

Missouri Science Standards: Physical Science

Kindergarten

Scope and Sequence – Properties of Matter

- Describe physical properties of objects (i.e., size, shape, color, mass) by using the senses, simple tools (e.g., magnifiers, equal arm balances), and/or nonstandard measures (e.g., bigger/smaller; more/less)
- Identify materials (e.g., cloth, paper, wood, rock, metal) that make up an object and some of the physical properties of the materials (e.g., color, texture, shiny/dull, odor, sound, taste, flexibility)
- Sort objects based on observable physical properties (e.g., size, material, color, shape, mass)

Scope and Sequence – Investigating Sound

- Identify the sounds and their source of vibrations in everyday life (e.g., alarms, car horns, animals, machines, musical instruments)
- Compare different sounds (i.e., loudness, pitch, rhythm)
- Recognize that the ear serves as a receiver of sound

Scope and Sequence – Changes in Position

- Describe an object's position relative to another object (e.g., above, below, in front of, behind)
 - Identify ways (push, pull) to cause some objects to move by touching them
 - Recognize magnets cause some objects to move without touching them
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Grade 1

Scope and Sequence – Properties of Matter: Mass and Temperature

- Given an equal-arm balance and various objects, illustrate arrangements in which the beam is balanced
- Measure and compare the mass of objects (more/less)
- Order objects according to mass
- Identify the source of energy that causes an increase in the temperature of an object (e.g., Sun, stove, flame, light bulb)
- Compare the temperature of hot and cold objects using a simple thermometer
- Describe the change in temperature of an object as warmer or cooler

Scope and Sequence – Characteristics of Plants and Animals

- Identify light from the Sun as a basic need of most plants

Scope and Sequence – Investigating Motion

- Compare the position of an object relative to another object (e.g., left of or right of)
 - Describe an object's motion as straight, circular, vibrational (back and forth), zigzag, stopping, starting, or falling
 - Compare the speeds (faster vs. slower) of two moving objects
 - Identify the force (i.e., push or pull) required to do work (move an object)
 - Describe ways to change the motion of an object (i.e., how to cause an object to go slower, go faster, go farther, change direction, stop)
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Grade 2

Scope and Sequence – Properties of Rocks and Soil

- Describe and compare the physical properties of objects by using simple tools (i.e., thermometer, magnifier, centimeter ruler, balance, magnet)
- Classify objects as “one kind of material” or a mixture
- Observe and describe how mixtures are made by combining solids
- Describe ways to separate the components of a mixture by their physical properties (e.g., sorting, magnets, screening)

Scope and Sequence – Forms of Energy: Sound

- Recognize that sound travels through different mediums (i.e., air, water, solids)
- Describe different ways to change the pitch of a sound (i.e., changes in size, such as length or thickness, and in tightness/tension of the source)
- Describe how the ear serves as a receiver of sound (i.e., sound vibrates eardrum)

Scope and Sequence – Forces and Motion

- Recognize magnets attract and repel each other and certain materials
 - Describe magnetism as a force that can push or pull other objects without touching them
 - Measure (using non-standard units) and compare the force (i.e., push or pull) required to overcome friction and move an object over different surfaces (i.e., rough, smooth)
 - Describe Earth’s gravity as a force that pulls objects on or near the Earth toward the Earth without touching the object
 - Describe the direction and amount of force (i.e., direction of push or pull, strong/weak push or pull) needed to change an object’s motion (i.e., faster/slower, change in direction)
 - Describe and compare the distances traveled by heavier/lighter objects after applying the same amount of force (i.e., push or pull) in the same direction
 - Describe and compare the distances traveled by objects with the same mass after applying different amounts of force (i.e., push or pull) in the same direction
 - Compare and describe the amount of force (i.e., more, less, or same push or pull) needed to raise an object to a given height, with or without using inclined planes (ramps) of different slopes
 - Compare and describe the amount of force (i.e., more, less, or same push or pull) needed to raise an object to a given height, with or without using levers
 - Apply the use of an inclined plane (ramp) and/or lever to different real life situations in which objects are raised
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Grade 3

