

KEY

Artsy Atoms

Brannon Chemistry Honors

Due April 3, 2013

(This is included in your 3rd Quarter grade)

1. Draw the following four depictions of the atom on blank paper or poster board:
 - a. Original atom
 - b. Atom undergoing nuclear decay
 - c. Atoms undergoing ionic chemical bonding
 - d. Atoms undergoing covalent chemical bonding
2. Label the pictures with short explanations using the key terms listed below for each depiction.
3. Combine the explanations into an essay that includes at least one paragraph for each picture, plus an intro and conclusion.

Key Terms

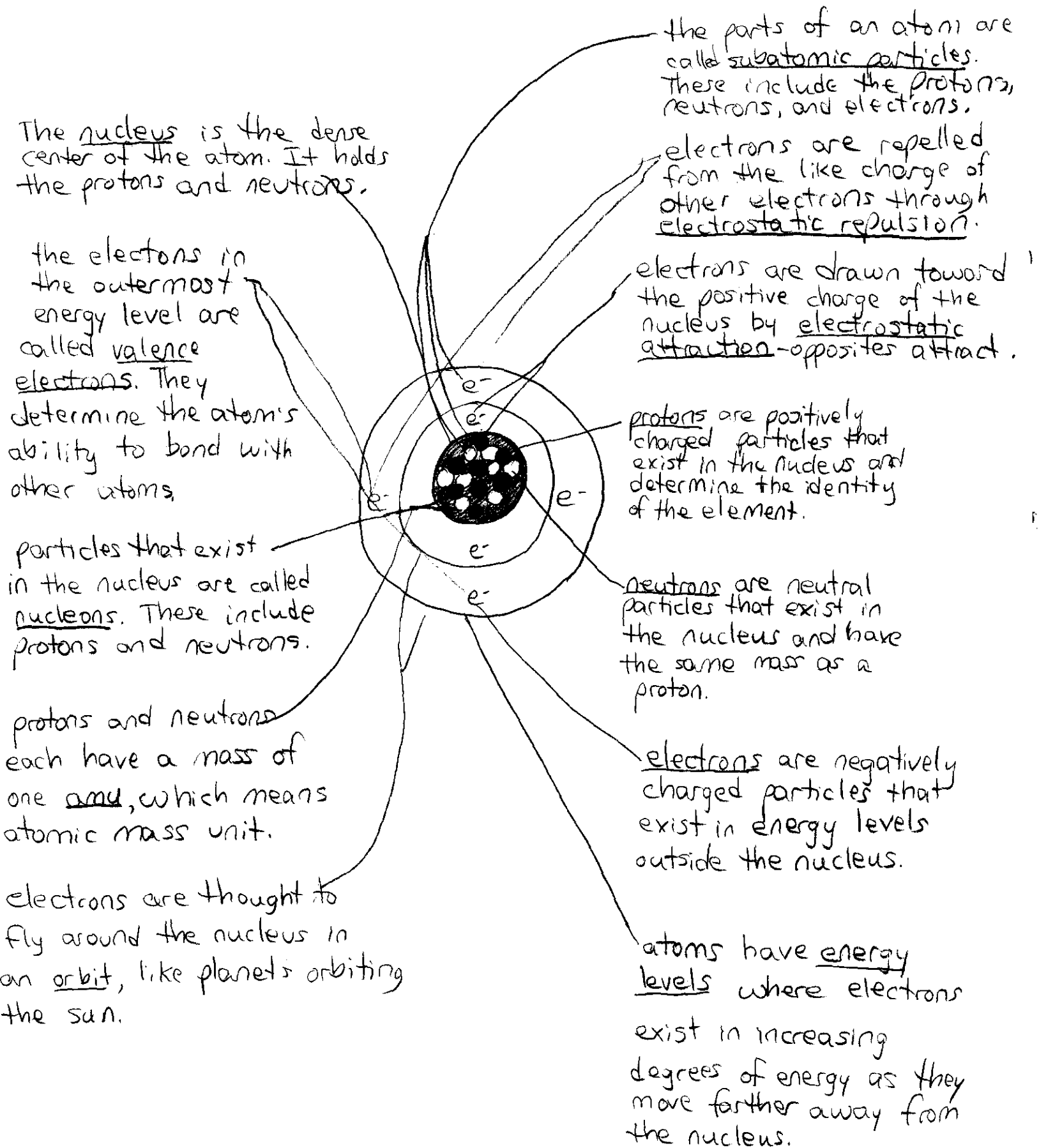
The Atom (atomic structure)	Atoms Decay (nuclear reaction)	Atoms Bond (chemical reaction)	
		Ionic Bond	Covalent Bond
protons neutrons electrons energy levels electrostatic attraction electrostatic repulsion valence electrons amu nucleon nucleus orbit subatomic particles	protons neutrons nuclear strong force electrostatic repulsion alpha particle beta emission gamma emission fission nuclear reaction	electron(s) transfer cation anion metal+nonmetal crystal salt formula unit octet valence electrons electrostatic attraction positive charge negative charge ionic compound	electrons shared in pairs nonmetals only molecule octet valence electrons single bond double bond orbit covalent compound

