

What is a variable?	A factor in an experiment.
What is a manipulated variable?	The variable that is deliberately changed in the experiment.
What is a responding variable?	The variable that changes in response to the manipulated variable and that is observed.
What is a controlled experiment?	An experiment in which only one variable is tested at a time.
What is observation?	Using the senses to gather information.
What is qualitative data?	Data that involves characteristics that cannot easily be measured or counted, such as color or texture.
What is quantitative data?	Data that is easily counted or measured, such as size or weight.
What is data?	Information gathered from observation.
What is a hypothesis?	-A possible explanation for a set of observations -An answer to a scientific question
What is an inference?	A logical interpretation, made using prior knowledge and experience.
What is a theory?	A well-tested explanation that is applicable to a wide range of observations.
What is the scientific method?	1. State the problem 2. Form a hypothesis 3. Set up a controlled experiment 4. Record and analyze results 5. Draw a conclusion
What are the characteristics of living things?	<ul style="list-style-type: none"> <li>● Made up of cells</li> <li>● Reproduce</li> <li>● Based on a universal genetic code</li> <li>● Grow and develop</li> <li>● Obtain and use materials and energy</li> <li>● Respond to their environment</li> <li>● Maintain a stable internal environment</li> <li>● Change over time as a group</li> </ul>
What is homeostasis?	The process by which organisms maintain internal stability.
At what levels can life be studied?	<ul style="list-style-type: none"> <li>● Molecules</li> <li>● Cells</li> <li>● Organisms</li> <li>● Populations</li> <li>● Communities</li> <li>● Ecosystems</li> <li>● Biosphere</li> </ul>

What is the metric system?	A decimal system of measurement. Its units are based on physical standards and are used in multiples of 10. It is called the International System of Units (or SI) and is used by most scientists worldwide.
What is a microscope?	A device that produces magnifies images of things that are not visible to the human eye.
What is a light microscope?	A microscope that produces magnified images by focusing visible light rays.
What is an electron microscope?	A microscope that produces magnified images by focusing beams of electrons.
What is a compound microscope?	A microscope that allows light to pass through a specimen and uses two lenses to form an image of it.
What is scanning power?	A large view that shows a large amount of the specimen, but at a very small size.
What is low power?	A medium view that shows a good amount of the specimen, with a medium amount of magnification.
What is high power?	A view that shows a very small amount of the specimen, but at a hugely magnified size.
How are light microscopes limited?	They can only produce sharp images of objects larger than .2 millimeters.
What is an electron microscope?	A microscope that focuses beams of electrons on specimens. They can produce images of specimens 1000x smaller than those light microscopes can magnify.
Do electron microscopes have color?	No, because they do not involve visible light.
What are transmission electron microscopes?	Microscopes that shine a beam of electrons through a thin specimen.
What are scanning electron microscopes?	Microscopes that shine a beam of electrons across the surface of a specimen. They produce realistic 3D images.
How are electron microscopes limited?	They cannot be used to study live specimens. Specimens studied must be completely dried out.
What is a cell culture?	A single cell is placed in a nutrient solution, so that it reproduces and the cells developed can be used for study.
What is cell fractionation?	A process used by biologists to separate cells into different parts. The cells are broken into pieces, added to liquid, and spun in a centrifuge (can spin

	things up to 20,000 times per minute) so that they separate by density.
What are the phases of matter?	Solid, liquid, gas.
What is an atom?	The smallest amount of matter that can exist and still retain its chemical and physical properties.
What makes up atoms?	Protons, neutrons, and electrons.
What are neutrons?	Particles with neutral charges that are in the nucleus of the atom.
What are protons?	Particles with positive charges that are bound to the neutrons in the nucleus of the atom.
What are electrons?	Particles with negative charges that are 1/1840 the size of protons and neutrons. They are outside the nucleus of the atom, in constant motion. They are moving so fast that they are “anywhere and everywhere”. The region of the atom that holds the electrons is known as the “electron cloud”.
Why are atoms balanced?	Because they have the same number of protons and electrons. Their charges balance each other out.
What are electron shells?	Electrons are distributed into shells/lanes as they move around the nucleus. The formula for these is $2(n)^2$ . Every atom must have its outermost shell full.
What are valence electrons?	Electrons in the outermost shell.
What is an element?	A substance that consists of one type of atom.
What are isotopes?	Atoms of the same element that have different numbers of neutrons. They have the same amount of protons and electrons as other isotopes of their element, so they retain the same properties.
What are radioactive isotopes?	Isotopes that have unstable nuclei and break down at a constant rate over time.
How are radioactive isotopes used?	They can be used to determine the age of rocks and fossils, treat cancer, kill food-spoiling bacteria, or act as “tracers” to help scientists follow substance movement through organisms.
What are molecules?	The smallest unit of most compounds, created by two or more atoms that are bound to one another.
What are chemical compounds?	A substance formed by by the chemical combination of two or more elements.
What are isomers?	Compounds with the same chemical formula- same makeup- but different structures and

