K - 6 Science Course of Study

for the

Darke County Schools

(Revised to reflect state standards 9/6/02)

Adopted and Approved by the

Governing Board
of the
Darke County Educational Service Center

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Kindergarten

Inquiry Standards - (the following skills should be embedded in all science lessons and activities)

IS-K-1. Explain that to construct something requires planning, communication, problem solving, and tools.

A. Explore that each kind of **tool** has an intended use, which can be helpful or harmful (e.g., scissors can be used to cut paper but they can also hurt you).

B. Know that each kind of **tool** has a special purpose.

IS-K-2. Ask a testable question and design and conduct a simple investigation to explore a question.

A. Ask "what if" questions.

B. Explore and pursue student directed "what if" questions.

C. Use appropriate safety procedures when completing scientific investigations.

D. Recognize that scientific investigations involve asking open-ended questions (e.g., How, What if).

IS-K-3. Gather and communicate information from careful observations and simple investigation through a variety of methods.

A. Use the five senses to make observations about the natural world.

B. Draw pictures that correctly portray features of the item being described.

C. Recognize that numbers can be used to count any collection of things.

D. Use appropriate **tools** and simple equipment/instruments to safely gather scientific data (e.g., magnifiers and other appropriate tools).

E. Measure the lengths of objects using **non-standard measurement**. (e.g., teddy bear counters, pennies)

F. Make pictographs and then use them to describe observations and draw conclusions.

G. Make new observations when people give different descriptions for the same thing.

H. Recognize that people are more likely to accept your ideas if you can give good reason for them.

I. Demonstrate ways science is practiced by people everyday (children and adults).

Kindergarten

Content Standards

"Life Sciences" formerly "Living Things"

K-1. Distinguish between living and nonliving things.

A. Explore differences between **living** things and **non-living** (never alive) things (e.g., plant, rock).

B. Discover that stories (e.g., cartoons, movies and comics) sometimes give plants and animals **characteristics** they really do not have (e.g., talking flowers).

C. Sort living, nonliving things into groups.

K-2. Investigate and explore living things.

A. Investigate the **habitats** of many different kinds of local plants and animals and some of the ways in which animals depend on plants and each other in our **community**.

B. Describe how plants and animals usually resemble their parents.

C. Investigate variations that exist among individuals of the same kind of plant or animal.

D. Use senses to group living things based on different characteristics.

E. Contribute to the care of plants and/or animals at home or in the classroom.

F. Investigate observable features of plants and animals have that help them live in different kinds of places.

"Earth and Space Sciences" formerly "Earth and Its Environment"

K-3. Observe the basics of weather.

A. Observe and describe day-to-day **weather** changes. (e.g., today is hot, yesterday we had rain)

B. Observe and describe seasonal changes in weather.

K-4. Explore changes that occur around us.

A. Explore that animals and plants sometimes cause changes in their surroundings.

B. Explore that sometimes change is too fast to see and sometimes too slow to see.

K-5. Observe objects in the sky and their properties.

A. **Observe** that the sun can be seen only in the daytime, but the moon can be seen sometimes at night and sometimes during the day.

Kindergarten

"Physical Sciences" formerly "Matter and Motion"

K-6. Discover that many objects are made of parts that have different characteristics.

A. Demonstrate that most things are made of parts. (e.g., toys, chairs)

B. Examine and describe objects according to the **materials** that make up the object.

C. Describe and sort objects by one or more properties. (e.g., size, color, shape)

K-7. Explore how objects move.

A. Investigate ways to change how something is moving (e.g., push, pull)

B. Explore that things can be made to move in many different ways such as straight, zigzag, up and down, round and round, back and forth, or fast and slow.

"Science and People"

K-8. Investigate how weather affects people.

A. Describe how weather affects their everyday lives. (Picking the right clothes to wear on a trip, etc.)

B. Identify ways weather is helpful and harmful to people.

K-9. Explore how we can better take care of our environment.

A. Explain how we care for the air, land and water.

B. Describe the 3-R's (Reduce, reuse and recycle).

C. **Interact** with **living** things and the **environment** in ways that promote respect.

K-10. Identify the importance of safe and healthy lifestyles.

A. Identify important safety measures at home and school.

B. Identify healthy behaviors and lifestyles.

PERFORMANCE OBJECTIVES FOR KINDERGARTEN

1. Given a set of pictures that tell a story, the learner will demonstrate understanding of observable patterns by explaining the meaning and sequence of the pictures.

2. The learner will demonstrate an awareness of changes over time by describing an event or process that he/she has observed.

3. When presented with a new situation, the learner will ask "What if..." and "Why..." questions related to his/her understanding of the scientific concept in the situation.

4. The learner will construct a recognizable simple model of a real object using familiar materials.

5. The learner will describe the subtle differences between routines that have occurred on different days (e.g. meals, traffic, play).

6. Given several similar items which vary in size, the learner will contrast the objects using the terms long/short, big/small and others.

7. The learner will observe and describe familiar patterns and cycles (e.g. day/night, seasons, geometric patterns).

8. Presented with an unfamiliar occurrence or setting, the learner will make accurate observations without exaggeration.

9. Given an object or organism or a facsimile, the learner will be able to describe it in such detail that another learner may identify the object or organism from the description.

