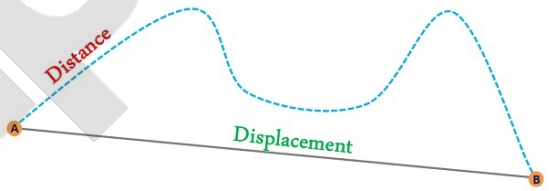
General Topics (8 terms):

- **Scientific Method and Process**
  - Sample Experiment: Jamie has 5 identical pots labeled A-E. Each pot contains the same amount of soil, as well as exactly one stalk of bamboo. Jamie first measures the initial height of each bamboo stalk, then places 4 different fertilizers in pots B-E, leaving pot A without any fertilizer. Jamie places all pots in a moist, sunlit environment and gives them the same amount of water each day for 10 days. She then measures the final height of each stalk and compares the growth rate of each stalk.
  - Control Variable: Does not change with each group; usually every other variable in an experiment besides the experimental variable (e.g. the amount of sunlight and the amount of water).
  - Experimental Variable: Changes with each group, usually only one in every experiment (i.e. the type of fertilizer).
  - Control Group: Group that does not have an experimental variable applied to it (i.e. pot A)
  - Experimental Group: Group that does have an experimental variable applied to it (i.e. pots B-E)
  - Hypothesis: Statement that provides a basic, untested explanation to a phenomenon (i.e. "If a pot gets fertilizer, it will have a higher growth rate"). Experiments are conducted to prove/disprove a hypothesis.
  - Empirical Data: Data collected through observation and experimentation (i.e. the end height and growth rate)
  - Inference: An educated conclusion made from data/evidence (e.g. "Since the pots that got fertilizer did not have a higher growth rate than the pot that did not, fertilizer has no apparent effect on growth rate")
  - Observation: The act of recording information through one's senses or scientific tools such as microscopes and graduated cylinders.

Physics (34 terms):

- **General Concepts**
  - Distance vs. Displacement:

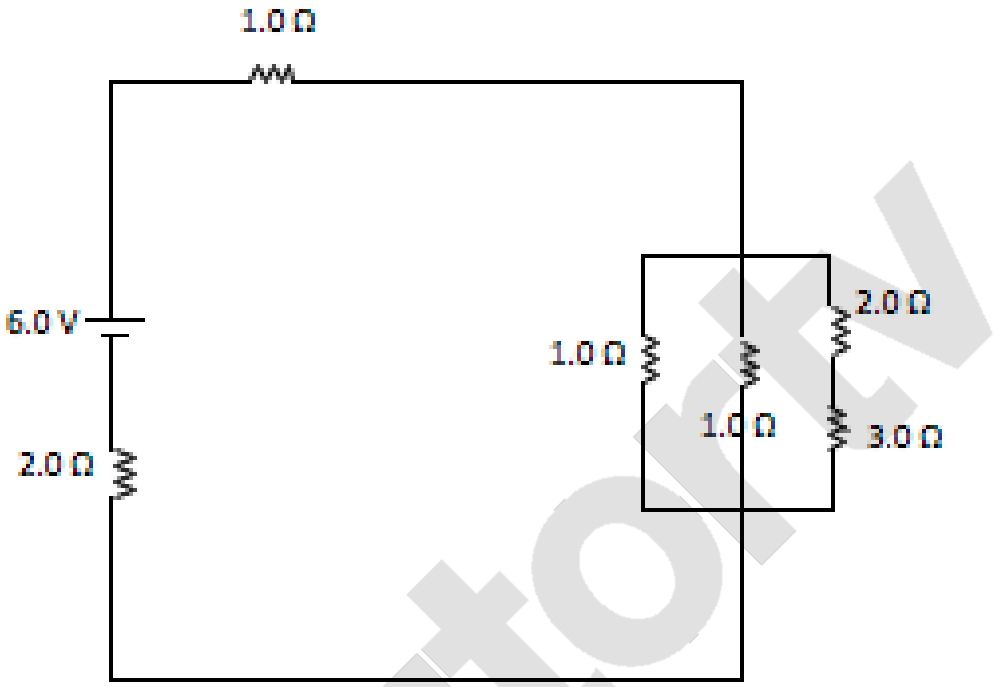


  - Distance: The total length of an object's travel path.
  - Displacement: The distance between an object's starting point and its ending point.
  - Velocity: The measure of an object's speed and direction. Velocity is a vector quantity because it measures both magnitude and direction. Velocity is equal to displacement divided by time ($v = \frac{d}{t}$).

