

Home learning activities

Subject
Science
Year Group
Year 7
Unit of work / Knowledge organiser
Chemical Reactions
Activities
<ul style="list-style-type: none">• Read through the Sections 1-4 of the 'Knowledge Organiser' on 'Chemical Reactions'.• Make careful and details notes on Sections 1-4, including writing out the 'gas tests' in Section 4.• Describe the differences between a 'chemical change' and a 'physical change' in your own words, without looking at your earlier notes.• Read the 'Key Revision Facts' sheet carefully.• Describe, in your own words, the meaning of 'exothermic' and 'endothermic' reactions without looking at the 'Key Revision Facts' sheet.• Complete the 'Chemical or Physical?', 'Match and Draw' and 'What Is?' activities on the 'Test Yourself 1' pages; the answers are provided at the end, but do not look at these until you have tried to complete the work yourself (be strict with yourself here).• Complete the 'Exothermic or Endothermic?', 'Thermal Decomposition' and 'Conservation of Mass' activities on the 'Test Yourself 2' pages; again, the answers are provided, but do not look at these until you have tried the work yourself.• Complete the 'Exam Style Questions' on 'Chemical Reactions'. Use the mark scheme (once you have tried the question) to mark your answers carefully.
Where do you complete the work?
In Study Books.

What to do if you finish the work? (Extension activity)

- Make sure you have completed the previous set work on 'Reproduction' and then complete the 'Mini Project' on 'Chemical Reactions'.

These websites might help:

- BBC Bitesize -> Secondary -> KS3 -> Science -> Chemistry -> Chemical Reactions

If you are struggling with your work or if you have finished.

Please email your classroom teacher directly using the email list found in the Home Learning section of the website.

Year 7 Chemical Reactions

1. Chemical reactions

- Chemical changes make new substances
- Physical changes involve a change in state
- In chemical changes particles are rearranged to form new substance
- Signs of a chemical reaction are temperature change, fizzing (effervescence) or colour change.

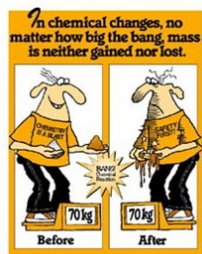
Examples are burning (combustion). When a fuel reacts with oxygen

Fuel + Oxygen → carbon dioxide + water + energy

When magnesium reacts with oxygen, magnesium oxide is made.

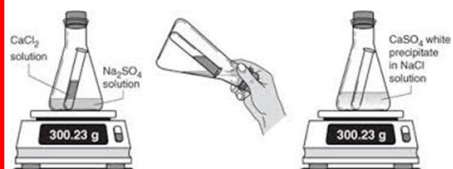
Magnesium + oxygen → Magnesium oxide

2. Conservations of mass.

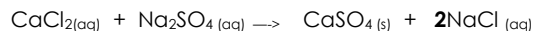


The **law of conservation of mass** states that no atoms are lost or gained during a chemical reaction so the mass of the products equals the mass of the reactants.

Proving the conservation of mass:

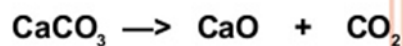
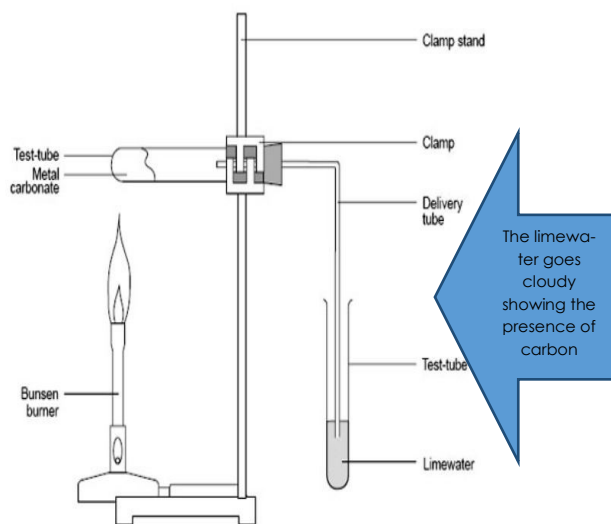


Calcium + sodium chloride → calcium sulfate + sodium chloride



To check conservation of atoms:

3. In thermal decomposition (break down using heat) of metal carbonates, carbon dioxide is produced and escapes into the atmosphere leaving the metal oxide as the only solid product.



