

ALCOSS: 5.1

Identify evidence of chemical changes through color, gas formation, solid formation, and temperature change.

Mastered:

Students should have a basic understanding of chemical changes.

Present:

Students will develop a deeper understanding of the chemical changes.

Going Forward:

Students will explore and predict how chemical changes might occur.

Present and Going Forward Vocabulary:

Chemical reaction, compound

Career Connections:

Chemist, Biochemist, Microbiologist

Advanced Understanding & Activity (Alternate activity):**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, Project Planner.

<u>ROLE</u>	<u>AUDIENCE</u>	<u>FORMAT</u>	<u>TOPIC</u>
Cake	Flour	Ballad	Why can't I go back?
Fireworks	Match	Poem	Boom! Boom! Pow!
Rotting Banana	Grocer	Advice Column	Keep me yellow!
Broken Glass	Floor	Conversation	Am I really finished?
Vinegar	Baking Soda	Rap	You make me bubble

Literature Connections/Resources:

- Tocci, Salvatore. *The Periodic Table* NY: Children's Press, 2005.
- Periodic Table of Elements and Chemistry: <http://www.chemicool.com/>
- WebElements: <http://www.webelements.com/>

ALCOSS: 5.2

Define mass, volume, and density.

Mastered:

Students should be able to define mass, volume and density.

Present:

Students will gain a thorough understanding of mass, volume, and density.

Going Forward:

Students will consider the effects of reduced gravity on mass, volume, and density and how those effects might be utilized.

Present and Going Forward Vocabulary:

Mass, volume, density, immiscible

Career Connections:

Chemist, Scientist, Biologist, Microbiologist

Advanced Understanding & Activity (Alternate activity):**I Can...** (Student page found in Appendix A)

The student will choose one "I CAN." activity to accomplish. If time permits, students may choose more than one activity. Students must research their topics in order to develop the products. Students may need to plan their product using the organizational tool, Project Planner.

1. Write a children's picture book describing mass, volume, and density.

2. Make a film canister sink, float, and be suspended in a solution. Write riddles for other students to solve for what made the film canister sink, float, and be suspended.
3. Research and determine why salad dressings have to be shaken before used. Write a recipe for a salad dressing explaining how and why the user must shake it. Invent a salad dressing that does not need to be shaken.
4. Design an experiment testing whether temperature affects density. Conduct the experiment.
5. Visit <http://phet.colorado.edu/en/simulations/category/new> and practice building an atom. Create a rap about an atom and its parts.

Literature Connections/Resources:

- Kramer, Stephen. How to Think Like a Scientist: Answering Questions by the Scientific Method. NY: HarperCollins. 1987.
- Jennings, Terry. Floating and Sinking. NY: Franklin Watts. 1990.

ALCOSS: 5.3

Use every day indicators to identify common acids and bases.

Mastered:

Students will recognize the difference between acids and bases.

Present:

Students will achieve a deeper understanding of the methods used to identify the differences between acids and bases.

Going Forward:

Students will explore the chemical formulas of pH and explain the effect of hydrogen.

Present and Going Forward Vocabulary:

Acid, base, neutral, pH

Career Connections:

Chemist, Environmentalist, Freshwater Biologist

Advanced Understanding & Activity (Alternate activity):**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, Project Planner.

<u>ROLE</u>	<u>AUDIENCE</u>	<u>FORMAT</u>	<u>TOPIC</u>
Baking Soda	Vinegar	Love Song	You Make Me Bubble and Fizz
Cabbage Juice	Various Household Chemicals	Warning	Testing You
Red Cabbage Indicator Paper	Students	Country Song	I was purple with rage and now I'm green with envy!
Cabbage Juice	Students	Game Show Contestant	What's the Solution

Literature Connections/Resources:

- Brent, Lynette, Acids and Bases (Why Chemistry Matters). NY: Crabtree Pub Co. 2008.
- Chem4Kids-Reactions: Acids and Bases:
http://www.chem4kids.com/files/react_acidbase.html
- Visionlearning: (Advanced text on acids and bases):
http://www.visionlearning.com/library/module_viewer.php?mid=58

ALCOSS: 5.4

Describe forms of energy, including chemical, heat, light, and mechanical.

Mastered:

Students should be able to identify different forms of energy.

Present:

Students will gain a deeper understanding of different forms of energy.

Going Forward:

Students will explore and predict what forms of energy will be used in the future.

Present and Going Forward Vocabulary:

Potential energy, kinetic energy, solar energy, geothermal energy, hydroelectric power, conduction, convection, radiation, fossil fuels

Career Connections:

Engineer, Electrical Engineer, Environmentalist

Advanced Understanding & Activity (Alternate activity):**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. Answers for each activity must begin with the corresponding letter. For example, answers for the first activity must begin with the letter "F." How many of these can you complete?