	properties.
What are ionic bonds?	Bonds formed when electrons are transferred from one atom to another. The one that gains electrons gains a negative charge, and vice versa. They attract one another.
What are ions?	Atoms with positive or negative charges.
What are covalent bonds?	Bonds that are created when atoms share electrons. There can be single, double, or triple covalent bonds.
What is a radical group?	An atom or molecule that cannot exist alone.
What is methyl?	$\begin{array}{c} \text{H} \\ + \\ \text{C} \\ + \\ \text{H} \end{array}$ A radical group. Almost methane (CH <sub>4</sub> ).
What is an acid?	A substance that has a concentration of hydrium ions (H <sup>+</sup> ).
What is a base?	A substance that has a concentration of hydroxide/hydroxyl (OH <sup>-</sup> ) ions. Also known as an alkaline solution.
What is the pH scale?	A scale of 1-14, 1 being most acidic and 14 being most basic. A number is 10 times more acidic or basic than the one higher or lower.
What are the types of organic compounds?	Carbohydrates, proteins, nucleic acids, and lipids.
What are macromolecules?	Huge molecules made up of hundreds or thousands of smaller molecules.
What is polymerization?	A process in which large compounds are built by joining smaller ones together.
What are polymers?	Large compounds, chains of molecules.
What are monomers?	Compounds that make up polymers.
What are carbohydrates made of?	Monomers- simple sugars, also known as monosaccharides.
What are polysaccharides?	The macromolecules formed from the polymerization of simple sugars.
What is a pentose?	A five ring monosaccharide.
Where are carbohydrates used in organisms?	<ol style="list-style-type: none"> <li>1. Starch- stored energy in plants</li> <li>2. Glycogen- stored energy in animals (muscles, liver)</li> <li>3. Cellulose- plant structure support</li> <li>4. Chitin- exoskeletons of anthropoids</li> </ol>

What are proteins?	Macromolecules made up of amino acids.
What are amino acids?	Compounds made of amines (NH <sub>2</sub> ), a central carbon, a carboxyl acid group (COOH), and a radical group.
How many amino acids are there?	20. They are disguised by their radical groups.
What is a peptide bond?	A covalent bond that connects amino acids.
What is a dipeptide?	Two bonded amino acids.
What are the four levels of structure to proteins?	<ol style="list-style-type: none"> <li>1. Primary- sequence, number, and kind of amino acids.</li> <li>2. Secondary- formation of first alpha helix.</li> <li>3. Tertiary- the molecule begins to fold and twist on itself</li> <li>4. Quaternary- combination of polypeptide chains.</li> </ol>
Where are proteins used in organisms?	They control chemical reactions and regulate cell processes, form bones and muscles, transport substances in and out of cells, and fight disease.
What are lipids?	Fats, oils, waxes, steroids.
What are lipids made of?	Fatty acids and glycerol (C-C-C-3carboxyl-5H= Glycerol)
What are saturated fats?	Fats that have one bond between carbons and a large amount of hydrogens.
What are unsaturated fats?	Fats that have double covalent bonds between carbons and few hydrogen.
What are nucleic acids?	Macromolecules assembled from nucleotides. They store and transmit genetic (hereditary) information- DNA and RNA.
What are nucleotides?	Molecules made up of a nitrogenous base, a pentose, and a phosphate group.
What is dehydration synthesis?	A process in which bonds, between monosaccharides, amino acids, and parts of fats, among other things are created. In order for enough electrons to be available to create covalent bonds, water is extracted. Molecules are built up into larger macromolecules this way.
What is hydrolysis?	A process in which bonds are broken and macromolecules are broken down into smaller molecules, by adding water (to create more covalent bonds).