First Grade

First Grade

Inquiry and Nature of Science Standards - (the following skills should be embedded in all science lessons and activities)

IS-1- 1. Ask a testable question and design and conduct a simple investigation to explore a question.

A. Ask "what happens when" questions.

B. Explore and pursue student-generated "what if" questions.

C. Use appropriate safety procedures when completing scientific investigations

D. Work in a small group to complete an investigation and then share findings with others.

E. Create individual conclusions about group findings.

F. Use appropriate **tools** and simple equipment/instruments to safely gather scientific data (e.g., magnifiers, timers, simple balances, and other appropriate tools).

G. Discover that when a science investigation is done the same way multiple times, one can expect to get very similar results each time it is performed.

IS-1- 2. Gather and communicate information from careful observations and simple investigation through a variety of methods.

A. Use oral, written and pictorial representation to communicate work.

B. Describe things as accurately as possible and compare their observations with the observations of others.

C. Make estimates to compare familiar lengths, weights, and time intervals.

D. Demonstrate good explanations are based on evidence from investigations and observations.

First Grade

Content Standards

"Life Sciences" formerly "Living Things"

1-1. Explore needs of living things.

A. Explore that organisms, including people, have basic needs which include air, water, food, living space and shelter.

1-2. Differentiate between plants and animals.

A. Recognize similarities and differences between plants and animals.

B. Classify or group plants and animals into groups based on characteristics or attributes such as size, shape, or body color.

1-3. Explore how animals live in their environments.

A. Identify needs of animals.

B. Explore that humans and other animals have parts that help to seek, find, and take in food when it is hungry (e.g., sharp teeth, flat teeth, good nose, sharp vision).

C. Compare and contrast the **habitats** of many different kinds of animals and some of the ways in which animals eat plants or other animals for food and may also use plants (or even other animals) for **shelter** and **nesting**.

1-4. Explore how plants live in their environments.

A. Identify needs of plants.

B. Identify and tell the function of roots, stems and leaves in plants.

C. Compare and contrast the **habitats** of many different kinds of plants and some of the ways in which animals depend on plants and each other.

1-5. Explore the basics of life cycles.

A. Describe what a life cycle is.

B. Explore life cycles of various animals.

C. Explore life cycles of various plants and know that seeds produce plants.

D. Describe how plants and animals look like their parents in many ways.

First Grade

"Earth and Space Sciences" formerly "Earth and Its Environment"

1-6. Explore how organisms change the environment.

A. Explain that all **organisms** cause changes in the **environment** where they live; the changes can be very noticable or slightly noticable, fast or slow. (e.g., tree roots slowly breaking sidewalks, spreading of grass cover slowing soil erosion).

1-7. Investigate resources on the earth.

A. Describe that resources are things that we get from the living (e.g., forests) and nonliving (e.g., fossil fuels) environment. Resources may meet the needs and wants of a population (e.g., families of organisms).

B. Investigate that the supply of many **resources** is limited but they can be extended through careful use, decreased use, **reusing**, and/or **recycling**.

"Physical Sciences" formerly "Matter and Motion"

1-8. Explore the properties of various objects and how they can change.

A. Explore the materials that various objects are made of and their properties.

B. Sort objects using the materials and properties from which the objects are made.

C. Investigate that water can change from a **liquid** or a **solid** or solid to a liquid.

D. Explore changes that greatly change the properties of an object (e.g., burning paper) and changes that leave the properties largely unchanged (e.g., tearing paper).

E. Explore and observe that things can be done to **materials** to change their **properties** (e.g., heating, freezing, mixing, cutting, wetting, **dissolving**, bending, exposing to light).

1-9. Investigate the way objects move.

A. Explore the effects of some objects on other objects, even when the two objects might not touch (e.g., wind, magnets).

B. Investigate a variety of ways of making things move and what causes them to change speed, direction, and/or stop.

1-10. Explore sources of energy.

A. Investigate how the sun is an **energy source** that warms the land, air, and water.

B. Describe that **energy** can be obtained from many sources in many ways (e.g., food, gasoline, **electricity** or batteries).

C. Explore how **energy** makes work (e.g., batteries in a toy, electricity turning fan blades).

First Grade

"Science and People"

1-11. Investigate how people use resources on earth.

A. Explain why people, when building or making something, need to determine what it will be made of and how it will affect other people and the environment.

B. Identify some **materials** that can be saved for **community recycling** projects (e.g., newspapers, glass, and aluminum).

C. Explore ways people use energy to cook their food and warm their homes (e.g., wood, oil, coal, natural gas, **electricity)** .

D. Identify how people can save **energy** by turning things off when they are not using them (e.g., lights and motors) .

E. Explain that food comes from other sources other than the grocery store (e.g., farm crops, farm animals, oceans, lakes and forests)

1-12. Explain that to construct something requires planning, communication, problem solving, and tools.

A. Explore that some kinds of **materials** are better suited than others for making something new (e.g., building materials used by the Three Little Pigs).

B. Explain that when trying to build something or get something to work better, it helps to follow directions and ask someone who has done it before.

