

Imagining the decomposition of water at the scale of molecules

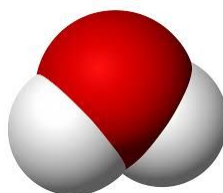
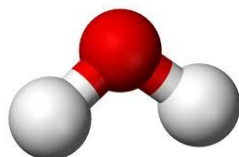
MATERIALS:

Play dough or plasticine clay in two different colours



INSTRUCTIONS:

1. Build **two water molecules** from the clay or play dough. Look at the pictures below to remind you what a water molecule looks like.



You may use any colour clay to build yours.

2. Now break all the bonds holding the molecules together, separating them into individual atoms.

3. Answer the following questions:
How many hydrogen (H) atoms do you have?

four

How many oxygen (O) atoms do you have?

two

4. Using your play dough Combine the hydrogen and oxygen atoms into hydrogen molecules (H₂) and oxygen molecules (O₂).

Answer the following questions:

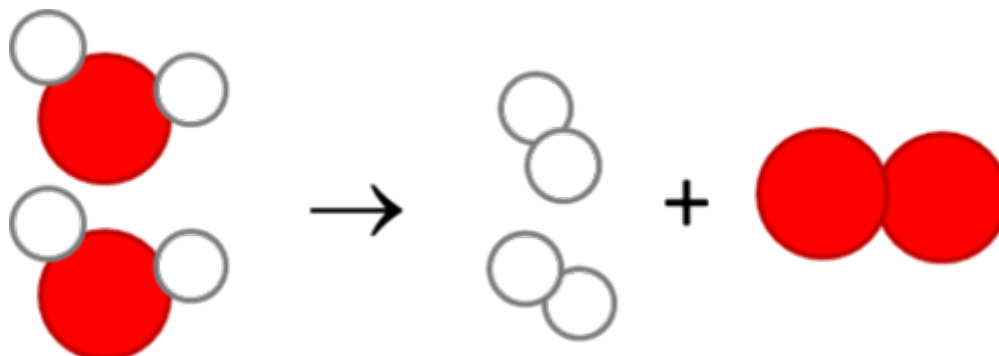
- a) How many hydrogen molecules could you build from the H atoms?

Two

- b) How many oxygen molecules could you build from the O atoms?

one

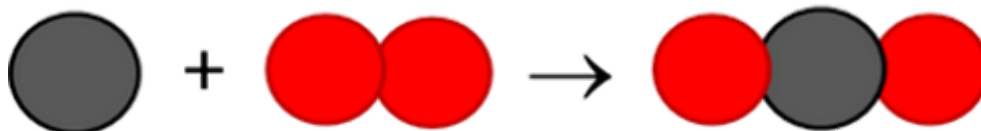
5. Can you write a chemical equation for the reaction that you have just built with the clay models? Look at the diagram for inspiration:



Does not have to be balanced



6. Let us look at another example of a chemical reaction: the reaction when **carbon** (in coal) reacts with **oxygen** (in the air) to form carbon dioxide:



- a) You can use the play dough balls to simulate this reaction.
- b) Try to write a chemical equation for the reaction when carbon and oxygen combine to form carbon dioxide. (Hint: Use the diagram to guide you.)



- c) How do the atoms in coal and oxygen rearrange to form carbon dioxide?
Which bond breaks?

The bonds in the diatomic oxygen molecule break. One O - O bond breaks

What new bonds form?

2 x C - O bonds

Adapted from Siyavula

<http://www.mstworkbooks.co.za/natural-sciences/gr8/gr8-mm-01.html#toc-id-12>