ALCOSS: 2.1
Identify states of matter as solids, liquids, and gases.

Mastered:
Students can describe changes between states of matter and measure quantities of solids and liquids, including an activity of making and measuring ice cream as a particulate solid with a liquid that resulted in a solid.

Present:
Students explore matter in order to gain a deeper understanding of how it changes states.

Going Forward:
Students will create a marketing plan to increase declining sales of ice cream during the cold winter months.

Present and Going Forward Vocabulary:
Sublimation, advertise, budget, marketing, consumer, producer, product

Career Connections:
Chemist, Researcher, Dietician, Biochemist, Microbiologist, Marketing Director

Advanced Understanding & Activity (Alternate activity):
Students may choose one or more of the following activities from either section to complete as alternate activities to the general assignment.

- **I Can...** (Student page found in Appendix A)
  The student will choose one or more "I CAN…" activity(ies) to accomplish, as time permits. Students must research their topics in order to develop the products. Students may need to plan their product using the organizational tool, Primary Project Planner.

  1. Design a marketing plan to help boost declining sales of icepops through advertising. (Including magazine ads, radio spots, billboards, etc.)
  2. Create a coupon to encourage consumers to purchase icepops on a hot summer day.
  3. Compose a jingle/rap/song for a new icepop commercial that identifies how icepops are maintained for hot weather. (What would keep the icepops from melting in the hot weather?)
  4. Plan a multicultural event to promote icepops. Students will select the cultures/countries to represent which ingredients are used in icepops. Include a layout of the stations that will be used to show how icepops are made. (How will the consumer observe icepops being produced and where do the ingredients originate?)

- **That's Good! That's Bad! Chain Story** (Student page found in Appendix A)
  Research the following questions:
  - How is plastic made?
  - Why can plastic be used to make so many different objects?
  - What are the positive points about using plastic to make objects?
  - What are the negative points about using plastic to make objects?

  Read the scenario. Then write and draw pictures of the chain of events to show the good events and the negative, or not so good events surrounding the scenario (story). You may use additional sheets of paper in order to complete your story.

  Scenario:
  In the town of "Plastica," Dr. Brown has developed a new invention. This new invention is capable of being made into several different forms. He has created bowls that are self cooling and can keep foods cold without being in the refrigerator. Now Dr. Brown is creating a supersized object to heat objects without an oven or microwave.

Literature Connections/Resources:
- Barrett, Judi. Cloudy with a Chance of Meatballs. NY: Atheneum. 1978.

- Meisel, Paul. What's the Matter in Mr. Whisker's Room? Somerville, MA: Candlewick. 2007.
- Zoehfield, Kathleen. What is the World Made of? NY: Collins. 1998.

ALCOSS: 2.2
Identify vibration as the source of sound.

Mastered:
Students will identify vibration as the source of sound and will identify and distinguish between pitch and volume.

Present:
Students will transfer sound through various objects.

Going Forward:
Students will create an instrument using household materials which can have various pitch and volume and will draw a diagram of it with labeled parts and functions.

Present and Going Forward Vocabulary:
Sound waves, pitch, volume

Career Connections:
Audiologist, Speech and Language Pathologist, Musician, Musical Engineer, Inventor

Advanced Understanding & Activity (Alternate activity):

Making Sounds Travel Through Objects (Student page found in Appendix A)

Adapted from Stereo Hanger found at http://pbskids.org/zoom/activities/sci/stereohanger.html

Materials needed:

- metal coat hanger
- long piece of string
- bowl of water
- metal spoon
- table
- muffin tins

Metal Coat Hanger Experiment Instructions:

1. Tie one end of a piece of string to one corner of a metal coat hanger. Tie the other end of a piece of string to the other end of a metal coat hanger.
2. Loop one piece of the tied string around one index finger and the other end around the other index finger.
3. Put your fingers in your ears and bang the hanger against a table.
4. The sound waves from the vibrating hanger travel through the string and into your ears.
   - Explain what it sounds like?
   - Does it sound the same when you do not have your fingers in your ears? Explain your answer.
5. Now bang the metal coat hanger against other objects, like a chair. Compare the chair sound to the table sound.
   - Does it sound the same? Why or why not?
   - Try another object and compare.
6. Now try this same activity with a metal spoon.
7. Now change the type of string you are using. Did the string make a difference in the sound?

