

## Grades K – 2 Science Stems and Expectations

### Earth and Space Science

**ESS1 - The Earth and Earth materials, as we know them today, have developed over long periods of time, through constant change processes.**

1. ATMOSPHERE, CLIMATE, & WEATHER
    - 1) Recognize that weather conditions change frequently, and that weather patterns change over the seasons.
    - 2) Describe and compare weather using observations and measurements of local weather conditions.
  2. COMPOSITION AND FEATURES OF EARTH MATERIALS
    - 1) Recognize that solid rocks, soils, and water in its liquid and solid states can be found on the Earth's surface.
    - 2) Use observable properties, such as color and texture, to classify and organize rocks and minerals.
    - 3) Recognize that Earth materials have a variety of properties, including size, shape, color and texture.
  3. FOSSILS  
*None at this grade span.*
  4. OBSERVATION OF EARTH FROM SPACE  
*None at this grade span.*
  5. PROCESSES AND RATES OF CHANGE OF THE EARTH'S SURFACE
    - 1) Recognize that some changes are too slow or too fast to be easily observed.
  6. ROCK CYCLE
    - 1) Explain that large rocks can be broken down into smaller rocks.
    - 2) Describe rocks and soils in terms of their physical properties.
  7. WATER AND THE EARTH'S SURFACE
    - 1) Recognize that water can be a liquid or a solid, and explain that it can be made to change from one state to the other, but the amount (mass) of water always remains the same in either state.
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**ESS2 - The Earth is part of a solar system, made up of distinct parts, which have temporal and spatial interrelationships.**

1. THE EARTH, SUN AND MOON
  - 1) Recognize the basic patterns of the Sun, including its appearance during the daytime, and how its position in the sky changes through the seasons.
  - 2) Recognize the basic patterns of the Moon, including its appearance sometimes at night and sometimes during the day, and how it appears to change shape through the month.

2. ENERGY

- 1) Recognize that the light and heat the Sun provides to the Earth is necessary for life

3. SOLAR SYSTEM

*None at this grade span.*

4. VIEW FROM EARTH

- 1) Recognize the Sun, Moon and stars all appear to move slowly across the sky.
  - 2) Recognize that as the position of the Sun changes in relation to the Earth it creates shadows of varying length and direction.
  - 3) Explain that people should not look directly at the Sun because it is dangerous and may cause injury to the eyes.
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**ESS3 - The origin and evolution of galaxies and the universe demonstrate fundamental principles of physical science across vast distances and time.**

1. SIZE AND SCALE

*None at this grade span.*

2. STARS AND GALAXIES

- 1) Recognize there are too many stars to count, and that they are unequal in their brightness.

3. UNIVERSE

*None at this grade span.*

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**ESS4 – The growth of scientific knowledge in Earth Space Science has been advanced through the development of technology and is used (alone or in combination with other sciences) to identify, understand, and solve local and global issues.**

1. DESIGN TECHNOLOGY

*None at this grade span.*

2. TOOLS

- 1) Recognize, and with assistance, safely demonstrate the use of tools to gather data and extend the senses, such as thermometers, hand lens and balances.

3. SOCIAL ISSUES (LOCAL AND GLOBAL)

USES OF EARTH MATERIALS

- 1) Differentiate between natural and man-made materials.

ENVIRONMENTAL CHANGE

- 2) Identify environments that are natural, such as a forest, meadow, or mountains and those that have been built or modified by people, including cities, roads, farms, and houses.
  - 3) Describe actions that can help the environment, such as recycling and proper disposal of waste materials.
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Proficiency Targets for NECAP Assessment are designated as ***boxed and italicized*** on the Grade 3 – 4 Stems and Proficiencies.

4. CAREER TECHNICAL EDUCATION CONNECTIONS

- 1) Recognize that some jobs/careers require knowledge and use of Earth science content and/or skills.
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## Life Science

### LS 1 – All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, & species).

1. CLASSIFICATION

- 1) Differentiate between living and nonliving things and categorize objects in each group using the significant observable characteristics they share, such as color, shape and size.
- 2) Recognize animals and plants as living things and describe how they are alike and different.

2. LIVING THINGS AND ORGANIZATION

- 1) Recognize that plants and animals have features that help them live in different environments.

3. REPRODUCTION

- 1) Recognize that parents and offspring of many species closely resemble one another, and describe the similarities in appearance of given plant and animal families.
  - 2) Recognize that living things have a life cycle or life span, during which they are born, grow, and die.
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### LS 2 – Energy flows and matter recycles through an ecosystem.

1. ENVIRONMENT

- 1) Recognize that living things are found almost everywhere in the world, and that specific types of environments are required to support the many different species of plant and animal life.
- 2) Recognize that animals, including humans, interact with their surroundings using their senses and that different senses provide different kinds of information.
- 3) Recognize that some plants and animals go through changes in appearance when the seasons change.

2. FLOW OF ENERGY AND RECYCLING OF MATERIALS

- 1) Identify the resources that plants and animals need for growth and energy, and describe how their habitat provides these basic needs.

