and build the tallest index card tower.

**Guided Practice:**

Students will work together in cooperative groups to design and build the tallest index card tower at least 10 inches high and no more than 10 inches of tape that can support an animal. (Marzano, Cooperative Learning).

Materials:

- Index Cards
- Tape
- Scissors
- Ruler
- Stuffed Animal

Instructions:

1. Each team must complete the construction of its tower.
2. The index cards may be cut into pieces and reassembled as desired. Also rolled, folded, stacked, etc.
3. Only 10 inches of tape is to be used to fasten parts of the tower together. It may not be used to attach the tower to the floor or any other object. Tape may not be used to extend the height of the tower.
4. A tower shall be declared freestanding if it remains self-supporting for more than 10 seconds.
5. Height is determined by measuring the perpendicular distance from the base of the tower to the top of the tower.

the highest point of the tower.

6. The tower must be able to hold a stuffed animal for more than 30 seconds.

**Formative Assessment:**

Q & A and final product of the tower. Provide feedback based on their understanding of the lesson learned. (Marzano: Providing Feedback).

- 1) Describe the shape or construction of the tower that was the sturdiest and won the challenge?
- 2) If you had a chance to do this project again, what would your team have done differently?
- 3) Do you think that this activity was more rewarding to do as a team, or would you have preferred to work alone on it? Why?

**Closure:**

Groups will share with the rest of the class their understanding the base of the tower needs to be sturdy so that it can be self-supporting.

**Independent Practice:**

Students will work independently to make a prediction about the index card tower and answer the evaluation questions.

**Description of Lesson (including instructional strategies):**

***Day 3 & Day 4: 03/03/16 & 03/04/16 Egg Drop Challenge***

Teacher will ask the students the following question:

How can you protect an egg from cracking when dropped from a certain height?

**Instruction & Strategies:**

Help students focus on the supporting facts and details for the main idea: the egg drop device must be sturdy enough to support the egg from cracking.

Egg drop devices simulate parachutes and other similar features seen in nature, such as the helicopter seeds that are dropped from some trees. The process of slowing descent to resist the force of gravity has been used in a number of instances in history, and continues to be an important science – especially currently around emergency aid and transportation of goods to inaccessible areas.

Questions to prompt discussion with the students:

What is your design for your egg device?

How can you make it sturdy enough to protect your egg from cracking?

Have students work in teams to design and build the egg drop device.

**Guided Practice:**

Students will work together in cooperative groups to design and build an egg drop device to protect their egg. (Marzano, Cooperative Learning).

**Materials:**

- Toothpicks
- String
- Paperclips
- Straws
- Cotton Balls
- Pipe Cleaners
- Rubber Bands
- Paper
- Cotton
- Newspaper
- Balloons
- Plastic Sheet

**Formative Assessment:**

Q & A and final product of the tower. Provide feedback based on their understanding of the lesson learned. (Marzano: Providing Feedback).

Student built designs on handout and answer the follow-up questions as a class.

1 - Describe how your device protected the egg from cracking. What material was most important in your design? What material that you used was least effective?

2 - Knowing what you know now, how would you improve upon your design to make it work better on the next try? Draw a picture if it helps!

3 - What material would you use in another design that you did not use today, and WHY? It can be a material that was not offered.

4 – What things in nature are similar to this egg drop experiment? What things that humans use are similar to the egg drop experiment? How do these things work? For example, the helicopter seeds that some trees use to disperse their seeds with the wind. What else is there?

**Closure:**

*Groups will share with the rest of the class their understanding of the egg drop device and how it must be sturdy in order to support the egg from cracking.*

**Independent Practice:**

Students will work independently to make a prediction about the egg drop device and answer the evaluation questions.

**Resources:**

- Harcourt Science- 4th Grade, paper, pencil, Egg Drop Device worksheet, Toothpicks, String, Paperclips, Straws, Cotton Balls, Pipe Cleaners, Rubber

Bands, Paper, Cotton, Newspaper, Balloons, Plastic Sheet, Index Cards, Tape, Scissors, Ruler, Stuffed Animal

**Accommodations:**

Cooperative groups will consist of students of various levels so they can help each other.

If needed, there can be a small group of students on which the teacher focuses his/her attention.

Have ESL students learn new words by selecting words in the dictionary and using them in sentences.

## Egg Drop Activity

TEAM MEMBERS:

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TEAM NAME:

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Using the listed materials, sketch a drawing of your egg drop device in the space below:

QUESTIONS:

1 - Describe how your device protected the egg from cracking. What material was most important in your design? What material that you used was least effective?

2 - Knowing what you know now, how would you improve upon your design to make it work better on the next try? Draw a picture if it helps!

3 - What material would you use in another design that you did not use today, and WHY? It can be a material that was not offered.

4 – What things in nature are similar to this egg drop experiment? What things that humans use are similar to the egg drop experiment? How do these things work? For example, the helicopter seeds that some trees use to disperse their seeds with the wind. What else is there?