- Acceleration: The measure of an object's change in velocity over time. Acceleration is also a vector and is equal to the change in velocity divided by the change in time $(a = \frac{\Delta v}{\Delta t})$. Caused by a net force acting on an object.
- Mass: The amount of matter an object has. Mass remains constant with changing gravities.
- Law of Conservation of Mass: Mass cannot be created nor destroyed.

- **Energy**
  - Potential Energy (PE): For the purposes of the ACT Science Test, potential energy is the stored energy caused by an object's relative position. For instance, a book put on top of a shelf has potential energy because it has the potential to fall down (it has stored energy due to gravity). The formula for potential energy is $PE = mgh$, where m is the mass of the object in kilograms, g is the acceleration due to gravity in meters per second squared (usually the Earth's gravity unless otherwise specified), h is the height of the object off of the ground in meters and PE is the potential energy of the object in joules. The higher an object is, the more PE it has.
  - Kinetic Energy (KE): The energy possessed by an object in motion. For instance, a sparrow flying at 15 meters per second has kinetic energy because it is moving, whereas a sparrow perched on a tree has no kinetic energy because it is stationary. The formula for kinetic energy is $KE = \frac{1}{2}mv^2$, where m is the mass of the object in kilograms, v is the velocity of the object in meters per second, and KE is the kinetic energy of the object in joules. The faster an object is moving, the more kinetic energy it has. Note that the velocity in the formula is squared, thus the amount of kinetic energy an object has is always independent of the direction the object is traveling in and can never be negative.
  - Mechanical Energy (ME): For the purposes of the ACT Science Test, mechanical energy is the energy related to an object's position and motion. It can basically be stated as the sum of an object's kinetic and potential energies.
  - Thermal Energy: Energy possessed by an object that has had a change in temperature.
  - Heat: specifically, the transfer of thermal energy. However, many like to use heat or heat energy interchangeably with thermal energy (make sure to understand the context given to avoid definition misunderstandings).
  - Law of Conservation of Energy: States that energy cannot be created or destroyed. We can apply this logic to state that the change in potential energy must be equal to the change in kinetic energy, or $\Delta PE = \Delta KE$ (assuming that there are no other types of energy given). This means that if an object falls downward, its loss in potential energy is equal to its gain in kinetic energy and vice versa.
- **Forces and Acceleration**
  - Newton's Second Law: States that the force acting on an object (in newtons) is equal to the object's mass (in kilograms) multiplied by its acceleration (in meters

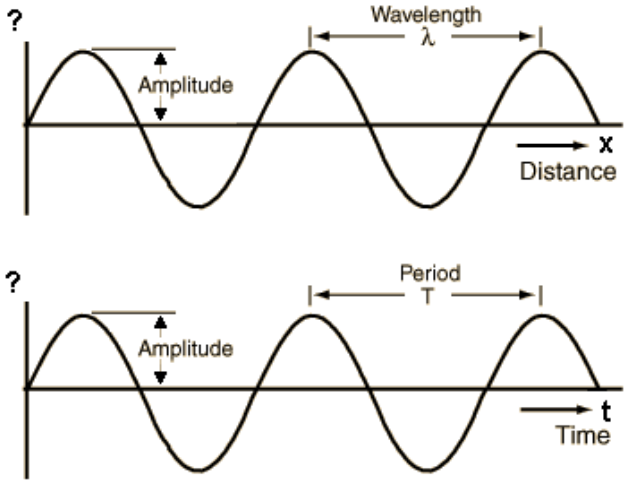
per second squared), or $F = ma$. This means that an object at rest or at a constant speed has no force acting on it, because it has no acceleration.
    - Net Force: the sum of all the forces acting on a single object; if two forces of the same magnitude are acting on an object from complete opposite directions, the net force would be zero.
    - Work: The energy used when a net force acts upon an object and causes the object's displacement. The formula for work is $W = Fd\cos\theta$, where W is the work done on the object (in joules or in newton meters), F is the force acting on the object (in newtons), d is the displacement of the object (in meters), and theta is the angle between the force and the displacement vector (in degrees). Note that the $\cos\theta$ is only necessary when the displacement is not in the same direction as the force is being applied in; in such a situation, θ is zero and so $\cos\theta$ is 1 so the formula simplifies to $W = Fd$.
    - Gravity: A force that attracts all objects that have mass towards each other. All objects on Earth experience an acceleration due to gravity (g) directed downwards with a magnitude of 9.8 meters per second squared.
    - Friction: A force that opposes motion. Friction acts between any two surfaces, and the force due to friction F_f (in newtons) is equal to μmg, where μ is the coefficient of friction, m is the mass of the moving object (in kilograms) and g is acceleration due to gravity (in meters per second squared).
    - Air Resistance: A force that opposes motion in the air and acts opposite to the direction of motion. Aerodynamic shapes such as a cone experience less air resistance than flat, boxy shapes because they have less surface area.
    - Free Fall: State in which a falling object's air resistance is equal to the gravitational pull acting on it, thus leading to a net force of zero and no acceleration of the object. All falling objects eventually enter free fall.
- **Heat**
    - Conduction: The transfer of thermal energy due to direct contact, like how cracking an egg into a hot pan causes the egg to cook.
    - Convection: The transfer of thermal energy through a fluid such as air or water, like how hot steam can cook a dumpling.
    - Radiation: The transfer of thermal energy through electromagnetic waves, like how the sun emits energy to Earth. No medium like direct contact or a fluid is required for this type of heat.
- **Circuits and Electricity**
    - Circuit Diagrams: These are basic diagrams which depict the layout of a circuit.



