

Fifth Grade

Ecosystems – Habitats and Food Webs

Indicator(s): Ls5.1. Describe the role of producers in the transfer of energy entering ecosystems as sunlight to chemical energy through photosynthesis. LS 5.2 Explain how almost all kinds of animals' food can be traced back to plants. **LS5.3 Trace the organization of simple food chains and webs (e.g. producers, herbivores, carnivores, omnivores, and decomposers).**

I can...

- 1. Define producer, herbivore, carnivore, omnivore, and decomposer.
- 2. Define photosynthesis.
- 3. Describe how producers use photosynthesis to transfer energy.
- 4. Trace the energy flow of food webs and food chains.
- 5. Create a food chain and food web.
- 6. Predict changes in the food chain if a producer, a consumer or a decomposer is removed or added.

Ecosystems – Habitats and Food Webs

Indicator(s): **LS 5.4 Summarize that organisms can survive only in ecosystems in which their needs can be met (e.g. food, water, shelter, air, carrying capacity, and waste disposal). The world has different ecosystems and distinct ecosystems support the lives of different types of organisms.** Ls5.5. Support how an organism's patterns of behavior are related to the nature of that organism's ecosystem, including the kinds and numbers of other organisms present, the availability of food and resources, and the changing physical characteristics of the ecosystem.

I can...

- 1. Define ecosystem, biotic (living), and abiotic (nonliving) factors.
- 2. Recognize and research different ecosystems and identify the living and nonliving factors in each.
- 3. Identify why different kinds of life can only live in ecosystems where its needs can be met.
- 4. Explain why the Earth has different ecosystems and how they support different kinds of life.
- 5. Describe how an organism's behavior (what it eats, how many are there, etc...) depends on its ecosystem.
- 6. Explain why an animal could not live in a different ecosystem, e.g. a polar bear in the jungle, a fish in the dessert, a monkey in the alpine, etc.
- 7. Predict how changes in an ecosystem's living and nonliving factors will affect other species or factors.

Ecosystems – Habitats and Food Webs

Indicator(s): Ls6.8. Describe how organisms may interact with one another. **LS 5.6**
Analyze how all organisms, including humans, cause changes in their ecosystems and how these changes can be beneficial, neutral or detrimental (e.g. beaver ponds, earthworms, grasshoppers eating plants, people planting and cutting trees and people introducing a new species).

I can...

- 1. Define organism, habitat, resources (renewable and nonrenewable), beneficial, and detrimental.
- 2. Examine examples of change like beaver ponds, earthworms, grasshoppers eating plants, people planting and cutting trees and people introducing a new species and figure out the changes they cause.
- 3. Design and construct an ecosystem for an animal and observe the changes it makes over a period of time.
- 4. Write weekly about the changes your ecosystem goes through.
- 5. Think of my own examples of how organisms cause changes and decide if the changes are good, no change, or bad (beneficial, neutral, or detrimental).
- 6. Recognize ways humans cause changes in their ecosystems and decide how the changes are good, no change, or bad (beneficial, neutral, or detrimental).
- 7. Analyze cause and effect of human changes and debate pros and cons.

Energy – Forms and transformation

Indicator(s): **PS 7.3 Identify different forms of energy (e.g electrical, mechanical, chemical, thermal, nuclear, light, and acoustic).**

I can...

- 1. Define energy and transformation.
- 2. Describe each form of energy (electrical, mechanical, chemical, thermal, nuclear, light, and acoustic) and differentiate between each.
- 3. Trace energy as it changes from one form to another.

Indicator(s): (Thermal Energy) Ps4.5. Compare ways the temperature of an object can be changed (e.g., rubbing, heating and bending of metal). Ps5.2. Trace how thermal energy can transfer from one object to another by conduction. **PS 5.1 Define temperature as a measure of thermal energy and describe the way it is measured.**

I can...

