

Chemical reactions

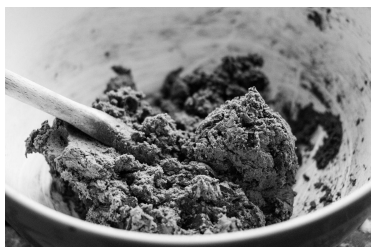


Task 1: Physical and chemical changes

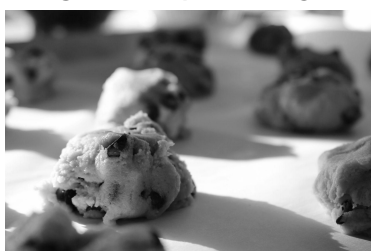
There are multiple stages to making cookies.

For each stage, **identify** whether it is a physical or chemical change and **explain** why.

Stage 1: Mixing the chocolate chips into the dough.



Stage 2: Separating the dough into balls.



Stage 3: Baking cookies in the oven.



Task 2: Equations

a) **Write** the word equation and **add** the symbols to the symbol equations.

Reaction	Word equation	Symbol equation
Potassium reacts with oxygen to make potassium oxide.		$4 \text{ ___} + \text{O}_2 \rightarrow 2 \text{K}_2\text{O}$
Sodium reacts with fluorine to make sodium fluoride.		$\text{Na} + \text{___} \rightarrow \text{NaF}$
Carbon reacts with oxygen to produce carbon dioxide.		$\text{C} + \text{O}_2 \rightarrow \text{___}$
Calcium reacts with chlorine to make calcium chloride.		$\text{___} + \text{Cl}_2 \rightarrow \text{CaCl}_2$

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b) **Write** the word equation and **balance** the symbol equations.

Reaction	Word equation	Symbol equation
Beryllium reacts with oxygen to produce beryllium oxide.		___ $\text{Be} + \text{O}_2 \rightarrow 2 \text{BeO}$
Hydrogen and bromine produce hydrogen bromide.		$\text{Br}_2 + \text{H}_2 \rightarrow$ ___ HBr
Iron reacts with oxygen to make iron oxide.		___ $\text{Fe} + 3 \text{O}_2 \rightarrow 2 \text{Fe}_2\text{O}_3$
Gallium reacts with sulfur to produce gallium sulfide.		___ $\text{Ga} +$ ___ $\text{S} \rightarrow \text{Ga}_2\text{S}_3$

Task 3: Displacement reactions

a) **Complete** the word equations for these displacement reactions.

i) calcium _____ + lithium \rightarrow lithium chloride + calcium

ii) sodium chloride + fluorine \rightarrow sodium fluoride + _____

iii) iron oxide + aluminium \rightarrow aluminium _____ + iron

iii) silver _____ + copper \rightarrow copper nitrate + silver

b) When zinc Zn is added to Copper nitrate $\text{Cu}(\text{NO}_3)_2$, zinc displaces lead to make zinc nitrate $\text{Zn}(\text{NO}_3)_2$ and copper Cu .

i) Write the **word equation** for this reaction.

ii) **Complete** the symbol equation for this reaction.





Task 4: Decomposition reactions

a) **Complete** the word equations for these decomposition reactions.

i) beryllium carbonate \rightarrow _____ oxide + carbon dioxide

ii) calcium carbonate \rightarrow calcium oxide + _____

iii) iron oxide \rightarrow _____ + oxygen

b) **Complete** the symbol equations for these decomposition reactions.

i) $\text{ZnCl}_2 \rightarrow \text{Zn} + \text{_____}$

ii) $2 \text{Fe}_2\text{O}_3 \rightarrow 4 \text{_____} + 3 \text{O}_2$

c) **Identify** if the following word equations represent displacement reactions or decomposition reactions.

Reaction equation	Displacement reaction	Decomposition reaction
calcium + lithium bromide \rightarrow lithium + calcium bromide		
zinc carbonate \rightarrow zinc + carbon oxide dioxide		
aluminium oxide \rightarrow aluminium + oxygen		
sodium + fluorine chloride \rightarrow sodium + chlorine fluoride		

d) **Identify** if the following symbol equations represent displacement reactions or decomposition reactions.

Reaction equation	Displacement reaction	Decomposition reaction
$2 \text{AgBr} \rightarrow 2 \text{Ag} + \text{Br}_2$		
$\text{K} + \text{AgNO}_3 \rightarrow \text{KNO}_3 + \text{Ag}$		
$\text{CaCl}_2 + \text{Sr} \rightarrow \text{SrCl}_2 + \text{Ca}$		
$2 \text{H}_2\text{O}_2 \rightarrow 2 \text{H}_2\text{O} + \text{O}_2$		



Task 1: Physical and chemical changes

There are multiple stages to making cookies.

