

- Vocabulary

### Experimental Design

- **control group** = group that has the variable
- **controlled variables** = all the things that stay the same in both the experimental and control group
- **dependent variable** = (responding variable) the variable that changes in response to independent variable.
- **experimental group** = group that has the variable
- **independent variable** = (manipulated variable) the variable the scientist changes
- **scientific method** = is a set of steps scientist used to test the solution to a scientific problem

### Structure of the Atom

- **Atom** = is the smallest particle of matter that still maintains the properties of that element.
- **Atomic mass** = is the average mass of an element. It is also the # of particles in the nucleus ( $P^+ + N^0$ ).
- **Atomic Number** = the number of protons but also the number of electrons in a neutral atom.
- **Electron** = negative particles that orbit the nucleus (# of  $e^-$  = to the atomic #).
- **Ions** = Atom that has gained or lost an electron (not neutral).
- **Isotopes** = atoms of an element that have a different number of neutrons.
- **Models** = a representation of something that is too small or too large to be seen
- **Neutron** = No charge particle located in the nucleus of an atom. {to find # of  $N^0$  subtract A# From AM}
- **Nucleus** = Center of the atom & (contains the  $P^+$  and  $N^0$ .) (# of particles in nucleus = atomic mass)
- **Proton** = positively charged particle that is located in the nucleus (# of  $p^+$  = to the atomic #).
- **Symbol** = a 1 or 2 letter combination that represents an element (e.g. H = Hydrogen & Fe = Iron).
- **Valence electrons** = electrons in the outer shell & are involved in bonding (2,8,8,8,8,8).

### Periodic Table of the Elements

- **periodic table** = is a collection of all the known elements in the universe.
- **Group** = is a column on the periodic table. The period # refers to the # of valence electrons.
- **Family** = is the same as group and means they have similar properties.

- **Metalloids** = elements on the stair-step crack. Metalloids have properties of metals & nonmetals.
- **Metals** = are on the left side of the periodic table Metals are good conductors of heat & electricity.
- **Nonmetals** = are on the right side of the periodic table. They are mainly gases & are poor conductors of heat & electricity.
- **Period** = is a row on the periodic table. The period # tells the number of electron shells.
- **Shell** = is an energy level where electrons reside. All the energy shells together make up the electron cloud.
- **Group 1** = Alkali metals most reactive group in the periodic table
- **Group 2** = Are called the alkaline earth metals.
- **Group 17** = are called the halogens.
- **Group 18** = are the Noble Gases & are the least reactive group on periodic table

### **Physical & Chemical Properties**

- **Physical properties** = properties found using sight or touch
- **Conductivity** = is the ability to conduct heat or electricity
- **Corrosiveness** = means it can be broken down by acid or rust.
- **Reactivity** = is the ability to react with another element or substance.
- **Density** = how heavy something is for its size  $D=m/v$ .
- **Solubility** = means the ability to be dissolved.
- **Ductility** = means the ability to be made into a wire.
- **Viscosity** = how thick a liquid is honey is viscous
- **Flammability** = means the ability to burn.
- **Insulation** = means the inability to conduct heat or electricity.
- **Luster** = means the ability to reflect light it is shiny
- **Malleability** = means the ability to be made into a foil
- **Oxidation** = means the ability to react to the presence of oxygen
- **Yields** = means reacts to become and is represented by the symbol ( $\rightarrow$ ).

### **Chemical Reactions**

- **Chemical change** = A change that cannot be reversed (ex: burning or rusting)
- **Chemical equation** = a way of showing a chemical reaction using symbols  $2H_2 + O_2 \Rightarrow 2H_2O$
- **Chemical formula** = A way to describe compound using symbols (ex:  $H_2O$ ,  $CO_2$ ,  $C_6H_{12}O_6$ )
- **Chemical reaction** = A way of showing a chemical change that occurs when substances react
- **Chemical symbol** = a 1 or 2 letter combination that represents an element (C, He, O)
- **Coefficient** = the number in front of a compound ( $2CO$ ,  $3FeO$ ,  $6NaCl$ )
- **Mixture** = a combination of 2 or more substances that are not chemically combined

- **Solution** = a mixture in liquid form where 1 substance is dissolved in another
- **Compound** = 2 or more elements chemically combined (ex: H<sub>2</sub>O, CO<sub>2</sub>, C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>)
- **Endothermic** = Chemical reactions that absorb heat
- **Exothermic** = Chemical reactions that release heat
- **Physical change** = a change in the way something looks can be reversed
- **precipitate** = a solid formed during a chemical reaction
- **Products** = substances on the right side of the chemical equation
- **Reactants** = substances on the left side of the chemical equation
- **Subscript** = O<sub>2</sub>, H<sub>2</sub>, N<sub>2</sub>
- **Law of conservation of mass** = the #of atoms in the reactant is =the # of atoms in the product.