C. Investigate that **tools** are used to help make things and some things cannot be made without **tools**.

D. Explore that several steps are usually needed to make things (e.g., building with blocks).

E. Investigate that when parts are put together they can do things that they could not do by themselves (e.g., blocks, gears and wheels).

F. Explain that everybody can do science, invent things, and have scientific ideas, no matter where they live.

1-13. Investigate the various aspects of good health.

A. Explore what must be done to maintain and improve health.

B. Investigate how nutrition is essential for good health.

C. Identify food types on a food pyramid.

D. Explore how diseases are spread and how we can keep from spreading them.

PERFORMANCE OBJECTIVES FOR FIRST GRADE

1. Given a situation in which a physical change is evident, the learner will observe and describe the physical change.

2. The learner will follow a simple set of instructions to construct a useful item (e.g. bird feeder, doorstop).

3. Given a set of familiar objects, the learner will design and describe categories and use them to organize the set.

4. Presented with unfamiliar situations of phenomena, the learner will ask questions related to cause and effect.

5. Given a familiar but unordered sequence of pictures that represent a physical change, the learner will describe the sequence using terms such as before and after.

6. The learner will use a classification system that they have previously developed to classify a new set of items, citing modifications of the systems as necessary.

7. The learner will observe events in which the causes of the effects are not observable (e.g. illness, magnets, respiration rate, static electricity , wind) and ask questions about their effects.

8. Given a simple question regarding natural phenomena, the learner will suggest several places to find information that may lead to answers to the questions.

9. Provided with a suggested familiar organism, the learner will describe or draw a picture of a simple home for the organism and describe its contributions to meeting the needs of the organism.

10. Provided with a familiar object, the learner will describe the potential safe uses of the object.

Second Grade

Inquiry and Nature of Science Standards - (the following skills should be embedded in all science lessons and activities)

IS-2-1. Ask a testable question and design and conduct a simple investigation to explore a question.

A. Ask "how can I/we" questions.

B. Ask "how do you know" questions (not "why" questions) in appropriate situations and attempt to give reasonable answers when others ask questions.

C. Explore and pursue student-generated "how" questions.

D. Use appropriate safety procedures when completing scientific investigations.

E. Use evidence to develop explanations of scientific investigations. (What do you think? How do you know?)

F. Describe that scientific investigations generally work the same way under the same conditions.

IS-2-2. Gather and communicate information from careful observations and simple investigation through a variety of methods.

A. Recognize that explanations are generated in response to observations, events and phenomena.

B. Use appropriate tools and simple equipment/instruments to safely gather scientific data (e.g., magnifiers, non-breakable thermometers, timers, rulers, balances, calculators and other appropriate tools).

C. Measure properties of objects using tools such as rulers, balances and thermometers.

D. Use whole numbers to order, count, identify, measure and describe things and experiences.

E. Share explanations with others to provide opportunities to ask questions, examine evidence and suggest alternative explanations.

F. Communicate orally, pictorially, or written the design process used to make something.

G. Explain why scientists review and ask questions about the results of other scientists' work.

H. Demonstrate that in science it is helpful to work with a team and share findings with others.

Second Grade

Content Standards

"Life Sciences" formerly "Living Things"

2-1. Explore the ways plants, animals and people meet their basic needs for survival.

A. Explain that food is a basic need of plants and animals (e.g., plants need sunlight to make food and to grow, animals eat plants and/or other animals for food, food chain) and is important because it is a source of energy (e.g., energy used to play, ride bicycles, read, etc.).

B. Explain that animals, including people, need air, water, food, living space and shelter, and plants need air, water, nutrients (e.g., minerals), living space and light to survive.

C. Investigate ways plants, animals and people meet their needs of water, food and energy. (e.g., lungs, gills to breathe, mouth parts, etc.)

D. Compare and contrast the activities of common animals (e.g., squirrels, chipmunks, butterflies, bees, ants, bats, and frogs) during summer and winter by describing changes in their **behaviors** and **body covering**.

2-2. Explore and classify animals into specific groups using various characteristics.

A. Compare similarities and differences among individuals of the same kind of plants and animals, including people.

B. Classify animals according to their characteristics (e.g., body coverings and body structure).

- Using obvious features, classify animals as birds and mammals.
- Using obvious features classify animals as reptiles or amphibians.
- Using obvious features classify animals as insects.

2-3. Explore how the environment affects the changes and survival of living things.

A. Compare the habitats of many different kinds of Ohio plants and animals and some of the ways animals depend on plants and each other.

B. Identify the many distinct **environments** that support different kinds of **organisms** and understand that **organisms** can survive only in **environments** that meet their needs.

C. Explain why organisms can survive only in environments that meet their needs (e.g., organisms that once lived on earth have disappeared for different reasons such as natural forces or human-caused effects).

D. Compare Ohio plants during the different seasons by describing changes in their appearance.

Second Grade

"Earth and Space Sciences" formerly "Earth and Its Environment"

2-4. Observe constant and changing patterns of objects in the day and night sky.

A. Recognize that there are more stars in the sky than anyone can easily count.

B. Observe and describe that the sun, moon, and stars all appear to move slowly across the sky.

C. **Observe** and describe that the moon appears a little different every day, but looks the same again about every four weeks.

