

GRADE 8 NATURAL SCIENCES

ASSESSMENTS: TERM 3

Please prepare using the worksheets below.

One task for 40 marks based on Term 2 work (pg. 17 -31)

This task will take place between 14/09/20 – 18/09/20.

TOPIC: Atoms

Questions

- a. What is matter?
- b. What are the smallest building blocks of matter?

SUB-ATOMIC PARTICLES

1. An atom is made up of smaller sub-atomic particles, namely protons, neutrons and electrons.
2. The protons and neutrons are situated in the nucleus of the atom.
3. The nucleus is at the centre of the atom.
4. The electrons move around the atom.
5. The protons are positively charged.
6. The neutrons are neutral and have no charge.
7. The electrons are negatively charged.
8. A neutral atom has the same number of positive and negative charges.
 - a. What are the two sub-atomic particles that are found in the nucleus of the atom?
 - b. What is the charge of an electron?

HOMEWORK TASK

Use beads/ lentils/ peas, glue and paper plate to make a model of a nitrogen atom. A nitrogen atom has seven protons, seven neutrons and seven electrons. Each type of sub-atomic particle should be a different colour.

Label each sub-atomic particle.

Questions

- a. What is the overall charge of the nucleus of an atom?
- b. How many electrons does a neutral atom with 17 protons have?

ELEMENTS

1. An element is made up of only one kind of atom.
2. Elements cannot be broken down into simpler substances.
3. There are 118 known elements and they are listed in the Periodic Table.
4. The elements are arranged in the Periodic Table in order of their atomic number.
5. The atomic number of an element is the number of protons that an atom has in its nucleus.
6. Each element has its own name, symbol and unique properties.
7. Some elements consist of single atoms while other elements consist of diatomic molecules.
8. A molecule is two or more atoms that are bonded together to form a unit.
9. A diatomic molecule consists of two identical atoms.
10. Atoms of different elements are different. They have different numbers of protons, neutrons and electrons.

Questions

- a. What does an element look like on the atomic level?
- b. Which table summarises in an orderly way all the elements known to us?

HOMEWORK TASK

Copy the table below in your book. Use the Periodic Table in your study guide to complete the table for the first 20 elements.

Name of element	Symbol of element	Number of protons in the nucleus

Questions

- a. How are the atoms of one element different from the atoms of another element?
- b. How many protons and electrons does a neutral magnesium element have?

COMPOUNDS

1. A compound is a material that consists of atoms of two or more different elements that are chemically bonded together.
2. The atoms in a given compound are always combined in a fixed ratio to form molecules.
3. A molecule is the smallest part of a compound and consists of two or more different atoms that are bonded together.
4. A compound consists of molecules of the same type.
5. A chemical bond is the force that holds atoms together in a compound.
6. The properties of a compound are different from the properties of the elements that it is made of.

Questions

- a. How are the atoms held together in a molecule?
- b. What do we call molecules of the same type?

DECOMPOSITION OF A COMPOUND

Use the following web links to for videos on the experiment:

1. https://www.youtube.com/watch?v=_Y1aIDuXm6A (1min 12sec) [Decomposition of mercury(II) oxide]
2. <https://www.youtube.com/watch?v=STsz0QZnCVU> (1min 25sec) [Decomposition of potassium permanganate]

EXPERIMENT QUESTION

The teacher showed you an experiment where copper chloride is decomposed. Observe carefully what is happening at each electrode and answer the following questions.

First draw the set-up for the experiment and use correct labels.

1. What did you observe at the one electrode?
2. What element was formed at this electrode?
3. What did you observe at the other electrode?
4. What element was formed at this electrode?
5. What are the two elements that copper chloride was decomposed to?

Questions

- a. What atoms are water molecules made of?
- b. How can a compound be decomposed into its elements?

PURE SUBSTANCES

1. A pure substance consists of only one kind of atom or molecule.
2. Elements and compounds are pure substances.
3. A pure substance cannot be seen with the naked eye.
4. The atoms or molecules that a substance consists of determine whether a substance is pure.
 - a. What substances are pure substances?
 - b. When is a substance a pure substance?

MIXTURES

1. A mixture consists of two or more substances that are mixed together, but not chemically combined, to form a new substance.
2. A mixture has the combined properties of the substances that form the mixture.
3. Elements and compounds are mixed together to form mixtures.
4. The amounts of substances can vary in a mixture.
5. In some mixtures we can recognise the different substances that make up the mixture.
6. In some mixtures it is not possible to see the different substances that make up the mixture.

SEPARATION OF MIXTURES

7. A mixture can be separated into separate substances by physical means.
8. Separation by physical means is separation manually by hand or with apparatus.
9. Separation techniques are:
 - a. Hand sorting
 - b. Filtration and sieving
 - c. Evaporation and crystallisation
 - d. Decanting
 - e. Distillation
 - f. Chromatography.
10. Mixtures are separated according to the properties of the substances that make up the mixture.

