VALWOOD

GO BEYOND

Fourth Grade Science Curriculum

4th Grade Overview

Course Description

In fourth grade science, students will be practicing scientific skills such as writing questions, making predictions, organizing data and developing logical conclusions. Students will write about investigations in science notebooks and represent data using graphs and tables. Science content in fourth grade will include matter, ecosystems, energy, force and motion.

Topics at a Glance

- Scientists and How They Work
- Matter
- Ecosystems
- Energy
- Force and Motion

Assessments

- Teacher created assessments
- Science notebooks
- Teacher observations

Grade Level Expectations

Standard	Big Ideas for Fourth Grade
1. Physical Science	1. Energy comes in many forms such as light, heat, sound, magnetic, chemical, and electrical 2. Newton's laws of motion describe the relationships among forces acting on and between objects, their masses, and changes in their motion. 3. Matter has properties related to its structure that can be measured and used to identify, classify and describe substances or objects.
2. Ecology	1. There is a relationship among organisms with each other and with their physical surroundings.

Notes for Fourth Grade

1. Science in fourth grade is built upon what the children already know which enables them to connect to new concepts and skills.
2. Students in fourth grade are given the opportunity to inquire, investigate and experiment using science tools and correct scientific terms. They learn that there is a certain method that scientist use to make valid conclusions. They also learn what it means to be a scientist.
3. Physical science gives students the opportunity to study energy and discover its many forms such as light, heat, sound, magnetic, chemical and electricity.
4. Physical science also allows students to discover important relations ships between force and motion.
5. Ecology allows students to study ecosystems and discover the relationships between organisms and their physical surroundings.

4th Grade Overview

Course Description

In fourth grade science, students will be practicing scientific skills such as writing question, making predictions, organizing data and developing logical conclusions. Students will write about investigations and represent data using graphs and tables. Science content in fourth grade will include the units Matter, Ecosystems, Energy, and Force and Motion.

Topics at a Glance

- Scientists and How The Work
- Matter
- Ecosystems
- Energy
- Forces and Motion

Assessments

- Teacher created assessments
- Teacher Observations
- Projects
- Science Notebooks

Grade Level Expectations

Standard	Big Ideas for Fourth Grade
1. Physical Science	1. Energy comes in many forms such as light, sound, mechanical, chemical thermal, and electrical. 2. Forces can cause objects to start moving, stop moving, and change directions. 3. Matter has properties related to its structure that can be measured and used to identify, classify and describe substances.
2. Ecology	1. There is a relationship among organisms with each other and with their physical surroundings.

Notes for Fourth Grade

1. Science in fourth grade is built upon what the children already now which enables them to connect to new concepts and skills.
2. Students in fourth grade are given the opportunity to inquire, investigate and experiment using science tools and correct scientific terminology. They learn that there is a method that scientists use to draw valid conclusions. They also learn what it means to be a scientist.
3. Physical science gives students the opportunity to study energy and differentiate between its many forms such as light, sound, mechanical, chemical, thermal, and electrical.
4. Physical science also allows student to discover important relationships between forces acting on matter and motion.
5. Students will explore the characteristics of matter that are used to differentiate between substances.
6. Ecology allows students to study ecosystems and the relationship between the organisms and their physical surroundings.

1. Physical Science

Students know and understand common properties, forms and changes in matter and energy.

Prepared Graduates
The preschool through twelfth-grade concepts and skills that all students who complete the Valwood School education system must master to ensure their success in a postsecondary and workforce setting.

Prepared Graduate Competencies in the Physical Science standard:

- Observe, explain, and predict natural phenomena governed by Newton's laws of motion, acknowledging the limitations of their application to very small or very fast objects
- Apply an understanding of atomic and molecular structure to explain the properties of matter, and predict outcomes of chemical and nuclear reactions
- Apply an understanding that energy exists in various forms, and its transformation and conservation occur in processes that are predictable and measurable
- *Engage in scientific inquiry by asking or responding to scientifically oriented questions, collecting and analyzing data, giving priority to evidence, formulating explanations based on evidence, connecting explanations to scientific knowledge, and communicating and justifying explanations.*

Content Area: Science - Fourth Grade

Standard: 1. Physical Science

Prepared Graduates:

Apply an understanding that energy exists in various forms, and its transformation and conservation occur in processes that are predictable and measurable

GRADE LEVEL EXPECTATION

Concepts and skills students master:

1. Energy comes in many forms such as light, sound, mechanical, chemical, thermal, and electrical

Evidence Outcomes	21st Century Skills and Readiness Competencies
Students can: a. Identify and describe the variety of energy sources b. Show that electricity in circuits requires a complete loop through which current can pass *c. Describe the effect of magnetic force on different objects* *d. Recognize that magnets are attracted to objects containing iron* e. Describe the energy transformation that takes place in electrical circuits where light, heat, sound, and magnetic effects are produced f. Use multiple resources – including print, electronic, and human – to locate information about different sources of renewable and nonrenewable energy	**Inquiry Questions:** 1. How do we know that energy exists within a system such as in an electrical circuit? 2. How can heat be transferred from one object to another? *3. How does using energy impact the environment?* *4. How does the effect on the environment change when using more/ or using less energy?*
	Relevance and Application: 1. There are multiple energy sources, both renewable and nonrenewable. 2. Energy can be used or stored. For example, it can be stored in a battery and then used when running a portable media player such as an iPod. 3. Transportation, manufacturing, and technology are driven by energy.
	Nature of Discipline: 1. Ask testable questions about energy, make a falsifiable hypothesis, design an inquiry based method of finding the answer, collect data, and form a conclusion. 2. Understand that models are developed to explain and predict phenomena that cannot be directly observed. 3. Critically evaluate models of energy, identifying the strengths and weaknesses of the model in representing what happens in the real world. 4. Create plans to decrease electrical energy use for one week and evaluate the results. *(for example, a tally chart of lights on and off, energy bill, etc.)*

2. Life Science

Students know and understand the characteristics and structure of living things, the processes of life and how living things interact with each other and their environment.

Prepared Graduates
The preschool through twelfth-grade concepts and skills that all students who complete the Valwood School system must master to ensure their success in a postsecondary and workforce setting.

Prepared Graduate Competencies in the Life Science standard:

- Analyze the relationship between structure and function in living systems at a variety of organizational levels, and recognize living systems' dependence on natural selection
- Explain and illustrate with examples how living systems interact with the biotic and abiotic environment
- Analyze how various organisms grow, develop, and differentiate during their lifetimes based on an interplay between genetics and their environment
- Explain how biological evolution accounts for the unity and diversity of living organisms

Content Area: Science - Fourth Grade

Standard: 2. Life Science

Prepared Graduates:

Analyze how various organisms grow, develop, and differentiate during their lifetimes based on an interplay between genetics and their environment

GRADE LEVEL EXPECTATION

Concepts and skills students master:

1. There is a relationship among organisms with each other and with their physical surroundings

Evidence Outcomes	21st Century Skills and Readiness Competencies
Students can: a. Use evidence to develop a scientific explanation of what plants and animals need to survive b. Use evidence to develop a scientific explanation for similarities and/or differences among different organisms (species) c. Analyze and interpret data representing variation in a trait *d. Classify organisms based on their traits and justify the classification.* e. Examine, evaluate, question, and ethically use information from a variety of sources and media to investigate questions about characteristics of living things	**Inquiry Questions:** 1. How have classification systems changed over time? *(i.e. as we get more information about an organism its classification could change.)* 2. How are individuals in a related species similar and different?
	Relevance and Application: 1. Human beings use technology, such as heating and air conditioning, in order to live comfortably in a variety of climates. *2. Outdoor habitats (for example: Sombrero Marsh or the school yard) provide rich opportunities to study variation and adaptation in the local ecosystem.*
	Nature of Discipline: 1. Understand that all scientific knowledge is subject to new findings and that the presence of reproducible results yields a scientific theory. 2. Evaluate and provide feedback on evidence used by others to justify how they classified organisms.

Content Area: Science - Fourth Grade

Standard: 2. Life Science

Prepared Graduates:

Explain how biological evolution accounts for the unity and diversity of living organisms

GRADE LEVEL EXPECTATION

Concepts and skills students master:

2. Comparing fossils to each other or to living organisms reveals features of prehistoric environments and provides information about organisms today

Evidence Outcomes	21st Century Skills and Readiness Competencies
Students can: a. Use evidence to develop a scientific explanation for: 1. What fossils tell us about a prehistoric environment 2. What conclusions can be drawn from similarities between fossil evidence and living organisms b. Analyze and interpret data to generate evidence about the prehistoric environment c. Evaluate whether reasoning and conclusions about given fossils are supported by evidence d. Use computer simulations that model and recreate past environments for study and entertainment	**Inquiry Questions:** 1. What are some things fossils *can tell us about the past?* 2. What conditions would most likely lead to something becoming a fossil? **Relevance and Application:** 1. Computers are used to model and recreate past environments for study and entertainment. **Nature of Discipline:** 1. Ask testable questions about past environments. 2. Make predictions about past environments based on fossil evidence. 3. Recognize that different interpretations of evidence are possible.