F	List 3 problems of using Fossil Fuels.
O	Name four objects that have potential energy.
S	List two differences of mechanical and chemical energy.
S	Identify two professions with energy.
I	List two examples of conduction.
L	Name four things affected by use of alternative sources of energy.
F	Name four objects that have kinetic energy.
U	List four benefits of alternative sources of energy.
E	List two examples of convection.
L	List two similarities of heat and light energy.
S	List two examples of radiation.

Literature Connections/Resources:

- Jerome, Kate Boehm. Science Quest: Atomic Universe: The Quest to Discover Radioactivity. Des Moines, IA: National Geographic Children's Books. 2006.
- DeRosa, Tom. Energy: Its Forms, Changes, and Functions. Green Forest, AR: Master Books. 2009.
- Benduhn, Tea. Nuclear Power. NY: Gareth Stevens Publishing 2008.
- Energy Information Administration Energy Kids:
http://www.eia.doe.gov/kids/energy.cfm?page=about_forms_of_energy-basics
- Forms of Energy: http://www.nmsea.org/Curriculum/Primer/forms_of_energy.htm

ALCOSS: 5.5

Contrast ways in which light rays are bent by concave and convex lenses.

Mastered:

Students will have a basic understanding of light rays.

Present:

Students will identify and understand the differences in concave and convex lenses.

Going Forward:

Students will explore the field of ophthalmology and predict how advances in lenses might eliminate vision problems.

Present and Going Forward Vocabulary:

Concave, convex, prism, reflection, lenses, optic, optical fibers

Career Connections:
 Ophthalmologist, Optometrist, Electrical Engineers, Telescope and Microscope Designers, Laser Engineers, Fiber Optic Designers

Advanced Understanding & Activity (Alternate activity):

Thinker Keys (Student page found in Appendix A)

The teacher and student will agree on the number of “keys” to accomplish. The student chooses the keys and completes the contract. Students may need to plan their product using the organizational tool, Project Planner.

What If?	What if we all saw in black and white? Write a narrative about what our lives would be like.	Ridiculous	Everyone must wear a patch over their left eye according to the new surgeon general. Write a persuasive piece begging him to change his mind.
Reverse Listing	Name ten things that are not dependent on light.	Commonality	Use a Venn diagram to find the commonalities between a convex lens and a pencil.
Disadvantages	List the disadvantages of blindness. Then, brain-storm ideas to correct or eliminate blindness.	Question	Answer: Refraction Question: Come up with 5 questions that have “Refraction” as the answer.
Combination	List and then combine some attributes of a flashlight and black construction paper.	Brainstorming	Everyone needs to wake up naturally to the sun. Brainstorm ideas to make this possible.
BAR-Bigger, Add, Replace	Make an item Bigger, Add something to it, or Replace something on it.	Inventions	Invent a new shape that will refract the visible spectrum.
Alphabet	Make an alphabet book on Light.	Brick Wall	We must have light. Try to “break down the wall” by outlining other ways to deal with this perception.
Variations	How many ways can you create the visible spectrum?	Construction	Construct a maze in which light from a flashlight will travel from four mirrors to a sheet of black construction paper.
Picture	 Transform this picture into something new.	Forced Relationships	Use a pencil, spoon, and a flashlight to make a microscope.
Prediction	Predict how the use of corrective lenses will change over the next 50 years.	Alternative	Think of three ways to solve nearsightedness without using corrective lenses.
Different Uses	List ten different uses for a mirror.	Interpretation	The visible spectrum knocks on your door. Write a narrative to communicate the situation.

Literature Connections/Resources:

- Kassinger, Ruth G. Glass: From Cinderellas Slippers to Fiber Optics (Material World) Minneapolis, MN: Twenty First Century Books. 2003.

ALCOSS: 5.6
 Compare effects of gravitational force on Earth, on the moon, and within space.

Mastered:

Students will compare effects of gravitation forces.

Present:

Students will develop a deeper understanding of the forces of gravity, the early exploration of

Going Forward:

Students will explore forces of gravity on other planets. Students will research Newton’s

the laws of gravity and how it impacts daily life. Laws of Gravity.

Present and Going Forward Vocabulary:

Gravity, force, friction, resistance

Career Connections:
Astronaut, Research Scientist, Engineers

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, Project Planner.

