

The Freezing Point of Mothballs

Name _____

Date _____ Page _____

Sunshine State Standard

SC.912.P.10.5 Students relate temperature to the average molecular kinetic energy.

Problem: Can mothballs be identified based on its freezing point temperature?

Research Topics: _____

Hypothesis: _____

Materials: ring stand, alcohol burner, utility clamp, test tube with mothballs, rubber stopper, thermometer, and goggles

Procedure:

1. Label in the independent & dependent variables in the question.
2. Prepare a data table to record the temperature of the mothballs every 30 seconds. Include descriptive title and label columns with variable & units.
3. **Go to the lab station. DO NOT MOVE or ADJUST THE RUBBER STOPPERS OR THERMOMETERS! The thermometer will break if moved. The mothballs are frozen.**
4. **Safety:** Wear goggles, tie back hair, no bagging clothing, and do not sit at your lab stations when burner is on. Do not over heat test tube.
5. Attach test tube to test tube clamp and to ring stand.
6. Assemble the ring stand by screwing rod into the base.
7. Attach test tube to the ring stand using a utility clamp.
8. Place alcohol burner about 5 cm beneath the test tube.
9. Light the alcohol burner and heat the test tube until the temperature reaches 90 degrees.
10. At 90 degrees, remove the alcohol burner and from the side-place the cap on the burner to extinguish the flame. The mothballs will continue to melt inside the test tube.
11. **Record the temperature every 30 seconds on the data table. Use clock in back of room or cell phone. Be precise.**
12. Temperature may increase due to latent heat.

13. Continue to record the temperature every 30 seconds until the temperature remains the same for several minutes (2-3 minutes). When the temperature remains constant, this is evidence a physical change as occurred- the freezing point.
14. Replace the goggles neatly in the UV cabinet.
15. Go to your desk and use the Material Safety Data Sheets to identify the chemical by its freezing point. Please note other physical properties of the specific mothball.
16. Graph your data.
17. Calculate percentage error on notebook paper.
18. Write a **results paragraph, conclusion paragraph, and application on same notebook paper.**
Use the Scientific Method notes to help write these paragraphs.

