

**LESA  
Science Curriculum  
2008**

<b>1. Strand: Unifying Concepts and Processes</b>	(NSES, IL 12 )
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**A. Standard: Systems, Order, and Organization**

<b><u>The student will know:</u></b>	<b><u>The student will be able to:</u></b>	<b><u>Suggested Activities</u></b>	<b><u>Suggested Resources</u></b>
1. That a system is an organized group of related objects or components that form a whole.	1. Explain how a group of components work together to make a system.	1. Students will be given a set of components, such as the planets, parts of a machine, or parts of the body and will explain how the parts work together.	
2. That the laws governing the way things behave are constant.	2. Tell why an experiment must be repeated by different people at different times or places and yield consistent results before the results can be accepted.	2. Students will measure the size, mass, and volume of assorted objects.	
3. That there are many different levels of organization.	3. Identify levels of organization within a system.	3. View and discuss the video "Powers of Ten."	<a href="http://www.powersof10.com">www.powersof10.com</a>

**B. Standard: Evidence, Models, and Explanation**

<b><u>The student will know:</u></b>	<b><u>The student will be able to:</u></b>	<b><u>Suggested Activities</u></b>	<b><u>Suggested Resources</u></b>
1. That evidence is used to understand interactions.	1. Gather evidence in a simple investigation to explain an interaction.	1. Students will observe ice cubes in environments having different temperatures and record the data.	

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2. That a model is a representation used to explain the concept.

2. Create and explain a model of their own design.

2. Create a model of their ideal classroom and explain it to others.

3. The difference between hypothesis, model, law, and theory as types of scientific explanations.

3. Use hypothesis, model, law, and theory correctly.

3. Small groups of students will create board games using hypothesis, model, law, and theory, then exchange with other students and play.

### C. Change, Constancy, and Measurement

#### The student will know:

1. Some properties change and some do not.

2. Different systems of measurement are used for different purposes.

#### The student will be able to:

1. Identify a property as constant or changing.

2a. Measure length, volume, and mass accurately.

2b. Use metric and standard systems of measurement appropriately.

#### Suggested Activities

1. Compare the mass of an ice cube, in a closed system, when it is solid and melted.

2a. Students will measure and record an assortment of objects that could be found in a public dump using both metric and standard measurements.

2b. Write a report appropriate for a group of scientists. Write a second report appropriate for the community.

#### Suggested Resources

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**D. Evolution and Equilibrium**

**The student will know:**

1. That evolution is a series of changes, some sudden and some sporadic.
2. Is a state in which forces and changes occur in opposite and off setting directions.

**The student will be able to:**

1. Identify the changes.
2. Identify when something is in equilibrium.

**Suggested Activities**

1. Photograph a stream table experiment in which the stream changes course. Students will tell where the stream changes and if possible explain why (for example, a rock in the way).
2. Have 2 water bottles that are the same size. Poke a hole near bottom of each bottle and connect them with a tube. Seal connections. Fill one bottle 3/4 full and the other 1/4 full. Observe and record what happens.

**Suggested Resources**

**E. Form and Function**

**The student will know:**

1. That the form or function of an object or system is related to its use, operation, or function.

**The student will be able to:**

1. Hypothesize the use of an object based on its form.

**Suggested Activities**

1. Gather a box of unusual items that students would not normally know what they are used for. Have them guess based on what they look like. Explain the reason they think that.

**Suggested Resources**

Rachel Ray TV show clip "Stump Rachel" segment

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<b>2. Strand: Science As Inquiry</b>	(NSES, IL 11, MO 7 )
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**A. Standard: Abilities Necessary to Do Scientific Inquiry**

<b><u>The student will know:</u></b>	<b><u>The student will be able to:</u></b>	<b><u>Suggested Activities</u></b>	<b><u>Suggested Resources</u></b>
1. How to refine and refocus broad and ill-defined questions.	1. Write questions that can be answered through scientific inquiry.	1a. Write questions for a variety of investigations. 1b. Keep a log book.	
2. How to design and conduct a scientific investigation.	2. Develop systematic observation, accurate measurements, identifying and controlling variables to design, and carry out investigations.	2a. Critique how some experiments are designed. 2b. Keep a log book.	
3. That tools and techniques used to gather, analyze, and interpret data for an investigation are guided by the question.	3. Choose appropriate tools and techniques for an investigation.	3. Using a log book explain why certain tools and techniques were chosen.	
4. Descriptions, explanations, predictions, and models are based on the evidence gathered during an investigation.	4. Base their explanations on what they observed including descriptions and causes.	4. Using a log book, support descriptions and causes with data.	
5. The relationships between evidence and explanations.	5. Review data from an investigation, summarize it, and form a logical argument about the cause and effect relationship.	5. Using a log book, write a reflection on the results of the investigation.	