The two horizontal lines ⫟ represent the battery, with the longer side being positive and the shorter side being negative. The squiggly lines ⩙ represent resistors, and the basic straight lines — represent the wires in the circuit. You may see other symbols in circuit diagrams besides these three, but they will most likely be labeled.

- Current: Rate at which electrons flow through a wire in a circuit. A higher current means that the flow of electrons is faster. Calculated by $I = \frac{Q}{t}$ where I is the current in amps (A), Q is the quantity of electrons in Coulombs (C), and t is the period of time (in seconds).
- Coulomb: SI unit of electric charge. One electron has a charge of $1.6 \times 10^{-19} C$.
- Resistance: The measure of an object's resistance to the flow of current. Resistance is measured in ohms (Ω) and is represented by the letter R.
- Ohm's Law: This law states that voltage is equal to current multiplied by resistance ($V = IR$). In the case of a basic circuit, this means that the voltage of the battery in the circuit is equal to the current flowing through the circuit multiplied by the total resistance of the circuit.
- Charges: Electric charges can either be negative or positive. Opposite charges attract, whilst negative charges repel.

- **Waves:**
  - Basic wave graph:



- Crest: Points along the wave where there is maximum positive displacement.
- Trough: Points along the wave where there is maximum negative displacement.
- Amplitude: The maximum displacement a wave goes from its rest position. Amplitude is measured in meters, and is represented by the letter A.
- Wavelength: The distance between any two successive points on a wave at the same height (usually successive crests). Wavelength is measured in meters and is represented by the letter lambda (λ).
- Period: The time it takes for a wave to complete one full cycle. Period is measured in seconds, and is represented by the letter T.
- Frequency: The amount of cycles a wave completes in one second. Frequency is measured in Hertz (Hz) and is represented by the letter f. It is equal to the reciprocal of the period ($f = \frac{1}{T}$ or $f = T^{-1}$).

Chemistry (27 terms):

- General Concepts
  - Density: Mass divided by volume. The more dense an object is, the more mass it has in less volume. For instance, a rock is denser than a cloud.
  - Molar mass: The mass (in grams) per mole of a substance.
  - Moles: SI unit of substance that equals to Avogadro's number 6.022×10^{23}; usually used to measure the amount of a molecule or atom (e.g. 1 mol of oxygen atoms has 6.022×10^{23} oxygen atoms).
  - Molarity: A measure of the number of moles of a substance in a liquid per volume of the liquid. The formula for molarity is mol solute/L of solution. A higher molarity equates to a higher concentration of the substance.
- Chemical Reactions
  - Chemical Equation: A representation of a chemical reaction, such as $N_2 + 3H_2 \rightarrow 2NH_3$. The numbers beside the molecules are coefficients and show how many moles of that respective molecule are present in the reaction. The subscripts of the molecules show the structure of the molecule. To combine

these concepts together, take $2NH_3$: $2NH_3$ refers to 2 moles of NH_3, which each have 1 Nitrogen atom bonded to 3 Hydrogen atoms.

- Reagents/Reactants: The left side of a chemical equation: what is used up during a reaction.
- Products: The right side of a chemical equation, what is formed during the reaction from the reactants.
- Balancing Chemical Equations: According to the law of conservation of matter, chemical equations must be balanced. This means that the number and respective type of atoms on one side must be equal to that on the other side. For example, $N_2 + 3H_2 \rightarrow 2NH_3$ is balanced because there is a total of 2 Nitrogen and 3*2 = 6 Hydrogen atoms on one side, and a total of 1*2 = 2 Nitrogen and 2*3 = 6 Hydrogen atoms on the other side. ALL chemical equations must be balanced, anything otherwise would violate natural law.

