Year 10 Science: Naming compounds and balancing chemical equations

Name: _____ Date: _____

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

Practice

1. Name K_2O, $CaSO_4$ and N_2O_4.

2. Write the formula for sulfur trioxide and for calcium chloride.

3. Balance: $Mg + HCl \rightarrow MgCl_2 + H_2$

4. Balance: $Na + Cl_2 \rightarrow NaCl$

5. A student heats magnesium ribbon in an open crucible and finds the mass increases. Does this disprove conservation of mass? Explain.

Fix the mistake

6. Correct this statement: "To balance $H_2 + O_2 \rightarrow H_2O$, I can change the water to H_2O_2."

7. Correct this statement: "$MgCl_2$ is magnesium dichloride."

8. Correct this statement: "CO_2 is monocarbon dioxide."

9. Correct this statement: "The open beaker got lighter, so some mass was destroyed in the reaction."

Answer key (for parents and tutors)

1. Name K_2O, $CaSO_4$ and N_2O_4.
   Potassium oxide (ionic, no prefixes); calcium sulfate (sulfate keeps its name); dinitrogen tetroxide (covalent: 2 N, 4 O).

2. Write the formula for sulfur trioxide and for calcium chloride.
   SO_3; $CaCl_2$, because one Ca^{2+} needs two Cl^-.

3. Balance: $Mg + HCl \rightarrow MgCl_2 + H_2$
   $Mg + 2HCl \rightarrow MgCl_2 + H_2$: two Cl on the right means two HCl, which also gives 2 H to match H_2.

4. Balance: $Na + Cl_2 \rightarrow NaCl$
   $2Na + Cl_2 \rightarrow 2NaCl$: Cl_2 forces 2NaCl, then 2Na balances sodium.

5. A student heats magnesium ribbon in an open crucible and finds the mass increases. Does this disprove conservation of mass? Explain.
   No. Oxygen atoms from the air combined with the magnesium to form magnesium oxide, so atoms were added from outside the system, none were created.

6. Correct this statement: "To balance $H_2 + O_2 \rightarrow H_2O$, I can change the water to H_2O_2."
   Only the numbers in front may change, because a new subscript makes a different substance (H_2O_2 is hydrogen peroxide), so the answer is $2H_2 + O_2 \rightarrow 2H_2O$.

7. Correct this statement: "$MgCl_2$ is magnesium dichloride."
   It is magnesium chloride, because ionic names never use prefixes: the charges of Mg^{2+} and Cl^- already fix the 1 : 2 ratio.

8. Correct this statement: "CO_2 is monocarbon dioxide."
   It is carbon dioxide, because mono is never put on the first element; a prefix goes there only for two or more atoms, as in dinitrogen monoxide.

9. Correct this statement: "The open beaker got lighter, so some mass was destroyed in the reaction."
   The carbon dioxide gas escaped into the room, so its atoms left the beaker; in a sealed flask the mass stays the same.