

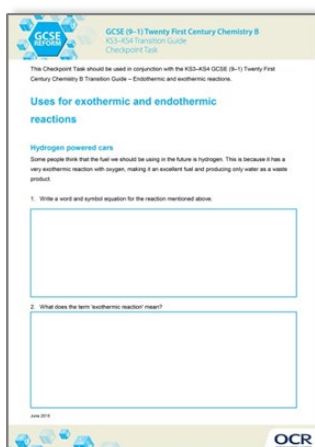
This Checkpoint Task should be used in conjunction with the KS3–KS4 GCSE (9–1) Twenty First Century Chemistry B Transition Guide – Endothermic and exothermic reactions.

Uses for exothermic and endothermic reactions



Instructions and answers for teachers

These instructions should accompany the OCR resource ‘KS3–KS4 GCSE (9–1) Twenty First Century Chemistry B Transition Guide – Endothermic and exothermic reactions’ activity which supports OCR GCSE (9–1) Twenty First Century Chemistry B.



The Activity:

This resource comprises of 2 tasks.



This activity offers an opportunity for English skills development.

Associated materials:

‘Uses for exothermic and endothermic reactions’ Checkpoint Task learner activity sheet.



This resource is an exemplar of the types of materials that will be provided to assist in the teaching of the new qualifications being developed for first teaching in 2016. It can be used to teach existing qualifications but may be updated in the future to reflect changes in the new qualifications. Please check the OCR website for updates and additional resources being released. We would welcome your feedback so please get in touch.





Uses for exothermic and endothermic reactions

Learners complete questions 1-7 on the worksheet. They then plan a short presentation about a chosen endothermic or exothermic reaction, including word and symbol equations of the chosen reaction, background/additional information about the reaction and an explanation of the energy changes in the reaction.

For higher ability learners, the teacher can let them research and choose their own reaction. For lower ability learners, the teacher may give one or two uses (examples can be found in the answer to Q7 below) and some information to get them started. A proforma printed onto A3 paper may also be of use for these learners.

Learners can peer assess others after all learners have completed their presentations by going round the class and writing one thing that the learner did well and one area for improvement on the back of each learner's visual aid. Learners can then use these comments evaluate their work.

Hydrogen powered cars

Some people think that the fuel we should be using in the future is hydrogen. This is because it has a very exothermic reaction with oxygen, making it an excellent fuel and producing only water as a waste product.

1. Write a word and symbol equation for the reaction mentioned above.

Answer: Hydrogen + Oxygen → Water
 $2\text{H} \quad \quad \quad \text{O}_2 \quad \quad \quad 2\text{H}_2\text{O}$

2. What does the term 'exothermic reaction' mean?

Answer: A chemical reaction that releases heat energy into its surroundings.



3. Use the keywords below to explain why the reaction is exothermic:

hydrogen & oxygen
molecules

give out

water molecules

take in

less energy

more energy

break bonds

make bonds

Answer: When hydrogen and oxygen molecules react, they take in less energy to break their bonds than the energy given out making bonds in the water molecules.

Self-cooling ice packs

Self-cooling ice packs are often used at football games to put on injuries to stop swelling. The pack contains a small bag of water surrounded by a larger bag containing a chemical. When the pack is 'punched' the chemical and the water mix and the pack becomes very cold.

4. Is the reaction in the pack endothermic or exothermic?

Answer: endothermic

5. Explain your reasoning.

Answer: Because the temperature decreases, meaning heat energy is being taken in from the surroundings.

A worker at the company who make the self-cooling ice packs accidentally puts the wrong chemical in the outer bag. There were lots of complaints from customers who claimed the ice-packs didn't work as the temperature didn't change.

6. Use the words below to explain the energy changes in this reaction:

| | | | |
|--------------------|------------------------------|------------------------|-------------------------|
| products | reactants | energy taken in | energy given out |
| break bonds | no temperature change | make bonds | |

Answer: There is no temperature change because the energy taken in to break bonds in the reactants is the same as the energy given out to make bonds in the products.

7. Give two more examples of how exothermic and endothermic reactions.

Answer:

Exothermic:

rusting iron
 combustion of hydrocarbon fuels
 hand warmers
 self-heating drinks cans
 glow sticks

Endothermic:

baking bread
 photosynthesis
 cracking of hydrocarbons
 thermal decomposition of limestone



8. Choose one endothermic or an exothermic reaction and plan a 2 minute presentation to a small group of learners in your class.

Your presentation must include:

- A summary of the endothermic/exothermic reaction involved (word and symbol equations).
- Background information about the reaction (eg general information, what do we use it for etc)
- A detailed explanation of the energy changes involved in the reaction (ie information about bonds being broken and formed would go here).
- A visual aid to help with your oral presentation.

Your teacher will explain how other learners will feedback to you on these areas.



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