One can balance a chemical equation by keeping track of how many atoms there are on either side. For instance, if given the equation $CH_4 + O_2 \rightarrow CO_2 + H_2O$, I could create a table of the amount of atoms on either side per each molecule:

	Left Side			Right Side		
	CH_4	O_2	Total	CO_2	H_2O	Total
Carbon	1	0	1	1	0	1
Hydrogen	4	0	4	0	2	2
Oxygen	0	2	2	2	1	3

Right now, I see that I have 4 Hydrogen on the left side, whereas I only have 2 on the right side. This means that I have to change my H_2O to $2H_2O$. After doing so, my table looks like this:

	Left Side			Right Side		
	CH_4	O_2	Total	CO_2	$2H_2O$	Total
Carbon	1	0	1	1	0	1
Hydrogen	4	0	4	0	4	4
Oxygen	0	2	2	2	2	4

Now, I have 4 Oxygen on the right side, whereas I only have 2 on the left side. This means I have to change my O_2 to $2O_2$ and update my table:

	Left Side			Right Side		
	CH_4	$2O_2$	Total	CO_2	$2H_2O$	Total
Carbon	1	0	1	1	0	1
Hydrogen	4	0	4	0	4	4
Oxygen	0	4	4	2	2	4

Now that all of my totals are the same, I am done. My final balanced equation is $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$. You can use this same process to balance any chemical equation. Keep in mind that if $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$, then $4CH_4 + 8O_2 \rightarrow 4CO_2 + 8H_2O$ is also balanced, as well as any other multiple of the balanced equation.

- Stoichiometry: A method for determining the amount of reactants and products based off of a balanced chemical equation. It essentially uses dimensional analysis to calculate amounts. For instance, say I had the same reaction $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$, and I wanted to know how many grams of CO_2 would be produced if I used 5 grams of O_2. First I must convert from grams to moles. Since O_2 contains two Oxygen atoms, it has twice the molar mass of Oxygen, or $16 * 2 = 32 \frac{g}{mol}$. I can now convert:

$$5\ g * \frac{1 mol}{32\ g} = 0.156 \text{ moles of } O_2.$$

In the reaction, I can clearly see that one mole of CO_2 is produced for every two moles of O_2 consumed. Therefore, the mole ratio of CO_2 to O_2 is 1:2. I can use this information to determine how many moles of CO_2 are produced:

$$0.156\ mol\ O_2 * \frac{1\ mol\ CO_2}{2\ mol\ O_2} = 0.078\ mol\ CO_2$$

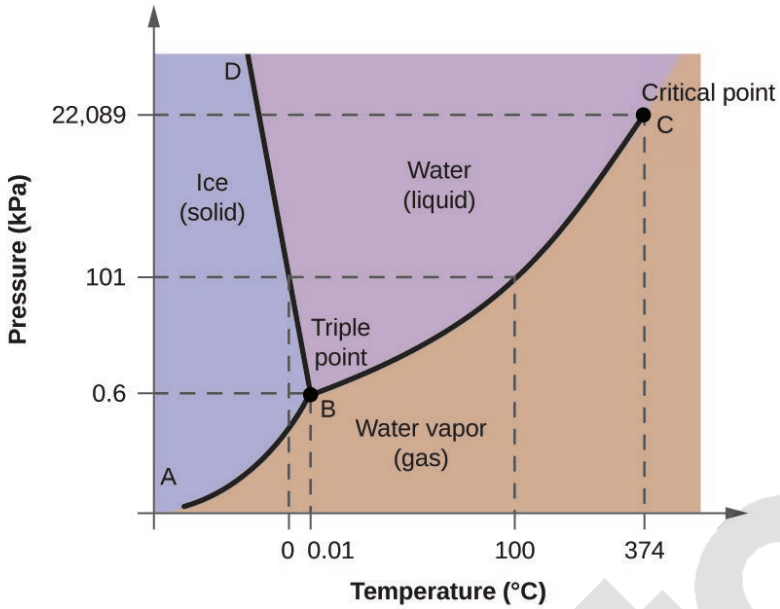
Now, I must convert back from moles to grams. Since CO_2 contains one carbon and two oxygen atoms, it has a molar mass of $12 + 16 * 2 = 44 \frac{g}{mol}$. I can now convert:

$$0.078\ mol * \frac{44\ g}{1\ mol} = 3.43\ g \text{ of } CO_2 \text{ are produced}$$

This same basic concept applies to any stoichiometry problem. Convert into moles using your molar masses (or get a lucky problem already in moles), use the ratios in your equation, and convert back to the unit the question asks for.

