

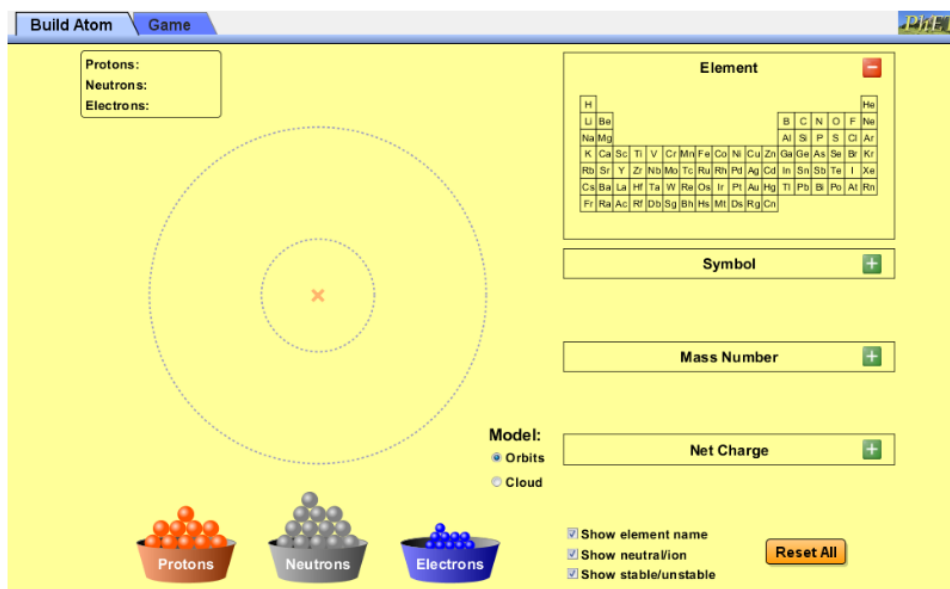
# What is matter and how is it formed?

## Virtual Practical Activity

### Atomic Structure

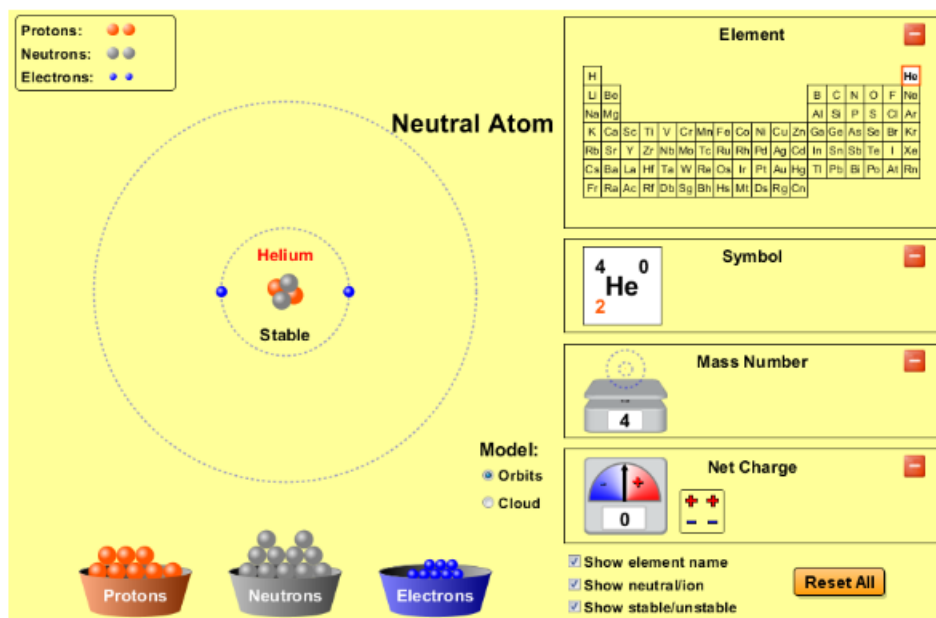
Name.....

This activity requires you to open up the **Build an Atom simulation (from PhET)** which is located under **Lesson 1: Atoms, Isotopes and Radioisotopes**.



Open up the **Symbol**, **Mass Number** and **Net Charge** boxes by selecting the **green + sign** on each.

Pick up two **protons** and two **neutrons** from the buckets and place them on the **orange X sign**. Then place sufficient **electrons** on the **inner blue circle** to create a neutral **Helium** atom.



Why is the **Net Charge** equal to **zero**?.....

**Mass Number** is the total number of ..... and ..... in the nucleus of the atom.

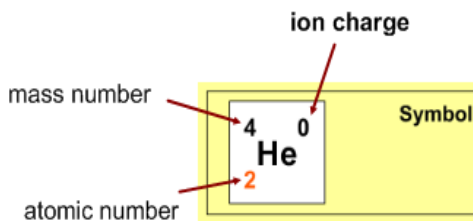
The ..... **Number** is the number of protons in the nucleus and this determines the **element** and hence the **element symbol**.

What is the **name** of the element you have created? .....

If an atom is **not** neutral, it is called an .....

Take two electrons away from this atom to create a Helium **ion**.

When describing a complete atom, the **ion charge** is shown at **top right** of the element symbol.



For a neutral atom, the ion charge will be .....

If the atom has **less** protons than electrons, the ion charge will be .....

If the atom has **more** protons than electrons, the ion charge will be .....

Use the naming convention to write down the **symbol** for the Helium ion that you have created.

Complete the following table by adding protons, neutrons and electrons to build a **stable, neutral** version of each of the **elements** listed below.

Stable Atom	N° of Protons	N° of Neutrons	N° of electrons	Symbol
Hydrogen				
Helium				
Lithium				
Beryllium				
Boron				
Carbon				
Nitrogen				
Oxygen				
Fluorine				
Neon				

Which of the elements above has more than one stable isotope? .....

Note that when describing just the **nucleus** of an atom, we usually drop the **ion charge** notation.

Create an **unstable neutral** atom for each of the following elements and complete the table below:

Unstable Atom	N° of Protons	N° of Neutrons	Symbol
Hydrogen			
Helium			
Carbon			
Oxygen			

What happens to unstable atoms? .....

.....

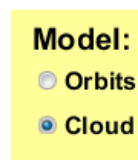
This is a simple **model** of the atom.

Is this model drawn to scale? Explain. ....

.....

There are two models for how electrons are arranged around the nucleus of an atom. One is called the **orbital** (or shell model) and the other pictures electrons as a type of **cloud** surrounding the nucleus.

Create a neutral, stable atom of Carbon. Then select '**Orbits**' or '**Cloud**' to see how each model represents the electrons.



Briefly describe what each model shows (a quick search of the internet may help here):

**Orbits** .....

.....

**Cloud** .....

.....

Finally, select the '**Game**' tab to further test your knowledge of atomic structure.

