

## REGULAR INQUIRY LAB 11b: What type of bonding is present?

### Your Tasks:

- Answer the **Pre-Lab Questions**
- Read the sections below on **Safety, Background & Prior Knowledge, Equipment Available** and **Chemicals Available**
- To design an experiment (i.e., to outline an experimental procedure) to answer the question posed above
- Answer the **Post-Lab Questions**

### Safety:

- Follow all the normal safety procedures in the laboratory

### Background & Prior Knowledge:

- Physical properties of materials are largely dependent on the type of bonding present.
- You should consult the notes in Regular Topic 11 part 2 to remind yourself of the typical properties associated with each type of bonding. *Especially helpful should be the answers to Regular Worksheet 11e, and the final page of the notes.*
- The resistors that you are supplied with will heat up if a circuit is complete.
- The copper wire can be used to make electrodes, that can be dipped into any solutions or liquids that you have, in order to test for conductivity.
- Aluminum foil can be used to make small 'boats' that can be placed directly on to a hotplate.
- Typical properties that can be tested include; **appearance, hardness (soft & 'waxy' or hard & brittle), solubility in water, conductivity as a solid, conductivity in solution or as a liquid, melting point (high or low).**

### Equipment Available:

- Hotplates, equipment to test conductivity (leads, 9V batteries, resistors, copper wire electrodes), test tubes, spatulas, test tube racks, stirring rods

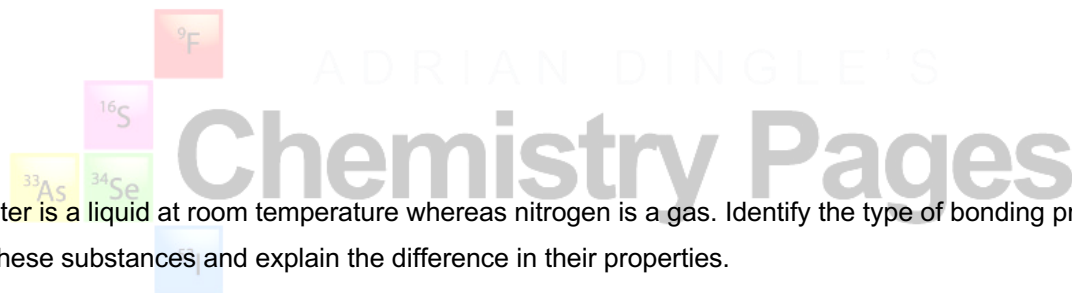
### Chemicals Available:

- Unknown substances labeled A, B, C and D, distilled water, copper wires for electrodes, aluminum foil for making 'boats'

**Pre-Lab Questions:**

1. What type of bonding would you expect to find in the components of air? Explain.
  
  
  
  
  
  
  
  
  
  
2. Many substances do not dissolve in, or mix with, water, an example of which is vegetable oil. What does this tell us about the bonds and bonding present in vegetable oil?

3. Water is a liquid at room temperature whereas nitrogen is a gas. Identify the type of bonding present in these substances and explain the difference in their properties.



**Post Lab Questions:**

1. Which of the following is *not* a property of ionic substances?
  - A. Conducts electricity when solid
  - B. Conducts electricity when dissolved in water
  - C. Has a high melting point and high boiling point
  - D. Conducts electricity when molten
  
2. What type of bonds/forces can be found in covalent substances?
  - A. Only inter
  - B. Only Intra
  - C. Both inter and intra
  - D. Strong electrostatic interactions between ions

3. Which substance described below, is most likely to be a gas at 298K?

- A. Sodium chloride
- B. HCl
- C. H<sub>2</sub>
- D. Al

4. What substance will *not* dissolve in water?

- A. A compound known to be ionic
- B. A polar covalent substance
- C. A non-polar covalent substance
- D. KNO<sub>3</sub>