Oxidation: three elements and oxygen

Student activity • observation and reasoning

YEAR 10 / LESSON 64 / CHEMISTRY + SCIENCE (DOUBLE AWARD)

The question

What changes when an element gains oxygen?

Compare teacher-selected recordings of magnesium, hydrogen and sulfur combustion. Separate visible evidence from product identification and balance each reaction.

Equipment

- Booklet, periodic table and reusable atom counters
- Teacher: projector and prechecked combustion recordings; no reagents issued

Recorded evidence only. No burning, gas generation or smelling chemicals. Keep model pieces away from mouths.

Course coverage: Shared core: 2.11. Recorded evidence and molecular modelling; this activity does not instruct learners to burn elements.

Plan, model or apparatus sketch

Draw and label the model or apparatus that explains the central idea of this lesson.

Method and reasoning

Read the whole sequence before starting

YEAR 10 / LESSON 64 / CHEMISTRY + SCIENCE (DOUBLE AWARD)

1. Predict products for magnesium, hydrogen and sulfur reacting with oxygen. Identify which predictions need experimental evidence.

2. Watch the teacher-selected magnesium recording. Record the light and solid-product appearance without looking at any live burning magnesium.

3. Watch the hydrogen and sulfur recordings. Record what is visible; do not infer a gas identity from an imagined smell. State when a product test is shown and when it is not.

4. Build atom-counter models for $Mg + O_2 \rightarrow MgO$, $H_2 + O_2 \rightarrow H_2O$ and $S + O_2 \rightarrow SO_2$. Change coefficients, never the chemical formulae.

5. Compare atom counts before and after. Explain oxidation here as gain of oxygen and distinguish reaction from physical mixing.

6. Evaluate the claim that every oxide is acidic. Use magnesium oxide and sulfur dioxide as contrasting examples; water is an oxide too.

Cleanup

- Return counters, retain corrected equations and recycle scrap paper.

Record your evidence

Blank spaces are for your own work

YEAR 10 / LESSON 64 / CHEMISTRY + SCIENCE (DOUBLE AWARD)

Reference and task data

Formula prompts: MgO, H_2O and SO_2. O_2 is diatomic. These are expected products to explain, not observations to copy. Use $2Mg + O_2 \rightarrow 2MgO$; $2H_2 + O_2 \rightarrow 2H_2O$; $S + O_2 \rightarrow SO_2$ only after attempting your models. No observation of smell is required.

Element	Evidence from recording	Equation / inference
Magnesium		
Hydrogen		
Sulfur		

Show your calculations, labelled model or correction here.

Explain and evaluate

Use evidence and show calculation steps where relevant

YEAR 10 / LESSON 64 / CHEMISTRY + SCIENCE (DOUBLE AWARD)

1. Balance magnesium combustion and count both elements on each side.

2. Balance hydrogen combustion and explain why H_2O_2 is not a balancing correction.

3. Write the sulfur equation and name its product.

4. Define oxidation in these examples.

5. Explain why a white solid alone does not prove magnesium oxide identity.

6. Correct: all oxides are acidic and all oxidation produces carbon dioxide.