2-5. Explain how resources found on the earth can be renewable or nonrenewable.

A. Explore what a renewable resource is and give examples found on earth.

B. Explore what a nonrenewable resource is and give examples found on earth.

2-6. Observe, describe, and measure changes in weather, both long term and short term.

A. Observe and describe that some **weather** changes occur from day to day and some changes occur in a repeating seasonal **pattern**.

B. Describe **weather** by measurable quantities, such as temperature and **precipitation**.

"Physical Sciences" formerly "Matter and Motion"

2-7. Explore the properties of sound and light.

A. Know how things make sound. (e.g., rubber bands, tuning fork, strings)

B. Explore and describe sounds (e.g., high, low, soft, loud, pleasant, noisy) produced by **vibrating** objects.

C. Explore with flashlights and shadows that light travels in a straight line until it strikes an object.

Second Grade

"Science and People"

2-8. Explain why people, when building or making something, need to determine what it will be made of and how it will affect other people and the environment.

A. Explain that developing and using technology involves benefits and risks.

B. Investigate why people make new products or invent new ways to meet their individual wants and needs.

C. Predict how building or trying something new might affect other people and the environment.

2-9. Investigate ways people can improve the environment.

A. Describe ways people can help the environment.

B. Explain the 3-R's (reduce, reuse, recycle) and know what can be recycled.

2-10. Describe the various aspects of good health.

A. Identify different substances that can damage the body.

B. Investigate how medicines can be useful in treating sickness, but can harmful if used incorrectly.

C. Describe the importance of getting sleep and rest.

D. Explain the importance of exercise and nutrition.

PERFORMANCE OBJECTIVES FOR SECOND GRADE

1. The learner will observe living organisms (animals or plants) in the classroom and make several predictions related to their behavior of response to a stimulus.

2. Given the results of a simple investigation, the learner will suggest several new questions to investigate.

3. The learner will discuss the basic needs of living things and describe the ways that organisms meet these needs.

4. Given a season of the year or local weather conditions, the learner will predict how different organisms will react.

5. Given an array of comparative scales and objects appropriate to the scales, the learner will contrast objects and suggest improvements in the scale being used.

6. Shown a natural event, the learner will ask several questions related to what happened and what may have caused it to occur.

7. The learner will use an electronic instrument to record and event.

8. The learner will select and use appropriate materials and tools to construct a useful device.

9. The learner will compare the mass, dimension and volume of familiar objects and organisms using nonstandard measurements.

Third Grade

Inquiry and Nature of Science Standards - (the following skills should be embedded in all science lessons and activities)

IS-3-1. Develop, design and safely conduct scientific investigations and use the design process and communicate the results.

A. Select the appropriate tools and use relevant safety procedures to measure and record length and weight in metric and English units.

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

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

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

IS-3-2. Organize and evaluate observations, measurements and other data to formulate inferences and conclusions.

A. Discuss observations and measurements made by other people.

B. Read and interpret simple tables and graphs produced by self/others.

C. Identify and apply science safety procedures.

D. Record and organize observations (e.g., journals, charts, tables).

E. Keep records of investigations and observations and do not change the records that are different from someone elses.

Third Grade

Content Standards

"Life Sciences" formerly "Living Things"

3-1. Describe how animals survive in their environment.

A. Trace how green plants depend on sunlight and all animals depend on plants. Some animals eat plants for food. Other animals eat animals that eat plants (e.g., food chain)

B. Identify common food chains in the local environments.

C. Describe what an adaptation is and identify adaptations of several animals.

D. Relate animal structures to their specific survival functions (e.g., obtaining food, escaping or hiding from enemies).

E. Compare the life cycles of different animals including birth to adulthood, reproduction and death (e.g., egg-tadpole-frog, egg-caterpillar-chrysalis-butterfly). and identify the **characteristics** received from parents that make offspring similar to their parents.

F. Describe how changes in an **organism's habitat** are sometimes **beneficial** to it and sometimes harmful.

G. Identify adaptations made by animal that are due to daily or seasonal changes.

3-2. Compare changes in an organism's ecosystem/habitat that affect its survival.

A. Describe how changes in an organism's habitat are sometimes beneficial and sometimes harmful.

B. Explain what extinction is and that plants and animals can become extinct.

C. List some animals that have become extinct.

D. Observe and explore how fossils provide evidence about animals that lived long ago and the nature of the environment at that time.

E. Use examples to explain that extinct organisms may resemble organisms that are alive today.

Third Grade

"Earth and Space Sicence" formerly "Earth and Its Environment"

3-3. Describe properties and characteristics of the earth and materials on the earth.

A. Compare distinct **properties** of rocks (e.g., color, layering, **texture**).

B. Observe and investigate that rocks are often found in layers.

C. Describe the **composition** of soil (e.g., small pieces of rock and decomposed pieces of plants and animals, and the products of plants and animals)

D. Investigate the properties of soil (e.g., color, texture, capacity to retain water, ability to support plant growth).

E. Investigate that soils are often found in layers and can be different from place to place.

3-4. Explore the basics of how the earth's surface changes.