Metal Coat Hanger Experiment Instructions:

1. Set out the muffin tins on a table.
2. Put different amounts of water in each muffin cup.
   a. Do you think there will be a difference in the way a muffin tin sounds?
   b. What do you think will happen?
   c. Make a prediction
   d. Do the experiment and explain what happened.

For other sound activities go to http://pbskids.org/zoom/activities/sci/ Scroll down to Sound-Listen Up.

Literature Connections/Resources:

- Newman, Frank. Zounds! The Kid's Guide to Sound Making. NY: Random House. 1983.
- Page, Linda. The Magic School Bus in the Haunted Museum: A Book About Sound. NY: Scholastic. 1995
- Riley, Peter. Sounds and Vibrations: Making Sense of Sound. London: Franklin Watts. 2005

ALCOSS: 2.3

Recognize that light travels in a straight line until it strikes an object.

Mastered:

Students can recognize that light travels in a straight line until it strikes an object.

Present:

Students will examine how light reacts as it moves through a prism. Students will explain why the light changes as it hits the prism and will write a report about their findings.

Going Forward:

Students will examine the problems/concerns about current glass light bulbs. Students will explore and research how to design a light bulb of alternative materials and decide which materials work best.

Present and Going Forward Vocabulary:

Refraction, reflection, prism

Career Connections:

Optometrist, Laser Engineer, Laser Technician, Clothing Designer, Interior Decorator, Inventor, Artist

Advanced Understanding & Activity (Alternate activity):

TIC-TAC-TOE (Student page found in Appendix A)

Students will choose three activities in a row, column, or diagonal, just like TIC-TAC-TOE. Then students will complete the contract to submit to their teachers. Students may need to plan their product using the organizational tool, Primary Project Planner.

1. Using a prism, demonstrate how to divide a beam of light into different colors.	2. Predict the amount of time that it takes for skin to burn in sunlight. Explore the different colors of skin. Do people with dark skin burn to the same degree as those with fair skin? Record why different skin types do not burn as easily. Make a safety manual for sunbathers.	3. Compare and Contrast three different brands of SPF 15 Sunscreen. Are all sunscreens created equal? Go to http://www.stevespanglerscience.com/experiment/sun-screen-spf-test to find out how. Make an advertisement for the brand that performs the best.
4. Use several mirrors to reflect light from one to another. How many mirrors can you use? Draw a detailed diagram of how you reflected the light. Where were the mirrors placed? Where was the flashlight?	5. Play the light reflecting game at http://www.bbc.co.uk/schools/ks2bitesize/science/physical_processes/how_we_see_things/plays.html .	6. Which type of light bulb is better for lighting a school, movie theater, kitchen, and library? Think about these things as you decide: • Cost efficiency • Effect on the Environment • Brightness • Safety • Availability • Other_____
7. Investigate Chromatography-is the color black REALLY black? Use colored spheres to layer together until you get black.	8. Design a T shirt that would be cool in the summer. Using various colors of the same type of fabric, wrap thermometers, each with one	9. Create a booklet that has invisible pictures that only appear under certain types of light.

Afterward, record all of the colors you used and their sequence? http://www.stevespanglerscience. com/experiment/00000201	color of fabric, and place in the sun. Record the temperatures of each thermometer after a pre-determined amount of time. Which color stayed the coolest? What colors would be best to use in the summer? Why? Now try the same experiment using different types of material.	

Literature Connections/Resources:

- Evans, Nevil. The Science of a Lightbulb. London: Hodder Children's Books. 2000.
- Gordon, Mike. Colour (Simple Science). London: Hodder Children's Books. 1995.
- Michelson, Abraham. Lights, Waves, and Their Uses. Charleston, SC: Nabu Press. 2010

ALCOSS: 2.4

Describe observable effects of forces, including buoyancy, gravity, and magnetism.

Mastered:

Students can identify simple machines, including the inclined plane, lever, pulley, wedge, screw, and wheel and axle.

Present:

Students will explore in–depth how compasses work and the complexities of levers.

Going Forward:

Students will research who used the first magnets, how they were made, how magnets were first used, and what kinds were used. Students will create a new machine to help a student with special needs, using at least two simple and/or compound machines. Students will illustrate the machine and write a description of how it works and its usage.