- Catalyst: Substance that increases the rate of a chemical reaction without being consumed.
- Chain Reaction: A reaction in which the products from one step provide the reagents for the next one. This is frequently referred to in nuclear fission (when large nuclei break apart to form smaller ones) and in free-radical reactions.

- **Thermodynamics:**
  - Phase Diagram: Diagram showing the different physical states of a substance under various combinations of temperatures and pressures. Below is an example of a basic phase graph.



- Freezing/Melting point: The temperature at which a liquid turns into a solid (or vice versa). The freezing point of pure water is 0°C.
- Boiling/Condensation point: The temperature at which a liquid turns into a gas (or vice versa). The boiling point of pure water is 100°C.
- Sublimation: Process where a solid turns into a gas (or vice versa) without going through the liquid phase.
- Triple point: Point on a phase diagram at which the solid, liquid, and gas phases of a substance coexist in thermal equilibrium.
- Critical point: Point on a phase diagram at which a distinction can no longer be made between two phases of a substance. The most commonly used critical point is the liquid-gas critical point (shown in the diagram above). Any substance at or above the liquid-gas critical point is classified as a supercritical fluid.

- **Solutions:**
  - Solution: A mixture of any two substances which is evenly mixed and distributed (such as salt water).
  - Solute: The substance dissolved into a solution (i.e. salt).
  - Solvent: The part of the solution with the greatest quantity, what the solute dissolves into (i.e. water). Water is called the universal solvent because of its ability to dissolve more substances than any other liquid.
  - Aqueous: Dissolved in water. A type of solution where the solvent is water.
  - Supersaturated: Type of solution where the solution holds more solute than it should at its temperature. Made by heating up the solution, adding more solute, and allowing the solution to cool. Before the excess solute precipitates as the solution cools, the solution is supersaturated.
- **Acids and Bases:**
  - pH: Measures how acidic or basic a substance is. It ranges from 1-14.
  - Acid: A substance whose pH is lower than 7. The lower an acid's pH is, the stronger it gets. Examples include lemon juice and vinegar.

- Base: A substance whose pH is higher than 7. The higher a base's pH is, the stronger it gets. Examples include ammonia and soap.
- Neutral substance: A substance whose pH equals 7. Water is a common example of a neutral substance.
- Buffer: A liquid that resists change in pH by the addition of an acid or base. It consists of a weak acid and its conjugate base (acetic acid and sodium acetate, for example)

Biology (65 terms):

- **Genetics**
  - Genotype: The specific genes responsible for creating a certain trait/feature.
  - Phenotype: The physical, observable traits of an organism. Phenotypes include things such as blue eyes or black hair.
  - Allele: A possible form of a gene. Alleles are represented by a single letter.
  - Recessive Allele: Represented by a lowercase letter such as "r". An organism requires two recessive alleles to gain a recessive trait.
  - Recessive Trait: Linked to recessive alleles. Generally uncommon because it requires two recessive alleles to form. Examples include blue eyes and blonde hair.
  - Dominant Allele: Represented by a capital letter such as "R". An organism only requires one dominant allele to gain a dominant trait.
  - Dominant Trait: Linked to dominant alleles. Generally common because it requires only one dominant allele to form. Examples include brown eyes and brown hair.
  - Heterozygous: When an organism holds two different alleles for a certain trait, such as "Rr" or "Aa".
  - Homozygous: When an organism holds two of the same alleles for a certain trait, such as "RR" or "aa".
  - Punnet Square: Depiction of the inherited traits an organism receives from its parents. An example can be seen below:

	R	R
R	RR	RR
r	Rr	Rr

A Punnett square shows all of the possible gene combinations of the children of two parents. The alleles of one parent are placed on top of the square (in this case "RR") and the other are placed on the side (in this case "Rr"). Each of the 4 boxes in the bottom left of the square represents a possible genotype of a child. An example of a Punnett square crossing a Rr parent and a rr parent can be seen below:

	R	r
r	Rr	rr

r	Rr	rr

Here we can see that 50% (or one half) of the children are heterozygous dominant whereas the other 50% are homozygous recessive.