4. Identification of common gases.

Hydrogen—insert a burning splint into a tube of the gas, the hydrogen burns with a squeaky pop sound

Oxygen—Insert a glowing splint (one that has just been blown out) into a tube of the gas, the splint relights

Carbon dioxide—the gas is bubbled through limewater (a solution of calcium hydroxide in water), limewater goes milky (cloudy)

Chlorine—insert damp (red or blue) litmus paper into the gas, litmus paper is bleached (it loses its colour and turns white)

Chemical Reactions Key Revision Facts

- Chemical changes make new substances whereas physical changes usually involves a change of state.
- Signs that a chemical reaction has occurred are: fizzing and flames.
- In a chemical reaction, the particles are rearranged to produce new substance
- Catalysts help speed up the rate of reaction.
- In the equation:
magnesium + oxygen \rightarrow magnesium oxide,
magnesium and oxygen are the reactants;
magnesium oxide is the product.
- A fuel is a material that releases energy in the form of heat. Examples of fuels are coal, oil and gas.
- Combustion is another word for burning.
- The equation for burning is:
fuel + oxygen \rightarrow carbon dioxide + water
- Thermal decomposition involves heating a substance until it breaks down into different parts.
- The products of the decomposition of calcium carbonate are calcium oxide and carbon dioxide.
- Gas tests:

Gas	Test	Result
Hydrogen	Place a lighted spill near the gas	Squeaky pop
Oxygen	Place a glowing spill near the gas	Relights the spill
Carbon dioxide	Bubble through limewater	Limewater turns milky

- Law for the conservation of mass:
mass of reactants = mass of products
- Exothermic reactions show an increase in temperature, for example burning fuels.
- Endothermic reactions show a decrease in temperature, for example sports ice packs.

Chemical Reactions Test Yourself 1

Chemical or Physical?

Place a ✓ in the correct box to show whether a chemical or physical change has occurred.

Action	Physical change	Chemical change
Chocolate melting		
Cutting a piece of ribbon		
Snowman melting		
Burning wood		
Magnesium in a test tube of acid		
Frying an egg		

Match and Draw

Draw a line between the gas and its test.

Hydrogen

Oxygen

Carbon Dioxide

Relights a glowing splint.

Turns limewater 'milky'.

When placed near a lighted splint a squeaky pop heard.

What Is?

- What is another name for burning?
- What is thermal decomposition?
- What is a catalyst?

Chemical Reactions Test Yourself 1 Answers

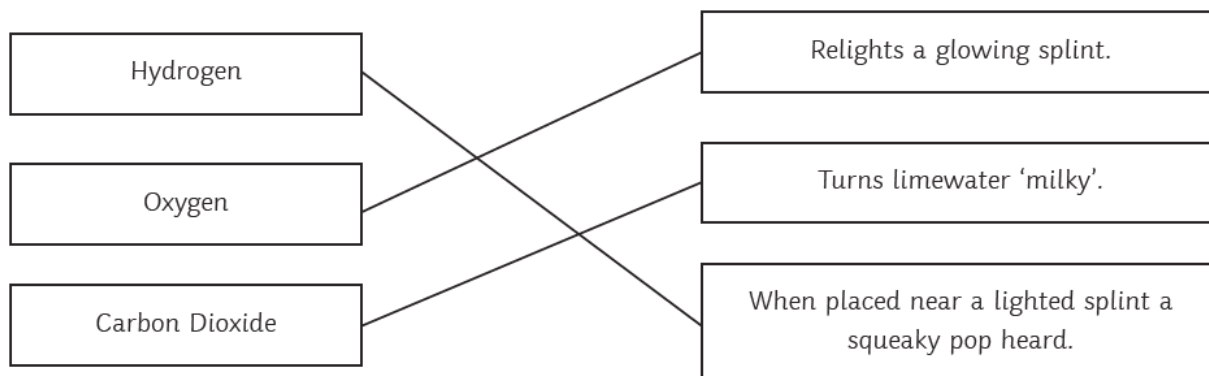
Chemical or Physical?

Place a ✓ in the correct box to show whether a chemical or physical change has occurred.

Action	Physical change	Chemical change
Chocolate melting	✓	
Cutting a piece of ribbon	✓	
Snowman melting	✓	
Burning wood		✓
Magnesium in a test tube of acid		✓
Frying an egg		✓

Match and Draw

Draw a line between the gas and its test.



What Is?

- What is another name for burning?
Combustion.
- What is thermal decomposition?
When heat causes the break down of a substance.
- What is a catalyst?
A catalyst speeds up the rate of reaction without being used in the reaction.