1. Visit the website below. Find out your weight on other planets. Why is it different? Write a script for a play explaining the difference between mass and weight. http://www.exploratorium.edu/ronh/weight/index.html	2. Design an experiment to test what factors affect force. Use sand paper, Hot Wheels car, spring scale, textbook, aluminum foil, and a whiteboard eraser.	3. Make a comic strip about how Isaac Newton discovered gravity.
4. Design a new roller coaster for Disney World. Draw a picture of what it will look like. Include labels and descriptions of what forces are at work.	5. Free Choice – Develop your own research topic or experiment. Must be approved by your teacher.	6. Research the life of Sir Isaac Newton. Write a song about his accomplishments.
7. Isaac Newton is known for his three laws of motion. Research those laws to learn more about them. Make a picture book to teach others about the laws.	8. Imagine what it would be like if there were no gravity on Earth. Write an expository piece explaining what a typical day would be like.	9. Visit the following website to conduct an experiment on air resistance. http://www.teachengineering.org/view_activity.php?url=http://www.teachengineering.org/collection/cub/_activities/cub_mechanics/cub_mechanics_lesson02_activity1.xml

Literature Connections/Resources:

- Gianopoulos, Andrea. Isaac Newton and the Laws of Motion. Mankato, MN: Capstone Press. 2007.
- Newton’s Three Laws of Motion:
<http://teachertech.rice.edu/Participants/louviere/Newton/>
- Physics4Kids: http://www.physics4kids.com/files/motion_laws.html

ALCOSS: 5.7
Identify common parts of plant and animal cells, including nucleus, cytoplasm, and cell membrane.

Mastered:

Students will develop a basic understanding of cells.

Present:

Students will understand the differences between plant and animal cells, including cell organelles.

Going Forward:

Students will research cell growth, including tumors and causes of tumors.

Present and Going Forward Vocabulary:

Cell membrane, ribosome, mitochondria, endoplasmic reticulum, Golgi apparatus

Career Connections:
Biologist, Botanist, Zoologist, Veterinarian, Cell Biologist

Advanced Understanding & Activity (Alternate activity):

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

The student will choose one “I CAN...” activity to accomplish. If time permits, students may choose more than one activity. Students must research their topics in order to develop the products. Students may need to plan their product using the organizational tool, Project Planner.

1. Make an ABC book on plant and animal cells.
2. Visit the Web site, www.cellsalive.com; view “cell models” under the heading “interactive.” Learn about both prokaryotic and eukaryotic cells. Practice some of the puzzles and quizzes.
3. Make a Venn diagram comparing animal and plant cells.
4. Create a 3D cell using art supplies provided.
5. Design an ad for one of the following major organelles; cell membrane, ribosome, mitochondria, endoplasmic reticulum, or Golgi apparatus. Include a written description of your organelle, a sales pitch, a price for your organelle, and a full-color diagram.

Literature Connections/Resources:

- Bender, Lionel. Atoms and Cells. London: Franklin Watts Ltd. 1989.
- Wallace, Holly. Cells and Systems. Mankato, MN: Heinemann Library. 2003.
- Cells Alive: http://www.cellsalive.com/cells/cell_model.html
- The Cell: <http://web.jjay.cuny.edu/~acarp/NSC/13-cells.html>

ALCOSS: 5.8
 Identify major body systems and their functions, including the circulatory system, respiratory system, excretory system, and reproductive question.

Mastered:

Students should know and understand how the major systems of the body work together.

Present:

Students will further develop their understanding of how the body systems work together.

Going Forward:

Students will examine the body systems in a new way to compose numerous formats that analyze, apply, and evaluate different body systems.

Present and Going Forward Vocabulary:

Circulatory system, respiratory system, excretory system, reproductive system

Career Connections:
 Medical fields, Research Biologist, Health Fields

Advanced Understanding & Activity (Alternate activity):

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, Project Planner.

<u>ROLE</u>	<u>AUDIENCE</u>	<u>FORMAT</u>	<u>TOPIC</u>
Circulatory System	Brain	Full Page Newspaper Ad	Why I’m important to you
Lung	Red Blood Cells	Comic Strip	Pumping Iron
Excretory System	Record Producer	Rap	A body is a terrible thing to waste.
Skeletal System	Muscular System	Letter	I’ve got a bone to pick with you.

Nervous System	Other body systems	Inaugural Speech	Ask not what other systems can do for you, but what you can do for the other body systems.
Reproductive System	Farmer John	Debate	What came first, the chicken or the egg?

