



Grade 5 Science Curriculum Framework

Introduction

Science, Technology & Engineering, and Environmental Literacy & Sustainability (STEELS) Standards guide the study of the natural and human-made world through inquiry, problem-solving, critical thinking, and authentic exploration. This document displays a curriculum framework for **Grade 5 Science**. It is designed to focus curriculum and teaching, provide guidance for multiple approaches to curriculum development, encourage less reliance on textbooks as curriculum, and avoid activity-oriented teaching without focus/purpose.

Science Long Term Transfer Goals

In support of the Curriculum Framework, Long Term Transfer Goals (LTTG) provide the overarching practices that ground the foundation for a robust curriculum; thus, all curricula should relate to one or more of the LTTGs detailed below – as they highlight the effective uses of understanding, knowledge, and skill that we seek in the long run; i.e., what we want students to be able to do when they confront new challenges – both in and outside of school.

Students will be able to engage as scientifically literate members of a global society, using their learning to:

1. Approach science as a reliable and tentative way of knowing and explaining the natural world and designed world.
2. Weigh evidence and use scientific approaches to ask questions, investigate, and make informed decisions.
3. Make and use observations to analyze relationships and patterns in order to explain phenomena, develop models, and make predictions.
4. Evaluate systems, in order to connect how form determines function and how any change to one component affects the entire system.
5. Explain how the natural and designed worlds are interrelated and the application of scientific knowledge and technology can have beneficial, detrimental, or unintended consequences.

LIFE SCIENCE

Organization for Matter and Energy Flow in Organisms						
Key Understanding	Driving Question	Standard	Science and Engineering Practices	Disciplinary Core Idea	Crosscutting Concepts	Vocabulary
Plants get most of what they need to grow from air and water.	How do we know what materials plants need to grow and survive?	3.1.5.A Support an argument that plants get the materials they need for growth chiefly from air and water.	Engaging in Argument from Evidence Support an argument with evidence, data, or a model.	Plants acquire their material for growth chiefly from air and water.	Energy and Matter Matter is transported into, out of, and within systems.	matter
Interdependent Relationships in Ecosystems						
Key Understanding	Driving Question	Standard	Science and Engineering Practices	Disciplinary Core Idea	Crosscutting Concepts	Vocabulary
Matter moves in a cycle between plants, animals, decomposers, and the environment.	How does matter move through plants, animals, decomposers, and the environment?	3.1.5.B Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.	Developing and Using Models Develop a model to describe phenomena.	<p>The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants.</p> <p>Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter.</p>	Systems and System Models A system can be described in terms of its components and their interactions.	bacteria consumer decomposer ecosystem energy food web fungi microbe producer

PHYSICAL SCIENCE

Structure and Properties of Matter						
Key Understanding	Driving Question	Standard	Science and Engineering Practices	Disciplinary Core Idea	Crosscutting Concepts	Vocabulary
Matter is made of particles too small to be seen.	What is the smallest part of a material? How small can something be and still be seen?	3.2.5.A Develop a model to describe that matter is made of particles too small to be seen.	Developing and Using Models Use models to describe phenomena.	Matter of any type can be subdivided into particles that are too small to see, but even then, the matter still exists and can be detected by other means. A model showing that gasses are made from matter particles that are too small to see and that are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects.	Scale, Proportion, and Quantity Natural objects exist from the very small to the immensely large.	matter particle
Different types of matter have different properties.	How can we identify a mystery material based on its properties?	3.2.5.B Make and communicate observations and measurements to identify materials based on their properties.	Planning and Carrying Out Investigations Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.	Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic scale mechanism of evaporation and condensation.)	Scale, Proportion and Quantity Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.	mineral

Key Understanding	Driving Question	Standard	Science and Engineering Practices	Disciplinary Core Idea	Crosscutting Concepts	Vocabulary
A material's properties help to decide how it can be used.	How can we choose the best material to solve a problem?	3.2.5.C Interpret and analyze data to make decisions about how to utilize materials based on their properties.	Planning and Carrying Out Investigations Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.	Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic scale mechanism of evaporation and condensation.)	Scale, Proportion and Quantity Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.	properties
Chemical Reactions						
Key Understanding	Driving Question	Standard	Science and Engineering Practices	Disciplinary Core Idea	Crosscutting Concepts	Vocabulary
The total weight of matter stays the same before and after it undergoes different types of changes.	What happens to the total weight of materials when they are heated, cooled, or mixed?	3.2.5.D Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.	Using Mathematics and Computational Thinking Measure and graph quantities such as weight to address scientific and engineering questions and problems.	The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary: Mass and weight are not distinguished at this grade level.)	Scale, Proportion, and Quantity Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume	weight