A. Describe that smaller rocks come from the break down of larger rocks through the actions of plants and **weather**.

B. Explore **erosion** and describe how water and wind cause erosion.

C. Explore **weathering** and describe how freezing can cause weathering.

"Physical Sciences" formerly "Matter and Motion"

3-5. Analyze the forces which directly affect objects and their motion.

A. Describe an objects position by locating it relative to another object or the background.

B. Describe an objects motion by tracing and measuring its position over time.

C. Identify contact/noncontact forces that affect motion of an object (e.g., gravity, magnetism, collision).

D. Predict the changes when an object experiences a force (e.g., a push or pull, weight, friction).

Third Grade

"Science and People"

3-6. Investigate food and nutrition.

A. Investigate how food contains several types of nutrients - protein, carbohydrates, fat, vitamins and minerals.

B. Evaluate the nutritional fact labels and ingredient list for food items and tell whether a food is high or low in various nutrients.

C. Identify a well-balanced food item or diet according to the official food guide pyramid.

D. Define calories and understand how an individuals activity influences their calorie needs.

3-7. Identify and describe the major systems in the human body.

A. Identify major systems in the human body.

B. List at least two major parts of the human body systems and describe their functions.

C. Explain how pollution, nutrition and different substances can affect the health of the body and its systems.

3-8. Investigate careers and contributions in science.

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

B. Identify various careers in science.

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

3-9. Describe how technology affects human life.

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

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

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

PERFORMANCE OBJECTIVES FOR THIRD GRADE

1. The learner will decide what information is necessary to make a simple weather report, collect the information and make the report.

2. Given a collection of evidence resulting from an event, the learner will seek clarification and propose an explanation for the event.

3. The learner will describe an episode (e.g. storms, rolling and bouncing balls, hatching eggs, falling maple copters) in terms of its duration and timing.

4. The learner will user whole numbers, counts and measures to compare and classify familiar objects.

5. Given several opportunities to observe, the learner will use both quantitative and qualitative descriptions to explain the attributes and behaviors of an object or organism.

6. The learner will choose a sense-extending device to gather information from observations of an object, event or organism.

7. Given a diverse collection of living and non-living things, the learner will distinguish between living and non-living things and provide justification for this classification.

Fourth Grade

Inquiry and Nature of Science Standards - (the following skills should be embedded in all science lessons and activities)

IS-4-1. Develop, design and safely conduct scientific investigations and communicate the results.

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

B. Explain the importance of keeping conditions the same in an experiment.

C. Describe how comparisons may not be fair when some conditions are not kept the same between experiments.

D. Formulate instructions and communicate data in a manner that allows others to understand and repeat an investigation or experiment.

IS-4-2. Use appropriate instruments safely to observe, measure and collect data when conducting a scientific investigation and organize and evaluate the observations, measurements and other data to formulate inferences and conclusions.

A. Select the appropriate tools and use relevant safety procedures to measure and record length, weight, volume and area in metric and English units.

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

C. Explain discrepancies in an investigation using evidence to support findings.

D. Explain why keeping records of observations and investigations is important.

E. Analyze a series of events and/or simple daily or seasonal cycles, describe the patterns and infer the next likely occurrence.

F. 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.

Fourth Grade

Content Standards

"Life Sciences" formerly "Living Things"

4-1. Investigate plant life cycles and characteristics.

A. Classify common plants according to their **characteristics** (e.g., tree leaves, flowers, seeds, **tubers**, and **bulbs**).

B. Describe the **life cycles** of different plants from **germination**, developing into adults, **reproducing**, and dying.

4-2. Understand the relationship between organisms, traits and the environment.

A. Analyze plant **adaptations** that serve specific **functions**: growth, **survival**, and **reproduction**.

B. Compare howplants differ in their characteristics and sometimes the differences give individuals an advantage in **survival**. (e.g., flower color which attract insects or animals to pollinate them, flower shape to allow certain animals or insects to pollinate them).

C. Analyze plant **adaptations** that serve specific **survival functions** (e.g., protection from enemies, decrease water loss, getting organisms to pollinate the plant, catching food(carnivorous plants)).

D. Identify adaptations made by plants that are due to daily or seasonal changes.

Fourth Grade

"Earth and Space Sicence" formerly "Earth and Its Environment"

4-3. Investigate how the changes on the earth's surface occur.

A. Compare how **waves**, wind, water, and ice shape and reshape the earth's land surface by **eroding** rock and soil in some areas and **depositing** them in other areas.

B. Identify how freezing, thawing, and plant growth reshape the land surface by **weathering** rock.

C. Describe **evidence** of changes on the earth's surface (e.g., volcanoes, earthquakes/cracks/faults, mountain building, **erosion**, **deposition**, and **weathering**).

D. Living organisms contribute to the weathering of rocks and can affect the rate of erosion (e.g., lichens, tree roots).

E. Relate how weather causes erosion and weathering.

4-4. Explain characteristics which make up and affect weather.

A. Explain air surrounds us, takes up space and moves around us as wind.

B. Identify how water exists in the air in different forms (e.g., in clouds and fog as tiny droplets; in rain, snow and hail) and changes from one form to another through various **processes** (e.g., freezing/ **condensation**, **precipitation**, **evaporation**).

