

Combined Science - Chemistry - Key Stage 4

Energy Changes

Energy level diagrams

Mrs. Begum



Independent task 1

1. What do all chemical reactions involve?
2. What is activation energy?
3. What is the definition of an exothermic reaction?
4. What is the definition of an endothermic reaction?
5. Is bond making endothermic or exothermic?
6. Is bond breaking endothermic or exothermic?



Independent task 1 answers

1. What do all chemical reactions involve? **All chemical reactions involve bond breaking and bond making.**
2. What is activation energy? **The minimum energy needed to start a reaction**
3. What is the definition of an exothermic reaction? **A reaction where energy is released into the surroundings**
4. What is the definition of an endothermic reaction? **A reaction where energy is taken in (absorbed) from the surroundings**
5. Is bond making endothermic or exothermic? **Exothermic**
6. Is bond breaking endothermic or exothermic? **Endothermic**



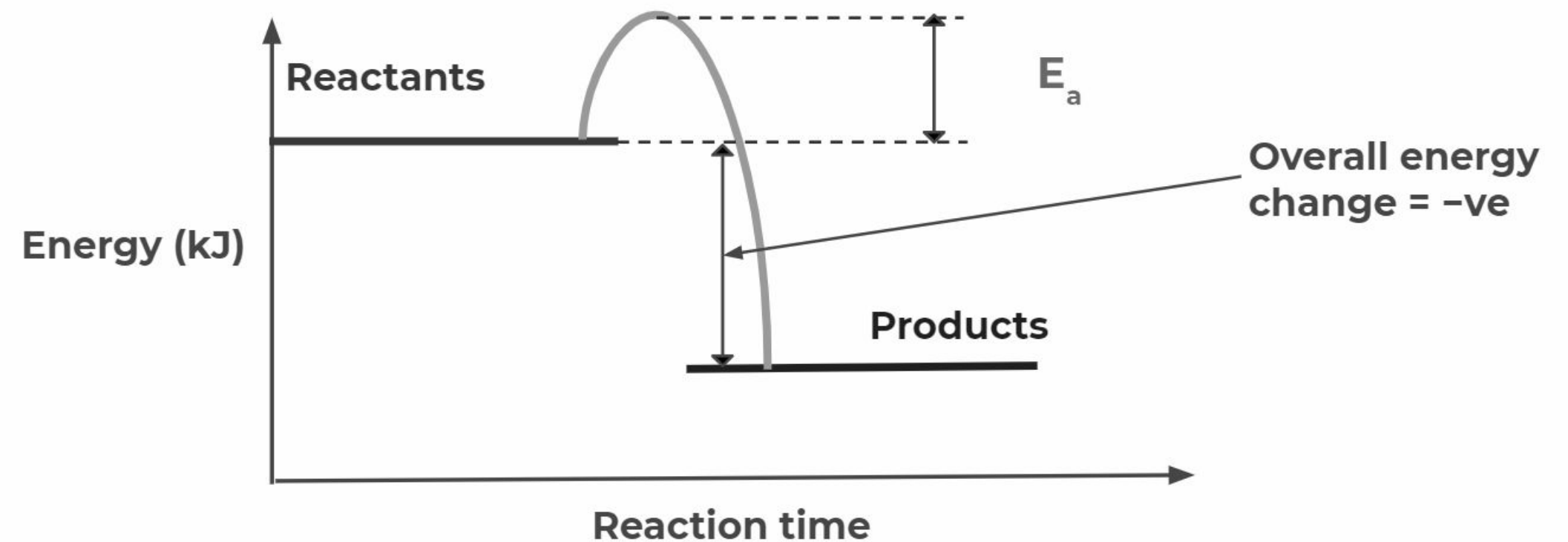
Independent task 2

1. Draw an energy level diagram for an exothermic reaction. Label the reactants, products, activation energy and overall energy change.
2. Explain why a reaction would be exothermic overall.



Independent task 2 answers

1. Draw an energy level diagram for an exothermic reaction. Label the reactants, products, activation energy and overall energy change.



2. Explain why a reaction is exothermic overall.

More energy has been released during bond making than has been used for bond breaking.



Independent task 3

A student adds citric acid to sodium hydrogen carbonate. The temperature on the thermometer went from 22°C to 18°C.

1. Is the reaction endothermic or exothermic?
2. How do the observations show this?
3. Sketch the reaction profile diagram.
4. Add the arrow for activation energy and label it.
5. Add the arrow for the overall change in energy and label it.



Independent task 3 answers

A student adds citric acid to sodium hydrogen carbonate. The temperature on the thermometer went from 22°C to 18°C.

1. Is the reaction endothermic or exothermic? **Endothermic**
2. How do the observations show this? **The temperature decreased**
3. Sketch the reaction profile diagram.
4. Add the arrow for activation energy and label it.
5. Add the arrow for the overall change in energy and label it.