- 1. Define temperature and heat.
- 2. Describe how temperature is measured and use a thermometer to record temperature in both Fahrenheit and Celsius.
- 3. Compare ways the temperature of an object can be changed (rubbing, heating, and bending of metal).
- 4. Trace how thermal energy can transfer from one object to another by conduction.
- 5. Create a chart of temperatures collected over time and graph the results.

Energy – Forms and transformation

Indicator(s): (Electrical Energy) **PS 5.3 Describe that electrical current in a circuit can produce thermal energy, light, sound and/or magnetic forces. PS 5.4 Trace how electrical current travels by creating a simple electric circuit that will light a bulb.**

I can...

- 1. Describe how a circuit can produce heat, light, sound, and magnetism.
- 2. Explain how electrical current travels through a circuit to light a bulb.
- 3. Create a simple, series, and parallel circuit.
- 4. Create a circuit diagram labeling the four main parts of a circuit (light bulb, battery, wires, and switch).
- 5. Predict if lights will remain lit if bulbs are removed/burn out throughout a series and parallel circuit.

Indicator(s) (Light): PS 5.5 Describe and summarize observations of the transmission, reflection, and reflection of light. PS 8.4 Describe that waves transfer energy.

I can...

- 1. Explain and demonstrate how light travels.
- 2. Describe and demonstrate reflection of light.
- 3. Describe and demonstrate refraction (bending) of light.
- 4. Define transparent, translucent, and opaque.
- 5. Predict and recognize objects that are transparent, translucent, & opaque.
- 6. Design an experiment to determine the amount of light that passes through an object then classify them as transparent, translucent, & opaque.

Energy – Forms and transformation

Indicator(s) (Sound) ****PS 5.6 Describe and summarize observations of the transmission, reflection, and absorption of sound. **Ps5.7. Describe that changing the rate of vibration can vary the pitch of a sound.**

I can...

- 1. Define wavelength, volume, frequency, pitch, resonance, and vibration.
- 2. Investigate and describe that causing vibrations create sound.
- 3. Demonstrate and describe why sound passes through (transmits through) different materials better than others.
- 4. Demonstrate and describe why sound is absorbed by different materials better than others.
- 5. Demonstrate and describe why sound reflects off different materials better than others.
- 6. Create and play a musical instrument from household objects and explain how and why it produces sound.

Space

Indicator(s): **Es5.3. Describe the characteristics of Earth and its orbit about the sun (e.g., three-fourths of Earth's surface is covered by a layer of water [some of it frozen], the entire planet surrounded by a thin blanket of air, elliptical orbit, tilted axis, magnetic field and spherical planet).** **Demonstrate magnetic field lines with iron fillings and relate to Earth.

I can...

- 1. Define orbit, rotation, revolution, atmosphere, and axis.
- 2. Describe the characteristics of the Earth (e.g., three-fourths of Earth's surface is covered by a layer of water [some of it frozen], the entire planet surrounded by a thin blanket of air, elliptical orbit, tilted axis, magnetic field and spherical planet)
- 3. Demonstrate that the Earth has a magnetic field lines using iron fillings.
- 4. Illustrate the Earth emphasizing and labeling its major features, including $\frac{3}{4}$ water, polar ice caps, thin atmosphere, spherical shape, tilted axis, and vegetation).

Space

Indicator(s): **Es5.1. Describe how night and day are caused by Earth's rotation. Explain how the Earth's tilt causes changes in the amount of sunlight at the equator than at the poles and recognize that daylight hours change with the seasons.** **Es8.1. Describe how objects in the solar system are in regular and predictable motions that explain such phenomena as days, years, seasons, eclipses, and moon cycles.**

I can...

