Water and X

	Cp solid (J/g°C)	Cp liquid (J/g°C)	Cp gas (J/g°C)	Heat of fusion (J/g)	Heat of vaporization (J/g)	MP (°C)	BP (°C)
X	0.8	1.1	0.9	210	1800	-30	70
Water	2.06	4.18	2.02	334	2260	0	100

1. If a 28g sample of water absorbs 1230 J of heat when warming from 34°C, what is its final temperature?
2. A piece of metal weighing 61 g at 98.0 °C is put it into 100.0 mL of water (initially at 24 °C). The water reached a final temperature of 28 °C. Calculate the specific heat of the metal.
3. A sample of X weighing 20 g is at 65.0 °C when it is dumped into 40 ml of water (initially at 20 °C). Find the final temperature.
4. How much energy is needed to vaporize 25g of water?
5. How much energy does it take to warm 12g of ice at -40°C to 115°C?
6. Draw the heating curve for #5.
7. 80 g of ice is at 0°C. How much energy is needed to warm it to 40°C?
8. How much water can be vaporized with 30 kJ of energy?
9. How much X can be vaporized with 30 kJ of energy?
10. What amount of energy is needed to warm 100 g of X from 10°C to 90°C?

1. $1230 = 28(4.18)(\Delta T)$
$\Delta T = 10.5°$
$44.5°$

2. $61(c_p)(70) = 100(4.18)(4)$
$c_p = .392\ J/g°C$

3. $20(1.1)(65 - x) = 40(4.18)(x - 20)$
$1430 - 22x = 167.2x - 3344$
$4774 = 189.2x$
$25.2°C$

4. $q = 2260(25)$
$56,500\ J$

5. $12(2.06)(40) = 988.8$
$12(334) = 4008$
$12(4.18)(100) = 5016$
$12(2260) = 27120$
$12(2.02)(15) = 363.6$
$37,496.4\ J$

6. 

7. $80(2.06) + 80(4.18)(40)$
$164.8 + 13376$
$13,540.8\ J$

8. $30,000 = 2260(g)$
$13.3\ g$

9. $30,000 = 1800(g)$
$16.7\ g$

10. $100(1.1)(60) = 6600$
$100(1800) = 180,000$
$100(.9)(20)\ \ 1800$
$188,400\ J$