

Solutions

Each answer shows the steps, then the **result**.

2.1

- an exothermic reaction gives out energy
- ΔH is **negative**

2.2

- bond breaking **takes in** energy (endothermic)

3.1 B

- an endothermic reaction takes in energy, so the surroundings **cool down**
- A is exothermic; C and D are wrong

3.2

(a)

- bonds broken = $436 + 158 = 594 \text{ kJ mol}^{-1}$
- bonds made = $2 \times 568 = 1136 \text{ kJ mol}^{-1}$

$$\Delta H = 594 \text{ kJ mol}^{-1} - 1136 \text{ kJ mol}^{-1} = -\mathbf{542} \text{ kJ mol}^{-1}$$

(b)

- ΔH is negative, so the reaction is **exothermic**

3.3

- the height of the hill above the reactants is the **activation energy**