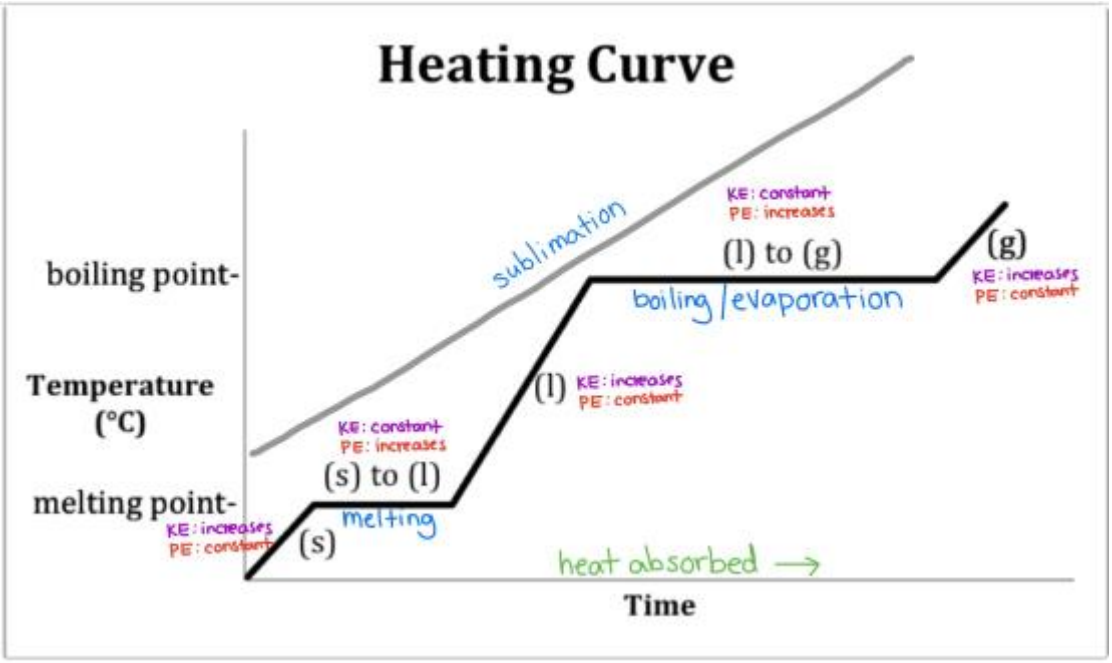
Heating and Cooling Curves Throwback Key Ideas

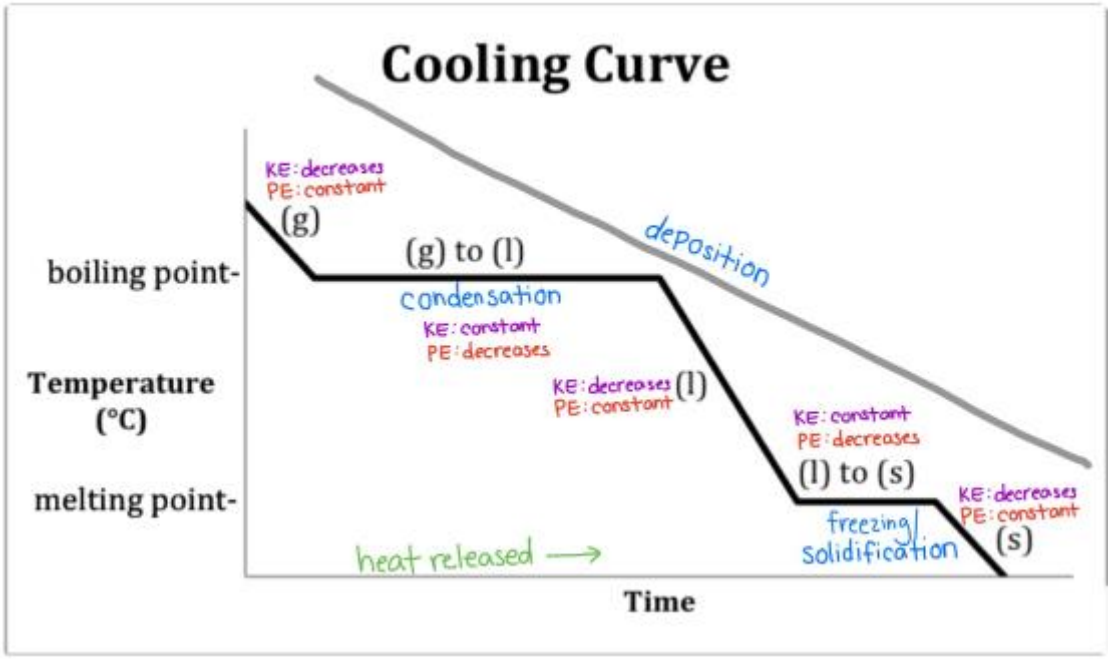
- Heating and Cooling Curves
  - Remember the 3 Ps: **P**lateaus = **P**hase change = **P**otential energy change
    - KE stays constant
  - Sloping lines = temperature (kinetic energy) change, PE stays constant, phase is constant
  - Can find the melting or boiling point by finding the plateau that marks that phase change and tracing over to y-axis to find the temperature

- Along the phase changes (plateaus), the added energy is being used to overcome the intermolecular forces (IMF) holding the particles together, so they can spread out and move into the next phase. This is why the temperature/KE does not change along the plateaus.

- We can calculate the amount of heat involved in a phase change or temperature change using 3 equations:

Equation	$Q = mc\Delta T$	$Q = mH_f$	$Q = mH_v$
Variables	Q = heat/energy m = mass c = specific heat (on Table B for water) ΔT = change in temperature; T_f-T_i	Q = heat/energy m = mass H_f = heat of fusion; on Table B for water	Q = heat/energy m = mass H_v = heat of vaporization; on Table B for water
When to use	Use when substance is heated or cooled and there is a change in temperature	Use when substance is melting or freezing at a constant temperature	Use when substance is vaporizing or condensing at a constant temperature


Heating Curve
boiling point-
Temperature (°C)
melting point-
sublimation
KE: constant
PE: increases
(l) to (g)
boiling / evaporation
(g)
KE: increases
PE: constant
(l) KE: increases
PE: constant
KE: constant
PE: increases
(s) to (l)
melting
KE: increases
PE: constant
(s)
heat absorbed →
Time


Cooling Curve
boiling point-
Temperature (°C)
melting point-
KE: decreases
PE: constant
(g)
(g) to (l)
condensation
KE: constant
PE: decreases
deposition
KE: decreases
PE: constant
(l)
KE: constant
PE: decreases
(l) to (s)
freezing / solidification
KE: decreases
PE: constant
(s)
heat released →
Time