Content Area: Science - Fourth Grade

Standard: 2. Life Science

Prepared Graduates:

Explain and illustrate with examples how living systems interact with the biotic and abiotic environment

GRADE LEVEL EXPECTATION

Concepts and skills students master:

3. There is interaction and interdependence between and among living and nonliving components of ecosystems

Evidence Outcomes	21st Century Skills and Readiness Competencies
Students can: a. Use evidence to develop a scientific explanation on how organisms adapt to their habitat b. Identify the components that make a habitat type unique c. Compare and contrast different habitat types d. Create and evaluate models of the flow of nonliving components or resources through an ecosystem *(for example, food web)* e. Make a plan to positively impact a local ecosystem f. Examine, evaluate, question, and ethically use information from a variety of sources and media to investigate endangered habitats	**Inquiry Questions:** 1. How are resources shared among organisms in a specific ecosystem or habitat? 2. How do nonliving components *(soil, sun, weather, water, etc.)* of an ecosystem *or habitat* influence living components? 3. What would happen if the Sun's energy no longer reached Earth? 4. What would happen if water were removed from an ecosystem? **Relevance and Application:** 1. Humans can have positive and negative impacts on an ecosystem. 2. Nonliving components are cycled and recycled through ecosystems and need to be protected and conserved. 3. *Outdoor habitats (for example: Sombrero Marsh or the school yard) provide rich opportunities to study the interaction and interdependence among organisms.* **Nature of Discipline:** 1. Understand that models are developed to explain and predict natural phenomena that cannot be directly observed because they happen over long periods of time. 2. Evaluate models that show interactions between living and nonliving components of ecosystems, identifying the strengths and weaknesses of the model in representing what happens in the real world.

3. Earth Systems Science

Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space.

Prepared Graduates:
The preschool through twelfth-grade concepts and skills that all students who complete the Colorado education system must master to ensure their success in a postsecondary and workforce setting.

Prepared Graduate Competencies in the Earth Systems Science standard:

- Describe and interpret how Earth's geologic history and place in space are relevant to our understanding of the processes that have shaped our planet
- Evaluate evidence that Earth's geosphere, atmosphere, hydrosphere, and biosphere interact as a complex system
- Describe how humans are dependent on the diversity of resources provided by Earth and Sun

Content Area: Science - Fourth Grade

Standard: 3. Earth Systems Science

Prepared Graduates:

Describe and interpret how Earth's geologic history and place in space are relevant to our understanding of the processes that have shaped our planet

GRADE LEVEL EXPECTATION

Concepts and skills students master:

1. Earth is part of the Solar System, which includes the Sun, Moon, and other bodies that orbit the Sun in predictable patterns that lead to observable paths of objects in the sky as seen from Earth

Evidence Outcomes	21st Century Skills and Readiness Competencies
Students can: a. Gather, analyze, and interpret data about components of the Solar System b. Utilize direct and indirect evidence to investigate the components of the Solar System c. Gather, analyze, and interpret data about the sunrise and sunset, and Moon movements and phases *d. Explain the tilt of the Earth on its axis causes the seasons* *e. Identify that gravity is the force that holds the parts of the Solar System together* f. Develop a scientific explanation regarding relationships of the components of the Solar System	**Inquiry Questions:** 1. What are the patterns of movement for the Sun and Moon across the sky as *observed from Earth?* 2. How does Earth compare to other objects orbiting the Sun? 3. How do we study the Solar System? *(i.e. models, photographs, space observation from Earth, etc.)* **Relevance and Application:** 1. Space exploration has produced data to answer questions about the Solar System. 2. Comets are observable objects seen from Earth which provide scientists data about the Solar System. 3. Orbits in a predictable pattern in space influence season's on Earth. **Nature of Discipline:** 1. Understand that models are developed to explain and predict natural phenomena that cannot be directly observed because they happen over long periods of time. 2. Critically evaluate models of the Solar System, identifying the strengths and weaknesses of the model in representing what happens in the real Solar System.