

Heat Quiz

	MP °C	BP °C	Hf (J/g)	Hv (J/g)	Cp(s) (J/gC)	Cp(l) (J/gC)	Cp(g) (J/gC)
H ₂ O	0	100	334	2260	2.06	4.18	2.02
D	-30	80	200	1600	1.1	1.0	.8

1. If 30 g of D at 20°C are mixed with 50 g of H₂O at 70°C, find final temp.

$$\begin{aligned}
 30(1.0)(x-20) &= 50(4.18)(70-x) \\
 30x - 600 &= 14630 - 209x \\
 239x &= 15230 \\
 x &= \boxed{63.7^\circ\text{C}}
 \end{aligned}$$

2. How much energy is needed to heat 200 g of D from -50 to 10°C?

$$\begin{array}{r}
 -50 \text{ to } -30 \quad 200(1.1)(20) \quad 4400 \\
 \text{melt} \quad 200(200) \quad 40,000 \\
 -30 \text{ to } 10 \quad 200(1.0)(40) \quad 8000 \\
 \hline
 \boxed{52,400 \text{ J}}
 \end{array}$$

3. How much water at 100°C can be vaporized with 40 kJ of energy?

$$\begin{aligned}
 40,000 &= 2260(g) \\
 &= \boxed{17.7g}
 \end{aligned}$$

4. A golden (looking) ring is heated to 100°C then dropped into 50 ml of water at 20°C. The water warms to 22°C. The ring is weighed and has a mass of 26 g. Find the specific heat of the supposed gold.

$$\begin{aligned}
 26(c_p)(78) &= 50(4.18)(2) \\
 &= \boxed{206 \text{ J/g}^\circ\text{C}}
 \end{aligned}$$