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|--|---|---|
| 6. That other people may have alternate explanations.    | 6. Listen to, respect, and consider alternate explanations.   | 6. Present oral presentations on the same investigation.    |
| 7. How to communicate procedures and explanations.       | 7. Using the log book, write or orally present a report including instructions, describing observations, and summarizing results. | 7. Prepare reports or oral presentations of investigations. |
| 8. Mathematics which may be needed for an investigation. | 8. Use the necessary mathematics to gather and interpret data.  | 8. Use a log book to record the mathematical steps used.    |

### **B. Standard: Understanding about Scientific Inquiry**

#### **The student will know:**

1. That different kinds of questions suggest different kinds of investigations.
2. Technology allows for better accuracy when gathering data.

#### **The student will be able to:**

1. Choose an investigation (observing and describing, collecting specimen, experiments, or gathering additional information) which is appropriate for the question.
2. Use technology to gather data.

#### **Suggested Activities**

- 1a. Record the kind of investigation in the log book.  
1b. Compare the kind of information each kind of investigation provides.
2. Use instruments developed for the computer to record data.

#### **Suggested Resources**

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3. Asking questions about other scientists' explanations is a part of scientific inquiry.

4. New ideas, technologies, methods, or procedures can come from investigations.

3. Evaluate explanations proposed by other scientists by examining and comparing data, identifying faulty reasoning, and suggesting alternative explanations.

4. Use new technologies in their investigations.

3. Discussions on oral reports of investigations.

4. Design investigations which use new technologies to gather data.

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**3. Strand: Physical Science**

(NSES, IL 12, MO 1, 2)

**A. Standard: Properties and Changes of Properties in Matter**

**The student will know:**

1. That a substance has characteristics such as density and a boiling point.

2. That there are physical and chemical changes.

3. That elements are made of one kind of atom.

**The student will be able to:**

1. Identify these properties in a substance.

2. Differentiate between physical and chemical changes.

3. Show that elements are made of one kind of atom.

**Suggested Activities**

1. Measure these properties for salt water, cooking oil, sugar water, and distilled water.

2. Cut up a piece of construction paper. Discuss that it is still the same substance-physical change. Check the mass before and after tearing. Burn the paper-chemical change. Check the mass before and after tearing.

3. Give students different colored paper dots. Have them sort them into similar colored groups to show that elements have only one kind of atom.

**Suggested Resources**

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4. That all matter is made of atoms that combine to form molecules.

4. Construct a simple model of a molecule such as water.

4. Using a handout with a larger circle drawn to represent the oxygen atom and two smaller circles drawn to represent the hydrogen atoms, instruct students to cut out and create a model of water-center the oxygen atom as the face and the hydrogen atoms in the position of a well known mouse cartoon character's ears. Extension: Use small water molecules as the rain in a drawing of their home.

5. That chemical elements do not break down during normal laboratory reactions.

5. Will demonstrate the concept using models.

5. Using models with spheres (similar to tinker toys) to represent each element show that compounds can be broken into separate atom elements.

6. That there are more than 100 elements.

6. Locate elements on the periodic table.

6. Examine the periodic table.

### **B. Standard: Motions and Forces**

#### **The student will know:**

1. That motion is described by position, speed, and direction.

#### **The student will be able to:**

1. Describe the motion of objects.

#### **Suggested Activities**

1. Using balls, students record position, speed, and direction and then represent the data on a grid.

#### **Suggested Resources**

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2. Objects not acted on by a force will continue at the same speed, in the same direction, and in a straight line.