C. Analyze how **weather** changes from day to day and over the **seasons**. **Weather** can be described by measurable quantities such as temperature, **wind** direction and **speed**, and **precipitation**.

D. Trace how **weather patterns** generally move from west to east in the United States.

E. Record local **weather** information on a calendar or map and describe changes over a period of time (e.g., temperature, **precipitation** symbols, cloud conditions).

F. Predict the weather pattern or conditions and defend the prediction when given a weather map or description.

Fourth Grade

"Physical Sciences" formerly "Matter and Motion"

4-5. Identify and describe the physical properties of matter in its various states.

A. Explain that all **materials** are composed of fundamental parts that are too small to be seen without magnification.

B. Describe objects by the **properties** of the **materials** from which they are made, and that these **properties** can be used to separate or sort a group of objects or **materials** (e.g., paper, glass, plastic, metal).

C. Explain that **matter** has different **states** (i.e., **solid**, **liquid**, and **gas**) and that each **state** has distinct **physical properties**.

4-6. Compare and contrast the characteristics of simple physical and chemical changes

A. Explain how different **materials** can be made from the same basic substances(e.g., bread, cake, cookies made from flour, sugar), but the **properties** of the new **material** may be different from the original **materials**.

B. Identify **characteristics** of a simple **physical change** (e.g., heating or cooling can change water from one **state** to another).

C. Identify **characteristics** of a simple **chemical change**. When a new **material** is made by combining two or more **materials**, it has chemical **properties** that are different from the original **materials** (e.g., burning paper, rusting steel wool).

Fourth Grade

"Science and People"

4-7. Summarize how technology affects human life.

A. Summarize how agricultural **technology** has improved human lives (e.g., in order to grow well, plants need enough warmth, light, and water, and must be protected from weeds and pests that can harm them).

B. Demonstrate an understanding of areas in which **technology** has improved human lives (e.g., transportation, **communication**, nutrition, sanitation, health care, agriculture, entertainment).

C. Investigate how **technology** and inventions change to meet peoples' needs and wants.

4-8. Describe and illustrate the design process.

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

PERFORMANCE OBJECTIVES FOR FOURTH GRADE

1. Given a repetitive pattern in nature (e.g. sound waves, seasons, phases of the moon, growth rings in a tree), the learner will describe the duration and timing of the pattern.

2. The learner will discuss the impact of human activity in selected natural environments.

3. Given a diverse but familiar set of objects, the learner will prepare a simple key for another learner to use to distinguish between objects in the set.

4. The learner will identify and example of an improbable, illogical event in a selected story and point out contradictions.

5. Given a series of related events, the learner will analyze the series and predict the next likely event.

6. Given a set of counts of objects or observations, the learner will construct a graphic representation and use it to make simple comparisons.

7. The learner will create and follow a simple procedure to carry out an investigation.

8. The learner will propose reasons why observations made by another learner may be different than theirs.

9. Given a collection of working devices (e.g. scissors, shovel, crowbar, wheel, can-opener, bottle-opener), the learner will explain the function of a selected device and comment on its safe use.

Fifth Grade

Inquiry and Nature of Science Standards - (the following skills should be embedded in all science lessons and activities)

IS-5-1. Develop, design and safely conduct scientific investigations and communicate the results.

A. Identify one or two variables in a simple experiment.

B. Identify potential hazards and/or precautions involved in an investigation.

C. 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).

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

IS-5-2. Analyze the evidence and results of scientific investigations.

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

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

C. 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.

D. 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).

E. Evaluate observations and measurements made by other people and identify reasons for any discrepancies.

F. 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, controlled experiments).

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

Fifth Grade

Content Standards

"Life Sciences" formerly "Living Things"

5-1. Understand the components of ecosystems.

A. Describe what an ecosystem is and the differences in the major ecosystems.

B. Summarize that **organisms** can **survive** only in **environments** in which their needs (e.g., food, water, air, and a way to dispose of waste) can be met. The world has different **environments**, and distinct **environments** support the life of different types of **organisms**.

5-2. Investigate principles of food chains and food webs.

A. Explore how **energy** entering **ecosystems** as sunlight is **transferred** to chemical **energy** through **photosynthesis** by **producers**.

B. Explain that **energy** flows through **ecosystems** in one direction from **photosynthetic organisms** to **herbivores** to **carnivores** and **decomposers**.

C. Trace the organization of simple **food chains** and **food webs** (e.g., green plants (**producers**) make their own food with sunlight, water, and air; some animals eat the plants (**herbivores**); some animals eat the animals that eat the plants (**carnivores**), some animals eat plants and animals (**omnivores**), and some **organisms** – primarily, **bacteria, fungi**, worms and some insects – (**decomposers**) eat dead **organisms** or waste **materials**).

D. Analyze food chains and food webs to trace the energy transfers among organisms.

E. Apply knowledge that the sun is the initial source of all energy and predict the effect of less sunlight on earth on the populations of given organisms in an ecosystem and defend the prediction.

F. Explain how **matter** is **transferred** from one **organism** to another repeatedly and between **organisms** and their physical **environment**. As in all **systems**, the total amount of **matter** remains constant, even through its form and location change.

5-3. Compare and contrast changes in an organism's environment/habitat that affect its survival.