- Sex Linked Traits: Traits linked to either sex chromosome. For instance, hemophilia is linked to the X chromosome. Males are more likely to inherit sex linked traits because they receive only one X chromosome, whereas since females have two X chromosomes, the mutation would have to occur in both chromosomes for the female to inherit the trait.
- Karyotype: A picture that depicts all of a person's chromosomes.
- Chromatid: A strand containing DNA that is part of a chromosome.
- Chromosome: The carrier of DNA. A chromosome contains two chromatids bounded together into an "X" shape.
- Gametes: Reproductive cells specific to each gender. For instance, the human male gamete is the sperm whereas the human female gamete is the egg.
- Nucleic Acids: Carriers of genetic information. DNA and RNA are both nucleic acids. Nucleic Acids are polymers and are composed of nucleotides.
- DNA: Stands for deoxyribonucleic acid. It is the basic genetic material found in most organisms.
- RNA: Stands for ribonucleic acids. It plays a major role in DNA replication and protein synthesis. There are several different kinds of RNA:
  - Messenger RNA (mRNA): Messenger between DNA information and ribosomes.
  - Ribosomal RNA (rRNA): Structural component of ribosomes.
  - Transfer RNA (tRNA): Brings amino acids to ribosomes to make proteins.
- Nucleotides: The monomer components of Nucleic Acids. Nucleotides themselves are made up of a nitrogenous base, a 5-carbon sugar and a phosphate group. There are 5 basic nucleotides: adenine (represented as A), guanine (G), cytosine (C), thymine (T), and uracil (U). Nucleotides are split up into two basic classes:
  - Purines: Contains two carbon-nitrogen rings. Includes adenine and guanine.
  - Pyrimidines: Contains one carbon-nitrogen ring. Includes cytosine, thymine and uracil.

- **Cellular**
  - Cell: The smallest, most basic structural and functional unit of all living organisms
  - Nucleus: The "brain" of the cell – it controls the cell's activity and holds the DNA of the cell.
  - Mitochondria: The "powerhouse" of the cell – it creates energy in the form of ATP through cellular respiration.
  - ATP (Adenosine Triphosphate): A molecule that stores energy, considered by biologists to be "the energy currency of life".

- Phosphate Group: One atom of phosphorous bonded to 4 oxygen atoms. It is found in DNA, RNA, ATP, and the cell membrane.
- Cellular respiration: A process wherein glucose (sugar) is broken down into CO_2 and water in order to create energy in the form of ATP.
- Photosynthesis: Process wherein plants convert CO_2 and water into glucose and oxygen by using sunlight absorbed through chlorophyll.
- Osmosis: When solvent particles (usually water) passes from high solvent concentration to low solvent concentration (or from low solute concentration to high solute concentration) through a semi-permeable membrane (thin layer). Solutes cannot pass through the semi-permeable membrane.
- Meiosis: A process wherein a cell creates gametes. These gametes are not a direct copy of the cell, thus causing genetic variation.
- Mitosis: A process a cell undergoes that creates an exact copy of that cell. Essentially duplication.
- Cytoplasm: A jelly-like solution that fills a cell. All organelles are suspended in the cytoplasm, similar to how fruit can be suspended in Jell-O.
- Aerobic: A process which requires oxygen (think of "air"-obic).
- Anaerobic: A process which does not require oxygen.
- Fermentation: An anaerobic process where glucose is broken down into CO_2 and either alcohol (like in yeast) or lactic acid (like in our muscles) to create energy.
- Glucose: A simple sugar which organisms convert into energy using respiration. Chemical formula is $C_6H_{12}O_6$.
- Hemoglobin: The red, oxygen carrying protein in blood.
- Metabolism: The full range of chemical processes that work in an organism, generally referring to those in energy production/food consumption.
- Carbohydrates: A group containing sugars and starches. They are the most common source of energy for most organisms.
- Monosaccharides: Simple sugars such as glucose.
- Enzymes: A biological catalyst used in bodily reactions.
- Amino Acids: The building blocks of proteins.
- Proteins: A substance which contains amino acids bonded by peptide bonds. They are the building blocks of cells.
- Lipids: Fats which are used to store energy, such as the phospholipid bilayer in the cell membrane.
- Hormones: Chemical messengers which regulate body functions like hunger. Notable human hormones include insulin and serotonin.
- Zygote: The precursor to the embryo; the very beginning of life.
- Fertilization: The process wherein a female and male gamete combine to create a genetically unique zygote.
- Tissue: A collection of cells responsible for a specific task. It is the level between cell and organ. A collection of tissue forms an organ.

