

THE VANISHING ICE CUBES

A. Question: *Are there specific temperatures at melting at boiling points?*

B. Materials Needed:

1. A bag of ice cubes (3-4 cubes per pair of students).
2. A thermometer, beaker, alcohol burner, and stand (for each pair)
3. Graph paper for all students

C: Procedure:

1. Distribute the materials to the students and have them work in pairs.
2. Instruct the students as to how to set up the stand and burner.
3. They should fill their beaker with water and add in the ice cubes.
4. Have one student stir the ice-water mixture and another one observe the temperature every minute while it is being heated (A third student may record the temperature as it is called out).
5. After all the ice is melted, continue heating the water and have the students record the temperature every minute until the water has boiled for ten minutes.
6. Have the students plot the observed temperatures (Y axis) against the time (X axis) on a graph.

D: Anticipated Results:

The students should notice that as time passes the water mixture goes from ice cold to cold, to room temperature, to warm, to hot, and lastly, to boiling. Their graph should reveal a directly proportional relationship.

E: Thought Questions for Class Discussion:

1. What was the temperature doing while there was still ice present?
2. Where did the heat from the alcohol flame go during that time?
3. What did the temperature do while the water was boiling?
4. Where did the heat from the flame go during this boiling time?
5. What will eventually be left over if the boiling was continued?
6. When heat is not added to the melting process, what will the melting ice do to the environment?
7. When heat is not added to the evaporating process, what will water that is evaporating do to the environment?

F: Explanation:

In the beginning of the heating process, the heat was used to melt the ice. This is why the temperature stayed at 0° C. It remained at that temperature as long as ice was present. As soon as all the ice is melted, the temperature rose steadily until 100° C, it then leveled off and stayed at the boiling temperature until all the water was evaporated (this temperature may be close to 98° C depending on the elevation of the place). The heat during the boiling process is used to transfer the liquid into vapor state.