3. Forces will cause objects to change speed or direction.

2. Conduct an investigation that demonstrates that objects do not change motion unless acted on by a force.

3. Measure, demonstrate, and communicate how forces cause an object to change motion.

2. Launch balls onto a surface as free of friction as possible (such as glass), record speed and direction.

1. Using a mini pool game, investigate how objects change motion when forces are applied from various directions.

### C. Standard: Transfer of Energy

#### The student will know:

1. Energy is associated with heat, light, electricity, mechanical motion, and sound.

2. Energy is transferred in many ways.

3. Simple machines can be used to move objects.

#### The student will be able to:

1. Observe and communicate about each of these types of energy.

2. Demonstrate and communicate how energy is transferred-heat (light, electrical, mechanical, motion, and sound).

3. Use lever, inclined plane, and wheel and axle to explain that simple machines move objects.

#### Suggested Activities

1. Given a variety of situations, such as heated water, candle, flashlight, mechanical toy, and radio, determine the type of energy.

2. Using a variety of materials show how energy is transferred in all these ways.

3. Use a lever, an inclined plane, and a wheel and axle to investigate how the force needed to move an object changes.

#### Suggested Resources

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4. Energy may be stored or changed.

4. Tell how potential energy may be converted to energy of motion.

4. Using ramps and toy cars, show potential and kinetic energy.

5. Heat moves from warmer areas to cooler areas until both reach the same temperature.

5. Design, execute, and communicate an investigation that shows the movement of heat.

5. Given hot and cold materials (e.g. water), have students demonstrate the movement of energy.

6. Thermal energy transfers from one object to another by conduction, convection, or radiation.

6. Demonstrate the transfer of heat from one object to another by conduction, convection, and radiation.

6. Using thermometers or heat sensitive temperature strips, measure changes in temperature through conduction, convection, and radiation.

7. Electrical circuits provide a means of transferring electrical energy.

7. Demonstrate the transfer of energy in an electrical circuit.

7. Construct circuits which show the transfer of electrical energy by lighting a bulb.

Society of Automotive Engineers has a free circuit unit.

8. The sun, a major source of energy for the earth, transfers its energy through waves of differing wavelengths (visible light, ultraviolet light, and infrared light).

8. Observe and communicate the sun's energy.

8. Use thermometers to measure the heat of the sun's visible light. Use UV beads to show the presence of ultraviolet light.

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**4. Strand: Life Science**

(NSES, IL 12, MO 3, 4 )

**A. Standard: Structure and Function in Living Systems**

**The student will know:**

1. Living systems demonstrate the complimentary nature of structure and function.
2. All organisms are composed of cells.
3. Cells carry on many functions needed to sustain life (grow and take in nutrients for energy).
4. In the process of photosynthesis, green plants use the sun's energy to convert water and carbon dioxide into sugars (energy) and oxygen.
5. Specialized cells perform specialized functions and work together to form tissue.

**The student will be able to:**

1. Identify structure and function of organs, tissues, organ systems, and whole organisms.
2. Observe and sketch cells in various organisms from single celled organisms to multi-cellular organisms.
3. Locate and identify cells as they grow or take in nutrients.
4. Conduct and report on simple experiments with green plants.
5. Examine and sketch cells from several kinds of tissue.

**Suggested Activities**

1. Make a model of a lung.
2. Using a microscope, look at slides of cells from various organisms.
3. Watch video of single celled organisms. Make notes on food gathering and growth.
4. Measure oxygen bubble production of elodea in water as evidence of photosynthesis.
5. Using a microscope, examine various kinds of tissue.

**Suggested Resources**

- <http://www.tsgc.utexas.edu/spaceexplorers/activities/Lungs.pdf>
- Botanical Gardens Nature Reserve at Gray Summit offers a field trip on making maple syrup with an emphasis on photosynthesis.

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6. Tissues group together to form organs which perform specific functions.	6. Examine an organ, such as a heart, to determine how structure and function work together to benefit the whole organism.	6. Using a model, examine an organ and make notes on its form and function.
7. The human organism has nine systems.	7. Identify and describe the form and function of the digestive, respiratory, circulatory, reproductive, excretory, skeletal, muscular, integumentary, and nervous systems.	7. Using models, diagrams, and pictures locate and describe the function of the digestive system.
8. Diseases can be caused by the failure of a system or by damage by infection by another organism.	8. Identify whether a disease is caused by a failure of a system or by an infection.	8. Using the internet, find the causes of various diseases.

