

# Third Grade

## Essential Questions by Unit

Strand	Unit	Essential Questions
Strand 1 <b>Matter &amp; Energy</b>	Earth Materials: Rocks	<b>What makes up our world?</b>
Strand 2 <b>Force &amp; Motion</b>	Forces and Motion	<b>How and why do objects move?</b>
Strand 3 <b>Living Systems</b>	Plants  Changes in the Earth's Surface	<b>What does it mean to be alive?</b> <b>What is necessary for life?</b> <b>How can living things be so different yet be so alike?</b>
Strand 4 <b>Ecology</b>	Food Chains	<b>How connected are all living things?</b> <b>Where does energy go?</b>
Strand 5 <b>Earth Systems</b>	Earth Materials: Rocks  Changes in the Earth's Surface	<b>How does the earth change?</b> <b>What is my impact on the world?</b>
Strand 6 <b>Universe</b>		
Strand 7 <b>Scientific Inquiry</b>	Inquiry	<b>What type of questions can science answer?</b> <b>How can I investigate my ideas about nature?</b>
Strand 8 <b>Science, Technology &amp; Human Activity</b>	Science, Technology & Human Activity	<b>How does science impact our life?</b>

# Third Grade Level Expectations

## **Strand 1: Properties and Principles of Matter and Energy**

### **1. Changes in properties and states of matter provide evidence of the atomic theory of matter**

#### **A. Objects, and the materials they are made of, have properties that can be used to describe and classify them**

##### *Scope and Sequence – Earth Materials: Rocks*

- Describe and compare the physical properties of objects by using simple tools (i.e., thermometer, magnifier, centimeter ruler, balance, magnet)
- Classify objects as “one kind of material” or a mixture

#### **B. Properties of mixtures depend upon the concentrations, properties, and interactions of particles**

##### *Scope and Sequence – Earth Materials: Rocks*

- Observe and describe how mixtures are made by combining solids
- Describe ways to separate the components of a mixture by their physical properties (e.g., sorting, screening)

## **Strand 2: Properties and Principles of Force and Motion**

### **2. Forces affect motion**

#### **A. Forces are classified as either contact (pushes, pulls, friction, buoyancy) or non-contact forces (gravity, magnetism), that can be described in terms of direction and magnitude**

##### *Scope and Sequence – Forces and Motion*

- Recognize magnets attract and repel each other and certain materials
- Describe magnetism as a force that can push or pull other objects without touching them
- Measure (using non-standard units) and compare the force (i.e., push or pull) required to overcome friction and move an object over different surfaces (i.e., rough, smooth)

#### **B. Every object exerts a gravitational force on every other object**

##### *Scope and Sequence – Forces and Motion*

- Describe Earth’s gravity as a force that pulls objects on or near the Earth toward the Earth without touching the object

#### **D. Newton’s Laws of Motion explain the interaction of mass and forces, and are used to predict changes in motion**

##### *Scope and Sequence – Forces and Motion*

- Describe the direction and amount of force (i.e., direction of push or pull, strong/weak push or pull) needed to change an object’s motion (i.e., faster/slower, change in direction)
- Describe and compare the distances traveled by heavier/lighter objects after applying the same amount of force (i.e., push or pull) in the same direction
- Describe and compare the distances traveled by objects with the same mass after applying different amounts of force (i.e., push or pull) in the same direction

#### **F. Simple machines (levers, inclined planes, wheel and axle, pulleys) affect the force applied to an object and/or direction of movement as work is done**

##### *Scope and Sequence – Forces and Motion*

- Compare and describe the amount of force (i.e., more, less, or same push or pull) needed to raise an object to a given height, with or without using inclined planes (ramps) of different slopes
- Compare and describe the amount of force (i.e., more, less, or same push or pull) needed to raise an object to a given height, with or without using levers
- Apply the use of an inclined plane (ramp) and/or lever to different real life situations in which objects are raised

## **Strand 3: Characteristics and Interactions of Living Organisms**

### **1. There is a fundamental unity underlying the diversity of all living organisms**

#### **A. Organisms have basic needs for survival**

##### *Scope and Sequence – Plants*

- Describe the basic needs of most plants (i.e., air, water, light, nutrients, temperature)