Present and Going Forward Vocabulary:

Rehabilitate, accommodate, modify

Career Connections:

Inventor, Mechanical Engineer, Navigational Software Designer,

Advanced Understanding & Activity (Alternate activity):

Choose one or more of the following activities to complete as alternate activities to the general assignments:

1. Students will explore how magnets are used in a compass. Students will research through web sites and create their own compass. Web sites:
   - http://tlc.howstuffworks.com/family/science-projects-for-kids-magnets-and-metal4.htm
   - http://education.jlab.org/qa/historymag_01.html
2. Students will create a layered book about levers which will include illustrations and examples of 1st, 2nd, and 3rd class levers. Use books and Internet to research the different classes of levers. Include in your book, where adults and children would find and/or use these different types of levers.

Literature Connections/Resources:

- Hodge, Deborah. Simple Machines; Starting With Science. Toronto: Kids Can Press. 1998.
- Tocci, Salvatore. Experiments with Simple Machines. San Francisco, CA: Children's Press. 2003.
- Wells, Robert. How Do You Lift a Lion? Park Ridge, IL: Albert Whitman & Co. 1996.

ALCOSS: 2.5
Identify the relationship of structure to function in plants, including roots, stems, leaves, and flowers

Mastered:
Students can identify the relationship of structure to function in plants, including roots, stems, leaves, and flowers.

Present:
Students will create a Venn diagram to compare and contrast seedless plants and plants with seeds.

Going Forward:
Students will research carnivorous plants and write a description of the plants which includes where they grow, how they multiply, and how they "eat" their prey.

Present and Going Forward Vocabulary:
Carnivorous, spores

Career Connections:
Botanist, Horticulturist

Advanced Understanding & Activity (Alternate activity):

I Can... (Student page found in Appendix A)

The student will choose one or more "I CAN..." activity(ies) to accomplish, as time permits. Students must research their topics in order to develop the products. Students may need to plan their product using the organizational tool, Primary Project Planner.

1. Investigate carnivorous plants and write a persuasive paragraph about how more people need these plants in their homes.
2. Write a rap song about carnivorous plants and their positive effect on the environment.
3. Write an identification/guide book about various seedless plants to demonstrate where they can be found.
4. Create a how-to booklet on caring for plants in a home with no windows.

Literature Connections/Resources:

- Baker, Wendy, and Haslam, Andrew. Make It Work Plants A Creative Hands-On Approach to Science. NY: Simon & Schuster. 1993.
- Batten, Mary. Hungry Plants. NY: Random House. 2004.
- Plott, Richard. Plants Bite Back. NY: DK Children. 1999.

ALCOSS: 2.6
Identify characteristics of animals, including behavior, size, and body covering.

Mastered:
Students can identify migration and hibernation as survival strategies.

Present:
Students will create a map and label the migratory routes of six different animal groups.

Going Forward:
Students will research animals in their area that hibernate. Students will create a graphic organizer listing the animals and duration of their hibernation.

Present and Going Forward Vocabulary:

Career Connections:
Wildlife Biologist, Biologist, Zoologist, Zookeeper

Advanced Understanding & Activity (Alternate activity):

Choose one or more of the following activities to complete as alternate activities to the general assignments:

1. Students will choose one migratory animal from each category: mammal, insect, bird, fish, reptile, and amphibian, for a total of six.
   - Create one migratory map that shows the routes of all six animals.
   - Label key areas along the route that are critical to the animal (provides food, water, shelter, breeding grounds, wintering grounds).
   - For each animal explain one barrier for the animal on their migration. Barriers may be loss of habitat, bad weather, etc.
   - Students may draw the map, use a real map, or use Google Maps online to develop the routes and label key areas for each animal.
2. **Think Fast** (Student page found in Appendix A)

   Follow the directions at each letter. Write your answers as quickly as possible on a separate piece of paper. The answers for each activity must begin with the corresponding letter. For example, answers for the first activity must start with the letter "A." How many of these can you complete?

A	Name three animals that are herbivores.
N	List two ways that we can help to keep natural habitats safe for animals.
I	Identify ways that five animals are like an extinct animal.
M	List three different ways that animal byproducts are used by people.
A	Name four possible reasons for the extinction of the dinosaur.
L	Name six animals that are carnivores.

Literature Connections/Resources:

- Berkes, Marianne. Going home: The Mystery of Animal Migration. Nevada City: CA. Dawn Publications. 2010.
- Lerner, Carol. On the Wing: American Birds in Migration. NY: HarperCollins. 2001

ALCOSS: 2.7

Identify geological features as mountains, valleys plains, deserts, lakes, rivers, and oceans.

Mastered:

Students can identify geological features as mountains, valleys plains, deserts, lakes, rivers, and oceans as well as local landforms and bodies of water.

