

Standards-Based Learning

Power Standards

Science

Grades 4-5

The science standards for grades 4-5 consist of nine Core Content Standards within the science domains. These standards should be learned during the two-year grade span, so that only four or five of them need to be learned *in depth* each year. Local school district curriculum teams will decide which of the areas will be learned at which grade level, depending on students' needs and interests

@Power Standards highlighted **All standards must be taught and assessed. Power standards identify the standards that should receive the most instructional focus.**

Systems		4-5 SYS
<i>Complex Systems</i>		
4-5 SYSA	Systems contain subsystems.	
4-5 SYSB	A system can do things that none of its subsystems can do by themselves.	
4-5 SYSC	Systems have inputs and outputs. Changes in inputs may change the outputs of a system.	
4-5 SYSD	One defective part can cause a subsystem to malfunction, which in turn will affect the system as a whole	
Inquiry		4-5 INQ
<i>Planning Investigations</i>		
4-5 INQA	Scientific <i>investigations</i> involve asking and answering <i>questions</i> and comparing the answers with <i>evidence</i> from the real world	
4-5 INQB	Scientists plan and conduct different kinds of <i>investigations</i> , depending on the <i>questions</i> they are trying to answer. Types of <i>investigations</i> include systematic <i>observations</i> and descriptions, <i>field studies</i> , <i>models</i> , and <i>open-ended explorations</i> as well as <i>controlled experiments</i>	
4-5 INQC	An <i>experiment</i> involves a <i>comparison</i> . For an <i>experiment</i> to be valid and fair, all of the things that can possibly change the outcome of the <i>experiment</i> should be kept the same, if possible	
4-5 INQD	<i>Investigations</i> involve systematic collection and recording of relevant <i>observations</i> and data	
4-5 INQE	Repeated <i>trials</i> are necessary for <i>reliability</i> .	
4-5 INQF	A scientific <i>model</i> is a simplified representation of an object, event, <i>system</i> , or process created to understand some aspect of the <i>natural world</i> . When learning from a <i>model</i> , it is important to realize that the <i>model</i> is not exactly the same as the thing being modeled	
4-5 INQG	Scientific explanations emphasize evidence, have logically consistent arguments, and use known scientific principles, models, and theories.	
4-5 INQH	Scientists <i>communicate</i> the results of their <i>investigations</i> verbally and in writing. They review and ask <i>questions</i> about the results of other scientists' work.	
4-5 INQI	Scientists report the results of their <i>investigations</i> honestly, even when those results show their predictions were wrong or when they cannot <i>explain</i> the results.	
Application		4-5 APP
<i>Different Technologies</i>		

4-5 APPA	<i>Technology</i> involves changing the <i>natural world</i> to meet human needs or wants.
4-5 APPB	People in different cultures all around the world use different materials or technologies to solve the same problems.
4-5 APPC	Problems of moderate complexity can be solved using the technological design process. This process begins by defining and researching the problem to be solved.
4-5 APPD	Scientists and engineers often work in teams with other individuals to generate different ideas for solving a problem.
4-5 APPE	Possible solutions should be tested to see if they solve the problem. Building a model or prototype is one way to test a possible solution.
4-5 APPF	<i>Solutions</i> to problems must be communicated, if the problem is to be solved.
4-5 APPG	Science and technology have greatly improved food quality and quantity, transportation, health, sanitation, and communication.
4-5 APPH	People of all ages, interests, and abilities engage in a variety of scientific and technological work.

Physical Science

4-5 PS

Measurement of Force and Motion

4-5 PS1A	The <i>weight</i> of an object is a measure of how strongly it is pulled down toward the ground by <i>gravity</i> . A spring scale can measure the pulling <i>force</i> .
4-5 PS1B	The relative <i>speed</i> of two objects can be determined in two ways: (1) If two objects travel for the same amount of time, the object that has traveled the greatest distance is the fastest. (2) If two objects travel the same distance, the object that takes the least time to travel the distance is the fastest.

States of Matter

4-5 PS2A	Substances can exist in different physical states—solid, liquid, and gas. Many substances can be changed from one state to another by heating or cooling.
4-5 PS2B	<i>Air</i> is a <i>gas</i> . <i>Air</i> fills a closed container completely. <i>Wind</i> is moving <i>air</i> .
4-5 PS2C	The total amount of <i>matter</i> is <i>conserved</i> (stays the same) when it undergoes a <i>physical change</i> such as when an object is broken into tiny pieces, when a <i>solid</i> is dissolved in a <i>liquid</i> , or when <i>matter</i> changes state (<i>solid, liquid, gas</i>).

