**Overview of Year**

**\_\_8th\_\_ Grade \_\_\_Science\_\_\_\_\_\_ Curriculum**

Your curriculum overview may have more than 6 units. Please adjust the template accordingly.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEPT** | **OCT** | | **NOV** | **DEC** | | **JAN** | **FEB** | | **MARCH** | | **APRIL** | **MAY** | | **JUNE** |
| Unit 1  Energy | | Unit 2  Forces & Motion | | | Unit 3  Astronomy | | | Unit 4  Energy of Life | | Unit 5  Energy of Body | | | Unit 6  Energy of Matter | |

|  |  |  |
| --- | --- | --- |
| **Unit 1** | **Understanding** | **Essential Question** |
| **Energy** | Energy exists in many forms, and when these forms change energy is conserved.  All processes require the use of energy.  Energy is the ability of a system to “do something” (do work on another system)  4.1c Most activities in everyday life involve one form of energy being transformed into another. For example, the chemical energy in gasoline is transformed into mechanical energy in an automobile engine. Energy, in the form of heat, is almost always one of the products of energy transformations.    4.1d Different forms of energy include heat, light, electrical, mechanical, sound, nuclear, and chemical. Energy is transformed in many ways.    4.1e Energy can be considered to be either kinetic energy, which is the energy of motion, or potential energy, which depends on relative position.    4.5a Energy cannot be created or destroyed, but only changed from one form into another.    4.5b Energy can change from one form to another, although in the process some energy is always converted to heat. Some systems transform energy with less loss of heat than others.    4.4e Electrical circuits provide a means of transferring electrical energy.    5.2c Machines transfer mechanical energy from one object to another. | What is energy, where does it come from, and **how do we use it**?  How does energy “make things happen?” (Can anything happen without energy?)  How can we tell something has energy? |
| Performance Task:  Design a Rube Goldberg style device to complete a simple task that demonstrates how energy changes from one form to another. | | |

|  |  |  |
| --- | --- | --- |
| **Unit 2** | **Understanding** | **Essential Question** |
| **Forces & Motion** | Energy and matter interact through forces that result in changes in motion.  · 5.1c An object’s motion is the result of the combined effect of all forces acting on the object.  · A moving object that is not subjected to a force will continue to move at a constant speed in a straight line. An object at rest will remain at rest.  · 5.1e For every action there is an equal and opposite reaction.  5.1a The motion of an object is always judged with respect to some other object or point. The idea of absolute motion or rest is misleading.  5.1b The motion of an object can be described by its position, direction of motion, and speed (rate of change).  · Newton’s First law is the law of inertia. An object at rest or in motion will remain that way unless a force acts upon it  · Inertia is the resistance to change in the state of motion and it is dependent on the amount of mass of an object  · Newton’s second law says that when an object fells an unbalanced net force it accelerates. The acceleration of the object depends on its mass and the force applied  · Newton’s third law state that for every applied force there is an equal and opposite force  · Mass is the amount of matter (“stuff”) that an object is made of.  Weight is the force felt by an object due to gravity  4.4f WIthout touching them, material that has been electrically charged attracts uncharged material, and may either attract or repel other charged material.  4.4g Without direct contact, a magnet attracts certain materials and either attracts or repels other magnets. The attractive force of a magnet is greatest at its poles.  5.1d Force is directly related to an object’s mass and acceleration. The greater the force, the greater the change in motion.  5.2a Every object exerts gravitational force on every other object depending on its mass and how far apart they are.  5.2b Electric currents and magnets can exert a force on each other.  5.2c Friction is a force that opposes motion.  key terms - distance, average speed, and acceleration. | How can we represent the motion of an object?  How do forces affect the way our world moves?  How do forces affect an object’s energy? |
| Performance Task:  Scholars determine if there is a speeding problem on a nearby street through designing and carrying out a quantitative investigation of the problem. | | |

|  |  |  |
| --- | --- | --- |
| **Unit 3** | **Understanding** | **Essential Question** |
| **Astronomy** | 1.1d Gravity is the force that keeps planets in orbit around the Sun and the Moon in orbit around the Earth.  1.1e Most objects in the solar system have a regular and predictable motion. These motions explain such phenomena as a day, a year, phases of the Moon, eclipses, tides, meteor showers, and comets.  1.1a Earth’s Sun is an average-sized star. The Sun is more than a million times greater in volume than Earth.    1.1b Other stars are like the Sun but are so far away that they look like points of light. Distances between stars are vast compared to distances within our solar system.    1.1c The Sun and the planets that revolve around it are the major bodies in the solar system. Other members include comets, moons, and asteroids. Earth’s orbit is nearly circular.  1.1g Moons are seen by reflected light. Our Moon orbits Earth, while Earth orbits the Sun. The Moon’s phases as observed from Earth are the result of seeing different portions of the lighted area of the Moon’s surface. The phases repeat in a cyclic pattern in about one month.    1.1h The apparent motions of the Sun, Moon, planets, and stars across the sky can be explained by Earth’s rotation and revolution. Earth’s rotation causes the length of one day to be approximately 24 hours. This rotation also causes the Sun and Moon to appear to rise along the eastern horizon and to set along the western horizon. Earth’s revolution around the Sun defines the length of the year as 365 1/4 days.    1.1i The tilt of Earth’s axis of rotation and the revolution of Earth around the Sun cause seasons on Earth. The length of daylight varies depending on latitude and season.    1.1j The shape of Earth, the other planets, and stars is nearly spherical.  4.1a The sun is the major source of energy for earth.  5.2a Every object exerts gravitational force on every other object. Gravitational force depends on how much mass the objects have and how far apart they are. Gravity is one of the forces acting on orbiting objects and projectiles. | What’s “out there” (in outer space), what’s it doing, and how do we know? |
| Performance Task:  Scholars research another planet in order to create a news report of settlers’ lives on that planet based on the planet’s properties (e.g. speed of rotation & revolution, mass, radius, distance from sun). | | |