- Endocrine System: A collection of organs which create and secrete hormones to regulate functions such as sleep and metabolism. Includes the pituitary gland and hypothalamus.
- Nervous System: A network of organs which control the body and relay messages between its parts. Includes the brain and spinal cord.
- Circulatory System: Transmits blood and nutrients throughout the body. Includes the heart and veins.
- Epidermis: The outermost layer of skin.
- Hypodermis: The innermost layer of skin; it stores fat. Also known as the subcutaneous.

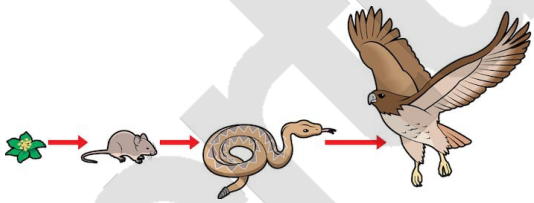
- **Evolutionary Biology and Taxonomy**
  - Endotherm: Warm-blooded organism
  - Ectotherm: Cold-blooded organism
  - Vertebrate: Organism that has a backbone
  - Invertebrate: Organism that does not have a backbone
  - Taxonomic Ranks: Large groups which classify different organisms. The largest rank is the kingdom, and each rank below gets smaller and smaller. Each kingdom is split into phyla, each phylum into classes, each class into orders, each order into families, each family into genera, and each genus into species.
  - Species: A group of organisms which can successfully breed. Smallest taxonomic rank.
  - Binomial Nomenclature: The style in which a species receives a scientific name. The nomenclature you will see on the ACT will be in the form of *Genus species*. For example, a fruit fly's scientific name according to nomenclature is its genus, Drosophila, plus its species, melanogaster: *Drosophila melanogaster*.
  - Natural Selection: Process where beneficial traits help an organism survive and pass on its traits. Essentially the "survival of the fittest".
  - Symbiotic: A relationship between two organisms. There are several kinds of symbiotic relationships:
    - Commensalism: One organism benefits and the other is unaffected (e.g. barnacles that grow on whales).
    - Mutualism: Both organisms benefit (e.g. bees and flowers).
    - Parasitism: One organism benefits while the other suffers (e.g. fleas that live on dogs).
    - Predatory: One organism (the predator) hunts and consumes the other (the prey).
  - Decomposers: Organisms which gain food by breaking down decaying/dead organisms. Includes worms and mushrooms.

<u>Environmental Science (20 terms):</u>

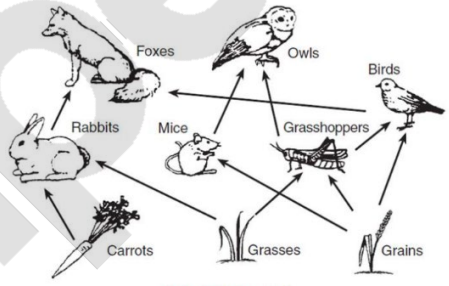
- **Earth/Rocks**
  - Igneous Rock: Formed from cooled magma and/or lava.
  - Sedimentary Rock: Formed from the collection of small particles such as sand.

- Metamorphic Rock: Formed when another rock is subjected to factors such as high heat and/or pressure.
- Rock Cycle: Process wherein rocks change type. Any rock can change to any other type of rock; for instance, an igneous rock could either turn into a sedimentary or a metamorphic rock.
- Erosion: Process where factors such as water and wind wear down rocks and transport them.
- Runoff: Process where rainwater slides off of land into lakes and rivers.
- Altitude: The height of an object above a reference such as sea or ground level.
- Earth's Layers: The Earth is split up into several different layers:
  - Crust: Outermost, thinnest layer split into tectonic plates.
  - Mantle: Under the crust, thickest layer, constantly moving due to convection currents of molten rock.
  - Outer Core: Under the mantle, creates Earth's magnetic field.
  - Inner Core: Innermost layer, extremely hot.
- Atmosphere: A very thin layer of gas that surrounds the Earth and helps sustain life on Earth by proving air and protection.

- **Ecology**
  - Food Chain: A series of organisms which consume each other. For example, the chain below shows how the mouse eats the plant, the snake eats the mouse and the bird eats the snake.



  - Food Web: A collection of intertwined food chains. It follows the same basic pattern, where an arrow points to the consumer. An example can be seen below:



  - Ecosystem: A community of organisms and their environment.
- **Astronomy**
  - Satellite: Any body orbiting another larger body. Satellites can be artificial, like the Hubble Space Telescope, or natural, like the Moon.
  - Orbit: The elliptical (oval-shaped) path a body follows when rotating around another body.
  - Terrestrial Planet: A rocky planet; terrestrial planets in the Solar System include Mercury, Venus, Earth and Mars.

