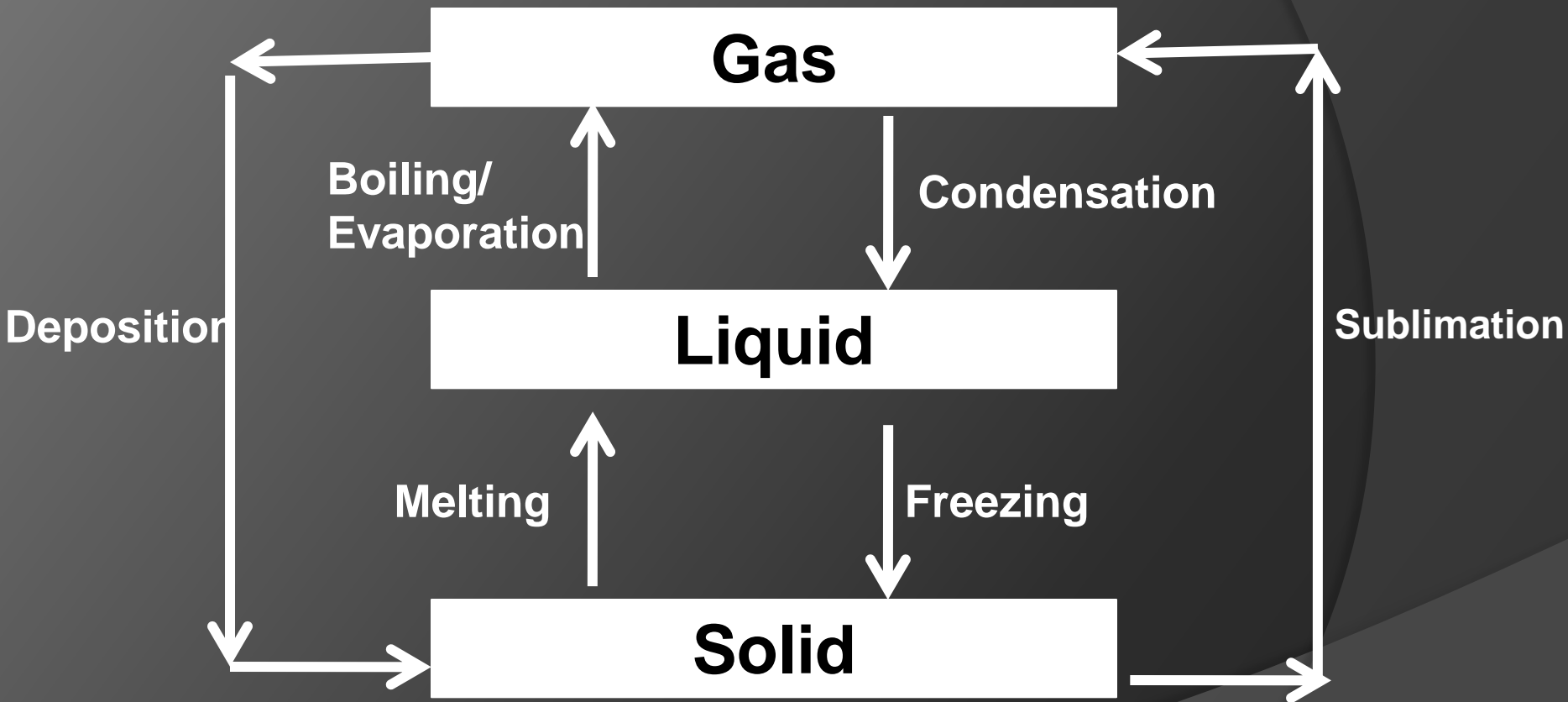


GENERAL CHEMISTRY

STANDARD 2.3

2.3: Identify Phase Changes and Calculate the Energy Needed to Change a Phase

PHASES OF MATTER



HEAT OF PHASE CHANGES

Heat of Fusion – Energy needed to melt one unit of mass of an object (constant)

Heat of Vaporization – Energy needed to boil one unit of mass of an object (constant)

Both can be found on foldable

Common units are J/kg so mass must be in units of kg.

For both melting/freezing and evaporation/condensation, the equation is:

$$Q = mL$$

Q = heat energy (J)

m = mass (units consistent with L)

L = latent heat (fusion or vaporization) = constant

PHASE CHANGE EXAMPLE

Calculate the amount of energy needed to melt 10. kg of ice.

Step 1

$$Q = ?$$

$$m = 10. \text{ kg}$$

$$L_f = 335000 \text{ J/kg (foldable)}$$

Step 2

$$Q = mL_f$$

Step 3

$$Q = mL_f$$

Step 4

$$Q = 10 \text{ kg (335000 J/kg)}$$

Step 5

$$Q = 3400000 \text{ J}$$

PHASE CHANGE DIAGRAM FOR WATER

