

7th Grade Science Pacing Guide 1st Quarter 2017-2018

HOP: Habits of Practice

Practice 1: Asking Questions/Defining Problems

Practice 4: Analyzing/Interpreting Data

Practice 7: Engaging in Argument from Evidence

Practice 2: Developing and Using Models

Practice 5: Using Math & Computational Thinking

Practice 8: Obtaining/Evaluating/Communicating Info

Practice 3: Planning/Carrying Out Investigations

Practice 6: Constructing Explanations/Designing Solutions

Practice 9: Metacognition

Sequence of Concepts	Rationale for Sequence	Prior Knowledge
Identifying Minerals <ul style="list-style-type: none"> - Minerals can be identified by their physical properties - Properties include hardness, cleavage, fracture, streak, color, etc. - These properties can be arranged in tables that allow minerals to be readily identified 	Minerals are the ingredients of rocks, the rock cycle is driven by processes and forces in nature that cause different minerals or different concentrations of minerals to be prevalent in different types of rocks	In 6 th grade students may have been exposed to minerals as an abiotic factor in an ecosystem
Identifying Rocks and the Forces that make them <ul style="list-style-type: none"> - Any of the three types of rocks can turn into any other type of rock - The forces that drive the rock cycle differ for each type of rock - These forces are heat and pressure, melting and cooling, weathering-erosion-deposition-compaction-cementation 	Rocks are mineral Mixtures. Different rocks have different concentrations of different minerals, this gives them different properties.	Students must understand minerals and how they are classified in order to understand that rocks are made from them.
Layers of the Earth <ul style="list-style-type: none"> - The Earth is composed of layers - These layers are identifiable by their composition and characteristics - These layers are not static, they move 	The Earth's crust is composed of rocks. These rocks go through a cycle in which they are remade into other form. An understanding of the composition and behaviors of these characteristics is necessary as a mode to understanding why and how the different layers move.	Students have previously learned that rocks are naturally occurring, inorganic solids.
Plate tectonics <ul style="list-style-type: none"> - The crust and upper mantle are broken into huge masses of earth that move - Lithospheric plates move slowly (cm/year) - This movement is created by convection currents deep within the earth - The plates moving toward, away, or beside each other creates earthquakes, mountain building, sea floor spreading, sea floor trenches, volcanoes 	This is how rocks are recycled. All rocks began as igneous rocks eons ago. We talk about rocks from their smallest unit (minerals) to their biggest unit (lithospheric plates)	Students must have working knowledge of minerals and the rock cycle Students in the 5 th grade learned about plate movements and what happens because of this movement, but not the mechanism
Mans Impact on the Environment <ul style="list-style-type: none"> - Renewable and nonrenewable resources - Effects of human activities on natural resources and sustainability 	Minerals and rocks from the earth provide us with nonrenewable resources. Obtaining these resources can have negative impacts on Earth. Renewable resources are a way to provide us sustainability.	Students in th 5 th grade learned about resources and the environment, but are not as deeply aware of the causes of negative impacts and possible solutions.

7th Grade Science Scope and Sequence 2nd Quarter 2017-2018

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Sequence of Concepts	Rationale for Sequence	Prior Knowledge
<p>Speed, Velocity, and Acceleration</p> <ul style="list-style-type: none"> - speed and velocity can be solved by using proper equations 	<p>Motion is an object's change in reference points pertaining to distance and direction. Motion can be measured by a relationship of distance and time. Acceleration is a change in velocity.</p>	<p>In 4th and 5th grade students may have been exposed to the relationship of speed, velocity, and acceleration and done basic calculations. Students must have a working knowledge of how speed, velocity, and acceleration have been used in their daily lives. In quarter 1 students learn that tectonic plates move at different velocities. Example: plates move at centimeters per year.</p>
<p>Newton's Laws</p> <ul style="list-style-type: none"> - Newton's Laws describe the behavior and motion of objects as forces act upon them - Forces act in pairs that can be balanced or unbalanced. 	<p>Newton's Laws further explain changes in motion and that forces are needed to change motion.</p>	<p>In 4th grade students may have been exposed to Newton's laws of motion. Newton's Laws can be applied to motion in their everyday lives.</p>
<p>Simple Machines</p> <ul style="list-style-type: none"> - There are six basic simple machines. - Simple machines can be combined to make a compound machine - Simple machines make work easier 	<p>The amount of force applied to an object can be changed using a simple machine.</p>	<p>Students have been exposed to the types of simple machines in prior grades and in daily life.</p>
<p>Work</p> <ul style="list-style-type: none"> - Though the amount of work needed to move an object remains the same, a simple machine can reduce the amount of force needed to move the object. - The amount of work done can be calculated by the amount of force needed to move the object a certain distance. (Motion has to occur for work to be done.) 	<p>In order for work to be done a force must be applied. Simple machines reduces the force needed by changing the direction of the force.</p>	<p>Students can connect their knowledge of simple machines to the amount of work done to move an object.</p>
<p>Waves</p> <ul style="list-style-type: none"> - Waves are the movement of energy. - Particles in a wave move perpendicular, parallel, or both. - Depending on the particle movement waves can be classified as transverse, longitudinal, or surface. 	<p>Waves are energy in motion through matter.</p>	<p>In quarter 1 students learn that earthquakes are the result of seismic wave activity.</p>

