

You and How Things Work Curriculum Map

| Properties & Change | | | | | | | Position & Force | | | | | Energy | | | | | |
|--|---|---|----|----|----|--|---|---|----|----|---|--|----|---|----|----|----|
| Grade k-1 | Topic: Physical properties | | | | | | Topic: Force and Gravity | | | | | Topic: Sound and Energy | | | | | |
| | Content Statements | | | | | | Content Statements | | | | | Content Statements | | | | | |
| | <ol style="list-style-type: none"> 1. Properties of materials can be observed, measured, and predicted. 2. Explore how the size, weight, shape, color, and temperature are properties of objects. 3. Recognize that these are physical properties. 4. Objects are made of materials. 5. Properties of objects can change. For example, Students know that water can be a liquid or a solid, and can be made to change back and forth | | | | | | <ol style="list-style-type: none"> 1. A force is a push or pull. 2. Forces are needed to change the movement of an object. 3. The motion of objects can be observed and measured. 4. The position of an object is described by locating it in relation to another object. 5. Gravity is a force that pulls objects to the ground. There are some places where there is more gravitational force than others. | | | | | <ol style="list-style-type: none"> 1. Objects can be made to vibrate to produce sound (tapping, blowing, touching) 2. Sound energy moves in waves. 3. Waves move at different rates to create different sounds. 4. Light energy moves in waves. 5. Light waves do not bend, but sound waves do. | | | | | |
| Key terms: observe, predict, measure, property: size, weight, color, shape, temperature | | | | | | Key terms: force, change, motion, position, gravity, push, pull | | | | | Key terms: sound , vibrate, waves, high, low, loud, soft, fast, slow | | | | | | |
| w | ob | 2 | 13 | 12 | k1 | w | pf | 2 | 13 | 12 | k1 | w | lh | 2 | 13 | 12 | k1 |

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| | | Topic: Solids, liquids, & gases | | | | | | Topic: Force and Gravity | | | | | | Topic: Magnetism and Energy | | | | | | | |
| Grade 2 | <p>Content Statements</p> <ol style="list-style-type: none"> 1. Explore how the size, weight, shape, color, and temperature are physical properties of objects. 2. Materials come in different forms (states), including solids, liquids, and gases. 3. Explain that solids, liquids, and gases have different properties. 4. The properties of substances can change when the substances are mixed, cooled, or heated. <p>Key terms: states of matter: solid, liquid, gas, substance, mix, cool, heat, physical property: size, weight, color, shape, temperature</p> | | | | | | | <p>Content Statements</p> <ol style="list-style-type: none"> 1. A force is a push or pull. 2. Forces are needed to change the movement of an object. 3. The motion of objects can be observed and measured. 4. The position of an object is described by locating it in relation to another object. 5. Gravity is a force that pulls objects to the ground. There are some places where there is more gravitational force than others. <p>Key terms: force, change, motion, position, gravity, push, pull</p> | | | | | | | <p>Content Statements</p> <ol style="list-style-type: none"> 1. Identify and observe forces: static electricity, gravity, and magnetism. 2. Sound is made by vibrating objects and can be described by its pitch and volume. 3. Magnets can be used to make some objects move without being touched. <p>Key terms: sound, pitch, frequency, volume, force, static electricity, gravity, magnet, magnetism, attract, repel</p> | | | | | | |
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| Grade 3 | | | | | | | Properties & Change | | | | | | Position & Force | | | | | | Energy | | | | | |
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| | | | | | | | Topic: Matter has properties Content Statements <ol style="list-style-type: none"> Matter takes up space and has observable properties. Matter can exist in different states, such as solid, liquid and gas and have different properties. Heating and cooling objects can change the state of matter. When two or more substances are combined, a new substance may be formed with properties that are different from those of the original materials. Key terms: matter, physical properties, states of matter, heating, cooling | | | | | | Topic: Change in Motion Content Statements <ol style="list-style-type: none"> Energy is a force that has the ability to cause motion or create change. The change in the motion of an object is directly related to the size (magnitude) of the force. Potential energy is stored energy when an object is at rest. Kinetic energy is displayed when an object is in motion. Key terms: energy, change, size (magnitude), force, potential energy, at rest, kinetic energy, in motion | | | | | | Topic: Light and Energy Content Statements <ol style="list-style-type: none"> Energy comes from the sun to earth in the form of light. Energy is revealed in various forms: heat, electrical, light, sound, and magnetic energy. Energy can be carried from one place to another by water waves & sound waves, electric current and moving objects. Light moves in waves. It has characteristics that can be observed. Key terms: heat energy (thermal), electricity, light energy, sound energy, waves, current | | | | | |
| | | | | | | | w | ob | 2 | 13 | 12 | 3 | w | pf | 2 | 13 | 12 | 3 | w | lh | 2 | 13 | 12 | 3 |

