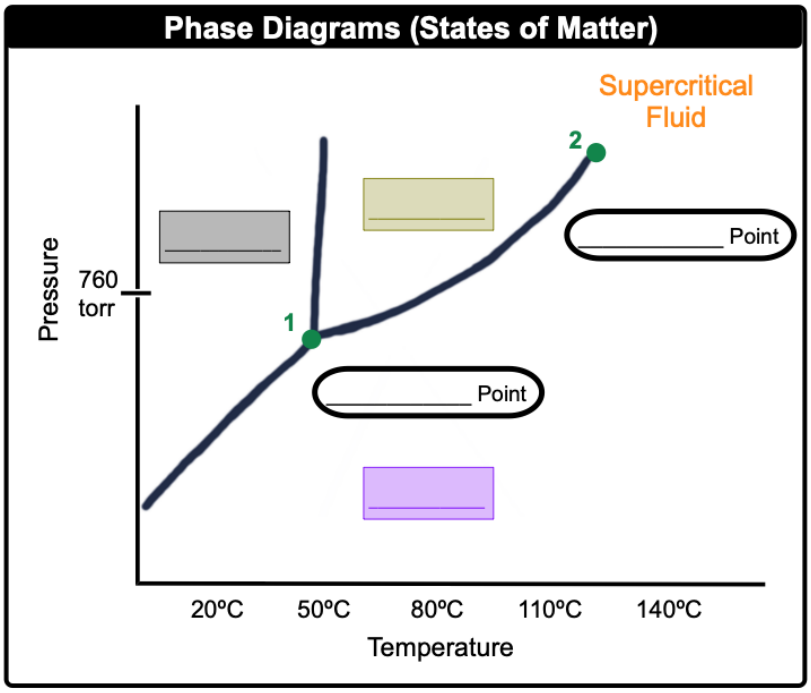
CONCEPT: PHASE DIAGRAMS

States of Matter of Phase Diagrams

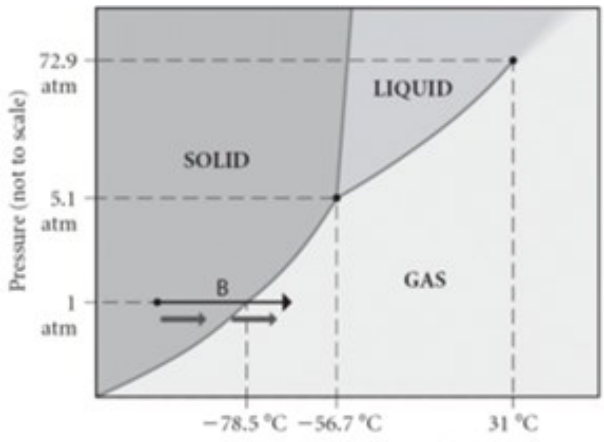
- A map of the physical state of a pure substance as a function of pressure (____-axis) and temperature (____-axis).
  - □ **Triple Point:** Unique set of conditions where ____ states of matter are stable and in equilibrium with one another.
  - □ **Critical Point:** Final set of pressure and temperature conditions where a _____ and _____ are distinguishable.



EXAMPLE: At a temperature of 60°C and 1.20 atm determine the physical state of the substance from the phase diagram shown above?

a) Liquid b) Gas c) Solid d) Supercritical Fluid

PRACTICE: The critical point of this substance occurs at what temperature?



a) 0 °C b) –78.5 °C c) –56.7 °C d) 31 °C e) 100 °C

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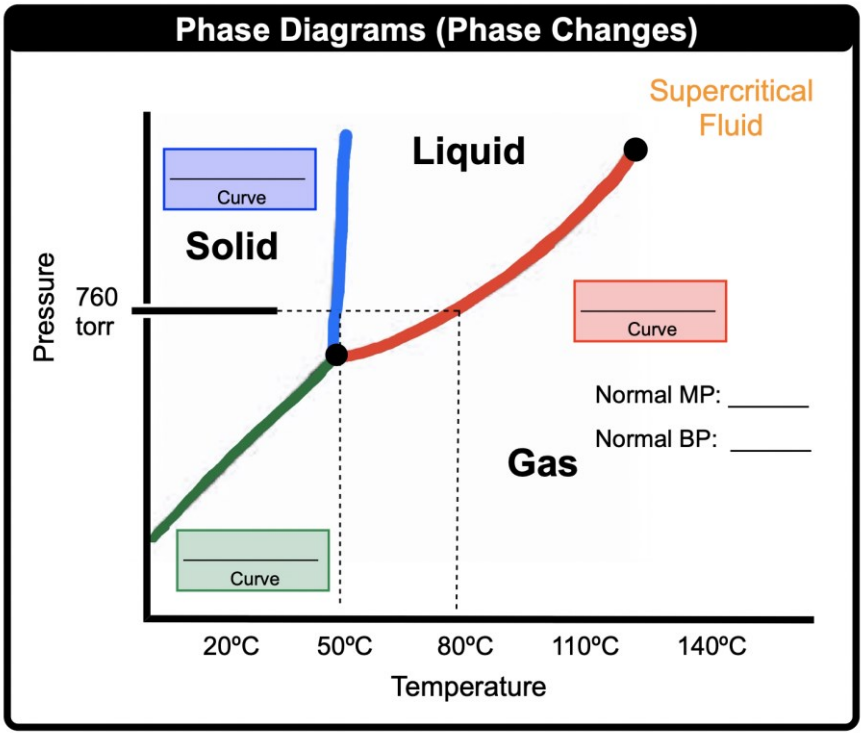
Phase Changes of a Phase Diagram

