Year 10 Science: Decomposition and neutralisation reactions

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. Write the word and balanced symbol equations for heating zinc carbonate.

2. Name the salt formed when magnesium oxide reacts with nitric acid.

3. Balance: $KOH + H_2SO_4 \rightarrow K_2SO_4 + H_2O$

4. Classify: $2KClO_3 \rightarrow 2KCl + 3O_2$

5. In a test, a student saw fizzing when acid was added to a white powder, but did not test the gas. Why can't they say for certain the powder was a carbonate, and what should they add to the method?

Fix the mistake

6. Correct this statement: "Heating copper carbonate gives copper and carbon dioxide."

7. Correct this statement: "A salt means sodium chloride."

8. Correct this statement: "Sodium hydroxide and hydrochloric acid make a salt and hydrogen gas."

9. Correct this statement: "Sulfuric acid makes sulfides."

Answer key (for parents and tutors)

1. Write the word and balanced symbol equations for heating zinc carbonate.
   zinc carbonate → zinc oxide + carbon dioxide; $ZnCO_3 \rightarrow ZnO + CO_2$, already balanced (1 Zn, 1 C, 3 O each side).
2. Name the salt formed when magnesium oxide reacts with nitric acid.
   Magnesium nitrate, $Mg(NO_3)_2$: magnesium from the base, nitrate from the acid.
3. Balance: $KOH + H_2SO_4 \rightarrow K_2SO_4 + H_2O$
   $2KOH + H_2SO_4 \rightarrow K_2SO_4 + 2H_2O$: two K on the right needs 2KOH, which makes two waters.
4. Classify: $2KClO_3 \rightarrow 2KCl + 3O_2$
   Decomposition: one compound breaks into two simpler substances.
5. In a test, a student saw fizzing when acid was added to a white powder, but did not test the gas. Why can't they say for certain the powder was a carbonate, and what should they add to the method?
   Other reactions also fizz, for example a metal such as zinc with acid gives hydrogen. They should bubble the gas through limewater; turning milky would confirm CO_2 and so a carbonate.
6. Correct this statement: "Heating copper carbonate gives copper and carbon dioxide."
   It gives copper oxide and carbon dioxide, because the carbonate ion loses only one CO_2 and its third oxygen stays with the metal.
7. Correct this statement: "A salt means sodium chloride."
   A salt is any ionic compound made of a metal ion from the base and the negative ion from the acid, such as copper sulfate or magnesium nitrate.
8. Correct this statement: "Sodium hydroxide and hydrochloric acid make a salt and hydrogen gas."
   A hydroxide gives a salt and water, because the acid's H^+ joins the OH^-; hydrogen gas comes from an acid reacting with a metal.
9. Correct this statement: "Sulfuric acid makes sulfides."
   It makes sulfates, because the salt keeps the acid's SO_4^{2-} ion; a sulfide contains only S^{2-}.