Points:

- | | |
|-----|---|
| 10 | Four clearly understandable depictions |
| 43 | <u>Key terms accurately applied</u> and explained on pictures |
| 43 | <u>Key terms accurately applied</u> and explained in essay |
| 2 | Introduction |
| 2 | Conclusion |
| 100 | Total points |

anywhere

The Atom (atomic structure)



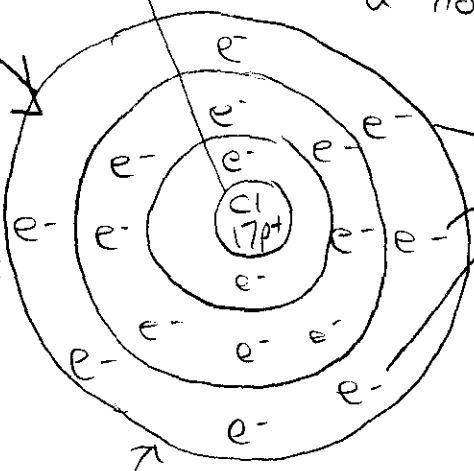
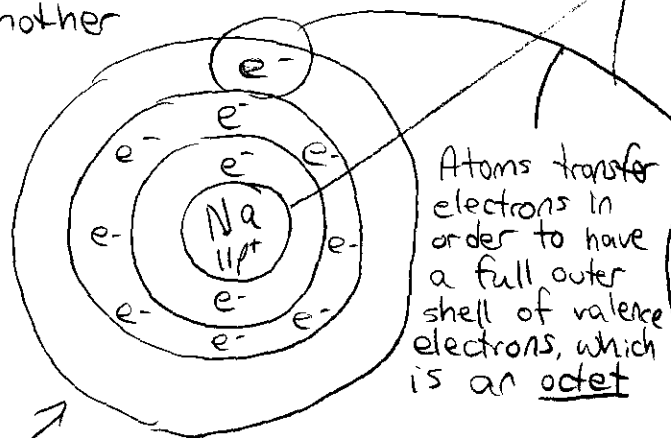
Atoms Bond (chemical reaction) Ionic Bond

The valence ^{more} electrons are ^{sometimes} attracted to the positive nucleus of another atom through electrostatic attraction.

Ionic bonds happen between a metal and a nonmetal.

A compound that consists of a metal and a nonmetal is called a salt.

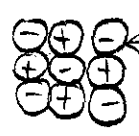
an ionic bond takes place when one or more electrons are transferred from one atom to another



An atom becomes a cation (an ion with a positive charge) when it loses one or more electrons.

An atom becomes an anion (an ion with a negative charge) when it gains one or more electrons.

An atom acquires a positive charge when it loses one or more electrons, and acquires a negative charge when it gains one or more electrons.



ionic compounds keep attracting more cations and anions, which stack together as a crystal.

When oppositely charged ions stick together, they form an ionic compound.

NaCl ← Because ionic compounds do not consist of a set number of atoms, their chemical formula is the simplest ratio of atoms, called a formula unit.

Atom's Decay (Nuclear reaction)

A nuclear reaction is when an atom's nucleus is changed.

protons are pushed away from the like charges of other protons due to electrostatic repulsion.

the protons and neutrons are held together by the nuclear strong force.

protons are positively charged particles in the nucleus.

