Prelab #5—Halogens Lab Name _____

Reading Assignment:

1. Description of experiment.
2. The Group 7A Elements—BLB, sec. 22.4, pp. 926-930
3. Periodic Properties—BLB, sec. 7.1-7.3, pp. 250-259.
4. Review Oxidation-Reduction Reactions—BLB, sec. 4.4, pp. 131–138.

Questions:

1. Make a list of all halogens and halide salts being used in this experiment giving proper names of each. Give the physical state (solid, liquid, or gas) in which the halogens are found at room temperature.

Halogen	Halide salt	Physical state of Halogens at room temperature

2. Write the balanced ***net ionic equation*** for the reaction of chlorine ($Cl_{2(aq)}$) with sodium bromide ($NaBr_{(aq)}$) to form bromine ($Br_{2(aq)}$) and chloride ions ($Cl^-_{(aq)}$). In aqueous solution, NaBr forms ions $Na^+_{(aq)}$ and $Br^-_{(aq)}$. Net ionic equation means that spectator ions (ions that do not participate in the reaction and are the same on both sides of the reaction) are not included.

---

3. The halogens and halides are members of the Group 17 (or Group 7a) elements and exhibit reactivities based on their position in the periodic table. The halogens and halides participate in **reduction - oxidation (redox) reactions** that involve the exchange of electrons. The upcoming experiment examines the ability of a given halogen to oxidize a given halide. Trends in the periodic table permit prediction of the outcome and also explain the reactivities as you go down a group. To gain knowledge on the tendencies of the group 17 elements visit the following website: www.chemguide.co.uk/inorganic/group7menu.html. Focus on the sections entitled: Atomic and Physical Properties and Halogens as Oxidizing Agents. Fill in the blanks in the following summary:

Prelab #5—Halogens Lab

Electronegativity:

- Electronegativity is a measure of the tendency of an atom to _____ _____.
- _____ is the most electronegative atom.
- Electronegativity _____ (*increases/decreases*) as you go down a Group.
- A more electronegative atom is _____ (*more/less*) likely to give up electrons to other atoms.
- Because fluorine is _____ (*smaller/larger*) than chlorine, its _____ is closer to its neighboring atoms, thus it exerts a stronger pull on its neighbor's electrons. This is why fluorine is more electronegative than chlorine.

Halogens as oxidizing/reducing agents:

- _____ (*oxidation/reduction*) is the loss of electrons.
- If a fluorine atom takes an electron from a chloride ion, we say that fluorine is helping the chloride ion to be _____ (*oxidized/reduced*). Hence, fluorine is a(n) _____ (*oxidizing/reducing*) agent.
- Chlorine has the ability to take electrons from both bromide ions and iodide ions. That means that chlorine is a more powerful _____ (*oxidizing/reducing*) agent than either bromine or iodine.
- This all means that ability to facilitate oxidation of other species _____ (*increases/decreases*) as you go down the Group.