3. RECYCLING OF MATERIALS

*None at this grade span.*

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**LS 3 – Groups of organisms show evidence of change over time (e.g. evolution, natural selection, structures, behaviors, and biochemistry).**

1. CHANGE
    - 1) Recognize that some living things, which lived on Earth long ago, are now extinct, such as dinosaurs, mammoths, giant tree ferns, and horsetail trees.
  2. EVIDENCE OF EVOLUTION
    - 1) Recognize that some plants and animals, which are alive today, are similar to living things, which have become extinct, such as elephants and mammoths.
  3. NATURAL SELECTION
    - 1) Recognize and describe similarities and differences in the appearance and behavior of plants and animals;
    - 2) Recognize there are different species of living things in various places around the world.
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**LS4 – Humans are similar to other species in many ways, and yet are unique among Earth’s life forms.**

1. BEHAVIOR
    - 1) Recognize how living things respond when exposed to helpful and harmful situations.
    - 2) Recognize that humans learn from each other in many different ways, such as listening and speaking, watching and imitating.
    - 3) Recognize that humans can gather different kinds of information about an object by adjusting their proximity to it.
    - 4) Recognize that some of the things humans can do, such as playing games, reading, and writing, must be learned.
  2. DISEASE
    - 1) Recognize that proper nutrition, exercise and rest are all important factors in maintaining good health;
    - 2) Differentiate that humans can spread germs that cause disease.
    - 3) Identify and describe the basic personal hygiene habits for maintaining good health, such as washing one’s hands with soap and water and brushing one’s teeth;
    - 4) Recognize symptoms, such as fever, rashes, coughing and congestion for common illnesses.
  3. HUMAN IDENTITY
    - 1) Recognize similarities and individual differences among people, and that children may closely resemble their parents;
    - 2) Identify the sense organs, including eyes, ears, nose, mouth, and skin, and describe how each can warn an individual about danger.
    - 3) Recognize that two parents, both a father and a mother, are required for human reproduction.
    - 4) Recognize and describe the human life cycle from birth to old age.
    - 5) Recognize that humans need food, water, air, waste removal and a particular range of temperatures in their environment, just as other animals do.
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**LS5 – The growth of scientific knowledge in Life Science has been advanced through the development of technology and is used (alone or in combination with other sciences) to identify, understand and solve local and global issues.**

1. DESIGN TECHNOLOGY
    - 1) Recognize that new products can be made out of natural materials, such as paper from trees, cloth from various plants and animals.
  2. TOOLS
    - 1) Recognize that some tools, such as magnifiers, balances and thermometers, have special uses, and can help gather information and extend the senses.
  3. SOCIAL ISSUES (LOCAL AND GLOBAL)
    - MEDICAL TECHNOLOGIES
      - 1) Recognize that technology is used in medicine to prevent and cure diseases, through vaccinations and medications.
      - 2) Provide examples from personal experience that illustrate how medicine helps humans recover from illness.
    - BIOTECHNOLOGIES  
*None at this grade span.*
  4. CAREER AND TECHNICAL EDUCATION CONNECTIONS
    - 1) Recognize that some jobs/careers require knowledge and use of life science content and/or skills.
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## **Physical Science**

**PS1 – All living and nonliving things are composed of matter having characteristic properties that distinguish one substance from another (independent of size/amount of substance).**

1. COMPOSITION
    - 1) Recognize that objects are made up of many different types of materials, such as wood, metal, and paper;
    - 2) Recognize that objects can be made of one or more materials.
  2. PROPERTIES
    - 1) Identify the observable properties of different objects, such as color, size, shape, weight and texture.
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**PS2 – Energy is necessary for change to occur in matter. Energy can be stored, transferred and transformed, but cannot be destroyed.**

1. CHANGE

1) Describe how the properties of certain materials can change when specific actions are applied to them, such as freezing, mixing, heating, cutting, dissolving and bending.

2) Recognize that not all materials react the same way when an action is applied to them.

2. CONSERVATION

*None at this grade span.*

3. ENERGY

1) Recognize that sound is produced by vibrating objects and that the pitch of the sound can be varied by changing the rate of vibration.

2) Explain that the Sun provides the Earth with heat and light.

3) Describe that heat can be produced in a variety of ways, such as burning, rubbing, and mixing substances together.

4) Recognize that energy comes from different sources, such as electricity and water, and is utilized in many common objects.

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**PS3 – The motion of an object is affected by force.**

1. FORCES

1) Describe the properties of magnetism and demonstrate how magnets can be used to move some things without touching them.

2) Describe and demonstrate that things close to the Earth drop to the ground unless something supports them.

2. MOTION

1) Describe the many different ways things can move, such as in a straight line, zigzag or circular motion, back and forth, and fast and slow.

2) Describe and demonstrate how the position and motion of an object can be changed by applying force, such as pushing and pulling, and explain that the greater the force, the greater the change.

3) Describe the position of an object by referencing its location in relation to another object or background.

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**PS4 – The growth of scientific knowledge in Physical Science has been advanced through the development of technology and is used (alone or in combination with other sciences) to identify, understand and solve local and global issues.**

1. DESIGN TECHNOLOGY

1) Recognize that new objects can be made out of physical materials, such as cloth and paper.

2. TOOLS

1) Identify tools and simple machines, such as a wheel, and explain how they work.

2) Demonstrate how to use tools, such as rulers, scales, balances, magnifiers and thermometers to measure properties of objects, such as size, weight, temperature.

3. SOCIAL ISSUES (LOCAL & GLOBAL)

ENERGY, POWER AND TRANSPORTATION

1) Provide examples of how man uses energy in everyday life, such as providing light, warmth in winter, cooling in summer, TVs, computers, telephones, transportation, factories.

MANUFACTURING

2) Provide examples of items that are manufactured or produced.

4. CAREER TECHNICAL EDUCATION CONNECTIONS

1) Recognize that some jobs/careers require knowledge and use of physical science content and/or skills.

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