● Recall, a phase change is a _____ change that involves the transition between the 3 states of matter.

□ **Phase Change Curve:** Line segment within phase diagrams that separates ___ states of matter from each other.

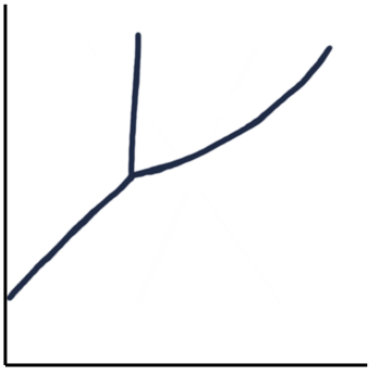


□ **Normal Pressure:** Name given to the standard pressure of _____ atm or _____ mmHg or torr.

- **Normal Melting Point:** Phase transition between _____ to _____ at normal pressure.
- **Normal Boiling Point:** Phase transition between _____ to _____ at normal pressure.

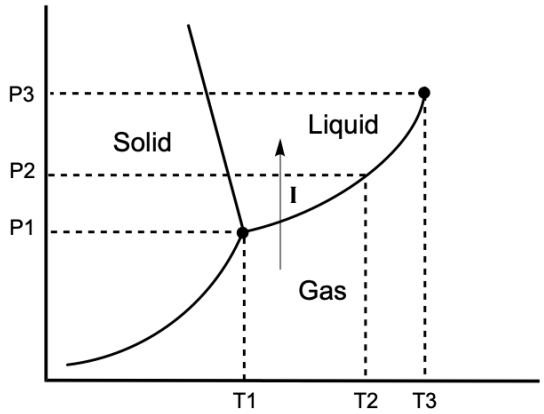
EXAMPLE: A substance has a triple point -45.0 °C and 500 mmHg. What is the most likely phase change to occur for a solid sample of this substance as it is heated from -60.0 °C to 10 °C at a pressure of 490 mmHg?

a) Condensation b) Vaporization c) Deposition d) Melting e) Sublimation



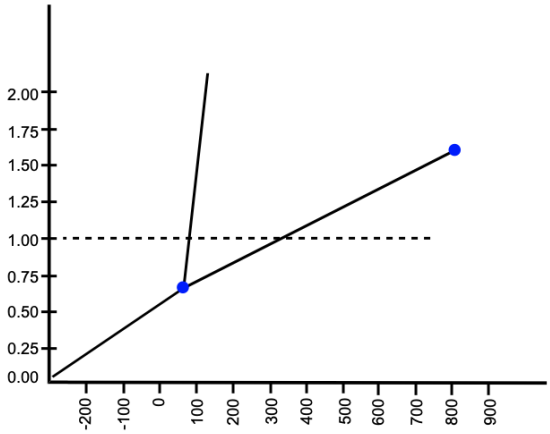
CONCEPT: PHASE DIAGRAMS

PRACTICE: Arrow I corresponds to:



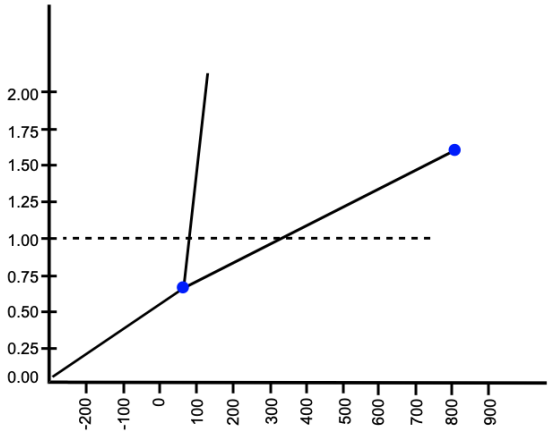
a) Equilibrium b) Sublimation c) Condensation d) Vaporization e) Deposition

PRACTICE: What is the normal freezing point of this unknown substance?



a) 0 ºC b) –200 ºC c) 200 ºC d) 400 ºC e) 100 ºC

PRACTICE: At what temperature can we no longer tell the difference between the liquid and gas phases?



a) 100 ºC b) 200 ºC c) 400 ºC d) 800 ºC e) 820 ºC