

MODULE: *Matter 1*

Pre Test

1. (5 minutes)

Inside atoms

We can only change, or 'split', atoms by using huge amounts of energy. So for practical purposes, and under normal circumstances, we think of atoms as being indestructible.

But atoms are actually made up of tiny sub-atomic particles. These particles cannot exist on their own.

They are called protons, neutrons and electrons.

They have different masses and different electrical charges.

They do different jobs in the atom.

The nucleus has the protons and neutrons. They are almost the same as each other, except each proton has a positive electrical charge and each neutron has no charge.

The protons give the atom its 'atomic weight', hence its properties.

The neutrons help stop the protons flying apart.

- a. Describe the central nucleus of an atom and explain what kinds of particles are found there.

- b. Explain what types of sub-atomic particle are found there.

- c. Describe what each particle is like.

- d. Describe the similarities and differences between the particles in the nucleus.

- e. Describe what each of those particles does in the atom.

2. (5 minutes)

Elements and compounds

- When atoms of the same type join up, they make elements.
- When different types of atoms join up in lots of identical combinations, and those combinations then join up, they make compounds.
- Elements and compounds are examples of pure substances, because all their molecules are the same as each other.

Here is a list of materials:

Helium	Chalk	Ethanoic acid (vinegar)	Gold
Cake	Magnesium oxide	Nitrogen	Brine
Zinc metal	Polythene	Hard rubber for tyres	Diamond

Using reference books or the internet if necessary, classify each of these as an element, a compound or a mixture. Give reasons for your choice.

Element

Compound

Mixture

3. (10 minutes)

Structure and bonding

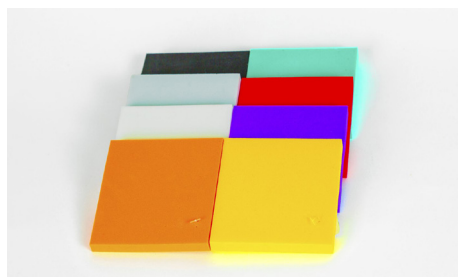
Diamond is a giant structure of carbon atoms. Each carbon atom shares electrons with four other carbon atoms around it. This sharing of electrons with four neighbouring carbon atoms extends for millions of atoms in three dimensions.

Because of this giant structure, diamond is one of the hardest materials known to us.

Polystyrene is a common plastic. It is made of long, straight molecules that stick to each other with some force of attraction. Because that force of attraction is weak, polystyrene is fairly flexible, and is used in many places where a rigid material would break.



Diamond



Polystyrene

- a. What is it about a diamond that makes it very hard?

- b. Would you expect diamond to melt easily? Explain your answer.

c. What hardness would you expect from polystyrene compared to diamond?

d. Would you expect polystyrene to melt easily? Explain your answer.

e. Suggest a use for diamond (other than jewellery) Explain your answer.

f. Suggest a use for polystyrene. Explain your answer.