### **B. Standard: Reproduction and Heredity**

#### **The student will know:**

1. Reproduction is characteristic of all living systems.
2. Many species, including humans, reproduce sexually, producing offspring which are not identical to either parent.

#### **The student will be able to:**

1. Identify parent/offspring for living organisms.
2. Recognize that traits from both parents are carried to the offspring.

#### **Suggested Activities**

1. Given a set of pictures for a wide range of organisms, have the students identify the parent and the offspring.
2. Examine photos of parents (maybe theirs) and offspring (maybe them) to find similar characteristics from both.

#### **Suggested Resources**

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3. Some traits are inherited and some result from interactions with the environment.

3. Examine a trait to determine if it is inherited or acquired from the environment.

3. Students choose a trait and find examples to prove if its inherited or acquired from the environment.

### C. Standard: Regulation and Behavior

#### The student will know:

1. All organisms adapt to their environment.

2. Behavior is a response to the environment which is part heredity and part experience.

#### The student will be able to:

1. Show how organisms obtain and use resources, grow, reproduce, and maintain stable internal conditions in a constantly changing environment.

2. Explain an organism's behavior based on heredity and experience.

#### Suggested Activities

1. Students choose an organism from varying biomes, observe and make observations about how it adapts to its environment.

2. Consider a dog. Evaluate its behavior based on heredity and experience.

#### Suggested Resources

Zoo, Wildlife shows, Animal Planet, videos, internet

Purina Farms

### D. Standard: Populations and Ecosystems

#### The student will know:

1. A population is all of the individuals of a species together in a given place at a given time.

#### The student will be able to:

1. Identify the populations in a given area.

#### Suggested Activities

1. Mark a square meter on the school yard. List all of the populations observed.

#### Suggested Resources

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2. All populations living together and the physical factors with which they interact compose an ecosystem.

3. In an ecosystem, sunlight is the major source of energy which passes from organism to organism in a food web.

4. The number of organisms an ecosystem supports depends on the resources available.

2. Identify various ecosystems from very small to very large.

3. Identify the organisms in a food web and label them as producer, consumer, or decomposer.

4. Explain how removing or limiting a resource affects populations in a food web.

2. Compare the ecosystem of the school yard to the grasslands.

3. Play the game Predator or Prey.

4. Create a food web using string to connect organisms and cards for abiotic factors. Remove organisms or cards and determine how the rest of the web is affected.

Botanical Gardens,  
[www.planet-earth.com](http://www.planet-earth.com)

### **E. Standard: Diversity and Adaptations of Organisms**

#### **The student will know:**

1. Biological adaptations include changes in structures, behaviors, or physiology that enhance survival in a particular environment.

2. Extinction occurs when the environment changes and the adaptations are insufficient.

#### **The student will be able to:**

1. Identify biological adaptations in species.

2. Identify populations which are endangered and explain why.

#### **Suggested Activities**

1. Examine several species for adaptations that increase the organism's chances of survival (e.g. Bears hibernate in winter).

2. Using posters, examine endangered populations in Missouri or Illinois and identify the cause.

#### **Suggested Resources**

Zoo,  
[www.animal.discovery.com/games/tourcentral.html](http://www.animal.discovery.com/games/tourcentral.html)

State Department of  
Conservation

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**5. Strand: Earth and Space** (NSES, IL 12, MO 5, 6 )

