Knowledge

1. The minimum amount of energy needed to get a reaction started
2. Breaking bonds
3. Making bonds
4. Polystyrene is a good insulator, so less heat will be transferred/lost to the room
5. Put a lid on the cup/insulate the cup with cotton wool
6. Combustion, neutralisation, oxidation, displacement
7. Thermal decomposition, citric acid & sodium hydrogencarbonate, photosynthesis

Application

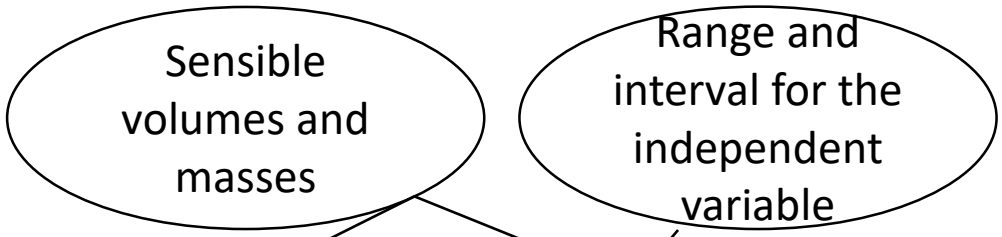
1. More energy is released when bonds were made than was absorbed when bonds were broken
2. a)7.4 (9.5 is an anomaly)

   b) exothermic as it says ‘temperature increase’

   c) It would go cloudy

3. More energy is needed to break bonds than is released when bonds are made, so the reaction is endothermic

The higher the concentration of acid, the more exothermic the reaction.



- Use a measuring cylinder to measure out 25cm^3 of 0.1M HCl
- Put the acid in a test tube and use a thermometer to take the start temperature.
- Add 2cm magnesium strip and record the highest temperature the acid reaches.
- Repeat using different concentrations of HCl – 0.2M, 0.3M. 0.4M and 0.5M
- Keep the volume of acid the same and the length of the magnesium strip

Higher tier – bond energy

$$Cl_{2(g)} + 2HI_{(g)} \rightarrow 2HCl_{(g)} + I_{2(g)}$$

Breaking bonds:	Making bonds:
Cl – Cl = 242	2 x HCl = 864
H-I x 2 = 596	I-I = 151
Total energy in = 838	Total energy released = 1051

Energy change = 838 – 1051

= -213 KJ/mol exothermic