A. Summarize that **organisms** can **survive** only in **environments** in which their needs (e.g., food, water, air, and a way to dispose of waste) can be met. The world has different **environments**, and distinct **environments** support the life of different types of **organisms**.

B. Explain how **population**s have limits to growth determined by space, food, and number of **predators** (e.g., carrying capacity).

C. Support how an **organism's patterns** of **behavior** are related to the nature of that **organism's environment**, including the kinds and numbers of other **organisms** present, the availability of food and **resources**, and the changing physical **characteristics** of the **environment**.

D. Analyze how all **organisms** (including humans) cause changes in their **environments**, and these changes can be **beneficial** or **detrimental**. (e.g., beaver ponds, earthworm burrows, squirrels hiding nuts, grasshoppers eating all plants, caterpillars eating too many leaves in a forest).

Fifth Grade

"Earth and Space Sicence" formerly "Earth and Its Environment"

5-4. Understand the make up and patterns involved in the solar system.

A. Describe how night and day are caused by the earth's **rotation**.

B. Explain how earth is one of several **planets** that **orbit** the sun and the moon **orbits** the earth.

C. Describe how shadows change with the position of the sun in the sky during the day.

D. Describe the **characteristics** of **planet** earth (e.g., third **planet** from the sun, three-fourths covered by a relatively thin layer of water "some of it frozen" and the entire **planet** surrounded by a thin blanket of air).

5-5. Identify and analyze the benefits and limits of the earth's resources.

A. Recognize that the supply of many **resources** is limited. If used, **resources** can be extended through **reducing**, reusing, and **recycling**.

B. Analyze how the benefits of the earth's **resources** (e.g., fresh water, air, soil and trees) can be reduced by using them wastefully or by deliberately or inadvertently destroying them (e.g., cleaning up polluted air water or soil or restoring depleted soil, forests, or fishing grounds can be very difficult and costly).

C. Describe how people try to conserve **energy** in order to slow down the depletion of **energy** sources, save money, and/or reduce **pollution**.

D. Explain how it is sometimes possible to use **materials** in discarded products to make new products, but knows that **materials** differ widely in the ease with which they can be **recycled**.

Fifth Grade

"Physical Sciences" formerly "Matter and Motion"

5-6. Summarize the ways temperature differences can be produced and thermal energy transferred.

A. Compare the ways the temperature of an object can be raised (e.g., rubbing, burning, bending, and cutting).

B. Trace how **thermal energy** can **transfer** from one object to another by **conduction**.

C. Support the fact that a warmer object can warm a cooler one by contact or at a distance.

D. Explain how some **materials conduct** heat much better than others (e.g., metal, wood, glass) do.

5-7. Trace how electrical energy flows by creating a simple electrical circuit and describe how the electrical energy can be transformed into other forms of energy.

A. Trace how **electrical current** flows by creating a simple electric **circuit** that will light two bulbs.

B. Describe how **electrical energy** in a circuit can produce light, sound, heat or magnetic force .

5-8. Describe the properties of light and sound energy

A. Explain that light and sound can be **reflected**, **refracted**, or **absorbed**.

B. Describe **observations** of the bending of light (e.g., a prism, a glass of water).

C. Describe how changing the rate of **vibration** can vary the **pitch** of the sound.

D. Explore how light and sound **energy** travel in **waves**.

Fifth Grade

“Science and People”

5-9. Describe and illustrate the design process.

A. Describe, illustrate, and assess the **design process** (identifying the problem, designing a solution, and evaluating a **design**).

5-10. Debate positive and negative impacts of human activity and technology on the environment.

A. Debate positive and negative impacts of human activity on the **environment**

5-11. Identify essentials of good health.

A. Identify essentials for humans to live a healthy life.

PERFORMANCE OBJECTIVES FOR FIFTH GRADE

1. Using sense-extending devices, the learner will describe an object of organism not easily observed in terms of its attributes and behaviors.

2. Given data from a simple mechanical or biological system, the learner will describe how changing one component impacts the other components of the system.

3. The learner will propose "What if ..." questions regarding a simple physical change, design and test their questions, and cite and justify appropriate safety precautions.

4. The learner will choose a simple technological device and describe the advantages and disadvantages to the user.

5. Given a question about a natural phenomena, the learner will propose several sources of information that may assist in addressing questions about the phenomenon.

6. The learner will choose and use appropriate tools to assemble and disassemble a simple mechanism of model.

7. Given data on the performance of consumer products, the learner will choose and defend their choice of a product based on performance data.

8. The learner will trace the transmission, transformation and conservation of various forms of energy in a simple system (e.g. food web, bicycle, kite, scissors, human body).

Sixth Grade

Abilities Standards (Apply the following to each content standard at appropriate grade levels)

AS-6-1. Develop abilities in science.

A. Think clearly and solve problems about science (question, classify, decide, estimate, solve, compare).

B. Talk and write clearly about science (present, persuade, collaborate, explain, conclude).

C. Make careful plans and use them (brainstorm, research, plan, organize, persist).

AS-6-2. Be able to apply science knowledge and skills to a variety of purposes.

A. Be able to solve problems using scientific reasoning (research, hypothesize, experiment, collect data, form conclusions).