- 1. Define poles, equator, day (one rotation on axis), year (one revolution around Sun), eclipse, lunar phase.
- 2. Demonstrate (and illustrate) with a flashlight and globe how day and night are caused as the Earth rotates on its axis.
- 3. Demonstrate how changing the tilt of the Earth changes the amount of sunlight on the Earth's surface.
- 4. Develop a model to represent how seasons are produced by the Earth's tilt as it travels around the Sun throughout the year.
- 5. Predict what the Earth's climate would be like if there was no tilt.
- 6. Demonstrate (and illustrate) a solar and lunar eclipse using a flashlight and balls to represent the moon and/or Earth.
- 7. Observe and record the phases of the moon over the course of a month.
- 8. Explain that the moon does not create its own light and is only visible when sunlight reflects off it.
- 9. Demonstrate and illustrate the changes in the appearance of the moon as it goes around the Earth.

Space

Indicator(s): **Describe characteristics that make the planets unique worlds. **Compare and contrast Earth with other planets in the solar system. Es5.2. Explain that Earth is one of several planets to orbit the sun, and that the moon orbits Earth. Name objects that orbit the sun other than planets (comets and asteroids).

I can...

- 1. Define star, solar system, planet, dwarf planet, moon, asteroids, meteoroids, and comets.
- 2. Illustrate and label the planets and other objects in our solar system.
- 3. Classify planets as either terrestrial (solid surface) or gas giants (gaseous, no surface).
- 4. Present the major features of a planet and contrast it with Earth.

Other Space Indicators:

Es5.4. Explain that stars are like the sun, some being smaller and some larger, but so far away that they look like points of light.

Es8.8. Name and describe tools used to study the universe (e.g., telescopes, probes, satellites and spacecraft).

Resources – Recycling

Indicator(s): Es5.6. Investigate ways Earth's renewable resources (e.g., fresh water, air, wildlife and trees) can be maintained. Es5.5. Explain how the supply of many non-renewable resources is limited and can be extended through reducing, reusing and recycling but cannot be extended indefinitely. Ps6.8. Describe how renewable and nonrenewable energy resources can be managed (e.g., fossil fuels, trees and water). Ps6.5. Explain that the energy found in nonrenewable resources such as fossil fuels (e.g., oil, coal and natural gas) originally came from the sun and may renew slowly over millions of years. Ps6.6. Explain that energy derived from renewable resources such as wind and water is assumed to be available indefinitely.

I can...

- _____ 1. Define nonrenewable and renewable resources, fossil fuels, reduce, reuse, recycle, and re-engineer.
- _____ 2. Explain that the energy found in nonrenewable resources such as fossil fuels (e.g., oil, coal and natural gas) originally came from the sun and may renew slowly over millions of years. Explain that energy derived from renewable resources such as wind and water is assumed to be available indefinitely.
- _____ 3. Classify resources as renewable and nonrenewable.
- _____ 4. Explain how humans can manage their resources such as water, air, wildlife, fossil fuels, and trees in responsible use and conservation programs.
- _____ 5. Provide examples ways that specific resources can be extended through reducing, reusing, and recycling.
- _____ 6. Plan, develop and complete a project that either reduces, reuses or recycles and explain its benefit.

Science and Technology Standards

Benchmark 3-5: Describe how technology affects human life.

ST3.1. Describe how technology can extend human abilities (e.g., to move things and to extend senses).

ST3.2. Describe ways that using technology can have helpful and/or harmful results.

ST3.3. Investigate ways that the results of technology may affect the individual, family and community.

ST4.1. Explain how technology from different areas (e.g., transportation, communication, nutrition, healthcare, agriculture, entertainment and manufacturing) has improved human lives.

ST4.2. Investigate how technology and inventions change to meet peoples' needs and wants.

ST5.1. Investigate positive and negative impacts of human activity and technology on the environment.

Benchmark 3-5: Describe and illustrate the design process.

ST3.4. Use a simple design process to solve a problem (e.g., identify a problem, identify possible solutions and design a solution).

ST3.5. Describe possible solutions to a design problem (e.g., how to hold down paper in the wind).

ST4.3. Describe, illustrate and evaluate the design process used to solve a problem.

ST5.2. Revise an existing design used to solve a problem based on peer review.

ST5.3. Explain how the solution to one problem may create other problems.

Scientific Inquiry Standards

Benchmark 3-5: Develop, design and safely conduct scientific investigations and communicate the results.