**A. Standard: Structure of the Earth System**

<b><u>The student will know:</u></b>	<b><u>The student will be able to:</u></b>	<b><u>Suggested Activities</u></b>	<b><u>Suggested Resources</u></b>
1. The Earth system has four major interacting components.	1. Identify the geosphere, hydrosphere, atmosphere, and biosphere of Earth and tell how they interact.	1. Create a closed "Earth System" using all 4 spheres. Observe the interactions.	Book- <i>Bottle Biology</i>
2. The solid Earth is composed of the lithosphere, mantle, and the core.	2. Identify the parts of the geosphere.	2. Create a 3-D model of the solid Earth, labeling all the layers.	<a href="http://en.wikipedia.org/wiki/Structure_of_the_Earth">http://en.wikipedia.org/wiki/Structure_of_the_Earth</a>
3. The lithosphere is broken into plates which move across the mantle causing major geological events such as earthquakes and volcanoes.	3. Locate the major tectonic plates.	3. Chart earthquakes and volcanoes on a world map.	<a href="http://volcano.und.edu/">http://volcano.und.edu/</a> <a href="http://earthquake.usgs.gov/regional/neic/">http://earthquake.usgs.gov/regional/neic/</a>
4. Landforms are a result of a combination of constructive and destructive forces.	4. Identify constructive and destructive forces and the landforms they create.	4a. Make a model of Earth's crust using 5 sponges for continents, cardboard for oceans, and thick cornstarch solution for the mantle, to demonstrate diverging and converging plates.  4b. Using a stream table set up a demonstration to show erosion and deposition.	

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5. Some changes in the earth are described in the rock cycle.	5. Identify the types of rocks and tell how they are formed.	5. Create a "Rock Cycle Chart" showing how one kind of rock can become another.	
6. Water circulates through the earth in the water cycle.	6. Locate water in the crust, oceans, and atmosphere.	6. Write a cartoon story about Ronnie Raindrop as he travels through the water cycle.	<a href="http://kids.mtpe.hq.nasa.gov/">http://kids.mtpe.hq.nasa.gov/</a>
7. The atmosphere is a mixture of nitrogen, oxygen, and trace gases including water vapor which has different properties at different elevations.	7. Identify the gases in the atmosphere and the properties of each level.	7a. Using a worksheet of 100 "molecules" have students count nitrogen, oxygen and the other molecules.	<a href="http://scifun.chem.wisc.edu/CEM/CEM/PDF/airgas.pdf">http://scifun.chem.wisc.edu/CEM/CEM/PDF/airgas.pdf</a>
		7b. Students develop a poster of the atmosphere showing each level and the properties of each.	
8. Water vapor forms clouds which affect weather and climate.	8. Show how clouds form to produce rain.	8. Create rain, using a closed system such as a salad container with a lid. Place warm water inside. Tilt the container so the water is at one end. Place an ice pack on the lid of the upper end. Observe and document.	<a href="http://www.kidzone.ws/WATER/">http://www.kidzone.ws/WATER/</a> <a href="http://ga.water.usgs.gov/edu/watercycle.html">http://ga.water.usgs.gov/edu/watercycle.html</a>
9. Atmospheric movement produces weather.	9. Demonstrate the flow of air from high pressure to low pressure and the weather associated with each.	9. Track the high pressure, low pressure, fronts, and weather for your area.	Check for a Weather Bug school in your area, to gather data. <a href="http://www.theweatherchannelkids.com">www.theweatherchannelkids.com</a> <a href="http://climate.weather.com/">http://climate.weather.com/</a>

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10. Oceans have a major effect on weather.

10. Show how the oceans affect the flow of air.

10. Prepare a PowerPoint presentation to show how air flow changes around an ocean.

<http://www.weather.com/>  
<http://www.waterencyclopedia.com/Tw-Z/Weather-and-the-Ocean.html>

11. Living organisms affect the earth system.

11. Document the affect of living things on the atmosphere, weathering of rock, or even creation of some rock.

11. As each area is studied have students prepare a skit, poem, song, etc., to explain the effects of living things.

An Inconvenient Truth found at:  
<http://www.climatecrisis.net/>  
<http://think.mtv.com/Issues/environment/>

### **B. Standard: Earth's History**

#### **The student will know:**

1. Earth's processes that are occurring today have occurred throughout Earth's past.
2. Earth's history has also been influenced by occasional catastrophic events such as the impact of an asteroid.
3. Fossils tell us about past life and environment on Earth.

#### **The student will be able to:**

1. Identify Earth's processes such as erosion, plate movement, and changes in atmospheric composition.
2. Show evidence that Earth has been impacted by an asteroid.
3. Look at fossils and give a plausible description of the time when that animal lived on Earth.

#### **Suggested Activities**

1. See activities for A4a and A4b
2. Using the internet, research for information on asteroid impact (e.g. extinction of dinosaurs).
3. Examine fossils or pictures of fossils. Create a story or diorama of that time in history.