For each stage, **identify** whether it is a physical or chemical change and **explain** why.

Stage 1: Mixing the chocolate chips into the dough.



physical

- Chips would be easy to separate again.
- No new products (still dough and chocolate chips).
- No fizzing, colour change, temperature change, sound or smell.

Stage 2: Separating the dough into balls.



physical

- Chips would be easy to separate again.
- No new products (still dough and chocolate chips).
- No fizzing, colour change, temperature change, sound or smell.

Stage 3: Baking cookies in the oven.



chemical

- New product formed - baked cookies.
- Would be difficult to return back to what you started with.
- Colour change, smell produced, and bubbling.

Task 2: Equations

a) **Write** the word equation and **add** the symbols to the symbol equations.

Reaction	Word equation	Symbol equation
Potassium reacts with oxygen to make potassium oxide.	<i>potassium + oxygen → potassium oxide</i>	$4 \underline{K} + O_2 \rightarrow 2 K_2O$
Sodium reacts with fluorine to make sodium fluoride.	<i>sodium + fluorine → sodium fluoride</i>	$Na + \underline{F} \rightarrow NaF$
Carbon reacts with oxygen to produce carbon dioxide.	<i>carbon + oxygen → carbon dioxide</i>	$C + O_2 \rightarrow \underline{CO_2}$
Calcium reacts with chlorine to make calcium chloride.	<i>calcium + chlorine → calcium chloride</i>	$\underline{Ca} + Cl_2 \rightarrow CaCl_2$

Name _____



b) **Write** the word equation and **balance** the symbol equations.

Reaction	Word equation	Symbol equation
Beryllium reacts with oxygen to produce beryllium oxide.	<i>beryllium + oxygen → beryllium oxide</i>	<u>2</u> Be + O ₂ → 2 BeO
Hydrogen and bromine produce hydrogen bromide.	<i>hydrogen + bromine → hydrogen bromide</i>	Br ₂ + H ₂ → <u>2</u> HBr
Iron reacts with oxygen to make iron oxide.	<i>iron + oxygen → iron oxide</i>	<u>4</u> Fe + 3 O ₂ → 2 Fe ₂ O ₃
Gallium reacts with sulfur to produce gallium sulfide.	<i>gallium + sulfur → gallium sulfide</i>	<u>2</u> Ga + <u>3</u> S → Ga ₂ S ₃

Task 3: Displacement reactions

a) **Complete** the word equations for these displacement reactions.

i) calcium chloride + lithium → lithium chloride + calcium

ii) sodium chloride + fluorine → sodium fluoride + chlorine

iii) iron oxide + aluminium → aluminium oxide + iron

iii) silver nitrate + copper → copper nitrate + silver

b) When zinc Zn is added to Copper nitrate Cu(NO₃)₂, zinc displaces lead to make zinc nitrate Zn(NO₃)₂ and copper Cu.

i) Write the **word equation** for this reaction.

zinc + copper nitrate → zinc nitrate + copper

ii) **Complete** the symbol equation for this reaction.

$\text{Zn} + \text{Cu}(\text{NO}_3)_2 \rightarrow \text{Zn}(\text{NO}_3)_2 + \text{Cu}$



Task 4: Decomposition reactions

a) **Complete** the word equations for these decomposition reactions.

i) beryllium carbonate \rightarrow beryllium oxide + carbon dioxide

ii) calcium carbonate \rightarrow calcium oxide + carbon dioxide

iii) iron oxide \rightarrow iron + oxygen

b) **Complete** the symbol equations for these decomposition reactions.

i) $\text{ZnCl}_2 \rightarrow \text{Zn} + \text{Cl}_2$

ii) $2 \text{Fe}_2\text{O}_3 \rightarrow 4 \text{Fe} + 3 \text{O}_2$

c) **Identify** if the following word equations represent displacement reactions or decomposition reactions.

Reaction equation	Displacement reaction	Decomposition reaction
calcium + lithium bromide \rightarrow lithium + calcium bromide	✓	
zinc carbonate \rightarrow zinc + carbon oxide dioxide		✓
aluminium oxide \rightarrow aluminium + oxygen		✓
sodium + fluorine chloride \rightarrow sodium + chlorine fluoride	✓	

d) **Identify** if the following symbol equations represent displacement reactions or decomposition reactions.

Reaction equation	Displacement reaction	Decomposition reaction
$2 \text{AgBr} \rightarrow 2 \text{Ag} + \text{Br}_2$		✓
$\text{K} + \text{AgNO}_3 \rightarrow \text{KNO}_3 + \text{Ag}$	✓	
$\text{CaCl}_2 + \text{Sr} \rightarrow \text{SrCl}_2 + \text{Ca}$	✓	
$2 \text{H}_2\text{O}_2 \rightarrow 2 \text{H}_2\text{O} + \text{O}_2$		✓