Scope and Sequence – Investigating States of Matter

- Compare the observable physical properties of solids, liquids, or gases (air) (i.e., visible vs. invisible, changes in shape, changes in the amount of space occupied)
- Identify everyday objects/substances as solid, liquid, or gas (e.g., air, water)
- Recognize water evaporates (liquid water changes into a gas as it moves into the air)
- Measure and compare the temperature of water when it exists as a solid to its temperature when it exists as a liquid
- Investigate and recognize water can change from a liquid to a solid (freeze), and back again to a liquid (melt), as the result of temperature changes
- Describe the changes in the physical properties of water (i.e., shape, volume) when frozen or melted
- Predict and investigate the effect of heat energy (i.e., change in temperature, melting, evaporation) on objects and materials
- Identify sources of thermal energy (e.g., Sun, stove, fire, body) that can cause solids to change to liquids, and liquids to change to gas

Scope and Sequence – Earth, Sun, and Moon

- Identify sources of light energy (e.g., Sun, bulbs, flames)
- Recognize light can be transferred from the source to the receiver (eye) through space
- Identify the three things (light source, object, and surface) necessary to produce a shadow

Scope and Sequence – Earth, Sun, and Moon/Food Chains

- Recognize the Sun is the primary source of light and food energy on Earth
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Grade 4

Scope and Sequence – Mixtures and Solutions

- Describe and compare the masses of objects to the nearest gram using balances
- Describe and compare the volumes (the amount of space an object occupies) of objects using a graduated cylinder
- Recognize no two objects can occupy the same space at the same time (e.g., water level rises when an object or substance, such as a rock, is placed in a quantity of water)

http://www.execulink.com/~ekimmel/density_displacment.htm

- Classify types of materials (e.g., water, salt, sugar, iron filings, salt water) into substances (materials that have specific physical properties) or mixtures of substances by using their characteristic properties
- Recognize that the total mass of a material remains constant whether it is together, in parts, or in a different state

<http://highered.mcgraw-hill.com/sites/dl/free/0078600499/161752/00076709.html>

Scope and Sequence – Mixtures and Solutions/ Changes on the Earth's Surface

- Identify water as a solvent that dissolves materials (Do NOT assess the term solvent)
- Observe and describe how mixtures are made by combining solids or liquids, or a combination of these
- Distinguish between the components in a mixture (e.g., trail mix, conglomerate rock, salad)
- Describe ways to separate the components of a mixture by their properties (i.e., sorting, filtration, magnets, screening)

<http://www.northland.cc.mn.us/biology/Biology1111/animations/dissolve.html>

<http://antoine.frostburg.edu/chem/senese/101/solutions/faq/why-salt-melts-ice.shtml>

Scope and Sequence – Forms of Energy: Electrical Circuits

- Construct and diagram a complete electric circuit by using a source (e.g., battery), means of transfer (e.g., wires), and receiver (e.g., resistance bulbs, motors, fans)

http://www.edukate.net/ed1_files/circuits1.html

- Observe and describe the evidence of energy transfer in a closed series circuit (e.g., lit bulb, moving motor, fan)

<http://www.article19.com/shockwave/oz.htm>

- Classify materials as conductors or insulators of electricity when placed within a circuit (e.g., wood, pencil lead, plastic, glass, aluminum foil, lemon juice, air, water)
- Identify the evidence of energy transformations (temperature change, light, sound, motion, and magnetic effects) that occur in electrical circuits

<http://www.ltscotland.org.uk/5to14/resources/science/speedofsound.asp>

- Predict the effects of an electrostatic force (static electricity) on the motion of objects (attract or repel)