- Gas Giant: A low density planet made mostly of gas, such as Jupiter, Saturn, Neptune or Uranus.

Environmental Science, Ecology, and Geology (Additional Terms):

- **Atmosphere/Gases:**
  - Layers of the Atmosphere (in order from lowest to highest)
    - Troposphere: Lowest layer, contains breathable air.
    - Stratosphere: Contains the ozone layer.
      - Ozone Layer: Absorbs most of the UV radiation coming from the sun and converts it into heat.
    - Mesosphere: Coldest layer of the atmosphere.
    - Thermosphere: Can heat up to very high temperatures, contains low density air.
    - Exosphere: Highest layer, where molecules escape into space.
  - Greenhouse gases: Gases such as Carbon Dioxide which trap infrared radiation and increases Earth's temperature.
  - Acid Rain: Rain made harmfully acidic through air pollution.
  - Global Warming: Process wherein the Earth's temperature rises due to greenhouse gases/pollution. Leads to major climate change and is currently occurring.
- **Astronomy:**
  - Order of Planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune (My Very Excellent Mother Just Served Us Nuggets).
    - Mercury, Venus, and Earth are terrestrial planets (a.k.a. rocky planets).
    - Jupiter, Saturn, Uranus, and Neptune are the Gas Giants.
    - Pluto is officially classified as a dwarf planet which is why it is not included in the list above (just to note though, Pluto does come after Neptune).
  - Star: A ball of hydrogen and helium held together by gravity that produces energy in its core (ex. The Sun).
    - Some of this energy is released as visible light, which is why stars glow.
  - Meteoroid: A small, rocky body traveling through outer space that becomes a **meteor** if it enters the Earth's atmosphere.
  - Comet: A small, icy body that can form an atmosphere (coma) of dust and gas and sometimes a tail of dust and/or gas.
  - Black Hole: Celestial object whose gravitational pull is so strong that it consumes everything around it, including light.
  - Dark Matter: Matter that cannot be directly observed because it does not give off light or energy; makes up the majority of the mass of the universe.
- **Ecology**:
  - Primary Consumers: Organisms which consume autotrophs, such as mice and grasshoppers.
  - Secondary Consumers: Organisms which eat primary consumers, such as small birds and snakes.
  - Tertiary consumers: Organisms which eat secondary consumers, such as wolves and mountain lions.
  - Autotrophs: Organisms which create their own food, such as plants.
  - Consumers: Organisms which must consume other organisms for food.
- **Geology:**

- Bedrock: Hard, solid rock lying underneath soil, gravel, sand and other sediments.
- Delta: Section of land formed from the build-up of sediment as a river slows down upon flowing into another body of water (such as an ocean).
- Epoch: A unit of geological time that is longer than an age but shorter than a period; periods are usually divided into epochs.
- Weathering: Process wherein rocks and minerals are weakened and broken down by various factors such as weather conditions, plants and animals, water, etc.
    - Does not move the rock, biggest difference between weathering and erosion.
- Erosion: Process wherein factors such as water and wind wear down rocks and transports the particles.
- Magma: Molten rock below the surface of the Earth.
- Lava: Molten rock above the surface of the Earth.
- Fault: A crack in the crust, usually between two tectonic plates. Earthquakes occur on faults.
- Igneous Rock: Formed from cooled magma and/or lava.
- Sedimentary Rock: Formed from the collection of small particles such as sand.
- Metamorphic Rock: Formed when another rock is subjected to factors such as high heat and/or pressure.
- Topography: The study of the Earth's surface and its features.
- Deformation: Process wherein stress changes a rock's shape and/or size.
- Estuary: Bodies of water found where rivers meet the sea. Contains brackish water.
- Brackish Water: Mixture of fresh water and saltwater.
- Exfoliation: Process wherein weathering and erosion peel off thin layers of a rock's surface.
- Hydrolysis: Chemical process which deteriorates rocks exposed to water (form of weathering)
- Mudflow: Flow of water containing large amounts of sediment and soil.
- Oxidation: Reaction of rock minerals with oxygen that causes the rock's mineral composition to change.
- Suspension: A mixture of a fluid and small particles in which the small particles eventually settle; can also be the process where sediment is transported by wind or water currents that are strong enough to keep the sediment continuously suspended (above the river bottom or ground).
- Vesicles: Small cavities in volcanic rocks caused by air bubbles in the magma.
- Viscosity: A fluid's resistance to flow. Magma is quite viscous, has a higher viscosity when colder, and a lower viscosity when hotter.