

UNDER STRICT LABORATORY CONDITIONS, RESEARCH CONCLUDES THAT, IN SPITE OF BEING WATCHED, POTS DO EVENTUALLY BOIL.



In this activity you will observe the phase changes of water.

Question:

At what temperatures do the different phase changes of water (H₂O) occur?

Materials:

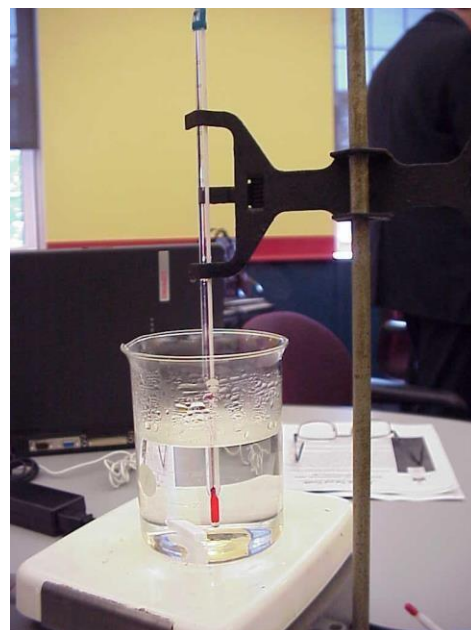
- 400 mL beaker
- Ring stand
- Ring stand clamp
- Stirring rod
- Thermometer
- Hot plate
- Ice water

Safety:

- Boiling water and hot plates should be handled with care to avoid burns.

Procedure:

1. Gather materials from around lab.
2. Set up the equipment according to the diagram below. Use the ring stand clamp to secure the thermometer above the hot plate. Don't let it touch the bottom of the beaker.

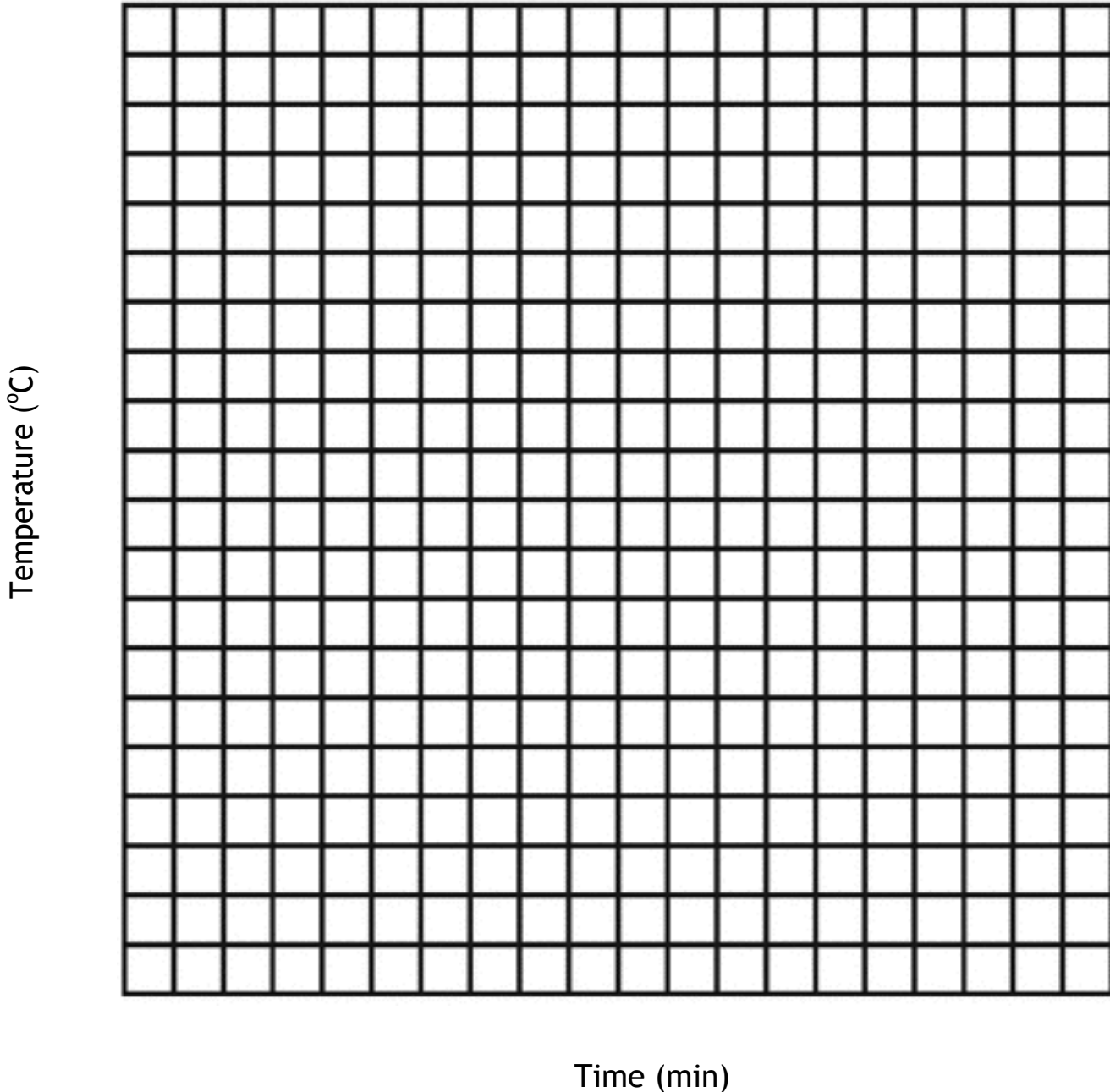


3. Get a 400 mL beaker and fill 3/4 full of ice cubes.
4. Add water so cubes are almost submerged, not floating, and take the starting temperature of your ice cubes.
5. Turn your hot plate on high.
6. Place the beaker on the hot plate. Make sure the thermometer is close to the bottom of the beaker but do not let it touch the bottom or sides of the beaker!
7. Take temperature of ice-water mixture **every 30 seconds**. Record the temperature in the observations section.
8. Do not touch the thermometer during this process.
9. Using a stirring rod you may stir the water and ice cubes to move them around.
10. Continue recording the temperature for 3 minutes after boiling starts. (this will be about 20 minutes)
11. Unplug the hotplate and let all equipment cool down.
12. Complete the analysis section by making a graph.
13. When all equipment is cool to the touch clean up and put everything away.

Observations (4 marks):

Time (min)	Temperature (°C)	Time (min)	Temperature (°C)
0		10.5	
0.5		11	
1		11.5	
1.5		12	
2		12.5	
2.5		13	
3		13.5	
3.5		14	
4		14.5	
4.5		15	
5		15.5	
5.5		16	
6		16.5	
6.5		17	
7		17.5	
7.5		18	
8		18.5	
8.5		19	
9		19.5	
9.5		20	
10			

Analysis: Complete the graph below using the values from your table. Label on the graph the melting point and the boiling point. Make sure to give your graph a title and numerical values on each axis. Connect the points to see any trends. **(5 marks)**



Conclusion (6 marks):

1. At what temperature did the water melt?

2. At what temperature did the water boil?

3. Were the melting and boiling points of the water what you expected? Why or why not?

4. Describe what is happening to the water particles as we heat up the water.

5. List two of your possible sources of error:

- I. _____

- II. _____
