

**PHASE  
HW 1**

Name: \_\_\_\_\_  
Read the PHASES BASICS      Problems: solve, show all math.

- 1 A gas is at the pressure of 1.25 atm. What is that pressure in kPa? \_\_\_\_\_
  
- 2 How many mm Hg is the pressure of 1.25 atm equal to? \_\_\_\_\_
  
- 3 On Mount Everest the air pressure is about 0.305 atm. How many kPa is that? \_\_\_\_\_
  
- 4 Convert 0.305 atm into mm Hg. \_\_\_\_\_
  
- 5 What are the temperature and pressure of STP? \_\_\_\_\_ °C & \_\_\_\_\_ kPa
- 6 Express the temperature of STP in Kelvin. \_\_\_\_\_
- 7 Express the pressure of STP in mm Hg and in atm. \_\_\_\_\_ & \_\_\_\_\_
- 8 What is so significant about the temperature 0 Kelvin? \_\_\_\_\_  
\_\_\_\_\_
  
9. Define atmospheric pressure
  
  
10. Define barometer

**PHASE  
HW  
2**

name: \_\_\_\_\_  
Read the Phases BASICS AGAIN (or for the first time)

- 1 What is the name of the force that attracts the molecules of a liquid together?
- 2 Describe the difference between vaporization and evaporation.
- 3 How can evaporation (or boiling) be described as a "cooling process"?
- 4 Explain what dynamic equilibrium means in your own words. Make up an example that shows Dynamic Equilibrium either in a chemical way, or "real life".
- 5 Explain in your own words: The temperature of a liquid can never go above its boiling point.
- 6 Why can't liquids be compressed very much?
- 7 At 101.3 kpa water boils at 100 degrees Celsius. High up a mountain or deep in a cave the air pressure is NOT NORMAL. Fill in this chart and label where the air pressure is exactly 101.3 kPa and exactly 100°C. The other boxes should be filled in with greater than or less than those units.

	air pressure (in kPa)	boiling point of water °C
below sea level in a deep cave		
at sea level	Normal or 101.3 kPa	100°C
high atop a mountain		

**PHASE  
HW 3  
page  
1/3**

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

Directions: read phases BASICS, draw a Cooling curve for any element. Put in dots at the end of each line segment, label the dots with the letters A to F (from left to right). Put a title on the graph, add numbers to the Y axis.

segment	phase or phases	KE and TEMP	PE
AB			
BC			
CD			
DE			
EF			

TITLE:

Temp  
Kelvin

Heat Removed at constant rate  $\longrightarrow$

**PHASE  
HW 3**  
page  
2/3

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

Directions: read phases BASICS, draw a Heating curve for another element. Put in dots at the end of each line segment, label the dots with the letters A to F (from left to right). Put a title on the graph, add numbers to the Y axis.

segment	phase or phases	KE and TEMP	PE
AB			
BC			
CD			
DE			
EF			

TITLE:

Temp  
Kelvin

Heat Removed at constant rate  $\longrightarrow$

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 the bottom of this page is the PHASE DIAGRAM for WATER.**

1. Please RE-DRAW the phase diagram below really big on white paper. Label the TP, CP, NBP, NFP, and label the sections of the diagram where the different 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; (D in the diagram)  
(at that temperature or higher, a gas cannot become a liquid at any pressure)

## PHASE DIAGRAM FOR WATER