Literature Connections/Resources:

- Green, Jan. Muscles. Mankato, Minn.: Stargazer Books. 2006.
- Newquist, H.P. The Great Brain Book: An Inside Look at the Inside of Your Head. New York: Scholastic Reference. 2004.
- Simon, Seymour. Guts: Our Digestive System. New York: HarperCollins. 2005.
- Simon, Seymour. Lungs: Your Respiratory System. New York: Collins. 2007.
- Ziefert, Harriet. You Can't See Your Bones With Binoculars : A Guide to Your 206 Bones. Maplewood, N.J.: Blue Apple Books. 2003.
- Indianapolis Marion County Public Library-Kids: <http://www.imcpl.org/kids/guides/health/skeletalsystem.html>

ALCOSS: 5.9
Describe the relationship of populations within a habitat to various communities and ecosystems.

<p>Mastered: Students will understand there are ecosystems.</p>	<p>Present: Students will gain a deeper understanding of the symbiotic relationship between a population and an ecosystem.</p>	<p>Going Forward: What happens when there is a change or imbalance in an ecosystem? How does a change effect both a population and the ecosystem?</p>
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Present and Going Forward Vocabulary:
Symbiotic, habitat, ecosystem

Career Connections:
Naturalist, Anthropologist, Biologist, Marine Biologist

Advanced Understanding & Activity (Alternate activity):
Fortunately, Unfortunately (Student page found in Appendix A)

Students will research the following questions.

- What happens when there is a change or imbalance in an ecosystem?
- How does a change effect both a population and the ecosystem?

Then students will read the Fortunately, Unfortunately scenario. Students will write and illustrate the chain of events to show the positive and negative situations surrounding the scenario. You may use additional sheets of paper in order to complete your story.

Scenario

Early one evening, several members of the Johnson family were cooking out steak for dinner. Their youngest daughter was often inside due to the mosquitoes; however, on this particular evening, they realized there were no mosquitoes. As a matter of fact, all the mosquitoes had become extinct. Unfortunately,...

Literature Connections/Resources:

- Glass, Susan. Populations And Ecosystems. Logan, IA: Perfection Learning. 2005.
- REAL TREES 4 Kids: <http://www.realtrees4kids.org/ninetwelve/system.htm>

ALCOSS: 5.10
Identify spheres of Earth, including the geosphere, atmosphere, and hydrosphere.

<p>Mastered: Students will be able to identify</p>	<p>Present: Students will identify differences</p>	<p>Going Forward: Students will predict what</p>
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the spheres of Earth.

of Earth's spheres, describe the rock cycle and technologies used to study same.

spheres might be on other planets.

Present and Going Forward Vocabulary:

Geosphere, atmosphere, hydrosphere

Career Connections:
Geologist, Geoscientist, Atmospheric Scientist, Hydrogeologist, Petrologist

Advanced Understanding & Activity (Alternate activity):

Students will choose either the TIC-TAC-TOE or Thinker Keys.

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, Project Planner.

1. Draw and label a diagram of the difference between rotation and revolution.	2. Create a flip book of the phases of the moon. Label all the phases.	3. Write a talk show interview with a scientist to discuss new ways technology helps us investigate Earth and the other planets.
4. A new music CD has been made about space; however, there are no titles. Create 10 titles of songs related to space and create the CD cover.	5. Free Choice – Develop your own research topic or experiment. Must be approved by your teacher.	6. Create a timeline detailing eight important events from the Space Age.
7. Create a brochure for a planet of your choice. Include a section for tourism, basic information, and a full color illustration.	8. Download the Jeopardy template below. Create a game to review this unit on space. http://teach.fcps.net/trt2/links/poverpointgames.html	9. Imagine you are a traveler from another solar system. Create a travel journal detailing your journey from the edge of our solar system to the sun. Include distances traveled and what you had seen.

Thinker Keys (Student page found in Appendix A)

The teacher and student will agree on the number of “keys” to accomplish. The student chooses the keys and completes the contract. Students may need to plan their product using the organizational tool, Project Planner.

What If?	What if the solar system revolved around the Earth as it was previously thought? Write an expository piece explaining how life would be different.	Ridiculous	Everyone should travel into space at least once in their lives. Write a persuasive speech to the president convincing him to pay for this.
Reverse Listing	Name ten things that could never survive in earth's hydrosphere.	Commonality	Use a Venn diagram to find the commonalities between a weather balloon and metamorphic rock.
Disadvantages	Write about the disadvantages of space travel. Then brainstorm ideas to eliminate all space travel.	Question	Answer: Satellite Question: Come up with at least five questions that have satellite as the answer.
BAR-Bigger, Add, Replace	Make an item Bigger, Add something to it, or Replace something on a Space Probe.	Brainstorming	An earthquake occurred in California, but no seismograph was available. How are we going to determine the intensity of the earthquake?