### **Interdependency in Ecosystems**

- **Ecosystem** = all the biotic (living) and abiotic (non-living) in an area.
- **Biotic** = the living things in an environment (plants , animals )
- **Abiotic** = means non-living (ex: rocks, air , water, soil)
- **Energy pyramid** = is a pyramid shaped diagram that shows how energy flows through an ecosystem
- **Food Chain**= one path of energy from the sun to the producer to a series of consumers, in an ecosystem
- **Food Web**= in an ecosystem, arrangement of several overlapping food chains
- **Food Pyramid**= a hierarchy of food chains with the principal predator at the top; each level preys on the level below
- **Predator** = is an organisms that hunts for food(ex: shark)
- **Prey** = is an organisms that is hunted for food (ex: mouse)
- **10% Rule** = how much energy is passed from one organism to another
- **Organism** = a living thing(ex: tree, wolf, mushroom)
- **population** = a group or organisms (one species) that live in an area (house sparrows)
- **Producer** = a plant makes energy using sunlight (photosynthesis)
- **Consumer** = eats organisms for food
- **Decomposer** = an organism that breaks down dead organisms and returns nutrients to the environment
- **Symbiosis** = a relationship between organisms where at least one organisms benefits
- **commensalism** = is a relationship where one organism benefits & one is unaffected (ex: hawk & tree)
- **mutualism** = is a relationship where both organism benefit (cleaner fish & grouper)
- **parasitism** = is a relationship where 1 organism benefits & 1 is harmed (deer & tick)

- **Predator prey relationship** = a relationship where one organism kills and eats another
- **Community** = all populations in an area (all the wolves, moose pines and ferns in an area)
- **Adaptation** = An inherited trait helps an organism survive and reproduce.
- **Biodiversity** = the number and variety of different species in a given area.
- **Camouflage** = an adaptation that allows an organism to blend into its surroundings.
- **Competition** = when two or more organisms are rivals for the same source.

### **Heat & Energy**

- **Change of state** = solid to liquid liquid to gas, liquid to solid
- **Heat** = a transfer of thermal energy
- **Kinetic energy** = energy a substance or particle has because it is moving
- **Temperature** = measure of the kinetic energy in a substance measured on degrees Celsius.
- **Thermal energy** = (Heat energy) total kinetic energy contained in the particles of a substance.
- **Thermal expansion** = is a change in volume caused by a change in temperature

### **Interactions Among Systems**

- **interaction** = means 2 things having an effect on each other
- **interdependence** = means that 2 things rely or depend on each other.
- **organ** = a group of tissues working together(ex: lung, heart, kidney, brain)
- **organ system** = a group organs working together(digestive, respiratory, skeletal or nervous)
- **system** = something that is made of parts working together
- **tissue** = a group of cells working together
- **cell** = the smallest part of a living thing

### **Feedback Mechanisms**

- **Diffusion** = to move from an area of high concentration to low concentration
- **Equilibrium** = in balance
- **External stimulus** = something from the outside that causes something to happen
- **feedback mechanisms** =
- **Homeostasis** = the idea that the body tries to keep itself in perfect balance.
- **Internal stimulus** = is the idea that the body tries to remain in perfect balance.
- **Metabolism** = a l
- **turgor pressure** = the pressure that water exerts against the cell wall of a plant cell.