#### **B. Organisms progress through life cycles unique to different types of organisms**

##### *Scope and Sequence – Plants*

- Recognize plants progress through life cycles of seed germination, growth and development, reproduction, and death
- Sequence and describe the stages in the life cycle of a flowering plant

#### **D. Plants and animals have different structures that serve similar functions necessary for the survival of the organism**

##### *Scope and Sequence – Plants*

- Identify the major organs (roots, stems, flowers, leaves) and their functions in vascular plants (e.g., absorption, transport, reproduction) (Do NOT assess the term vascular)

### **2. Living organisms carry out life processes in order to survive**

#### **C. Complex multicellular organisms have systems that interact to carry out life processes through physical and chemical means**

##### *Scope and Sequence – Plants*

- Illustrate and trace the path of water and nutrients as they move through the transport system of a plant

### **3. There is a genetic basis for the transfer of biological characteristics from one generation to the next through reproductive processes**

#### **A. Evidence for the nature and rates of evolution can be found in anatomical and molecular characteristics of organisms and in the fossil record**

##### *Scope and Sequence – Changes in the Earth’s Surface*

- Compare and contrast common fossils found in Missouri (i.e., trilobites, ferns, crinoids, gastropods, bivalves, fish, mastodons) to organisms present on Earth today

**D. There is heritable variation within every species of organism**

*Scope and Sequence – Plants*

- Identify and relate the similarities and differences between plants and their offspring (i.e., seedlings)

## **Strand 4: Changes in Ecosystems and Interactions of Organisms with their Environments**

### **2. Matter and energy flow through an ecosystem**

**A. As energy flows through the ecosystem, all organisms capture a portion of that energy and transform it to a form they can use**

*Scope and Sequence – Food Chains*

- Identify sunlight as the primary source of energy plants use to produce their own food
- Classify populations of organisms as producers or consumers by the role they serve in the ecosystem
- Sequence the flow of energy through a food chain beginning with the Sun
- Predict the possible effects of removing an organism from a food chain

## **Strand 5: Process and Interactions of the Earth's Systems**

### **1. Earth's systems (geosphere, atmosphere, and hydrosphere) have common components and unique structures**

**A. The Earth's crust is composed of various materials, including soil, minerals, and rocks, with characteristic properties**

*Scope and Sequence – Earth Materials: Rocks*

- Observe and describe the physical properties of rocks (e.g., size, shape, color, presence of fossils)

*Scope and Sequence – Changes in the Earth's Surface*

- Identify and describe the components of soil (e.g., plant roots and debris, bacteria, fungi, worms, types of rock) and its properties (e.g., odor, color, resistance to erosion, texture, fertility, relative grain size, absorption rate)
- Compare the physical properties (i.e., size, shape, color, texture, layering, presence of fossils) of rocks (mixtures of different Earth materials, each with observable physical properties)

### **2. Earth's Systems (geosphere, atmosphere, and hydrosphere) interact with one another as they undergo change by common processes**

**A. The Earth's materials and surface features are changed through a variety of external processes**

*Scope and Sequence – Changes in the Earth's Surface*

- Observe and describe the breakdown of plant and animal material into soil through decomposition processes (i.e., decay, rotting, composting, digestion)
- Identify the major landforms on Earth (i.e., mountains, plains, oceans, river valleys, coastlines, canyons)
- Describe how weathering agents (e.g., water, chemicals, temperature, wind, plants) cause surface changes that create and/or change Earth's surface materials and/or landforms
- Describe how erosional processes (i.e., action of gravity, waves, wind, rivers, glaciers) cause surface changes that create and/or change Earth's surface materials and/or landforms

**F. The Earth's materials and surface features are changed through a variety of external processes**

*Scope and Sequence – Earth Materials: Rocks*

- Observe and recognize examples of slow changes in the Earth's surface and surface materials (e.g., rock, soil layers) due to processes such as decay (rotting), freezing, thawing, breaking, or wearing away by running water or wind