Chemical Reactions Test Yourself 2

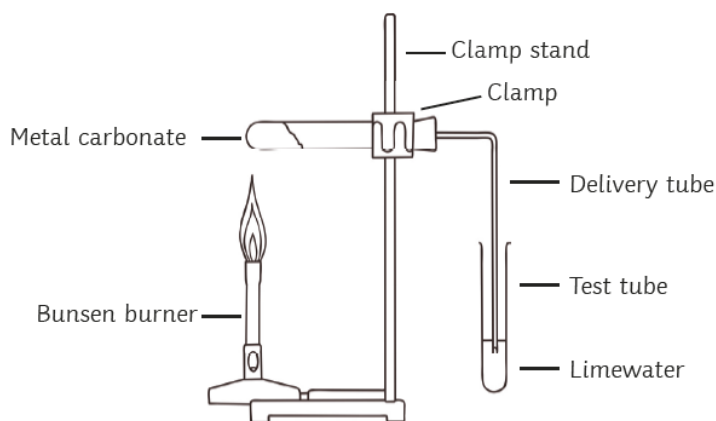
Exothermic or Endothermic?

The results table shows how the temperature changes when substances are dissolved in water. Write down the names of the substances that dissolve endothermically.

Name of substance	Temperature before dissolving °C	Temperature after dissolving °C	Endothermic or exothermic?
Potassium chloride	18	12	
Calcium chloride	18	42	
Sodium carbonate	18	20	

Thermal Decomposition

Pupils were carrying out the thermal decomposition of calcium carbonate as shown in the diagram below.

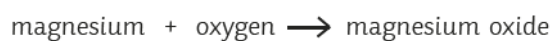
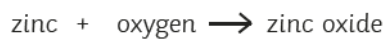


Why did the pupils need limewater?

Name 2 safety precautions required when carrying out this experiment

Conservation of Mass

Complete the equations below:



Chemical Reactions Test Yourself 2 Answers

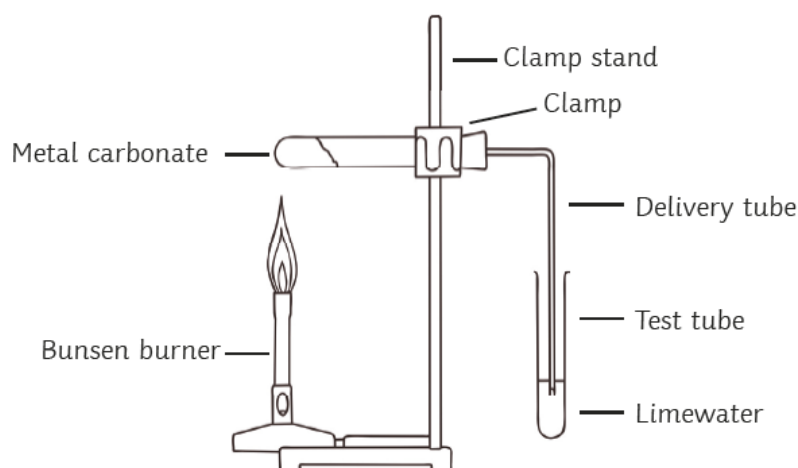
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Name of substance	Temperature before dissolving °C	Temperature after dissolving °C	Endothermic or exothermic?
Potassium chloride	18	12	Endothermic
Calcium chloride	18	42	Exothermic
Sodium carbonate	18	20	Exothermic

Thermal Decomposition

Pupils were carrying out the thermal decomposition of calcium carbonate as shown in the diagram below.



Why did the pupils need limewater?

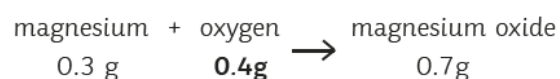
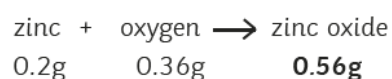
To show carbon dioxide was released

