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## Investigating Phase Changes

"PDB Lab"

Pure matter can exist in three phases: solid, liquid, gas. A phase change occurs when matter changes from one phase to another. Phase changes occur when heat is added or removed from a substance. The melting point of a substance is the temperature at which the solid-liquid phase change takes place. The freezing point is the temperature at which the liquid-solid phase change takes place. The melting point of a substance is the same as its freezing point. At this temperature, solid and liquid can exist together. In this investigation, you will observe what happens when the compound, paradichlorobenzene (PDB), is cooled from a liquid to a solid.

### Problem:

What temperature changes occur when a substance changes phase?

### Procedure:

1. You should begin with the burner on, the water boiling, and the PDB in liquid form.
2. Turn off the burner. Take temperature readings of both the water and the PDB every half minute. Record the data in the table on the following page.
3. When you finish taking temperature readings, graph both data sets on the same graph. Follow the guidelines for making a good line graph to represent the general trend seen in the data. *↳ see handout*

### Questions:

1. Based on your data, at what temperature does the PDB become solid?
2. Describe what happens to the arrangement of the particles as the PDB cools.
3. Based on your data, at what temperature did the water have the most energy?
4. What happened to the volume of PDB as it became a solid?