Key Understanding	Driving Question	Standard	Science and Engineering Practices	Disciplinary Core Idea	Crosscutting Concepts	Vocabulary
Combining two or more substances may result in the formation of a new substance.	How can we combine two or more substances to make something entirely new?	3.2.5.E Conduct an investigation to determine whether the mixing of two or more substances results in new substances.	Planning and Carrying Out Investigations Conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.	When two or more different substances are mixed, a new substance with different properties may be formed.	Cause and Effect Cause and effect relationships are routinely identified and used to explain change.	substance
Types of Interactions						
Key Understanding	Driving Question	Standard	Science and Engineering Practices	Disciplinary Core Idea	Crosscutting Concepts	Vocabulary
Gravitational force pulls objects towards the center of the Earth.	How do we stay on the surface of the Earth?	3.2.5.F Support an argument that the gravitational force exerted by Earth on objects is directed down.	Engaging in Argument from Evidence Support an argument with evidence, data, or a model.	The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center.	Cause and Effect Cause and effect relationships are routinely identified and used to explain change.	gravitational force gravity planet
Energy in Chemical Processes and Everyday Life						
Key Understanding	Driving Question	Standard	Science and Engineering Practices	Disciplinary Core Idea	Crosscutting Concepts	Vocabulary
Energy in animals' food was once energy from the sun.	How are the energy from the sun and the energy in animals' food related?	3.2.5.G Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.	Developing and Using Models Use models to describe phenomena.	The energy released from food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion.	Energy and Matter Energy can be transferred in various ways and between objects.	energy flow

EARTH & SPACE SCIENCE

The Universe and Its Stars						
Key Understanding	Driving Question	Standard	Science and Engineering Practices	Disciplinary Core Idea	Crosscutting Concepts	Vocabulary
The sun appears brighter than many stars because it is closer to the Earth.	Why do some stars appear brighter than others?	3.3.5.A Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.	Engaging in Argument from Evidence Support an argument with evidence, data, or a model.	The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth.	Scale, Proportion, and Quantity Natural objects exist from the very small to the immensely large.	apparent brightness relative distance
Earth and the Solar System						
Key Understanding	Driving Question	Standard	Science and Engineering Practices	Disciplinary Core Idea	Crosscutting Concepts	Vocabulary
How Earth moves in space can create predictable patterns that we can observe both on Earth and in the sky.	How does the movement of the Earth cause changes in the patterns we observe on Earth and in the sky?	3.3.5.B Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.	Analyzing and Interpreting Data Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships.	The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes.	Patterns Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena.	axis North Pole orbit rotation shadow South Pole

Earth Materials and Systems						
Key Understanding	Driving Question	Standard	Science and Engineering Practices	Disciplinary Core Idea	Crosscutting Concepts	Vocabulary
The geosphere, biosphere, hydrosphere, and atmosphere constantly interact to change Earth's surface.	In what ways do the interactions of the Earth's spheres influence living things, weather, ecosystems, and landforms?	3.3.5.C Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.	Developing and Using Models Develop a model using an example to describe a scientific principle.	Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes, landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather.	Systems and System Models A system can be described in terms of its components and their interactions.	atmosphere biosphere geosphere hydrosphere

The Roles of Water in Earth's Surface Processes						
Key Understanding	Driving Question	Standard	Science and Engineering Practices	Disciplinary Core Idea	Crosscutting Concepts	Vocabulary
Water is a valuable and limited resource because only a small portion of the water available on Earth is freshwater that is readily available for living things.	If most of the Earth's surface is covered in water, why do we need to conserve it?	3.3.5.D Describe and graph the amounts of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.	Using Mathematics and Computational Thinking Describe and graph quantities such as area and volume to address scientific questions.	Nearly all of Earth's available water is in the ocean. Most freshwater is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere.	Scale, Proportion, and Quantity Standard units are used to measure and describe physical quantities such as weight and volume.	conservation freshwater glacier groundwater reservoir saltwater surface water
Human Impact on Earth Systems						
Key Understanding	Driving Question	Standard	Science and Engineering Practices	Disciplinary Core Idea	Crosscutting Concepts	Vocabulary
People use science and technology to make informed decisions that help protect Earth's natural resources and reduce human impact on the environment.	How can people use science to protect Earth's resources and the environment?	3.3.5.E Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.	Obtaining, Evaluating, and Communicating Information Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.	Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments.	Systems and System Models A system can be described in terms of its components and their interactions Connections to Nature of Science Science Addresses Questions About the Natural and Material World. Science findings are limited to questions that can be answered with empirical evidence.	environmental impact pollution resource management

Key Understanding	Driving Question	Standard	Science and Engineering Practices	Disciplinary Core Idea	Crosscutting Concepts	Vocabulary
People can use science, engineering, and creativity to develop solutions that reduce environmental problems, protecting Earth's resources for future generations	What can we do to solve an environmental problem?	3.3.5.F Generate and design possible solutions to a current environmental issue, threat, or concern.	Developing Possible Solutions At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs.	Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment.	Connections to Nature of Science Science Addresses Questions About the Natural and Material World. Science findings are limited to questions that can be answered with empirical evidence.	habitat restoration recycle reduce reuse waste management