Name 2 safety precautions required when carrying out this experiment

Wear goggles, remove tube from limewater before removing heat

Conservation of Mass

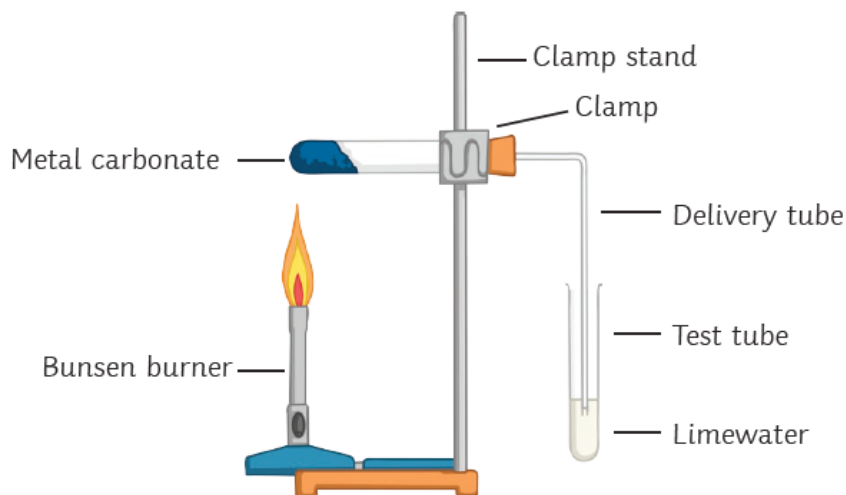
Complete the equations below:



Chemical Reactions

Exam Style Questions

1. Thermal decomposition of copper carbonate



- State what is meant by thermal decomposition.
- What effect would adding a catalyst have on the experiment?
- Complete the equation.

copper carbonate \rightarrow _____ + carbon dioxide

- Complete the table below to show the mass of carbon dioxide produced when 120g of copper carbonate is broken down completely.

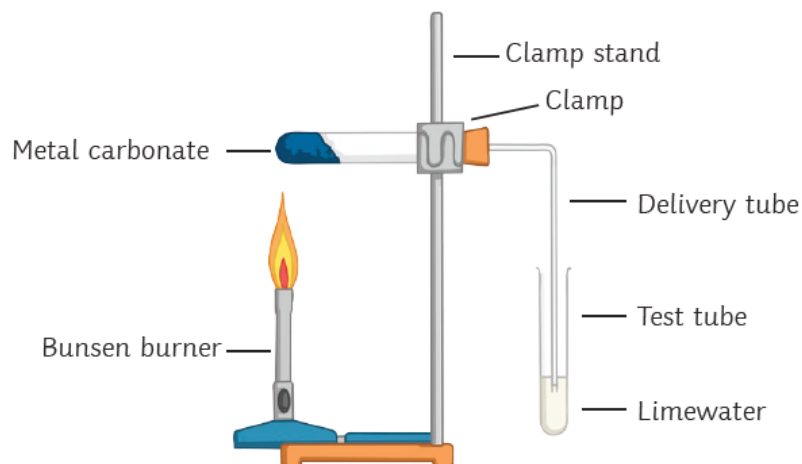
Compound	Reactant or product	Mass (g)
Copper carbonate	Reactant	120
Unnamed in equation	Product	75
Carbon dioxide	Product	

2. State 2 changes that may occur in a chemical reaction
3. State 1 difference between an exothermic and endothermic reaction

Chemical Reactions

Exam Style Questions Answers

1. Thermal decomposition of copper carbonate



- State what is meant by thermal decomposition.
when heat causes the breakdown of a substance
- What effect would adding a catalyst have on the experiment?
Catalysts speed up the rate of reaction
- Complete the equation.
copper carbonate \rightarrow **copper oxide** + carbon dioxide
- Complete the table below to show the mass of carbon dioxide produced when 120g of copper carbonate is broken down completely.

Compound	Reactant or product	Mass (g)
Copper carbonate	Reactant	120
Unnamed in equation	Product	75
Carbon dioxide	Product	45

2. State 2 changes that may occur in a chemical reaction
Temperature rise, colour change, bubbles of gas, flames
3. State 1 difference between an exothermic and endothermic reaction
Exothermic reactions show an increase in temperature, endothermic reactions show a decrease in temperature

Chemical Reactions

Watch this video: <https://www.youtube.com/watch?v=5iowJs6MryI>

Task	Description
1	Explain why a) Baking a cake is a <u>chemical change</u> b) Melting ice is a <u>physical change</u>
2	a) Write word equations for when each of the following <u>react with sulphuric acid</u> () I. Copper II. Zinc III. Iron IV. Magnesium b) Then write out all the word equations using symbols
3	Use the internet or text books, to produce a poster on A4 paper, on “ The Uses of ” (carbon dioxide)
4	Create a table showing the differences between chemical changes and physical changes. Think of a practical example of each. You must write a detailed method for each example.
5	Prepare a “ Fire Safety ” brochure
6	Use ‘BBC Bitesize’ to look up the ‘Environment’ topic and <u>read</u> up on fossil fuels . Make a summary to show what they are and how they are used. Include what are the problems with using fossil fuels.