#### **Suggested Resources**

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**C. Standard: Earth in the Solar System**

**The student will know:**

1. Earth is the third planet in a system of 9 planets and other smaller bodies which orbit an average star.
  
2. Predictable motion of objects in the solar system explain the day and the year.
  
3. The sun is the major source of energy for Earth. Seasons result from variations in the amount of the sun's energy hitting the earth, due to the tilt of Earth.

**The student will be able to:**

1. Locate and name the bodies in the solar system.
  
2. Tell the difference between rotation and revolution and the effects of each.
  
3. Explain how the seasons occur on Earth.

**Suggested Activities**

- 1a. Create a floor-sized map of the solar system locating all of the bodies.
  
- 1b. Develop a "Planet Parade" where the student dresses as a planet to show the major features of the planet.
  
2. Use the words rotate and revolve as part of an exercise routine (e.g., stand up and rotate, revolve around your desk).
  
3. In a dark room, use a large ball or balloon to represent Earth and a bright flashlight to represent the sun's light. Examine how the light strikes the surface at different angles.

**Suggested Resources**

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<b>6. Strand: Science and Technology</b>	(NSES, IL 13, MO 8 )
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**A. Standard: Abilities of Technological Design**

<u><b>The student will know:</b></u>	<u><b>The student will be able to:</b></u>	<u><b>Suggested Activities</b></u>	<u><b>Suggested Resources</b></u>
1. How to identify a need considering the potential user.	1. Identify a need considering the abilities and desires of a target group.	1-5. Design a jet toy.	Society of Automotive Engineers-World in Motion <a href="http://science.discovery.com/fansites/howitsmade/howitsmade.html">http://science.discovery.com/fansites/howitsmade/howitsmade.html</a>
2. How to design one or more products to meet a need considering trade-offs that might be needed.	2. Prepare a proposal for a product design meeting as many of the needs as possible.		
3. How to organize materials and resources, plan the work, and collaborate to produce a product.	3. Keep records and documents of materials, plans, and collaborations as they work to produce the product.		
4. How to use criteria to evaluate their products and the suitability for the intended user.	4. Develop a checklist of factors which the user wants. Write an evaluation that includes suggestions for improvements.		
5. How to communicate the process of technological design.	5. Prepare a report describing the stages of development of the product.		

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**B. Standard: Understanding about Science and Technology**

**The student will know:**

1. Scientists and engineers use similar processes to go about their work.
2. Technological solutions have side effects (costs, risks, benefits, etc.).
3. Many different people in different cultures make contributions to science and technology.
4. Science and technology are reciprocal.

**The student will be able to:**

1. Use investigative methods for both the discovery of our own natural world and the design of product.
2. Identify the side effects of a product.
3. Name products and identify the inventor or designer, and/or the country of origin.
4. Show that science principles help develop technology and technology helps discover new science principles.

**Suggested Activities**

1. Create a chart which compares an inventor's steps with a scientist's steps as they go about their work.
2. Choose from a list of current technologies (e.g. computers, genetic engineering, automobiles, etc.) and make a chart/poster comparing costs, risks, and benefits.
3. Create a world map with flags locating developers from around the world (e.g. Toyota).
4. Develop a flow chart about the development of a product which then allows for further study of science (e.g. microscope).

**Suggested Resources**

[www.Toyota.com](http://www.Toyota.com)

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5. All technological solutions have trade-offs; none are perfect.

5. Recognize that all products have to give up something to get something else.

5. Choose a product and come up with improvements. Determine if those improvements are practical; are they too expensive, too dangerous, or too complicated?

