**Name:**

**Class: Review-Chem Unit--ACADEMIC**

**Atomic Structure**

1. Atoms are made of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the nucleus and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in energy rings around the nucleus. Different forms of the same atom exist called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which have different numbers of \_\_\_\_\_\_\_\_\_\_\_\_\_.
2. The atomic # stands for the # of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ .
3. All atoms are neutral in charge so they have equal numbers of negatively charged \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and positively charged \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
4. Neutrons have a mass of \_\_\_\_\_\_amu. To determine the number of neutrons an atom has, you subtract the \_\_\_\_\_\_\_\_\_\_\_\_# from the mass #. (Don’t forget to round!).
5. The first energy shell can only hold \_\_\_\_\_\_\_\_ electrons but the second shell can hold \_\_\_\_\_\_ and the third shell acts full at \_\_\_\_\_\_ before it overflows to the next shell.
6. The electrons in the outermost shell of the atom are called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ electrons and are involved with making \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_between atoms.

**Bonding**

1. Atoms with full valence shells the group \_\_\_\_\_ are stable and do not bond. All other atoms are not full and therefore reactive.
2. When the valence electrons of one atom are given by one atom and taken by another a \_\_\_\_\_\_\_\_\_\_ bond is formed by ions attracting to each other due to their opposite charges.
3. When valence electrons are shared a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ bond forms.
4. If sharing is even (like with oil/wax molecules) it is \_\_\_\_\_\_\_\_\_\_\_\_ covalent and the molecules have no charged regions (non-sticky).
5. When electron sharing is uneven (like with water molecules) the bond is \_\_\_\_\_\_\_\_\_\_\_covalent.
6. The uneven sharing results in +/- regions. In a water molecule the oxygen end has a \_\_\_\_\_\_\_\_ charge and hydrogen end a \_\_\_\_ charge. Polar covalent molecules will stick to each other and weak attractions or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ bonds (these don’t make new molecules like ionic and covalent).
7. All elements in group 2 have a valence of \_\_\_ e- will give/share/take e- (circle one) to be full and stable and make \_\_\_ bonds.

**Chemical Reactions & Photosynthesis**

1. When atoms bond together (or break apart) it is called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reaction. The molecules before the arrow (left) are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and after the (right) are called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as they are made.
2. When atoms react and form bonds, energy is \_\_\_\_\_\_\_\_\_\_ and to get it out, the bonds must be \_\_\_\_\_\_\_\_\_\_\_\_\_\_. An atom with more energy will have more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. Chemical reactions can be sped up by hotter \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, a higher \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of reactants, a change in \_\_\_\_ level or a greater surface area.
4. Evidence that a chemical reaction occurred to make a new molecule is a change in \_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or the production of a \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
5. Photosynthesis is a chemical reaction and the energy from \_\_\_\_\_\_\_\_\_\_\_\_ is moved into the chemical bonds of the \_\_\_\_\_\_\_\_\_\_ molecule.
6. The full reactions is: + ----------------🡪 +
7. Light is absorbed by the pigment \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ found in the \_\_\_\_\_\_\_\_\_\_\_\_\_ organelles (cell “organs”) in the long compact Pallisade \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells.
8. All the colors are absorbed from white light except \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ color which is reflected and that is why we see plants this color.
9. The bottom of the leaf has openings called \_\_\_\_\_\_\_\_\_\_\_\_\_\_ that let the gases in/out for photosynthesis and the top of the leaf has a waxy layer called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to help trap water inside the leaf.
10. Water from the roots moves up and into the leaves by the \_\_\_\_\_\_\_\_\_\_\_\_ using capillary action and then the sugars leave to feed the rest of the plant in the opposite direction.
11. The clear \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ skin cells of a leaf are protective but also let light through.

**Water Cycle**

1. The sun heats surface water and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from a liquid to a gas will occur.
2. They cool in the atmosphere ­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ occurs from gas to liquid & form clouds.
3. When the clouds become heavy enough they will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ back to earth as rain or snow and then either \_\_\_\_\_\_\_\_\_\_\_\_\_ along the surface into streams or \_\_\_\_\_\_\_\_\_\_\_\_\_\_ into the soil and become part of a groundwater aquifer.
4. Plants absorb water through their roots and evaporate it out their leaves by \_\_\_\_\_\_\_\_\_\_\_\_\_.

**Carbon Cycle**

1. Plants absorb CO2 from the air to make a \_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_ as a byproduct with the process of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This sugar is later used by plants as food and burned with \_\_\_\_\_\_\_gas by the process of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. Some of that sugar gets converted into other plant tissues and the carbon is stored in the body of the plant. When plants die they are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by bacteria and fungus that use their tissues as a food source releasing \_\_\_\_\_\_\_\_\_ back into the atmosphere.
3. If the dead organic material is buried and not completely decomposed it will become a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ like coal, tar or gas. We later dig these out and burn them in a process called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which releases that CO2 back to the atmosphere.
4. Excess CO2 in the atmosphere can dissolve into the oceans by \_\_\_\_\_\_\_\_\_\_\_\_\_\_ making the ocean acidic if not quickly absorbed by the plankton and crabs for making their\_\_\_\_\_\_\_\_\_\_\_\_.
5. The plankton also help to remove CO2 from the atmosphere by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ just like land plants (in fact more so since there is more ocean than land) but when the ocean becomes acidic the shells dissolve and they die. When they die the extra shell bits can accumulate on the ocean floor and be squished together over time in a process known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. These rocks can later melt in \_\_\_\_\_\_\_\_\_\_\_eruptions and release the carbon all over again.
6. The carbon level in the atmosphere is \_\_\_\_\_\_\_\_\_\_\_because we are returning CO2 to the air faster than it is recycled due to increased \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and less \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ due to cutting down trees (deforestation). This excess CO2 traps heat and warms the planet in a process called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ effect.