SI3.4. Identify and apply science safety procedures.

SI3.6. Communicate scientific findings to others through a variety of methods (e.g., pictures, written, oral and recorded observations).

SI4.3. Develop, design and conduct safe, simple investigations or experiments to answer questions.

- SI4.4. Explain the importance of keeping conditions the same in an experiment.
- SI4.5. Describe how comparisons may not be fair when some conditions are not kept the same between experiments.
- SI4.6. Formulate instructions and communicate data in a manner that allows others to understand and repeat an investigation or experiment.
- SI5.4. Identify one or two variables in a simple experiment.
- SI5.5. Identify potential hazards and/or precautions involved in an investigation.
- SI5.6. Explain why results of an experiment are sometimes different (e.g., because of unexpected differences in what is being investigated, unrealized differences in the methods used or in the circumstances in which the investigation was carried out, and because of errors in observations).

Benchmark 3-5: Safely use appropriate instruments to observe, measure, and collect data when conducting scientific investigations.

- SI 3.1, 4.1. Select the appropriate tools and use relevant safety procedures to measure and record length, weight, volume, temperature and area in metric and English units.
- SI4.3. Develop, design and conduct safe, simple investigations or experiments to answer questions.

SI5.1. Select and safely use the appropriate tools to collect data when conducting investigations and communicating findings to others (e.g., thermometers, timers, balances, spring scales, magnifiers, microscopes and other appropriate tools).

Benchmark 3-5 B: Organize and evaluate observations, measurements, and other data to formulate inferences and conclusions.

- SI3.2. Discuss observations and measurements made by other people.
- SI3.3. Read and interpret simple tables and graphs produced by self/others.
- SI3.5. Record and organize observations (e.g., journals, charts and tables).
- SI4.2. Analyze a series of events and/or simple daily or seasonal cycles, describe the patterns and infer the next likely occurrence.
- SI5.2. Evaluate observations and measurements made by other people and identify reasons for any discrepancies.

SI5.3. Use evidence and observations to explain and communicate the results of investigations.

Scientific Ways of Knowing

Benchmark 3-5 SWKA. Distinguish between fact and opinion and explain how ideas and conclusions change as new knowledge is gained.

SWK4.1. Differentiate fact from opinion and explain that scientists do not rely on claims or conclusions unless they are backed by observations that can be confirmed.

SWK5.1. Summarize how conclusions and ideas change as new knowledge is gained.

Benchmark 3-5 SWKB. Describe different types of investigations and use results and data from investigations to provide the evidence to support explanations and conclusions.

SWK3.1. Describe different kinds of investigations that scientists use depending on the questions they are trying to answer.

SWK4.3. Explain discrepancies in an investigation using evidence to support findings.

SWK5.2. Develop descriptions, explanations and models using evidence to defend/support findings.

SWK5.3. Explain why an experiment must be repeated by different people or at different times or places and yield consistent results before the results are accepted.

SWK5.4. Identify how scientists use different kinds of ongoing investigations depending on the questions they are trying to answer (e.g., observations of things or events in nature, data collection and controlled experiments).

Benchmark 3-5 SWKC. Explain the importance of keeping records of observations and investigations that are accurate and understandable.

SWK3.2. Keep records of investigations and observations and do not change the records that are different from someone else's work.

SWK4.2. Record the results and data from an investigation and make a reasonable explanation.

SWK4.4. Explain why keeping records of observations and investigations is important.

SWK5.5. Keep records of investigations and observations that are understandable weeks or months later.

Benchmark 3-5 SWKD. Explain that men and women of diverse countries and cultures participate in careers in all fields of science.

SWK3.3. Explore through stories how men and women have contributed to the development of science.

SWK3.4. Identify various careers in science.

SWK3.5. Discuss how both men and women find science rewarding as a career and in their everyday lives.

SWK5. 6. Identify a variety of scientific and technological work that people of all ages, backgrounds and groups perform.