96°F ⟶ ~~??°C~~ +35.6°C

	°F	°C
Water freezes	32°F	0°C
Water boils	212°F	100°C

180°F ... 100°C

96°F is 64°F higher than freezing point of water

Difference in T → 180°F = 100°C

$$(64°F)\left(\frac{100°C}{180°F}\right) = 35.6°C$$

above freezing water

0°C liquid water → 100°C steam

Heat Capacity

$$\left(\frac{1\,\text{cal}}{\cancel{g}\cdot\cancel{^\circ C}}\right)(1\,\cancel{g})(100\,\cancel{^\circ C}) = 100\,\text{cal}$$

+

Phase Change:

$$\left(\frac{540\,\text{cal}}{\cancel{g}}\right)(1\,\cancel{g}) = 540\,\text{cal}$$

$$640\,\text{cal}$$

How much energy must be removed to cool 24.6g of steam at 105°C to liquid water at 27.5°C?

$E_1 \rightarrow$ 105°C – 100°C (steam cooling)

$E_2 \rightarrow$ @ 100°C (phase change, steam condensing)

$E_3 \rightarrow$ 100°C – 27.5°C (liquid water cooling)

$E_1 = \left(\frac{0.43\,cal}{g \cdot °C}\right)(24.6g)(5°C) =$

$E_2 = \left(\frac{540\,cal}{g}\right)(24.6g) =$

$E_3 = \left(\frac{1\,cal}{g \cdot °C}\right)(24.6g)(72.5°C) =$