Present:

Students will develop a deeper understanding of the life cycle of a mountain and soils.

Going Forward:

Students will compare and contrast two volcanic mountains including any eruptions that have occurred and the current activity of the volcanoes. Students will create a machine to dig a hole through the Earth to the other side. Students will research the layers of the Earth to determine how their machine will move through the Earth's layers, such as cutting through the mantle or "swimming" through the core.

Present and Going Forward Vocabulary:

Organic, inorganic

Career Connections:

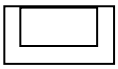
Geologist, Agronomist, Inventor

Advanced Understanding & Activity (Alternate activity):

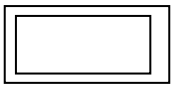
Choose one or more of the following activities to complete as alternate activities to the general assignments:

1. Students will create a comic strip to explain the life cycle of a mountain using the book, *The Mountain That Loved a Bird.* Students will include the young, mature, and old stages of the life cycle.
   Web site: http://www.ouramazingplanet.com/mount-hood-eruptions-explained-0419/

2. Students will explore a section of soil using a frame created from a file folder. Starting with the folded edge, cut the center out of the folder, leaving one inch edges.

   Open the file folder. This frame will define the parameters of the section of soil to explore. Lay the open frame over the patch of soil you wish to observe.

   Draw and write about your observations.
   - What is alive and what is dead?
   - What is organic and what is inorganic?
   - Identify any plants and/or animals above and below the surface of the soil.
   - Dig and identify the soil components found in your section of soil.
   - Research and identify any unknown plants/animals that are found.
   - Illustrate the layers of your soil section, identifying the soil components, plants, and animals.

   Adapted from U.S. Forestry Service, Woodsy Owl Activity Guide, which can be downloaded at http://www.eric.ed.gov/PDFS/ED448026.pdf

3. **RAFT** (Student page found in Appendix A)
   Students will choose one row. They will write about the TOPIC from the perspective of the ROLE to the AUDIENCE using the FORMAT. You can allow students to choose one item from each of the four columns. Provide an audience for the student to present their product. Students may need to plan their product using the organizational tool, Primary Project Planner.

ROLE	AUDIENCE	FORMAT	TOPIC
Sand	2nd Graders	Advice Column	Don't build too close to the Ocean!
Clay	General Public	Acceptance Speech	Award for "Sticking"Around.
Silt	Dredging machine	Diary/ Journal Entry	Being dredged from the bottom of a river is…
Humus	Plants	Jingle	I can help you!

Literature Connections/Resources:
- Bourgeois, Paulette. The Amazing Dirt Book. Boston, MA: Addison Wesley. 1990.
- McLerran, Alice. The Mountain That Loved a Bird. NY: Aladdin. 2000

ALCOSS: 2.8
Identify evidence of erosion and weathering of rocks.

Mastered:
Students will identify evidence of erosion and weathering of rocks.

Present:
Students will investigate and describe two locations where erosion is occurring in their community.

Going Forward:
Students will create a foldable* listing information about the 1930's Dust Bowl. Students will include information about "where, when, how/why" the Dust Bowl occurred.

Present and Going Forward Vocabulary:
Weathering, erosion, igneous rock, metamorphic rock, sedimentary rock, parent material,

Career Connections:
Agronomist, Civil Engineer

Advanced Understanding & Activity (Alternate activity):

Students will investigate and describe two sites or areas where erosion is occurring in their community. Student will create a graphic organizer to record their information. Include the following information about the locations:

- What is causing the erosion to the two areas?
- Where are the sites located?
- How can the erosion be prevented?

Web site: http://www.livinghistoryfarm.org/farminginthe30s/water_02.html

Literature Connections/Resources:

- Bailey, Jackie. Cracking Up: A story About Erosion (Science Works). Mankato, MN: Picture Window Books. 2006.
- Koontz, Robin. Erosion: Changing Earth's Surface. Mankato, MN: 2002.
- Spillsbury, Richard. The Disappearing Mountain and Other Earth Mysteries: Erosion and Weathering. Mankato, MN: Heinemann-Raintree. 2005.

ALCOSS: 2.9

Describe evaporation, condensation, and precipitation in the water cycle.

Mastered:

Students will describe evaporation, condensation, and precipitation in the water cycle.

Present:

Students will explore the water cycle in-depth.

Going Forward:

Students will compose and present a rap song about the water cycle and its components to a friend or their teacher.