7th Grade Science Scope and Sequence 3rd Quarter 2017-2018

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Sequence of Concepts	Rationale for Sequence	Prior Knowledge
<p>Cells</p> <ul style="list-style-type: none"> - There are two main types of cells that have unique characteristics. - Each type of cell has a variety of organelles with specific functions. 	<p>Cells are the basic units of life. Cells and organelles can be identified by their structure and function.</p>	<p>In 5th grade students may have been exposed to plant and animal cells and basic organelles. Students should know that one difference between non-living and living things is that living things are made up of cells.</p>
<p>Diffusion</p> <ul style="list-style-type: none"> - Concentration gradients because particles flow from higher to lower concentrations. - Some materials flow through the cell's semi-permeable membrane through diffusion. 	<p>One function of the cell membrane is to control substances diffusing in and out of the cell. This is most simply done by the cell maintaining equilibrium or homeostasis.</p>	<p>Students are familiar with particles traveling through air and water from higher concentrated areas to lower concentrated areas.</p>
<p>Mitosis</p> <ul style="list-style-type: none"> - Cells must divide to make more cells for replacement or growth of the organism. - Cells pass through stages as they divide. Specific events occur at each of these stages. 	<p>Cell division is another process cells undergo. Students look more in depth at the nucleus of the cell and what must happen for the cell to divide. Knowledge that chromosomes copy will prepare students for heredity concepts in quarter 4.</p>	
<p>Photosynthesis and cellular respiration</p> <ul style="list-style-type: none"> - Photosynthesis and cellular respiration are processes that all living organisms go through. - These processes occur in specific organelles and use and produce specific chemical compounds needed for plants and animals to survive. 	<p>Photosynthesis occurs in the chloroplasts of plant cells and cellular respiration occurs in the mitochondria of both plant and animal cells.</p>	<p>In 4th and 5th grade students may have been exposed to photosynthesis as a process that occurs in plants but have not been exposed to cellular respiration in mitochondria. Students should understand that living things require oxygen to live and obtain it in different ways.</p>

Carbon-Oxygen Cycle

Oxygen and carbon dioxide are exchanged between living things and the environment.

Photosynthesis and cellular respiration are the processes that cycle oxygen and carbon dioxide through our atmosphere.

Students should have prior knowledge that plants require carbon dioxide and the ability to make their own food. Animals requiring oxygen to breathe and function.

7th Grade Science Scope and Sequence 4th Quarter 2017-2018

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Sequence of Concepts	Rationale for Sequence	Prior Knowledge
<p>Organ Systems</p> <ul style="list-style-type: none"> - The human body is made of cells that make tissues, organs, organ systems, organisms - These organ systems perform functions based on the makeup of their tissues and subsequent cells - These organ systems work together to maintain homeostasis 	<p>Up to this point in 7th grade life science students have been studying how organelles (internal parts of a cell) function. Body organ systems are the combinations of organs, made from tissues, composed of cells and their function is based on individual cells.</p>	<p>Students have learned how the internal components of cells work. The function of these internal components determine the function of the cells</p>
<p>Reproduction</p> <ul style="list-style-type: none"> - In order to survive all organisms must reproduce - Reproduction can occur asexually (without a mate) or sexually (with a mate) 	<p>This is an introduction to flowers, genetics and heredity.</p>	<p>Students should be aware that reproduction is an organ system that helps organisms to sustain life.</p>
<p>Flowers</p> <ul style="list-style-type: none"> - Flowers contain parts that perform reproductive functions. 	<p>In flowering plants, sexual reproduction requires pollination and fertilization.</p>	<p>Students have previously learned about the types of reproduction.</p>
<p>Genetics</p> <ul style="list-style-type: none"> - Genes make up chromosomes and chromosomes determine inherited traits. - Genes are made up of a sequence of DNA. 	<p>Chromosomes determine inherited traits and are received from parents during sexual reproduction. The DNA code is what determines our physical traits.</p>	<p>Students have previously learned about sexual reproduction.</p>
<p>Heredity</p> <ul style="list-style-type: none"> - With heredity comes a variety of genetic combinations passed from parents to offspring during sexual reproduction. - Punnett squares allow us to predict possible genetic combinations. 	<p>Students further understand how combinations of chromosomes are unique but the probability of allele combinations can be determined.</p>	<p>In 5th grade students may have been exposed to traits passed from parents to offspring.</p>