

Teaching Unit: **Metric System**

Essential Understandings

Most of the world uses the metric system.
Basic units of measure are the liter, meter, and gram.
Symbols and their values are K-kilo, H-hecto, Da-deka, D-deci, C-centi, M-milli.
Liter is the basic unit of volume.
Meter is the basic unit of length.
Gram is the basic unit of mass.

The value of Kilo is 1,000
The value of hecto is 100
The value of deka is 10.
The value of deci is 0.1.
The value of centi is 0.01.
The value of milli is 0.001.
Understanding to change values the decimal point is moved left or right.

Teaching Unit: **Structure of Matter**

Essential Understandings

The basic atom is made up of positive protons, neutral neutrons, and negative electrons.
Elements in the periodic are arranged in order of the number of protons that each element has. Hydrogen with one electron is number one and so on.
To make using the periodic table easier each element has its own symbol.
Elements in the horizontal periods all have the same number of energy levels.
Elements in the vertical groups or families have the same number of outer energy level electrons.
The numbers in each box for each element depict the number of protons, neutrons, and electrons. Periodic tables differ in the placement of these numbers.
Metals lose outer energy level electrons during bonding.
Nonmetals gain outer energy level electrons during chemical bonding.

Sub Topic:

Knowledge and Skills

Metric prefixes kilo, hecto, deka, deci, centi, milli.
The basic units of mass, volume, and length and knowing the symbols of each.
Knowing the value of each prefix and symbol.
Moving the decimal point to the right or left when changing mg to kg or cm to mm.

Sub Topic: **Periodic Table**

Knowledge and Skills

Understanding the periods and groups or families and what the numbers and symbols mean.
differences in metals and nonmetals.

Teaching Unit: **Structure of Matter**

Essential Understandings

An atom is made up of protons and neutrons in the nucleus and electrons outside the nucleus.

the electrons travel in energy levels around the nucleus.

In most compounds atoms end up with 8 electrons in the outer energy level.

In ionic bonding metals lose outer energy level electrons.

In covalent bonding outer energy level electrons are shared.

Carbon has the ability to form four compounds. This is why carbon is found in more compounds than any other element. Carbon forms compounds by covalent bonding.

Ionic bonding occurs because metals lose outer energy level electrons and non-metals gain outer energy level electrons.

metals become positive ions, non-metals become negative ions. The opposite charges are attracted to each other forming a new compound.

Non-metals combine by sharing outer energy level electrons.

In ionic and covalent bonding outer energy levels usually end up with eight electrons.

Balancing chemical equations showing that the same number of atoms are appearing on both sides of the equations.

Counting the number of atoms of each element in an equation.

Teaching Unit: **Structure of Matter**

Essential Understandings

Density equals mass divided by volume.

An object will float if it displaces more air or water than the mass of the object itself.

Using the formula and plugging in the correct information to acquire the correct answer.

Sub Topic: **Bonding & Conservation**

Knowledge and Skills

Basic structure of an atom.

Electrons in ionic and covalent bonding.

How ionic bonding works and the formulas.

Carbon and covalent bonding.

Importance of stable-8.

Matter can neither be created nor destroyed.

How to balance a chemical equation.

Sub Topic: **Buoyancy & Density**

Knowledge and Skills

Objects with a density less than 1.0 g/cm^3 will float in water.

Objects with a density greater than 1.0 g/cm^3 will sink in water.

Density of mediums will determine whether objects will float or sink.

Relation between mass and volume determines density.

Teaching Unit: ***The Earth***

Essential Understandings

The earth revolves around the sun once every 365 days, this is called a year.
The earth rotates on its axis once every 24 hours. this is called a day.

The earth tilts on its axis 23.5 degrees.

As the earth revolves the northern and southern hemispheres take turns tilting towards the sun.

When the northern hemisphere tilts towards the sun it is summer. It would be winter in the southern hemisphere.

When the northern hemisphere tilts away from the sun it is winter. It would be summer in the southern hemisphere.

When a hemisphere tilts towards the sun, sunlight hits earth more directly, with more intensity making it much warmer.

When you go north or south from the equator you increase latitude. In the northern hemisphere the further north you go the longer days get. It is just the opposite in the winter time. The same is true in the southern hemisphere.

When neither hemisphere is pointing towards or away from the sun it is either fall or spring.

Teaching Unit: ***Motion Simple Machines***

Essential Understandings

Sub Topic: ***Tilt of Axis***

Knowledge and Skills

How the tilt of the axis affects the intensity and the amount of sun that hits earth.

Importance of earth revolution

Importance of latitude.

Importance of rotation.

Sub Topic:

Knowledge and Skills

How to find mechanical advantage and what it means.

Know different simple machines and the mechanical advantage of each one.

what is a compound machine

Teaching Unit: ***Motion***

Essential Understandings

Sub Topic: ***Math Speed, Distance, Time***

Knowledge and Skills

Perform math functions using different formulas.

Properly labeling each formula.

Teaching Unit: ***The Universe***

Essential Understandings

Sub Topic: ***Solar System & Galaxies***

Knowledge and Skills

Describe motion of moons, planet, stars, solar systems, and galaxies.

Understand rotation, revolution and that planets rotate around the sun.

Understand that the sun is the center of our simple solar system.

Solar system is part of a galaxy. The galaxies themselves also rotate.

Gravity is what makes it all possible.

Teaching Unit: ***Motion***

Essential Understandings

Sub Topic: ***Newton's Three Laws***

Knowledge and Skills

Newton' Three Laws

1st Law of Motion - inertia

2nd Law - force and mass - acceleration and force are directly proportional, mass and acceleration are inversely proportional

3rd Law - action / reaction - reaction force is equal to action force

Teaching Unit: ***Energy***

Essential Understandings

Energy is constantly being transferred in and out of everything all the time.

Sub Topic: ***Waves, Conduction, Convection,***

Knowledge and Skills

Waves - energy travels in waves including the electro-magnetic spectrum

Conduction - energy transfer through molecules

Convection - energy transfer through warm and cool materials

Radiation - energy transfer by waves and does not need a medium to travel.

Teaching Unit: ***The Universe***

Essential Understandings

Sub Topic: ***Life cycle of stars***

Knowledge and Skills

Make Up of a Star

Stars have a life like we do. They are born, live, and die.

Know the different stages of a life: proto-star, main sequence, red giant, white dwarf, black dwarf, super nova, black hole, neutron

The mass of a star determines its life cycle.

Teaching Unit: ***The Earth***

Essential Understandings

Relative age is the age of an object as compared with another. Relative age is finding the order in which events occurred.

Absolute age is the actual age in years.

Carbon dating is using carbon isotopes to find the age of objects.

Absolute age is the actual age in years.

Carbon dating is using carbon isotopes to determine the age of an object.

An isotope is an atom of an element with a different number of neutrons in the nucleus.

Radioactive isotopes change over a period of time. Half-life is the time it takes for half the mass of a radioactive isotope to decay.

Sub Topic: ***Evidence to find Earth's age***

Knowledge and Skills

Show how isotopes are used to find the age of earth objects (carbon-14 dating), half-life

Know the difference between: Absolute Age, Relative Age

Carbon Dating

Isotopes and Half Life

Radioactive elements do have a half-life. Understand how the math works.

Teaching Unit: ***Energy***

Essential Understandings

Sub Topic: ***Static and Current Electricity***

Knowledge and Skills

(never had time to get to it so currently undeveloped.)