<http://weathereye.kgan.com/cadet/lightning/electricity.html>

<http://highered.mcgraw-hill.com/sites/dl/free/0078600499/161383/00053407.html>

Scope and Sequence – Laws of Motion

- Classify different types of motion (straight line, curved, back and forth)
<http://highered.mcgraw-hill.com/sites/dl/free/0078617707/161752/00035803.html>
 - Describe an object's motion in terms of distance and time
 - Identify the forces acting on the motion of objects traveling in a straight line
<http://www.teachersdomain.org/resources/lsp07/sci/phys/maf/momentum/index.html>
 - Recognize friction as a force that slows down or stops a moving object that is touching another object or surface
 - Compare the forces (measured by a spring scale in Newtons) required to overcome friction when an object moves over different surfaces (i.e., rough/smooth)
<http://www.teachersdomain.org/resources/phy03/sci/phys/matter/zhovr/index.html>
 - Determine the gravitational pull of the Earth on an object (weight) using a spring scale
<http://www.teachersdomain.org/resources/hew06/sci/phys/maf/springmass/index.html>
 - Recognize that balanced forces do not affect an object's motion
 - Describe how unbalanced forces acting on an object changes its speed (faster/slower), direction of motion, or both
<http://www.teachersdomain.org/resources/lsp07/sci/phys/maf/airtrack/index.html>
 - Explain how increasing or decreasing the amount of force on an object affects the motion of that object
<http://highered.mcgraw-hill.com/sites/dl/free/0078617707/161752/00035808.html>
 - Explain how the mass of an object (e.g., cars, marbles, rocks, boulders) affects the force required to move it
<http://highered.mcgraw-hill.com/sites/dl/free/0078617707/160350/00035807.html>
 - Predict how the change in speed of an object (i.e., faster/slower/remains the same) is affected by the amount of force applied to an object and the mass of the object
<http://highered.mcgraw-hill.com/sites/dl/free/0078617707/161752/00035806.html>
<http://www.ourmedia.org/node/19273>
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Grade 5

Scope and Sequence – Water Cycle and Weather

- Recognize how changes in state (i.e., freezing/melting, condensation/evaporation) provide evidence that matter is made of particles too small to be seen
- Classify matter as a solid, a liquid, or a gas, as it exists at room temperature, using physical properties (i.e., volume, shape, ability to flow)
- Predict the effect of heat energy on the physical properties of water as it changes to and from a solid, liquid, or gas (i.e., freezing/melting, evaporation/condensation)
<http://www.teachersdomain.org/resources/lsp07/sci/phys/matter/cookingsugar/index.html>
- Recognize the mass of water remains constant as it changes state (as evidenced in a closed container)
<http://lgfl.skool.co.uk/content/keystage3/chemistry/pc/learningSimulations/COSSC/launch.html>
<http://highered.mcgraw-hill.com/sites/dl/free/0078600499/164155/00053405.html>
- Recognize the Sun as the primary source of energy for temperature change on Earth

Scope and Sequence – Solar System

- Recognize light can be transferred from the source to the receiver (eye) through space in straight lines

<http://science.howstuffworks.com/light.htm>

- Recognize how an object (e.g., moon, mirror, objects in a room) can only be seen when light is reflected from that object to the receiver (eye)

http://www.exploratorium.edu/snacks/colored_shadows.html

Scope and Sequence – Work and Simple Machines

- Identify the forces acting on a load and use a spring scale to measure the weight (resistance force) of the load
- Describe how friction affects the amount of force needed to do work over different surfaces or through different media

<http://www.fearofphysics.com/Friction/friction.html>

- Explain how work can be done on an object (force applied and distance moved) (No formula calculations at this level)

<http://www.teachersdomain.org/resources/phy03/sci/phys/energy/zmilk/index.html>

- Recognize simple machines change the amount of effort force and/or direction of force

<http://highered.mcgraw-hill.com/sites/dl/free/0078617707/161752/00035809.html>

- Compare the measures of effort force (measured using a spring scale to the nearest Newton) needed to lift a load with and without the use of simple machines

- Identify the simple machines in common tools and household items

<http://www.teachersdomain.org/resources/phy03/sci/phys/energy/zplant/index.html>

Kansas Science Standards

Grades K-2

- observes *properties of objects* and measures or describes those *properties* using age-appropriate tools and materials.
- separates or sorts a group of objects or materials by *properties*.
- compares the properties of solids and liquids.
- describes the position of an object in relation to other objects.

Grades 3-4

- observes *properties* of objects and measures those *properties* using appropriate *tools*.
- describes and *classifies* objects by more than one property.
- observes and records how one object *interacts* with another object.
- recognizes and describes the differences between solids, liquids, and gases.
- moves objects by pushing, pulling, throwing, spinning, dropping, and rolling; and describes the motion.
- describes the change in position of objects when moved.
- identifies that the source of sound is vibrations.
- discriminates between sounds made by different objects.
- discriminates between various pitches.
- demonstrates that magnets attract and repel
- designs a simple experiment to determine whether various objects will be attracted to magnets.
- constructs a *simple circuit*.