a

In an exothermic reaction heat _____ the reaction to the surrounding environment.

The surrounding temperature _____ .

In an endothermic reaction heat _____ the chemical reaction.

The surrounding temperature _____ .

b

Circle the exothermic reactions and underline the endothermic reactions:

combustion
photosynthesis
electrolysis
neutralisation
water reacting with calcium oxide
ammonium chloride reacting with water

Name some every day uses of exothermic reactions.

Give an example of an every day use of an endothermic reaction.

c

What is activation energy?

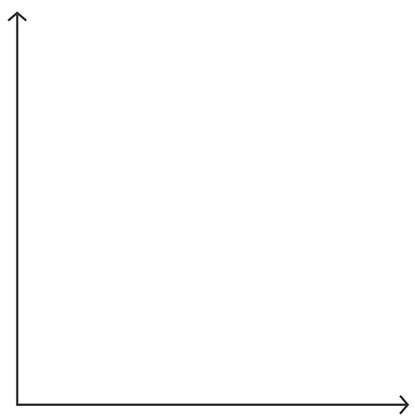
d

Describe how energy transfer can be measured in a practical.

Draw a diagram to show the practical.

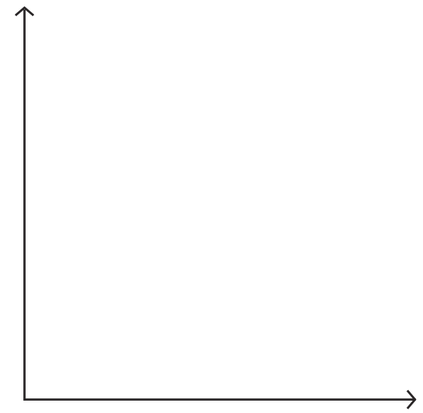
e

Sketch a reaction profile for an endothermic reaction.



f

Sketch a reaction profile for an exothermic reaction.



g

Describe the reaction profile of an endothermic reaction.

Describe the reaction profile of an exothermic reaction.

h

Use the approximate bond energies to calculate the energy change in the following reaction.

$H_2 + Cl_2 \rightarrow 2HCl$

State whether the reaction is endothermic or exothermic.

H–H = 436kJ/mol **Cl–Cl** = 243kJ/mol **H–Cl** = 432kJ/mol

a

In an exothermic reaction heat **exits** the reaction to the surrounding environment.

The surrounding temperature **increases** .

In an endothermic reaction heat **enters** the chemical reaction.

The surrounding temperature **deceases** .

b

Circle the exothermic reactions and underline the endothermic reactions:

combustion **exothermic**
photosynthesis **endothermic**
electrolysis **exothermic**
neutralisation **exothermic**
water reacting with calcium oxide **exothermic**
ammonium chloride reacting with water **endothermic**
Name some every day uses of exothermic reactions.
Hand warmers, self-heating cans, matches, etc.

Give an example of an every day use of an endothermic reaction.
sports injury packs, etc.

c

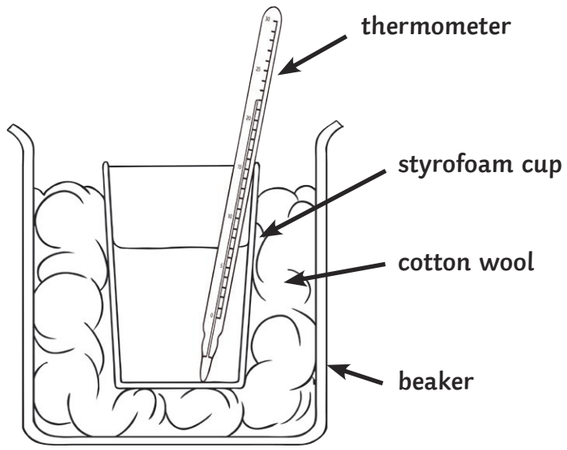
What is activation energy?
The minimum amount of energy needed by the reactants to start the reaction.

d

Describe how energy transfer can be measured in a practical.

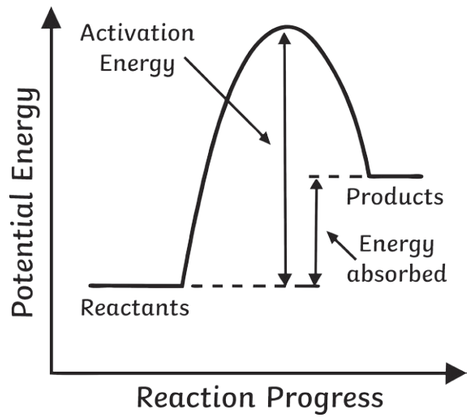
Draw a diagram to show the practical.

1. **Take the start temperature of the reactants.**
2. **Record the highest temperature.**
3. **Record the lowest temperature.**
4. **Take away the temperature from the temperature of the reactants.**



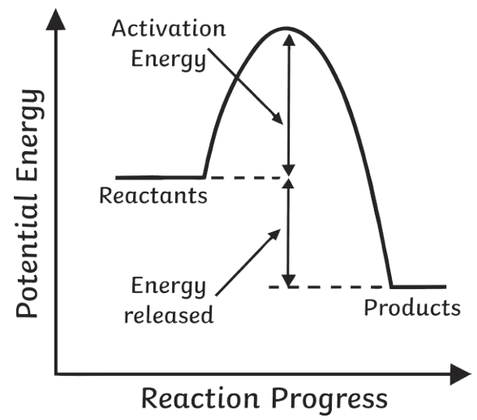
e

Sketch a reaction profile for an endothermic reaction.



f

Sketch a reaction profile for an exothermic reaction.



g

Describe the reaction profile of an endothermic reaction.
The products are at a higher energy level because energy has come into the chemical reaction.

Describe the reaction profile of an exothermic reaction.
The products are at a lower energy level because energy has gone out of the chemical reaction.

h

Use the approximate bond energies to calculate the energy change in the following reaction.
$H_2 + Cl_2 \rightarrow 2HCl$

State whether the reaction is endothermic or exothermic.
H–H = 436kJ/mol **Cl–Cl** = 243kJ/mol **H–Cl** = 432kJ/mol

436 + 243 → 432 + 432
679 → 864
- 185kJ/mol

The energy change is negative so the reaction is exothermic.