Present and Going Forward Vocabulary:

Evaporation, condensation, precipitation

Career Connections:

Hydrologist, Agronomist, Botanist, Meteorologist Biologist

Advanced Understanding & Activity (Alternate activity):

Sunless Water Cycle

Students will imagine what would happen if the sun did not shine for a month. Then share how they could "assist" the water cycle in continuing without the sun. Write a play about their "new" water cycle and describe how it works.

Literature Connections/Resources:

- Locker, Thomas. Water Dance. San Anselmo: CA: Sandpiper. 2002.
- McClure, Brian. The Raindrop. Bel Air, CA: Universal Flag Publishing. 2006.
- Wells, Robert. Did Dinosaurs Drink This Water? Park Ridge, IL: Albert Whitman & Co. 2006.

ALCOSS: 2.10

Identify the impact of weather on agriculture, recreation, the economy, and society.

Mastered:

Students will identify the impact of weather on agriculture, recreation, the economy, and society as well as recognize the importance of science and technology to weather predictions.

Present:

Students will analyze weather predictions for accuracy.

Going Forward:

Students will study the graph of tornadoes during the last 100 years and identify how new technology has helped to prevent deaths and injuries from violent storms. Students will research the layers of

Earth's atmosphere and their relation to our weather, including information about the troposphere. Students will create a foldable* to identify the sequence and height of each layer.

Present and Going Forward Vocabulary:
Atmosphere, troposphere, stratosphere

Career Connections:
Meteorologist, Emergency Manager, Community Planner, Inventor.

Advanced Understanding & Activity (Alternate activity):
Choose one or more of the following activities to complete as alternate activities to the general assignments:

1. Students will use a Venn diagram to compare and contrast predicted and actual weather conditions. Students will see how accurate predictions have become over the last 20 years.
2. Students will devise a way to encourage rainfall during a drought.
   Web sites: http://www.ncdc.noaa.gov
   http://www.spc.noaa.gov/wcm
3. **RAFT** (Student page found in Appendix A)
   Students will choose one row. They will write about the TOPIC from the perspective of the ROLE to the AUDIENCE using the FORMAT. You can allow students to choose one item from each of the four columns. Provide an audience for the student to present their product. Students may need to plan their product using the organizational tool, Primary Project Planner.

ROLE	**AUDIENCE**	**FORMAT**	**TOPIC** Include how these types of weather affect agriculture, recreation, the economy and society.
Tornado	People in "Tornado Alley"	Full Page Newspaper Ad	Ready or not, Here I Come!
Weather Forecaster	General Public	Video	I really want to be right, but sometimes…
American Flag	Elementary Students	Diary/ Journal	Why do they forget me when it rains?
Raindrop	2nd graders	Energizer Bunny Commercial	I keep going and going and going

Literature Connections/Resources:
- Barrett, Judi. Cloudy with a Chance of Meatballs. NY: Atheneum. 1978.
- Branley, Franklin. Tornado Alert: Let's Read & Find Out Science 2. NY: Collins. 1990.

ALCOSS: 2.11
Identify basic components of our solar system, including the sun, planets, and Earth's moon.

Mastered:
Students will identify basic components of our solar system, including the sun, planets, and Earth's moon.

Present:
Students will examine how our seasons are created by the Earth turning on its axis and revolving around the sun. Students will distinguish that other parts of Earth have different seasons as compared to where they live, such as Northern Hemisphere and

Going Forward:
Students will examine how satellites are used in our daily lives and will create a list of all the ways that they can find. Students will decide if our lives are better or more complicated because of satellites. Students will write a report explaining their

	Southern Hemisphere have different summer months.	decision and will include any recommendations that would make satellites more helpful, more efficient, etc.

Present and Going Forward Vocabulary:

Summer solstice, winter solstice, autumnal equinox, vernal equinox, perihelion, aphelion,

Career Connections:

Climatologist, Cartographer, Space Scientist

Advanced Understanding & Activity (Alternate activity):

The Opposites

Students will examine how our seasons are created by the Earth turning on its axis and revolving around the sun. Students will distinguish that other parts of Earth have different seasons as compared to where they live, such as Northern Hemisphere and Southern Hemisphere have different summer months.

Create a flip book to illustrate the difference between the Northern and Southern Hemispheres during the different seasons. Explain why they are different using the vocabulary of a scientist.

Literature Connections/Resources:

- Gibbons, Gail. The reason for the Seasons. NY: Holiday House. 1996.
- Hall, Margaret. Seasons of the year. Mankato, MN: Capstone Press. 2008.