**A Tale of Two Societies**

Name:

Date:

<b>Activity</b>	<b>Society A</b>	<b>Society B</b>

Heat the living quarters:		
Make tools for hunting, get food and create clothing:		
Obtain drinking water:	Walk to the closest freshwater source, fill container with enough water to last until next time, and carry it home.	Turn on the faucet.
Get rid of wastes and garbage:		
Diagnose and cure illness:		
Transport people and goods:		
Explain natural phenomena (experiences):		

<b>Content:</b> Earth Science	<b>Grade:</b> 4 <sup>th</sup>	<b>Timeline:</b> 45 minutes 03/8/16-03/11/16
<p><b>Science Standard(s):</b></p> <p>4.4.6 List and define geological concepts in the formation of rocks. Example(s): igneous, conglomerates, sedimentary</p> <p>4.4.2 Describe how an environment can be changed by typhoons, earthquakes, volcanoes, waves, currents, and floods can change an environment.</p> <p>4.4.3 Describe how islands and reefs are formed and what forces could change them.</p> <p><b>CCSS ELA Standards:</b></p> <p>4.RI.5 Describe the overall structure (chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.</p> <p>4.W.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic.</p> <p>4.W.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences</p>		
<p><b>Lesson Overview:</b></p> <p>In this lesson, students will be able to recognize that earth's moving plates cause changes including mountain building, seafloor spreading, volcanoes, and earthquakes.</p>	<p><b>Lesson Objective(s):</b></p> <p>In this lesson, students will be able to:</p> <ul style="list-style-type: none"> <li>• Describe the composition of the Earth's atmosphere.</li> <li>• Students will be able to define and describe how the three major types of rocks are formed.</li> <li>• Compare and contrast the layers of the atmosphere.</li> </ul>	
<p><b>Vocabulary:</b></p> <p>question, hypothesis, data, collect, analyze, conclusion, prediction, investigation, experiment, support, observation, inference, recycling, greenhouse effect, igneous, sedimentary, metamorphic, air mass, igneous, sedimentary, metamorphic, volcano, earthquake, tsunami, typhoon</p>	<p><b>Focus Question(s):</b></p> <ul style="list-style-type: none"> <li>• In what ways is the earth always changing? How do we know?</li> </ul>	

**Description of Lesson (including instructional strategies):**

*Day 1: 03/08/16 Earth's Atmosphere*

**Anticipatory Set:**

Explain to the students that they will be learning about the earth's atmosphere.

**Instruction and Strategies:**

- **Layers of the Earth's Atmosphere**

The atmosphere is the thin layer of air that surrounds earth. The atmosphere is divided into five layers. It is thickest near the surface and thins out with height until it eventually merges with space.

- 1) The troposphere is the first layer above the surface and contains half of the Earth's atmosphere. Weather occurs in this layer.
- 2) Many jet aircrafts fly in the stratosphere because it is very stable. Also, the ozone layer absorbs harmful rays from the Sun.
- 3) Meteors or rock fragments burn up in the mesosphere.
- 4) The thermosphere is a layer with auroras. It is also where the space shuttle orbits.
- 5) The atmosphere merges into space in the extremely thin exosphere. This is the upper limit of our atmosphere.

- **What is weather?**

The weather is just the state of the atmosphere at any time, including things such as temperature, precipitation, air pressure and cloud cover. Daily changes in the weather are due to winds and storms. Seasonal changes are due to the Earth revolving around the sun.

What causes weather?

Because the Earth is round and not flat, the Sun's rays don't fall evenly on **the land and** oceans. The Sun shines more directly near the equator bringing these areas more warmth. However, the polar regions are at such an angle to the Sun that they get little or no sunlight during the winter, causing colder temperatures. These differences in temperature create a restless movement of air and water in great swirling currents to distribute heat energy from the Sun across the planet. When air in one region is warmer than the surrounding air, it becomes less dense and begins to rise, drawing more air in underneath. Elsewhere, cooler denser air sinks, pushing air outward to flow along the surface and complete the cycle.

**Description of Lesson (including instructional strategies):**

*Day 2: 03/09/16 Layers of the Earth & Natural Disasters*

### **Instruction and Strategies:**

#### **The Layers of the Earth**

The earth is made up of four different layers. There are many historians and geologists that believe the earth wasn't always made up for four layers. Instead, they believe that as the earth cooled as rapidly as it did that the heavier parts of the earth sank into the inside of the world, the lighter, dense materials moved into the middle of the world, and the lightest materials of all rose to the top. This explains why things like rock are on the surface of the earth and the much heavier things like iron are located in the earth's core.

The four layers of the earth are:

- The Crust -- the part of the earth that you live on.
- The Mantle -- a hot area that has the ability to flow (think of lava). Found below the crust. Thickest layer of the planet.
- The Outer Core -- the heaviest parts of earth in a hot liquid state.
- The Inner Core -- the heaviest parts of earth in a solid state.

#### **Natural Disasters**

Natural disasters are events caused by forces of nature (**earthquake, typhoon, tsunami**) that cause destruction of life and/or property.