Alphabet	Make an alphabet book on Space.
Variations	How many ways can you use technology to study planets, the solar system, and the universe?
Picture	Transform this picture into something to do with Earth's spheres and/or the planets. 
Prediction	Predict what space travel will look like in five years, ten years, and 50 years.
Different Uses	List ten different uses for salt water.

Inventions	Invent a new technology to study space.
Brick Wall	We must have space travel in order to learn about space. Try to "break down the wall" by brainstorming other ways to deal with this situation.
Construction	Construct a telescope using a mirror, flashlight, and paper towel tube.
Alternative	Think of three ways to transform sedimentary rock to metamorphic rock.
Interpretation	Extraterrestrial life enters your classroom. Write a narrative to tell what happens next.

Literature Connections/Resources:

- Cvancara, Alan M. A Field Manual for the Amateur Geologist: Tools and Activities for Exploring Our Planet. Hoboken, NJ: Jossey-Bass. 1995.
- Vogt, Gregory. The Atmosphere: Planetary Heat. Engine. Breckenridge, CO: Twenty-First Century Books. 2007.
- Vogt, Gregory. The Hydrosphere: Agent of Change. Breckenridge, CO: Twenty-First Century Books. 2007.

ALCOSS: 5.11
Compare distances from the sun to planets in our solar system.

Mastered: Compare distances from the sun to planets in our solar system.	Present: Students will further explore distances in space and technology used to explore space.	Going Forward: Student will research and map the current locations of technology in space using scale.
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Present and Going Forward Vocabulary:
Light-year, Astronomical unit (AU)

Career Connections:
Astrophysicist, Astronomer, Aeronautical Engineer

Advanced Understanding & Activity (Alternate activity):
Students will complete different activities from the TIC-TAC-TOE or Thinker Keys than what had been completed from ALCOSS 5.10.

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, Project Planner.

1. Draw and label a diagram of the difference between rotation and revolution.	2. Create a flip book of the phases of the moon. Label all the phases.	3. Write a talk show interview with a scientist to discuss new ways technology helps us investigate Earth and the other planets.
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4. A new music CD has been made about space; however, there are no titles. Create 10 titles of songs related to space and create the CD cover.	5. Free Choice – Develop your own research topic or experiment. Must be approved by your teacher.	6. Create a timeline detailing eight important events from the Space Age.
7. Create a brochure for a planet of your choice. Include a section for tourism, basic information, and a full color illustration.	8. Download the Jeopardy template below. Create a game to review this unit on space. http://teach.fcps.net/trt2/links/powerpointgames.html	9. Imagine you are a traveler from another solar system. Create a travel journal detailing your journey from the edge of our solar system to the sun. Include distances traveled and what you had seen.

Thinker Keys (Student page found in Appendix A)

The teacher and student will agree on the number of “keys” to accomplish. The student chooses the keys and completes the contract. Students may need to plan their product using the organizational tool, Project Planner.

What If?	What if the solar system revolved around the Earth as it was previously thought? Write an expository piece explaining how life would be different.	Ridiculous	Everyone should travel into space at least once in their lives. Write a persuasive speech to the president convincing him to pay for this.
Reverse Listing	Name ten things that could never survive in earth’s hydrosphere.	Commonality	Use a Venn Diagram to find the commonalities between a weather balloon and metamorphic rock.
Disadvantages	Write about the disadvantages for space travel. Then brainstorm ideas to eliminate all space travel.	Question	Answer: Satellite Question: Come up with at least 5 questions that have satellite as the answer.
BAR-Bigger, Add, Replace	Make an item Bigger, Add something to it, or Replace something on a Space Probe.	Brainstorming	An earthquake occurred in California, but no seismograph was available. How are we going to determine the intensity of the earthquake?
Alphabet	Make an alphabet book on Space.	Inventions	Invent a new technology to study space.
Variations	How many ways can you use technology to study planets, the solar system, and the universe?	Brick Wall	We must have space travel in order to learn about space. Try to “break down the wall” by brainstorming other ways to deal with this situation.
Picture	Transform this picture into something to do with Earth’s spheres and/or the planets. 	Construction	Construct a telescope using a mirror, flashlight, and paper towel tube.
Prediction	Predict what space travel will look like in five years, ten years, and 50 years.	Alternative	Think of three ways to change sedimentary rock to metamorphic rock.
Different Uses	List ten different uses for salt water.	Interpretation	Extraterrestrial life enters your classroom. Write a narrative to tell what happens next.

Literature Connections/Resources:

- Aquilar, David. 13 Planets: The Latest View of the Solar System. Des Moines, IA: National Geographic Children's Books. 2011.
- Stott, Carol. Space Exploration. New York, NY: DK Children. 2004.