B. Be able to conduct research (field research, library research, experimentation).

C. Be able to use scientific equipment appropriately (safely, effectively, efficiently, accurately).

D1. Possess technical skills - listen/dictate/write/present: instructions, chart, report, proposal, letter of request, summary.

D2. Possess technical skills - technology: word processing, Internet, AV production.

Sixth Grade

Content Standards

"Living Things"

6-1. Understand the importance of cells in living organisms.

A. Recognize that all living organisms are made up of cells.

B. Explain the life functions carried out by cells and all organisms.

C. Describe the major cell parts and their functions.

D. Know how some cells are specialized for specific functions in the body.

E. Describe how cells are organized into tissues, organs and organ systems to carry out the life processes.

6-2. Understand reproduction and the passing of genetic material.

A. Explain the differences between sexual and asexual reproduction.

B. Know the make up of genetic material.

C. Know what genes are and how they control traits.

D. Know how genetic material is passed and carried from individual to individual by heredity.

E. Investigate and debate the pros and cons of biotechnology.

6-3. Understand the relationship between traits, adaptations and survival.

A. Understand how certain traits can become adaptations.

B. Understand what biological evolution involves.

C. Understand how biological evolution results in the diversity of species gradually over time.

D. Know that extinction occurs when the environment changes and the adaptations are not sufficient to survive the change.

E. Explore how fossils indicate that many organisms that lived long ago are extinct.

Sixth Grade

"Earth and Its Environment"

6-4. Understand the theory of plate tectonics and its impact on the earth's surface.

A. Understand the make up of the earth's crust and the theory of plate tectonics.

B. Explain the cause of earthquakes and the scale used to measure their strength.

C. Explain the cause of volcanic activity and its impact on the earth.

D. Describe the relationship between earthquakes and volcanoes.

6-5. Know the forces which shape the earth's surface.

A. Recognize the forces which build up and tear down the features of the earth.

B. Know changes in the solid earth that form rock (rock cycle) and soil.

6-6. Understand the importance of the sun for earth's many phenomena.

A. Know how the sun is the major source of energy for the growth of plants.

B. Know how the sun is the major source of energy for wind and ocean currents.

C. Know how the sun is the major source of energy for the water cycle.

Sixth Grade

"Matter and Motion"

6-7. Understand the laws of motion.

A. Describe on a practical level, Newton's laws of motion.

B. Use knowledge of Newton's laws of motion to predict the motion of objects thrown or released by a system in motion.

C. Identify the apparent forces that result in a change of motion of an object.

D. Describe the affect of gravity and friction on the motion of objects.

6-8. Understand the properties of matter.

A. Recognize that all matter occupies space and is composed of small particles called atoms.

B. Recognize that all matter is composed of a combination of materials called elements which are composed of like atoms.

C. Know the chemical and physical properties of matter.

D. Describe properties of matter such as density, boiling point, solubility, etc..

E. Be familiar with the periodic table of elements.

6-9. Understand the principles of physical and chemical changes.

A. Describe physical and chemical changes of matter and identify the differences between the two.

B. Apply the laws of conservation of matter and energy to a given system involving a chemical change (e.g. a candle being lit and burned).

C. Know how chemical reactions occur.

Sixth Grade

"Science and People"

6-10. Understand the effects of humans on the environment.

A. Know the effects of humans on the limited resources of earth and how we can extend their supply.

B. Debate whether a specific human activity (e.g. strip mining, farming, etc.) is helping or harming the earth's ecosystems and provide supporting evidence for the position.

6-11. Apply science and technology to everyday situations and problems.

A. Understand and identify the ways science and technology have changed food storage and preparation down through history. (refrigeration, cooking techniques, packaging, etc.)

B. Design a new tool or device to perform a unique task and utilize proper design principles and ideas.

6-12. Know essentials and benefits of good diet.

A. Be able to understand and use nutritional information on food packages.

B. Understand the relationships of food calories and energy needs

C. Know a diet low in fat, saturated fat and cholesterol can reduce the risk of heart disease, obesity and types of cancer.

PERFORMANCE OBJECTIVES FOR SIXTH GRADE

1. The learner will predict and test the effects of influences on the motion of selected objects (e.g. rubber band-powered vehicles, hygrometers, sailboats, tropisms, flowing water).

2. Provided with examples of patterns in natural phenomena (e.g. period of a pendulum, variation in populations, the spread of disease, Logo fractal, position of the moon, reflection, refraction, interference patterns), the learner will design and perform an investigation to document the constancy of the pattern.

3. The learner will identify a community problem (e.g. recycling, water quality, animal and plant overpopulation and competition, extinction, urban growth, soil conservation, transportation issues, physical recreation opportunities) and propose a solution for that problem using information collected to support their proposal.

4. Given a collection of data presented in tabular or graphic form, the learner will make inferences to explain the events or phenomena from which the data was collected.

5. Given the observations of witnesses and related evidence, the learner will identify the impact of different perspectives on explanations of an event.

6. Presented with different versions of a historical event in science or technology, the learner will discuss the impact of scientific and social context at the time of the event.

7. Given a set of data and a set of attendant conclusions, the learner will verify or refute the accuracy of the conclusions.