## **Inherited Traits & Learned Behaviors**

- **dominant trait** = Strong trait that will be present when dominant allele is present
- **inherited trait** = trait passed from parent to offspring
- **interaction** = is how things affect one another
- **learned behavior** = not innate but learned from parents or the group
- **recessive trait** = weak trait that will be expressed only when 2 recessive alleles are present
- **allele** = Big B or Big T or Little b Or Little t
- **genetics** = the study of heredity or how traits are passed from parent to offspring
- **genotype** = GG Tt or bb
- **heterozygous** = different alleles Bb Tt Gg
- **homozygous** = Same Alleles BB TT gg hh
- **percentage** = part of a hundred
- **phenotype** = what a genotype means like tall brown eye or green seeds
- **Punnett square** = tool to calculate probability of inheriting a specific trait
- **ratios** = a part out of 4

## **Interactions Between Living and Non-living Systems**

- **Carbon cycle** = how Carbon gets recycled through the environment
- **Nitrogen cycle** = how Nitrogen gets recycled through the environment
- **Water cycle** = how water gets recycled through the environment

## **Environmental Conditions Affecting Species Survival**

- Natural selection
- Environmental conditions are driven
- **Survival of the fittest** = organisms that are adapted to their environment will survive & reproduce

## **Road to Survival vs. Road to Extinction**

- **endangered species** = species that is in danger of becoming extinct
- **equilibrium** = means that the number of predator and prey are regulated by each other
- **extinction** = get rid of a species
- **habitat destruction** = deforestation, by fires or to build homes or businesses
- **threatened species** = species that may become endangered

## **Global Warming: Who Moved the Carbon?**

- **acid rain** = A harmful form of precipitation caused by air pollution
- **emissions** = carbon released by cars and factories
- **equilibrium** = to be in balance

- **Fertilizer** = chemical put on plants to increase growth
- **Runoff** = the idea that water flows from a high place to a low place.
- **Fertilizer runoff** = chemicals and fertilizers not absorbed by plant are washed away
- **global warming** = the idea that the planet is getting warmer because of carbon in the atmosphere
- **greenhouse effect** = greenhouse gases like carbon trap the sun's rays and raise the temp
- **ozone depletion** = CFC from spray cans harm the Ozone layer & make a hole in it.

### **Natural Events Contribute to Extinction**

- **mass extinction** = the extinction of many species at once ( e.g. Alvarez theory)
- **catastrophic events** = any event fire, flood Volcano that might kill a large # of organisms.

### **Changes in the Rocks**

- **landform** = are features that make up the Earth's surface like mountains, canyons and valleys.
- **contour line** = A line on a contour map that connects points of equal elevation.
- **rock cycle** = describes the formation of the 3 main rock types; sedimentary, metamorphic, & igneous.
- **topographic map** = map that provides information about elevation & land features of an area.
- **Slope** = steepness of a hill or mountain
- **Weathering** = Breaking down rock by physical or chemical means
- **Erosion** = The carrying away of sand or soil by wind or water
- **Deposition** = dropping off of sediment & the opposite of erosion
- **Cementation** = forming rock from sediment & the opposite of weathering
- **Magma** = melted rock
- **Lava** = melted rock that has been exposed to air
- **Mountain** = a landform that is made of rock and is higher than the areas around it.
- **Valley** = a low area between two mountains
- **Canyon** = a landform formed by flowing water over millions of years
- **Delta** = where a river empties into the ocean & drops off sediment.
- **Plateau** = a landform, & an area of elevated flat land
- **Plains** = area of flat land

### **Forces Behind Change**

- **continental drift**= the idea that continents used to be together and have since drifted apart
- **convergent boundary**= where two plates are moving in the direction of each other
- **divergent boundary**= where two plates are moving away from each other
- **transform boundary** = boundary between 2 plates sliding past each other (causes earthquakes)
- **Convection current** = the rising & sinking of magma in the mantle & is the force behind plate tectonics
- **land subsidence** = land sinking
- **lithosphere** = the layer of planet Earth made of rock
- **mid-ocean ridge** = mountain range in the middle of the Atlantic caused by a divergent boundary.
- **Pangaea** = the name of supercontinent that was made up of all the 7 continents put together
- **plate tectonics**= the of movement of lithospheric plates and the landforms they create
- **Sea-floor spreading** = is the process that comes from a divergent boundary under the surface of the sea (causes mid-ocean ridge)
- **Subduction Zone**= the place where one plate slides under another plate (deep ocean trench)
- **uplift** = pushing up of earth's crust when 2 plates collide
- **Volcanic mountains** = mountains caused by an opening, or rupture, in a planet's surface or crust
- **Asthenosphere**= the upper part of the mantle where the Earth's plates float.
- **Continental crust** = crust made of granite rock & is lighter than oceanic crust
- **Oceanic crust** = crust made of basalt rock & is heavier than oceanic crust