##### **What is a Tsunami?**

A tsunami is a series of ocean waves with very long wavelengths (typically 100s of kilometers) caused by large-scale disturbances of the ocean. Disturbances of the ocean that could cause a tsunami include: earthquakes, landslides, volcanic eruptions, explosions, and meteorites. These disturbances can either be from below the water surface (e.g. underwater earthquakes, submarine landslides) or from above the water surface (e.g. meteorite impact). Tsunamis have many effects: causes death, injury and sickness, destroys homes and buildings, causes floods and landslide.

##### **What is a typhoon?**

A typhoon is a type of large storm system having a circular or spiral system of violent winds, typically hundreds of kilometers or miles in diameter. The winds spiral around a region of low atmospheric pressure. "Typhoon" is the name of these storms that occur in the Western Pacific. For stronger typhoons, a characteristic structure called the "eye" forms when the maximum wind speeds exceed about 85 miles per hour, or 140 kilometers per hour. The eye is a region of clear air with no clouds, and is a few tens of kilometers in diameter. The energy that powers typhoons comes from the evaporation of warm ocean water. The water vapor rises to the top of the typhoon along the sides of the eye, then condenses into clouds. Warmer ocean water produces more powerful typhoons, which can grow into "super typhoons".

##### **What is an earthquake?**

An earthquake is a vibration, or shaking, of Earth's crust. Simply, earthquakes are the rumblings, shaking or rolling of the earth's surface. It is usually what happens when two blocks of the earth suddenly slip past one another, or break apart from each other as a result of tension caused by prolonged energy build up. Earthquakes come in many forms. It can be felt as a shock under your feet, or may be very powerful and destructive enough to flatten an entire city. They can happen anywhere, land or sea.

**Description of Lesson (including instructional strategies):**

**Day 3: 03/10/16 Types of Rocks & Landforms**

**Instruction and Strategies:**

- The slow and fast processes that occur on Earth form different types of rocks. Again, wind, water, and ice (a form of water) change the Earth's materials.
- Tell your students that the first type of rock is called **igneous**. Igneous rocks are composed of melted rock that hardens and cools. Igneous rocks are formed from molten rock.  
A few examples include Obsidian and Pumice.
- Tell your students that the second type of rock is called **sedimentary**. They are formed from material that is settled into layers. The layers are squeezed until they harden into rock. Sedimentary rocks are formed from deposited rock particles that are then compacted.  
A few examples include Limestone, Breccia, and Sandstone.
- Tell your students that the third type of rock is called **metamorphic**. They are changed by heat and pressure. Igneous and sedimentary rocks can be transformed into metamorphic rock through extreme heat and pressure over time.  
A few examples include Slate and Marble.

## Igneous Rocks

Coarse-Grained



Fine-Grained



## The rock cycle – Sedimentary

- Examples of sedimentary rocks include:

- Sandstone
- Limestone
- Flint
- Shale
- Coal
- Limestone



## Metamorphic rocks



## What are landforms?

A landform is any natural formation of rock and dirt, found on Earth. A landform can be as large as a mountain range, or as small as a hill. It can be as large as a continent, or as small as a pond. Geologists study how landforms are created, and how they interact with one another.

## Types of landforms

- island  
An island is a piece of land that is surrounded by water.
- desert  
A desert is a very dry area.
- lake  
A lake is a large body of water surrounded by land on all sides. Really huge lakes are often called seas.
- plain  
Plains are flat lands that have only small changes in elevation.
- hill  
A hill is a raised area or mound of land.
- lake  
A lake is a large body of water surrounded by land on all sides. Really huge lakes

are often called seas.

- mountain

A mountain is a very tall high, natural place on Earth - higher than a hill. The tallest mountain on Earth is Mt. Everest.

- valley

A valley is a low place between mountains.

- volcano

A volcano is a landform (usually a mountain) where molten rock erupts through the surface of the earth. A volcano is a mountain that opens downwards to a pool of molten rock (magma) below the surface of the earth. Volcanoes can be useful to people because they add minerals to the soil.

**Description of Lesson (including instructional strategies):**

*Day 4: 03/11/16 What is air?*

**Instruction and Strategies:**

***What is Air?***

I can explain that air is a substance that surrounds us, takes up space, and whose movement we feel as wind.

Air is always around us. Just because we cannot see it, does not mean that it is not there. Air is always around us. The movement of air is known as wind. Wind is air in its natural motion. A huge body of air with similar temperature and moisture throughout is air mass.

What is air? (Air is a substance that surrounds us, takes up space, and whose movements we feel as wind.)

Where is air?

Is it touching you right now?

When air moves outside what do we call it?

***Formative assessment:***

Students will be able to explain their understanding about each topic.

**Closure:**

*Students will share with the rest of the class their understanding of the topics learned.*

**Independent Practice:**

Students will be able to answer questions for each lesson.

**Resources:**

Harcourt Science- 4th Grade, Harcourt Science workbook, paper, pencil

**Accommodations:**

Cooperative groups will consist of students of various levels so they can help each other. If needed, there can be a small group of students on which the teacher focuses his/her attention. Have ESL students learn new words by selecting words in the dictionary and using them in sentences.

