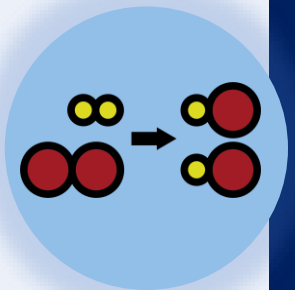
Prior Knowledge Review

Answer the questions below.

1. What are the three states of matter?
   Solid, liquid and gas.
2. State the chemical symbol for sodium.
   Na
3. State the elements that make up CO_2
   Carbon, oxygen
4. Write a general equation for the reaction between metals and oxygen.
   Metal + oxygen → metal oxide
5. Write a general equation for the reaction between metals and acids.
   Metal + acid → salt + hydrogen

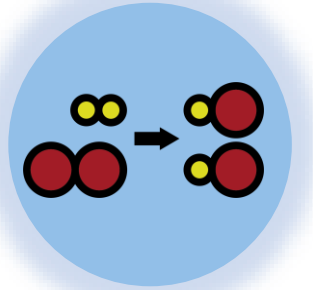


Do Now

Prior Knowledge Review

C3.2.1

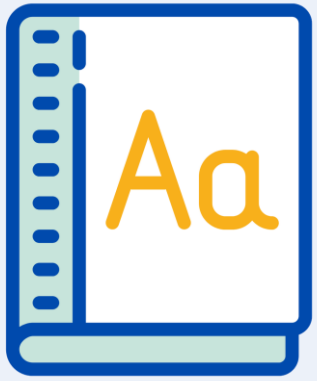
Science Mastery



Following this lesson, students will be able to:

- Interpret chemical formulae
- Describe the number and names of elements in a compound
- Name compounds using standard rules

Key Words:



compound **subscript** **acid**

chemical formula **neutralisation** **metal**

Lesson Objectives

This is the fix-it portion of the lesson

The **fix-it** is an opportunity to respond to gaps in knowledge, especially those identified by the previous lesson's exit ticket.

- The teacher should customise this slide as needed, to facilitate
  - **reteach**, **explanation, demonstration** or **modelling** of ideas and concepts that students have not yet grasped or have misunderstood.
  - **practise** answering specific questions or of key skills.
  - **redrafting** or **improving** previous work.

Fix-it

Vocabulary

Formula

"As a coach, I can only give them the formula, they do the work"

A Johnson

General Definition

A list of ingredients or a method from which something is made or calculated

Scientific Definition

A combination of chemical element symbols and numbers which show the number and type of atoms present in an element or compound

Synonyms

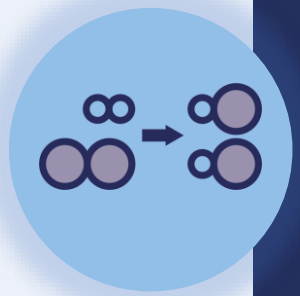
- recipe
- method

General Example

- x + y = 10
- The secret formula to make a the special fish batter has been in the family for years

Scientific Example

The formula for carbon dioxide is CO_2



Key points to remember

1. Formulae can be used to show which **elements** are in **compounds** e.g. H_2O contains two hydrogen atoms and one oxygen atom. The **ratio** is 2:1.

2. Chemical reactions always involve the **formation of one or more new substances**.

3. Symbol equations can be used to show chemical reactions
e.g. $2H_2 + O_2 \rightarrow 2H_2O$

What is a chemical formula?

Example 1: **sodium sulfate**.

$$Na_2SO_4$$

1. How many elements in this compound? 3
   2 sodium atoms
   1 sulfur atom
2. How many atoms of each type of element are there? 4 oxygen atoms

3. How many atoms are there in total are there in this compound? 7

What is a chemical formula?

Example 2: **iron hydroxide**.

$Fe(OH)_3$

1. How many elements in this compound? 3

   1 iron atom
   3 oxygen atoms
2. How many atoms of each type of element are there? 3 hydrogen atoms

3. How many atoms are there in total are there in this compound? 7

What is a chemical formula?

Example 3: **iron nitrate**.

$$Fe(NO_3)_3$$

1. How many elements in this compound? 3

1 iron atom
3 nitrogen atoms

2. How many atoms of each type of element are there? 9 oxygen atoms

3. How many atoms are there in total are there in this compound? 13

Naming Compounds

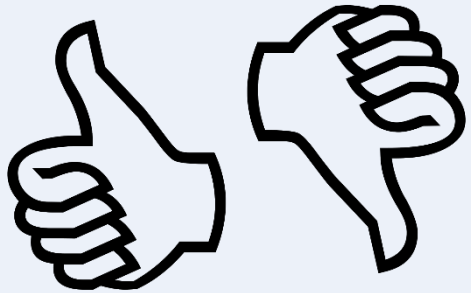
Rule 1 – usually, the metal goes first and the non-metal goes second

Rule 2 – if a metal and a non-metal react, the name of the non-metal ends in –ide.

Rule 3 – for some compounds (where the elements are both non-metals), if there are a different number of atoms we add in 'mono' for 1, 'di' for 2 and 'tri' for 3

Rule 4 – if the compound names ends in –ate then it usually contains three elements, including a non-metal and oxygen

True or false?

