Balancing Chemical Equations

New Regents original practice • Name: _____ Date: _____
Show your work for written answers.

Use the smallest whole-number coefficients when balancing. A coefficient of 1 can be omitted. Keep the subscripts in each chemical formula unchanged.

1 How many oxygen atoms are represented by $3Ca(NO_3)_2$?

(1) 6

(2) 8

(3) 9

(4) 18

2 Balance $H_2 + O_2 \rightarrow H_2O$. Show how many H and O atoms appear on each side of your balanced equation. [1]

Answer and work

3 A student balances oxygen by replacing H_2O with H_2O_2. Explain why this change is invalid. [1]

Answer and work

4 Which equation is balanced?

(1) $Al + O_2 \rightarrow Al_2O_3$

(2) $4Al + 3O_2 \rightarrow 2Al_2O_3$

(3) $2Al + O_2 \rightarrow Al_2O_3$

(4) $4Al + 2O_2 \rightarrow 2Al_2O_3$

Carbon and Hydrogen in a Burner

Use the information below to answer questions 5–8.

A laboratory burner uses propane, C_3H_8. When it undergoes complete combustion in oxygen, the products are carbon dioxide and water. The starting equation is $C_3H_8 + O_2 \rightarrow CO_2 + H_2O$.

5 With one molecule of propane reacting, how many molecules of CO_2 are needed to account for all the carbon atoms?

(1) 1

(2) 2

(3) 3

(4) 4

6 Write the balanced equation for complete propane combustion using the smallest whole-number coefficients. [1]

Answer and work

7 A proposed equation is $C_3H_8 + 4O_2 \rightarrow 3CO_2 + 4H_2O$. Identify the unbalanced element and give its atom count on each side. [1]

Answer and work

8 Explain what the coefficient 4 in front of H_2O means in the balanced propane equation at the particle level. [1]

Answer and work