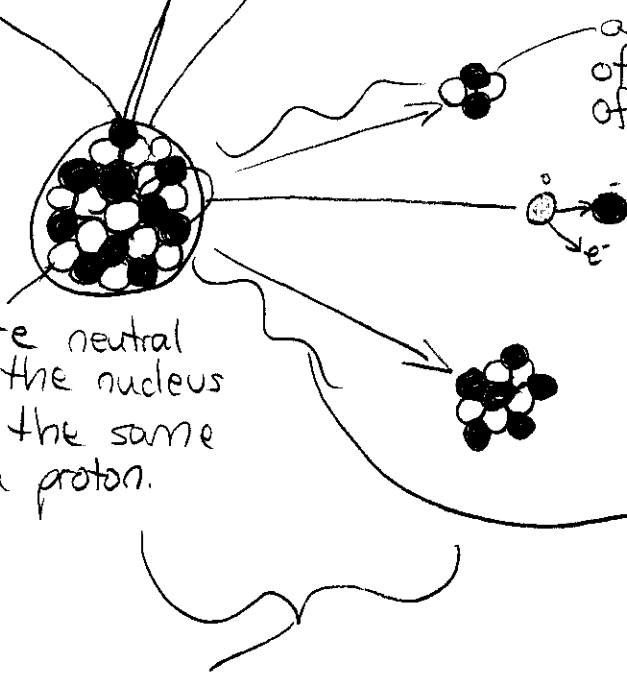
an alpha particle is a piece of nuclear decay that consists of two protons and two neutrons.

beta emission is when a neutron sheds an electron and becomes a proton, or when a proton sheds a positron and becomes a neutron.

neutrons are neutral particles in the nucleus that have the same mass as a proton.

gamma emission is the energy released when a nucleus undergoes radioactive decay.

fission is the type of radioactive decay that consists of an atom splitting apart.



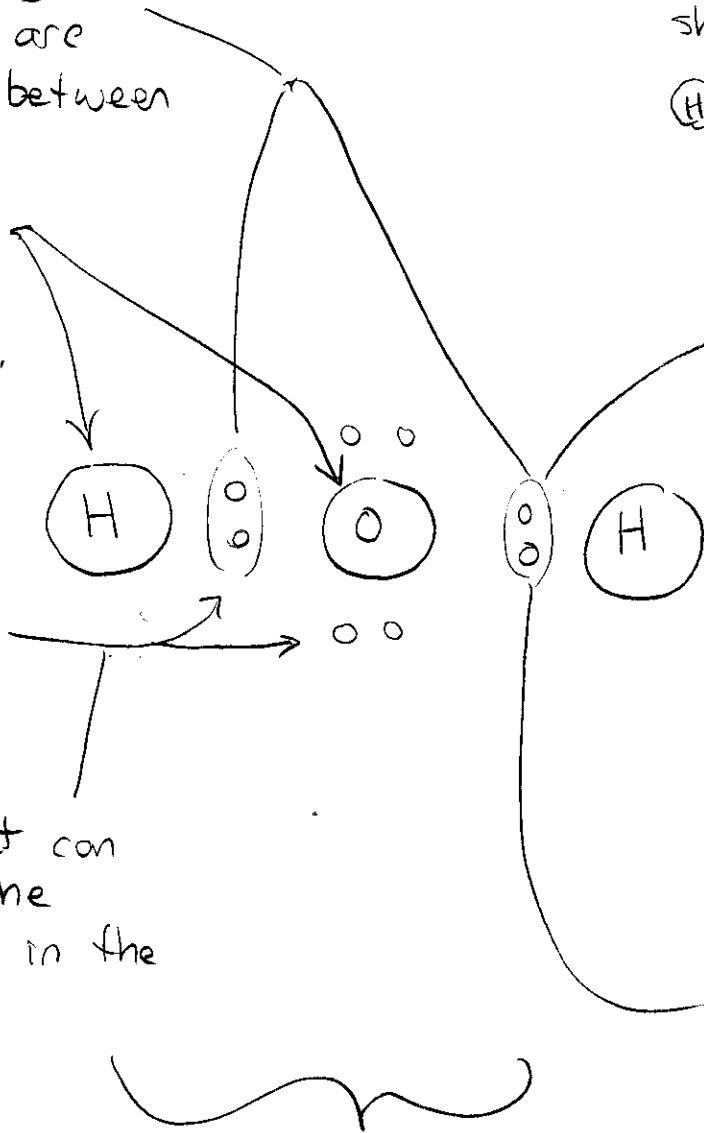
Atoms Bond (chemical reaction) Covalent Bond

A covalent bond is when electrons are shared in pairs between atoms.

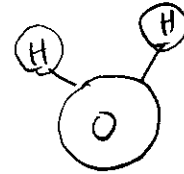
Covalent bonding occurs between nonmetals only.

Nonmetal atoms share electrons in order to achieve an octet, which is a full outer shell of electrons.

The electrons that can be shared are the valence electrons in the outer shell.



The particle that consists of atoms that share electrons is called a molecule.



If only two electrons are being shared in one place, it is called a single bond.

If two pairs of electrons are being shared, it is called a double bond.

When electrons are being shared, they actually orbit both atoms that are sharing them.

When two or more atoms are bonded by sharing electrons, they become a covalent compound.