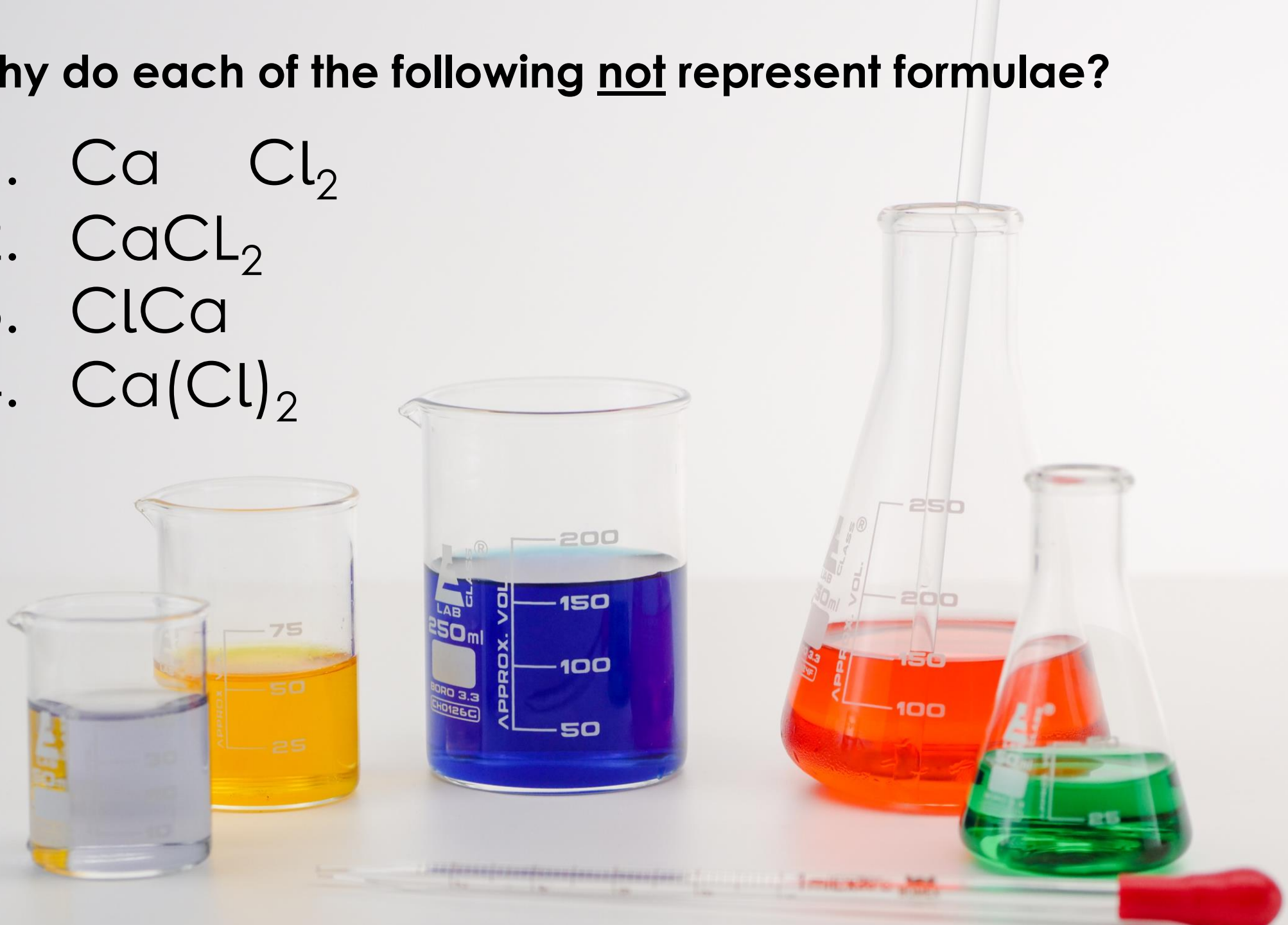


1. Calcium (Ca) is an element. **True**
2. Oxygen (O_2) is a compound. **False**
3. Water boiling to form steam is a chemical reaction. **False**
4. Compounds are made of one element. **False**
5. NH_3 has a fixed ratio of one nitrogen atom to three hydrogen atoms. **True**
6. CO_2 has a fixed ratio of 2 oxygen to 2 carbon atoms. **False**
7. $Al_2(SO_4)_3$ contains 3 sulfur atoms. **True**
8. $Al_2(SO_4)_3$ contains 4 oxygen atoms. **False**

Check for understanding

Why do each of the following <u>not</u> represent formulae?

1. Ca Cl_2
2. $CaCL_2$
3. ClCa
4. $Ca(Cl)_2$



Talk Task

What information can we get from this chemical formula?

$$Al(NO_3)_3$$

I think this compound is called…

I think this compound contains…

The total number of atoms in this compound is..

Talk Task

Which statements do you agree with?

Sodium carbonate is made up of sodium and carbon

Water (H_2O) has a fixed ratio of 1 hydrogen atom to 2 oxygen atoms

All molecules are compounds but not all compounds are molecules

Sodium chloride is the only salt

Talk Task

Answer the questions below.

1. Ammonia (NH_3) contains:
   - ☐ A. 3 nitrogen atoms and 1 hydrogen atom
   - ☐ B. 3 nitrogen atoms and 3 hydrogen atoms
   - ☑ C. 3 hydrogen atoms and 1 nitrogen atom

2. How many hydrogen atoms are in the formula $(NH_4)_2SO_4$?
   - ☐ A. 4
   - ☑ B. 8
   - ☐ C. 6

3. Copper carbonate reacted with hydrochloric acid. Which statement is correct?
   - ☑ A. Carbon dioxide is produced, and if it is bubbled through limewater it would turn cloudy/milky
   - ☐ B. Carbon dioxide is produced, and if it was bubbled through limewater it would remain clear
   - ☐ C. Carbon dioxide is not produced.

Exit ticket

Feedback

Lesson C3.2.1	
What was good about this lesson?	What can we do to improve this lesson?

Send us your feedback by clicking this link. Thank you!