|  |  |  |
| --- | --- | --- |
| **Unit 4** | **Understanding** | **Essential Question** |
| **Energy of Life** | Energy and matter flow from one organism to another. Energy enters ecosystems as sunlight, and is eventually lost from the community to the environment, mostly as heat.  5.1c All organisms require energy to survive.  5.1d. The methods for obtaining nutrients vary among organisms. Producers, such as green plants, use light energy to make their food. Consumers, such as animals, take in energy-rich foods.  5.1e Herbivores obtain energy from plants. Carnivores obtain energy from animals. Omnivores obtain energy from both plants and animals. Decomposers, such as bacteria and fungi, obtain energy by consuming wastes and/or dead organisms.  6.1a Energy flows through ecosystems in one direction, usually from the sun, through producers to consumers and then to decomposers. This process may be visualized with food chains or energy pyramids.  6.1b Food webs identify feeding relationships among producers, consumers, and decomposers in an ecosystem.  6.2a Photosynthesis is carried on by green plants and other organisms containing chlorophyll. In this process, the Sun’s energy is converted into and stored as chemical energy in the form of a sugar.  6.2c Green plants are the producers of food which is used directly or indirectly by consumers. | Why do living things need energy and how do they get it? |
| Performance Task:  Scholars write a letter to the World Wildlife foundation arguing for additional support for an endangered species. Scholars support their claims through their understanding of the flow of energy through an ecosystem. | | |

|  |  |  |
| --- | --- | --- |
| **Unit 5** | **Understanding** | **Essential Question** |
| **Energy of Body** | 5.1c All organisms require energy to survive.  1.2a Each [body] system is composed of organs and tissues which perform specific functions and interact with each other.  1.2b Tissues, organs, and organ systems help to provide cells with nutrients, oxygen, and waste removal.  1.2c The digestive system consists of organs that are responsible for the mechanical and chemical breakdown of food.  1.2d During respiration, cells use oxygen to release the energy stored in food. The respiratory system supplies oxygen and removes carbon dioxide.  1.2e The excretory system functions in the disposal of dissolved waste molecules, the elimination of liquid and gaseous wastes, and the removal of excess heat energy.  1.2f The circulatory system moves substances to and from the cells, where they are needed or produced, responding to changing demands.  1.2h The nervous and endocrine systems interact to control and coordinate the body’s responses to changes in the environment, and to regulate growth, development, and reproduction. Hormones are chemicals produced by the endocrine system; hormones regulate many body functions. Hormones regulate many body functions.  1.2i The male and female reproductive systems are responsible for producing sex cells necessary for the production of offspring. | How do our bodies use energy? |
| Performance Task:  For a given physical activity scholars analyze and present on how their body systems are using and transforming energy for the activity. | | |

|  |  |  |
| --- | --- | --- |
| **Unit 6** | **Understanding** | **Essential Question** |
| **Energy of Matter** | 3.1a Substances have characteristic properties. Some of these properties include color, odor, phase at room temperature, density, solubility, heat and electrical conductivity, hardness, and boiling and freezing points.  3.1c The motion of particles helps to explain the phases (states) of matter as well as changes from one phase to another. The phase in which matter exists depends on the attractive forces among its particles.  *3.1g Characteristic properties can be used to identify different materials, and separate a mixture of substances into its components.*  Temperature is a direct measurement of the average kinetic energy of the particles in a sample of material. It should be noted that temperature is not a measurement of heat.  3.1d Gases have neither a determined shape nor a definite volume. Gases assume the shape and volume of a closed container.  3.1e A liquid has a definite volume, but takes the shape of a container.  3.1f A solid has a definite shape and volume. Particles resist a change in position.  3.1h Density can be described as the amount of matter that is in a given amount of space. If two objects have equal volume, but one has more mass, the one with more mass is denser.  3.1i Buoyancy is determined by comparative densities.  3.2a During a physical change a substance keeps its chemical composition and properties. Examples of physical changes include freezing, melting, condensation, boiling, evaporation, tearing, and crushing.  3.2b Mixtures are physical combinations of materials and can be separated by physical means. | What is our world made of and how do we measure it?  How are matter and energy related?  How do we measure “space”? |
| Performance Task:  Scholars assume the role of a scientist that have been given a series of samples to analyze. Their task is to identify a series of unknown substances in a mixture based on the properties of those materials (i.e. density, conductivity, etc). | | |