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| | | <p>Topic: Matter is conserved</p> <p>Content Statements</p> <ol style="list-style-type: none"> Matter takes up space and has observable properties. Observe and explain that the total amount of matter is conserved when it undergoes a change. When two or more substances are combined, a new substance may be formed with properties that are different from those of the original materials. Pressure and heat can result in changes of state. <p>Key terms: matter, conserved, substance, change of state</p> | | | | | | <p>Topic: Forces in Nature</p> <p>Content Statements</p> <ol style="list-style-type: none"> Compare and contrast forces in nature and forces of objects and on objects. Gravity is a force that pulls objects to the ground. There are some places where there is more gravitational force than others. Some objects exert a force on one another without contact. The position of an object can alter the force. <p>Key terms: balanced force, unbalanced force, gravity, force field, direct contact, indirect contact</p> | | | | | | <p>Topic: Thermal Energy</p> <p>Content Statements</p> <ol style="list-style-type: none"> Energy can be transformed from one form to another (heat, light, and motion). Heat (thermal energy), magnetism, and electricity are forms of energy. Electricity runs in an electrical circuit. Magnetism is a strong force that originates in earth's core. Electricity and magnetism are closely related. <p>Key terms: transform energy, transfer energy, heat energy (thermal), light energy, motion, magnetism, electricity, open circuit, closed circuit, force, earth's core</p> | | | | | |
| Grade 4 | | w | ob | 2 | 13 | 12 | 4 | w | pf | 2 | 13 | 12 | 4 | w | lh | 2 | 13 | 12 | 4 |
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| Grade 5 | Topic: Atoms | | | | | | Topic: Forces that Affect Motion | | | | | Topic: Light and Sound | | | | | |
| | Content Statements | | | | | | Content Statements | | | | | Content Statements | | | | | |
| | <ol style="list-style-type: none"> All matter is made up of small particles called atoms. The arrangement of atoms impacts the physical and chemical properties of matter. Atoms may combine to form molecules. An element is composed of one kind of atom and organized on an element chart. Scientists have developed instruments to investigate atoms. (the smaller the object being viewed, the larger the instrument for viewing) | | | | | | <ol style="list-style-type: none"> The motion of an object can change by speeding up, slowing down, or changing direction. The amount of change in movement of an object is based on the mass of the object and the amount of force exerted. Movement can be measured by speed. The change in speed or direction of an object requires a force. Weight is a measure of the gravitational force between an object and the Earth. | | | | | <ol style="list-style-type: none"> Light and sound are forms of energy that behave in predictable ways. Light travels and maintains its direction until it interacts with an object or moves from one medium to another. Light can be reflected, refracted, or absorbed. Sound is produced by vibrating objects. The rate of vibration is related to the pitch of the sound. | | | | | |
| Key terms: atom, molecule, element, electron footprint | | | | | | Key terms: force, motion, acceleration, weight, mass, gravity, speed | | | | | Key terms: vibration, medium, wave, pitch, frequency, reflection, refraction, absorption, color | | | | | | |
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| Grade 6 | <p>Topic: Modern Cell Theory</p> <p>Content Statements</p> <ol style="list-style-type: none"> All matter is made up of small particles called atoms. There are empty spaces between the atoms that make up a substance. There are distinct characteristics of an element that differentiate it from other elements. Atoms and molecular activities can explain chemical changes. Compounds are formed by combining two or more different elements and have properties that are different from their elements. <p>Key terms: atoms, molecule, element, mole, nanotechnology, atomic engineer, nuclear engineer</p> | | | | | | <p>Topic: Matter & Motion</p> <p>Content Statements</p> <ol style="list-style-type: none"> Thermal energy refers to the motion of an atom and the molecules in a substance. Solids, liquids, and gases vary in motion of and the spacing and attraction between particles. An object's position and speed can be measured and graphed as a function of time. Each atom takes up space, has mass, and is in constant motion. <p>Key terms: thermal energy, atom, molecules, solid, liquid, gas, particles, mass</p> | | | | | | <p>Topic: Kinetic & Potential Energy</p> <p>Content Statements</p> <ol style="list-style-type: none"> There are two categories of energy: kinetic and potential. Objects and substances in motion have kinetic energy. Objects and substances can have energy as a result of their position (potential energy). Thermal energy is the total amount of kinetic energy present in a substance. Solar energy reaches Earth through radiation, mostly in the form of light. It powers winds, ocean currents, and the water cycle. <p>Key terms: kinetic energy, potential energy, motion, at rest, thermal energy, solar energy, radiation</p> | | | | | | |
| | | w | ob | 2 | 13 | 12 | 6 | w | pf | 2 | 13 | 12 | 6 | w | lh | 2 | 13 | 12 | 6 |

