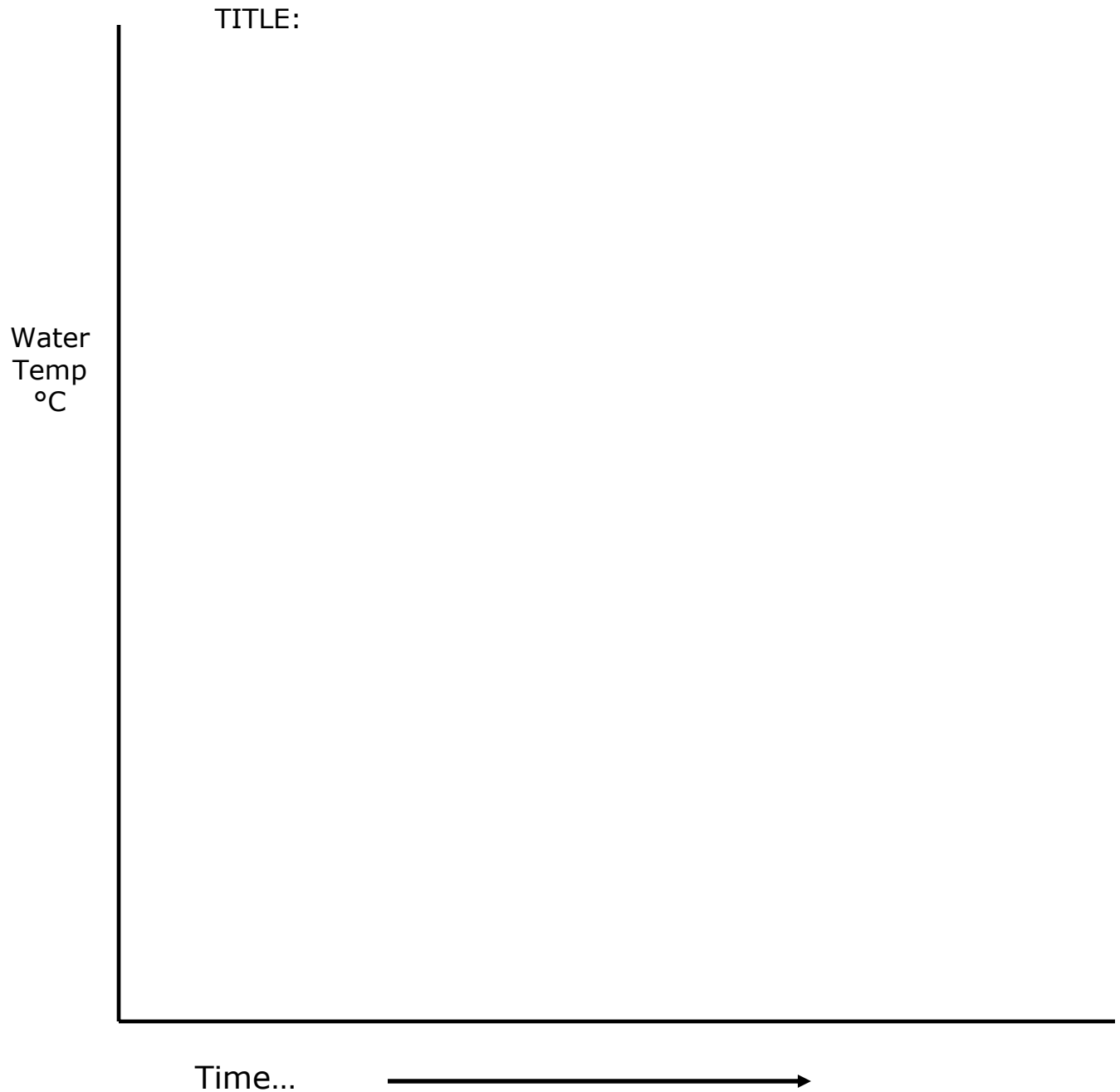


Phases HW #3

name: \_\_\_\_\_

Directions: read phases diary, read chapter 10, draw a NEAT cooling curve for water below. Use dots at the end of each line segment, label from F to A (top to bottom).

Each line segment represents certain events happening to the water concerning temperature changes and changes in kinetic energy. Indicate those in the boxes.



line segment	Phase the H <sub>2</sub> O is in what's happening to the kinetic energy?	what's happening to the potential energy?
FE		
ED		
DC		
CB		
BA		

Do your own graphing please.  
Do not just copy to get it handed in.

# PAPER IS CHEAP, KNOWLEDGE IS VALUABLE.

Drawing A Phase Diagram: Phase diagrams show the phases of a substance at all temperatures and pressures. To use them you find the point on the graph that corresponds to both the temperature and pressure you are investigating and decide if that point lies within the solid, the liquid, or the gas phase.

On page 284 in your text book is a drawing of the PHASE DIAGRAM for WATER.

1. Please RE-DRAW it on the back of this page, label the TP, CP, NBP, NFP, where solid and liquid and the gas phases exist.
2. Then draw arrows to show the 6 different phase changes, put temperatures and pressures on the proper axis, and give your graph a title.

**TP** = triple point, where the three phases can exist all at the same time

**NFP** = normal freezing point ( 0°C, 101.3 kPa)

**NBP** = normal boiling point (100°C, 101.3 kPa)

**CP** = critical point, the end of the line between gas and liquid;  
(at that temperature or higher, a gas cannot become a liquid at any pressure)

3. Draw in the 6 - PHASE CHANGES to put onto graph (use small arrows & words)
  - A. solid to gas is called sublimation  
gas to solid is called deposition
  - B. solid to liquid is called melting  
liquid to solid is called freezing (freezing point)
  - C. liquid to gas is called vaporization (boiling point)  
gas to liquid is called condensation

Phase diagrams are always understood to be measured in a CLOSED SYSTEM, otherwise as you add heat/energy, this energy would be lost to the universe. Water would evaporate away, so for these diagrams, ONLY a closed system will work.

To Prepare to Celebrate...

1. Make sure that you have read chapter 10 and the PHASES DIARY online.
2. You should be capable of reading Table H, a PHASE diagram, and both the heating and cooling curves for water.
3. You definitely should grasp the connection between the temperature and kinetic energy.
4. The concept of potential energy (phases diary) is more difficult to grasp, but that too should make sense after your readings. No slacking. Email me or call my cell phone if you struggle.