### **3. Human activity is dependent upon and affects Earth's resources and systems**

**A. Earth's materials are limited natural resources affected by human activity**

*Scope and Sequence – Earth Materials: Rocks*

- Observe and describe ways humans use Earth's materials (e.g., soil, rocks) in daily life

*Scope and Sequence – Changes in the Earth's Surface*

- Identify the ways humans affect the erosion and deposition of Earth's materials (e.g., clearing of land, planting vegetation, paving land, construction of new buildings)
- Propose ways to solve simple environmental problems (e.g., recycling, composting, ways to decrease soil erosion) that result from human activity

## **Strand 7: Scientific Inquiry**

### **1. Science understanding is developed through the use of science process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking**

**A. Scientific inquiry includes the ability of students to formulate a testable question and explanation, and to select appropriate investigative methods in order to obtain evidence relevant to the explanation**

*Scope and Sequence – All Units*

- Pose questions about objects, materials, organisms, and events in the environment
- Plan and conduct a fair test to answer a question

**B. Scientific inquiry relies upon gathering evidence from qualitative and quantitative observations**

*Scope and Sequence – All Units*

- Make qualitative observations using the five senses
- Make observations using simple tools and equipment (e.g., hand lenses, magnets, thermometers, metric rulers, balances, graduated cylinders)
- Measure length to the nearest centimeter, mass using grams, temperature using degrees Celsius, volume using liters
- Compare amounts/measurements
- Judge whether measurements and computation of quantities are reasonable

### **C. Evidence is used to formulate explanations**

#### *Scope and Sequence - All Units*

Use quantitative and qualitative data as support for reasonable explanations

- a. Use data as support for observed patterns and relationships, and to make predictions to be tested

### **D. Scientific inquiry includes evaluation of explanations (hypotheses, laws, theories) in light of scientific principles (understandings)**

#### *Scope and Sequence - All Units*

- a. Evaluate the reasonableness of an explanation
- b. Analyze whether evidence supports proposed explanations

### **E. The nature of science relies upon communication of results and justification of explanations**

#### *Scope and Sequence - All Units*

- a. Communicate simple procedures and results of investigations and explanations through:
  - ⇒ oral presentations
  - ⇒ drawings and maps
  - ⇒ data tables
  - ⇒ graphs (bar, single line, pictograph)
  - ⇒ writings

## **Strand 8: Impact of Science, Technology and Human Activity**

### **1. The nature of technology can advance, and is advanced by, science as it seeks to apply scientific knowledge in ways that meet human needs**

#### **A. Designed objects are used to do things better or more easily and to do some things that could not otherwise be done at all**

##### *Scope and Sequence – Earth Materials: Rocks*

- a. Recognize some objects or materials (e.g., Sun, fire, ice, snow) occur in nature (natural objects); others (e.g., stoves, refrigerators, bulbs, candles, lanterns) have been designed and made by people to solve human problems and enhance the quality of life (manmade objects)

#### **B. Advances in technology often result in improved data collection and an increase in scientific information**

##### *Scope and Sequence – Forces and Motion*

- a. Describe how new technologies have helped scientists make better observations and measurements for investigations (e.g., telescopes, magnifiers, balances, microscopes, computers, stethoscopes, thermometers)

### **2. Historical and cultural perspectives of scientific explanations help to improve understanding of the nature of science and how science knowledge and technology evolve over time**

#### **A. People of different gender and ethnicity have contributed to scientific discoveries and the invention of technological innovations**

##### *Scope and Sequence – All Units*

- a. Research biographical information about various scientists and inventors from different gender and ethnic backgrounds, and describe how their work contributed to science and technology (Assess Locally)

### **3. Science and technology affect, and are affected by, society**

#### **A. People, alone or in groups, are always making discoveries about nature and inventing new ways to solve problems and get work done**

##### *Scope and Sequence - All Units*

- a. Identify a question that was asked, or could be asked, or a problem that needed to be solved when given a brief scenario (fiction or nonfiction of people working alone or in groups solving everyday problems or learning through discovery)
- b. Work with a group to solve a problem, giving due credit to the ideas and contributions of each group member (Assess Locally)