6. Technological solutions have intended benefits and unintended consequences.

6. Identify benefits and consequences of products.

6. Consider a product (e.g. a car) and determine the benefits and consequences. Is it worth it?

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**7. Strand: Science in Personal and Social Perspectives** (NSES, IL 12, MO 8 )

**A. Standard: Personal Health**

<b><u>The student will know:</u></b>	<b><u>The student will be able to:</u></b>	<b><u>Suggested Activities</u></b>	<b><u>Suggested Resources</u></b>
1. Regular exercise is important to the maintenance and improvement of health.	1. Recognize the benefits of regular exercise on the circulatory and respiratory systems.	1. Keep a diary of daily exercise, pulse rate, and breathing rate.	<a href="http://www.school.discovery.com/foodscience_resources.html">www.school.discovery.com/foodscience_resources.html</a> <a href="http://health.discovery.com/convergence/truth.html">health.discovery.com/convergence/truth.html</a>
2. Safe living involves the development and use of safety precautions and the recognition of risk in personal decisions.	2. Recognize the benefits of using safety precautions such as using safety belts or picking up after yourself and the possible consequences of choosing safe behaviors.	2. Develop a commercial to encourage students to "clean up their rooms" for safety reasons.	
3. The use of tobacco increases the risk of illness.	3a. Explain that social and psychological factors lead to tobacco use. 3b. Tell that smoking has long-term detrimental effects.	3a. Discuss peer pressure and smoking. Develop ways to say, "No." 3b. Research the effects of smoking tobacco.	D.A.R.E. program-local police department
4. Alcohol and other drugs are often abused and can lead to addictions.	4. Recognize that alcohol can be used to excess, and recognize that drugs not used as prescribed can be harmful.	4. Research the effects of alcohol both on the body and the social life of the drinker.	

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5. Food provides energy and nutrients for growth and development. Food requirements vary based on weight, age, sex, activity, and body functioning.

5. Determine their need for food based on their needs.

5. Keep a food diary noting the foods they eat. Determine the ideal calorie intake for each.

6. The sex drive is a natural human function.

6. Recognize that the sex drive is part of the reproductive system that emerges as the body develops.

6. View the movie on human growth and development.

7. Natural environments contain substances that are harmful to human beings.

7. Use monitoring devices to keep track of soil, water, and air quality.

7a. Test water for the presence of harmful materials and organisms.

7b. Demonstrate the use of radon or carbon monoxide detectors.

### **B. Standard: Populations, Resources, and Environments**

#### **The student will know:**

1. Overpopulation causes an environment to become degraded due to increased uses of resources.

#### **The student will be able to:**

1. Recognize the effects of overpopulation on the environment.

#### **Suggested Activities**

1. Create a simulation of a community with finite resources. Determine which populations use the resources. Add to the populations to see what happens.

#### **Suggested Resources**

Grade level: Fifth Grade

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2. Causes of resource depletion are varied and change from region to region.

2. Identify the causes of resource depletion in many regions.

2. Compare the resources of two countries widely separated geographically, especially focusing on the things they are running out of.

### C. Standard: Natural Hazards

#### The student will know:

1. Internal and external processes of the earth system cause natural hazards, events that change or destroy human and wildlife habitat, damage property, and harm or kill humans.

2. Human activities can also produce hazards.

#### The student will be able to:

1. Identify earthquakes, landslides, wildfires, volcanic eruptions, floods, and storms as natural hazards.

2. Identify human activities which are potentially hazardous.

#### Suggested Activities

1. Create a chart that shows which of Earth's processes are responsible for the hazard.

2. Choose one of the following to create a display showing how human activities can be hazardous: resource acquisition (e.g. digging for coal), urban growth, land use decisions, or waste disposal.

#### Suggested Resources

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**D. Standard: Risks and Benefits**

**The student will know:**

1. The risks associated with natural hazards, chemical hazards, biological hazards, social hazards, and personal hazards.

2. Important personal and social decisions are made based on perceptions of benefits and risks.

**The student will be able to:**

1. Recognize the hazards of fire, flood, tornado, hurricane, earthquake, volcanic eruption, pollution in air, water, soil, and food, pollen, viruses, bacteria, parasites, transportation, smoking, and drinking.

2. Consider the benefits and risks of an action before making a decision.

**Suggested Activities**

1. Create a hazards documentary highlighting the hazards and how to remain safe.

2. Make benefit and risk charts. Be sure to include statistics.

**Suggested Resources**

**E. Standard: Science and Technology in Society**

**The student will know:**

1. Science influences society through its knowledge, and is neither entirely beneficial nor entirely detrimental.

2. Technology influences the quality of life and the ways people act and interact.

**The student will be able to:**

1. Evaluate the effect science has on them and society.

2. Recognize the ways technology changes people's lives and interactions.

**Suggested Activities**

1. Hold a debate to determine if the computer is more beneficial or detrimental to society.

2. Compare a typical day in 1910 with one in 2010 focusing on technology.

**Suggested Resources**

Grade level: Fifth Grade

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3. Science and technology have advanced through contributions of many different people in different cultures at different times in history.