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| | | Topic: Elements | | | | | | Topic: Simple Machines | | | | | | Topic: Forms of Energy | | | | | | | |
| Grade 7 | <p>Content Statements</p> <ol style="list-style-type: none"> 1. The properties of matter are determined by atomic structures and interactions. 2. Atoms form elements in nature that can be identified by their properties. 3. A table has been developed that can be used to compare/contrast known elements. 4. The total mass of matter is conserved in chemical reactions. It is not created or destroyed. <p>Key terms: atom, molecule, element, proton, electron, neutron, Periodic Table of Elements, Law of Conservation, atomic mass, mixture, solution</p> | | | | | | | <p>Content Statements</p> <ol style="list-style-type: none"> 1. All objects experience a buoyant force when immersed in a fluid. (Upward force on an object in a fluid is equal to the weight of the fluid that the object has displaced. 2. A property of substances is its density. This can be measured when you know its mass and volume. 3. Objects have properties that help us to predict whether they will float or sink. 4. Kinetic and potential energy are related. 5. Simple machines confer mechanical advantage and they are modeled to work like the human musculoskeletal system. <p>Key terms: buoyant force, density, mechanical energy, kinetic energy, potential energy, simple machine, lever, wedge, pulley, wheel & axle, inclined plane, screw</p> | | | | | | | <p>Content Statements</p> <ol style="list-style-type: none"> 1. Understand that energy can be transformed or transferred but is never lost. 2. Explain how electromagnetic waves transfer energy when they interact with matter. 3. Thermal energy is transferred through conduction, convection, and radiant currents 4. Magnetism and electricity travel in waves. 5. Convection energy powers winds, ocean currents, and the water cycle. <i>(will also be covered in depth in home planet)</i> 6. Solar energy reaches Earth through radiation, mostly in the form of light. <i>(will also be covered in depth in home planet)</i> <p>Key terms: thermal energy, convection, conduction, radiation, electromagnetic spectrum, transform, transfer, waves</p> | | | | | | |
| | w | ob | 2 | 13 | 12 | 7 | w | pf | 2 | 13 | 12 | 7 | w | lh | 2 | 13 | 12 | 7 | | | |

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| Grade 8 | Topic: Atomic Structure | | | | | | Topic: Magnitude and Direction | | | | | Topic: Potential Energy | | | | | |
| | Content Statements 1. The structure of the atom and its composed protons, neutrons, and electrons that move around in orbits. 2. Rearranging atoms into new positions to form new substances is evidence that the chemical potential energy has most likely changed (chemical reaction). 3. Living organisms are made of molecules consisting largely of carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur. 4. Atoms and molecules form solids by building up repeating patterns. 5. Chemical reactions liberate or absorb heat; physical processes have no chemical reaction. 6. Chemical reactions are processes in which atoms are rearranged into different combinations of molecules. | | | | | | Content Statements 1. Forces have magnitude and direction in reference to a given location. 2. Explain how forces between objects act when the objects are in direct contact or when they are not touching. 3. The motion of an object is always measured with respect to a reference point. 4. Balanced and unbalanced forces act differently. 5. Interpret graphs of position, time and speed for a single direction. 6. Items with potential energy are storing energy. 7. Elasticity represents a form of potential energy. | | | | | Content Statements 1. There are a variety of examples for potential energy, such as gravitation, elastic, chemical, electrical, and magnetic potential energy. 2. Electrical energy can be transferred into kinetic, thermal, light, sound, and/or magnetic energy. 3. Light can be reflected, refracted, transmitted, and absorbed by matter, but to be seen it must be detected by the eye. 4. Light is a mixture of many wavelengths (colors) and that retinal cells react differently to different wavelengths. | | | | | |
| | Key terms: atomic mass, isotope, ion, proton, electron, neutron, radioactive , chemical reaction | | | | | | Key terms: balanced and unbalanced force, motion, magnitude, speed, acceleration, position, magnetic force, electrical force, gravitational force | | | | | Key terms: electromagnetic spectrum, angle of reflection, angel of incidence, reflect, refract, absorb, electrical energy, kinetic and potential energy | | | | | |
| w | ob | 2 | 13 | 12 | 8 | w | pf | 2 | 13 | 12 | 8 | w | lh | 2 | 13 | 12 | 8 |