## **The Global Climate**

- **Climate** = pattern of weather in a region for a long time
- **neap tide** = least extreme tides happen during 1<sup>st</sup> and 3<sup>rd</sup> quarter
- **spring tide** = the most extreme tides happen during new and full moon
- **Convection** = the transfer of heat energy in a liquid or a gas (heat rises and cold falls)
- **Coriolis effect** = the effect that Earth rotation has on air & water on its surface
- **El Nino** = unusually warm ocean temps that shift ocean current and weather patterns
- **Ocean currents** = A streamlike movement of water
- **Radiation** = transfer of energy using electromagnetic waves (like sunlight)
- **Weather** = condition of the atmosphere influenced by wind water and sunlight

## **Force and Motion**

- **Acceleration** = means to change in speed or get faster
- **average speed**= total distance divided total time
- **balanced forces** = both forces are = and are not moving
- **constant speed** = stay at the same speed
- **Density** = mass divided by volume
- **displacement** = to move from one place to another
- **distance** = the length from one point to another
- **distance-time- graph** = time is on the X axis & distance is on Y axis
- **force** = a push or a pull
- **friction** = something that resists movement
- **inertia** = an object in motion wants to stay in motion but an object at rest wants to stay at rest
- **motion** = means to move
- **net force** = total combined force
- **Newton's 1st law of motion** = is the law of inertia
- **Newton's 2nd law of motion** = the greater the mass the greater the force and the greater the force the greater the acceleration.
- **Newton's 3rd law of motion** = for every action there is an equal an opposite reaction
- **Speed** = distance divided by time
- **unbalanced force** = one force is stronger than another
- **velocity** = is speed plus direction
- **work** = force X distance.
- **Potential Energy** = energy at rest or in a high place.
- **Kinetic Energy** = is energy in motion
- **Weight** = is a measure of the force of gravity.
- **Mechanical energy** = that energy that involves moving things.

### **Waves and Their Properties**

- **amplitude** = is the distance from the line at rest to the trough or the crest.
- **crest** = is the top of a standing or transverse wave
- **frequency** = is how many waves pass a given point in a given amount of time.
- **trough** = is the bottom of a standing or transverse wave
- **wavelength** = is the distance from trough to trough or crest to crest in adjacent waves.
- **waves** = a disturbance that carries energy & may require a medium

### **Types of Waves**

- **Electromagnetic spectrum** = a diagram that shows electromagnetic waves & their frequencies.

- **Electromagnetic waves** = carry energy but do not require a medium like EMS waves.
- **Frequency** = how many waves pass a given point in one second.
- **Longitudinal waves** = are waves that run parallel to the direction of the wave.
- **mechanical waves** = waves that require a medium like water, or sound waves
- **Compressions** = the places on a longitudinal wave where the medium is close together.
- **Rarefactions** = the places on a longitudinal wave where the medium is spread apart.
- transverse waves

### **Stars & Galaxies**

- **absolute magnitude / luminosity**= how bright a star is
- **apparent magnitude/ luminosity** = how bright a star appears from Earth.
- **Elliptical galaxy**= A galaxy that has a superficially smooth, and ellipsoidal shape.
- **galaxy**=group of billions of stars
- **Hertzprung Russell (H-R) diagram**= is a graph of stars that shows the relationship between the stars' absolute magnitudes or luminosities versus classification group and effective temperatures.
- **Irregular galaxy**= is a galaxy that does not have a distinct regular shape.
- **Pulsar**= a neutron star that emits beams of radiation that sweep through Earth's line of sight.
- **spiral galaxy**= a galaxy having a spiral shaped arms and appears to be turning
- **Universe**= means everything that exists.
- **Asteroid** = **objects of rocks metal and ice that are smaller than planets and revolve around the sun**
- **Meteor** = **a rock that burns in the earths atmosphere**
- **Meteorite** **a piece of rock that lands of earth**
- **Comet**= an object made of ice and dust that orbits the sun and has a tail.

### **Light Years**

- **light year** = is a unit of length equal to just under 10 trillion kilometers.
- **scientific notation** = is a way of writing numbers with values too large or small to be written in standard decimal notation.
- **speed of light** = the speed at which light travels or 186,000 miles per second.

### **Origin of the Universe**

- **Big Bang theory** = the theory on how the Universe was created.

