

## Latent Heat of Fusion and Vaporization

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$$Q = mc\Delta T$$

$$Q_f = mL_f \quad Q_v = mL_v$$

1. Draw a heating diagram and calculate how much energy is required to change 2.0 kg of ice at 0°C to water at 50°C?
2. Draw a heating diagram and calculate how energy is required to change 5.0kg of ice at -10°C to steam at 120°C.
3. Draw a cooling diagram and calculate how much energy is released when 5 kg of water vapor at 130°C condenses and then freezes to ice at -15 °C.
4. Draw a heating diagram and calculate how much energy is required to convert 17kg of ice at -25°C into steam at 143 °C.
5. Draw a heating diagram and calculate the energy required to convert 236 grams of ethyl alcohol from room temperature (21.3°C) to vapor.

Ethyl alcohol	
Freezing Point (°C)	-114
Boiling Point (°C)	78.3
Latent Heat of Fusion (J/kg)	$1.1 \times 10^5$
Latent Heat of Vaporization (J/kg)	$8.6 \times 10^5$
Specific Heat Capacity (as a liquid) (J/kg·°C)	2,460