Heat, Light, Sound, and Electricity

4-5 PS3A	Energy has many forms, such as heat, light, sound, motion, and electricity.
4-5 PS3B	Energy can be transferred from one place to another.
4-5 PS3C	Heat energy can be generated a number of ways and can move (transfer) from one place to another. Heat energy is transferred from warmer things to colder things.
4-5 PS3D	Sound energy can be generated by making things vibrate.
4-5 PS3E	Electrical energy in circuits can be changed to other forms of energy, including light, heat, sound, and motion. Electric circuits require a complete loop through conducting materials in which an electric current can pass.

Earth and Space Science

4-5 ES

Earth in Space

4-5 ES1A	Earth is approximately spherical in shape. Things on or near the Earth are pulled toward Earth's center by the force of gravity.
4-5 ES1B	Earth's daily spin relative to the Sun causes night and day.
4-5 ES1C	Earth's nearly circular yearly orbit around the Sun causes us to see different constellations at different times of year.
4-5 ES1D	The Sun is a star. It is the central and largest body in our <i>Solar System</i> . The Sun appears much brighter and larger in the sky than other stars because it is many thousands of times closer to Earth.

Formation of Earth Materials

4-5 ES2A	Earth materials include solid rocks and soil, water, and gases of the atmosphere. Materials have different physical and chemical properties which make them useful in different ways. Earth materials provide many of the resources that humans use.
4-5 ES2B	Weathering is the breaking down of rock into pebbles and sand caused by physical processes such as heating, cooling, and pressure, and chemical processes such as acid rain.
4-5 ES2C	Erosion is the movement of Earth materials by forces such as wind, moving water, ice forming, and gravity.
4-5 ES2D	Soils are formed by <i>weathering</i> and <i>erosion</i> , decay of plant <i>matter</i> , transport by rain through streams and rivers, and <i>deposition</i> of <i>sediments</i> in valleys, riverbeds, and lakes
4-5 ES2E	Soils are often found in layers, with each layer having a different chemical composition and different physical <i>properties</i>
4-5 ES2F	Erosion plays an important role in the formation of soil, but too much erosion can wash away fertile soil from ecosystems and farms
<i>Focus on Fossils</i>	
4-5 ES3A	Different kinds of events caused the formation of different kinds of fossils.
4-5 ES3B	By studying the kinds of plant and animal <i>fossils</i> in a layer of rock, it is possible to <i>infer</i> what the <i>environment</i> was like at the time and where the layer formed.
Life Science 4-5 LS	
<i>Structures and Behaviors</i>	
4-5 LS1A	Plants and animals can be sorted according to their structures and behaviors.
4-5 LS1B	Plants and animals have different structures and behaviors that serve different <i>functions</i>
4-5 LS1C	Certain structures and behaviors enable plants and animals to respond to changes in their <i>environment</i>
4-5 LS1D	Plants and animals have structures and behaviors that respond to internal needs.
4-5 LS1E	Nutrition is essential to health. Various kinds of foods are necessary to build and maintain body structures. Individuals have responsibility for their own health and food choices.
<i>Food Webs</i>	
4-5 LS2A	An ecosystem includes all of the populations of living organisms and nonliving physical factors in a given area. Living organisms depend on one another and the nonliving physical factors in their ecosystem to help them survive..
4-5 LS2B	Plants make their own food using energy from the sun. Animals get food energy by eating plants and/or other animals that eat plants. Plants make it possible for animals to use the energy of sunlight.
4-5 LS2C	Plants and animals are related in food webs with producers (plants that make their own food), consumers (animals that eat producers and/or other animals), and decomposers (primarily bacteria and fungi) that break down wastes and dead organisms, and return nutrients to the soil.
4-5 LS2D	Ecosystems can change slowly or rapidly. Big changes over a short period of time can have a major impact on the ecosystem and the populations of plants and animals living there.
4-5 LS2E	All plants and animals change the ecosystem where they live. If this change reduces another organism's access to resources, that organism may move to another location or die.
4-5 LS2F	People affect <i>ecosystems</i> both positively and negatively
<i>Heredity and Adaptation</i>	

4-5 LS3A	In any ecosystem, some populations of organisms thrive and grow, some decline, and others do not survive at all.
4-5 LS3B	Plants and animals inherit many characteristics from their parents. Some inherited characteristics allow organisms to better survive and reproduce in a given ecosystem.
4-5 LS3C	Some characteristics and behaviors result from an individual plant's or animal's interactions with the environment and are not passed from one generation to the next by heredity.
4-5 LS3D	Fossils provide evidence that many plant and animal species are extinct and that species have changed over time.