4. Science cannot answer all questions and technology cannot solve all problems or meet all needs.

3. Demonstrate that advancements are based on contributions of others from the past.

4. Recognize that new technologies can decrease some risks, but may increase others.

3. Create a timeline to show the development of the computer.

4. Develop a label for computers. Include a warning portion.

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<b>8. Strand: History and Nature of Science</b>	(NSES, IL 13 )
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**A. Standard: Science as a Human Endeavor**

<u>The student will know:</u>	<u>The student will be able to:</u>	<u>Suggested Activities</u>	<u>Suggested Resources</u>
1. Men and women with diverse interests, talents, qualities, and motivation engage in science, engineering, and related fields.	1. Identify some of the people who work in science and science related fields.	1a. Review current events making note of people who are making contributions.  1b. Invite people from the community to come speak to the class.	<i>Time for Kids, Science World</i> by Scholastic  Monsanto, Zoo, Children's Hospital, Washington University
2. Science requires different abilities depending on the field of study and type of inquiry.	2. Recognize which abilities are needed for a field of study.	2. Create a chart showing what abilities are needed for various fields of study.	Microsoft Excel

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### B. Standard: Nature of Science

#### The student will know:

1. Scientists formulate and test their explanations of nature using observation, experiments, and models.

2. Most major ideas in science have been confirmed through many experiments and observations. Scientists do and have changed their ideas when new evidence does not match existing explanations.

3. In some areas where there is active research and there is not a lot of evidence, scientists differ with each other.

4. It is part of scientific inquiry to evaluate and question the results and explanations of other scientists.

#### The student will be able to:

1. Formulate and test hypotheses using observation, experiments, and models.

2. Keep an open mind to new evidence.

3. Recognize that some areas of study have not come to a common conclusion and be open to new evidence and conclusions.

4. Review and discuss work of other scientists on their level.

#### Suggested Activities

1. Keep a lab book which documents this process.

2. Check current events and news for new ideas and concepts.

3. Check current events for new evidence and theories.

4. Peer reviews of investigation reports.

#### Suggested Resources

[http://www.academyofscience.stl.org/initiatives/junior\\_academy/points.php](http://www.academyofscience.stl.org/initiatives/junior_academy/points.php)  
<http://www.academyofscience.stl.org/resources/index.php>

*Time for Kids, Science World* by Scholastic  
<http://climate.weather.com/>

*Time for Kids, Science World* by Scholastic, local and national newspapers

<http://www.amnh.org/exhibitions/darwin/>

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**C. Standard: History of Science**

**The student will know:**

1. Studying people who have contributed to the traditions of science helps us further understand the parts of science.

2. Historically, scientists and engineers of high achievement are among the most valued contributors to their culture.

3. Difficulty experienced by scientists who have new and differing ideas.

**The student will be able to:**

1. Recognize that these people have added to not only what we know, but also how we discover it, and how it affects us.

2. Recognize that scientists and engineers are highly regarded.

3. Recognize that new ideas are not easily accepted.

**Suggested Activities**

1. Examine the lives and contributions of people, from the past as well as from current day, to determine how and why they discovered the concepts being studied. Create a book highlighting these people.

2. Look at the people who are highly regarded in today's society (e.g. NASA scientists or Bill Gates).

3. Study the lives of Newton and Wegener to see how difficult their lives were because of their new ideas.

**Suggested Resources**

<http://www.amnh.org/exhibitions/darwin/>

[http://en.wikipedia.org/wiki/Bill\\_Gates](http://en.wikipedia.org/wiki/Bill_Gates)  
<http://www.nasa.gov/>

[http://en.wikipedia.org/wiki/Alfred\\_Wegener](http://en.wikipedia.org/wiki/Alfred_Wegener)  
[http://en.wikipedia.org/wiki/Isaac\\_Newton](http://en.wikipedia.org/wiki/Isaac_Newton)