

Second Grade Essential Questions by Unit

Strand	Unit	Essential Questions
Strand 1 Matter & Energy	Investigating States of Matter Forms of Energy: Sound	What causes change in our physical world? How does energy move?
Strand 2 Force & Motion		
Strand 3 Living Systems	Life Cycles of Animals	What does it mean to be alive? How can living things be so different yet be so alike?
Strand 4 Ecology		
Strand 5 Earth Systems	Observing Water and Weather	What causes change in our physical world? How are parts of Earth (land, air and water) related?
Strand 6 Universe		
Strand 7 Scientific Inquiry	Inquiry	How can I investigate my ideas about nature?
Strand 8 Science, Technology & Human Activity	Science, Technology & Human Activity	How does science impact our life?

Second 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

D. Physical changes in the state of matter that result from thermal changes can be explained by the Kinetic Theory of Matter

Scope and Sequence – Investigating States of Matter

- Compare the observable physical properties of solids, liquids, or gases (air) (i.e., visible vs. invisible, changes in shape, changes in the amount of space occupied)
- Identify everyday objects/substances as solid, liquid, or gas (e.g., air, water)
- Recognize water evaporates (liquid water changes into a gas as it moves into the air)
- Measure and compare the temperature of water when it exists as a solid to its temperature when it exists as a liquid
- Investigate and recognize water can change from a liquid to a solid (freeze), and back again to a liquid (melt), as the result of temperature changes
- Describe the changes in the physical properties of water (i.e., shape, volume) when frozen or melted
- Predict and investigate the effect of heat energy (i.e., change in temperature, melting, evaporation) on objects and materials

2. Energy has a source, can be transferred, and can be transformed into various forms but is conserved between and within systems

A. Forms of energy have a source, a means of transfer (work and heat), and a receiver

Scope and Sequence – Investigating States of Matter

- Identify sources of thermal energy (e.g., Sun, stove, fire, body) that can cause solids to change to liquids, and liquids to change to gas

Scope and Sequence – Properties of Matter: Mass and Temperature

- Identify the source of energy that causes an increase in the temperature of an object (e.g., Sun, stove, flame, light bulb)
- Compare the temperature of hot and cold objects using a simple thermometer
- Describe the change in temperature of an object as warmer or cooler

Scope and Sequence – Forms of Energy: Sound

- Recognize that sound travels through different mediums (i.e., air, water, solids)
- Describe different ways to change the pitch of a sound (i.e., changes in size, such as length or thickness, and in tightness/tension of the source)
- Describe how the ear serves as a receiver of sound (i.e., sound vibrates eardrum)

Strand 3: Characteristics and Interactions of Living Organisms

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

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

Scope and Sequence – Life Cycles of Animals

- Recognize that animals progress through life cycles of birth, growth and development, reproduction, and death
- Record observations on the life cycle of different animals (e.g., butterfly, frog, chicken)
- Sequence the stages in the life cycle of animals (i.e., butterfly, frog, chicken)

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

D. There is heritable variation within every species of organism

Scope and Sequence – Life Cycles of Animals

- Identify and relate the similarities and differences between animal parents and their offspring
- Recognize similarities and differences among multiple offspring of an animal parent

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

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

F. Constantly changing properties of the atmosphere occur in patterns which are described as weather

Scope and Sequence – Observing Water and Weather

- Observe, measure, record weather data throughout the year (i.e., cloud cover, temperature, precipitation, wind speed) by using thermometers, rain gauges, wind socks
- Compare temperatures in different locations (e.g., inside, outside, in the sun, in the shade)
- Compare weather data observed at different times throughout the year (e.g., hot vs. cold, cloudy vs. clear, types of precipitation, windy vs. calm)
- Recognize patterns indicating relationships between observed weather data and weather phenomena (e.g., temperature and types of precipitation, clouds and amounts of precipitation)

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 – Observing Water and Weather

- Observe and describe ways water, both as a solid and liquid, is used in every day activities at different times of the year (e.g., bathe, drink, make ice cubes, build snowmen, cook, swim)

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

- a. Pose questions about objects, materials, organisms, and events in the environment
- b. Plan and conduct a simple investigation (fair test) to answer a question

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

Scope and Sequence - All Units

- a. Make qualitative observations using the five senses
- b. Make observations using simple tools and equipment (e.g., magnifiers/hand lenses, magnets, equal arm balances, thermometers)
- c. Measure length, mass, and temperature using standard and non-standard units
- d. Compare amounts/measurements

C. Evidence is used to formulate explanations

Scope and Sequence - All Units

- a. Use observations as support for reasonable explanations
- b. Use observations to describe relationships and patterns 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. Compare explanations with prior knowledge

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, 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 – Forms of Energy: Sound

- a. Design and construct a musical instrument using materials (e.g., cardboard, wood, plastic, metal) and/or existing objects (e.g., toy wheels, gears, boxes, sticks) that can be used to perform a task (Assess Locally)

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

Scope and Sequence – Forms of Energy: Sound/ Weather

- a. Describe how tools have helped scientists make better observations, measurements, or equipment for investigations (e.g., magnifiers, balances, stethoscopes, thermometers)

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 individuals 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)