Questions

- a. What is a characteristic of a mixture?
- b. Can you give one separation technique for mixtures?

Interesting facts on MIXTURES

- a. There are not many pure substances in our everyday lives. Most of the substances around us are mixtures of elements and compounds.
- b. Examples of mixtures include the air that we breathe (oxygen, nitrogen, carbon dioxide), fizzy drinks (cold drink and carbon dioxide [bubbles]) and steel (iron and carbon).
- c. Mix water and sugar in a glass. The sugar and water did not react chemically to form a new substance. The sugar molecules mixed with the water molecules by moving in between the water molecules.

- d. The sugar water mixture still has the properties of the water because it can be poured into another glass. The mixture also has the properties of the sugar because it tastes sweet.
- e. We can have any proportion of water and sugar. When we add more sugar to the water, we still have a sugar water mixture.
- f. We cannot see the sugar in the mixture but we know that it is there.
- g. Make a mixture of water and sand. When we mix sand and water we can see the sand in the mixture.

PARTICLE MODEL OF MATTER

1. A model is used to explain the behaviour of particles because particles are too small to see.
2. Atoms and molecules are referred to as particles in the particle model of matter. We represent these particles as circles.
THE PARTICLE MODEL OF MATTER STATES:
3. All matter is made up of particles.
4. The particles are continuously moving.
5. The particles have spaces between them.
6. The particles exert forces on each other

SOLIDS

MACROSCOPIC PROPERTIES OF A SOLID

1. Matter can exist in a solid state.
2. A solid has a definite shape. It can be hard, soft or powdery.
3. A solid occupies a definite space.
4. Solids cannot be compressed.

MICROSCOPIC PROPERTIES OF A SOLID

1. The particles of a solid are closely packed and arranged in an orderly way.
2. There are strong forces between the particles in a solid.
3. The particles of a solid vibrate about fixed points in one place.
4. There are small spaces between the particles

Questions

- a. What can you say about the shape of a solid?
- b. How do the particles of a solid move?
- c. Why does a solid object have a definite shape?
- d. Why is a solid not compressible?

LIQUIDS

MACROSCOPIC PROPERTIES OF A LIQUID

1. Matter can exist in a liquid state.
2. Liquids are runny. Some liquids are runnier than others.
3. A liquid has a definite volume.
4. A liquid takes the shape of its container.
5. Liquids are not easily compressible.

MICROSCOPIC PROPERTIES OF A LIQUID

In a liquid the particles:

6. are loosely arranged but are still in contact.
7. are constantly moving and sliding past each other in all directions.
8. have weaker forces between them.
9. have small spaces between them.

Questions

- a. What is a property of a liquid?**
- b. How do the particles of a liquid move?**
- c. Why are liquids runny?**
- d. Does a liquid have a fixed volume or a fixed shape?**

GAS

MACROSCOPIC PROPERTIES OF A GAS

1. Matter can exist in a gaseous state.
2. Most gases are colourless and not visible.
3. A gas has no definite shape or volume and will fill all the available space.
4. A gas can be compressed into a smaller space.

MICROSCOPIC PROPERTIES OF A GAS

In a gas the particles:

1. Have no particular arrangement.
2. Move very fast in straight lines until they collide with another particle or the walls of the container.
3. Have extremely weak forces between them.
4. Have very big spaces between them.

Questions

- a. How are the particles in the gas state arranged?**
- b. Why are gases compressible?**
- c. Why do gases not have a fixed shape?**
- d. Why are there such big spaces between gas particles?**

DIFFUSION

1. Diffusion is a process in which the particles move from a highly concentrated area to an area with a lower concentration of those particles.
2. Diffusion only takes place in liquids and gases.
3. Concentration refers to the number of particles in a certain area. A high concentration contains many particles and a low concentration contains fewer particles.
4. Diffusion is faster in gases than in liquids.
5. Gas particles move more quickly and at greater speeds and, therefore, they will move more quickly from a high concentration area to a low concentration area.
6. The speed at which particles diffuse depends on the size of the particles, the state of the particles and the temperature of the particles.

Questions

- a. What is diffusion?
- b. Do liquid particles or gas particles diffuse faster?
- a. Why do gases diffuse more quickly than liquids?
- b. When will the process of diffusion stop?

CHANGE OF STATE

1. When a substance is heated, it gains energy and the temperature of the substance increases.
2. When a solid is heated, it changes to a liquid state.
3. When a solid changes to a liquid, we call it melting.
4. When the particles of the solid gain energy, they overcome the strong forces of attraction and move more freely.
5. When a liquid is heated, it changes to the gas state.
6. When a liquid changes to a gas, we call the process evaporation or boiling.
7. The liquid particles gain more energy, they overcome the forces of attraction, and are able to move faster and further apart from one another.
8. The amount of matter stays the same during a change of state.

Questions

- a. What happens when a substance is heated?
- b. What do we call the change of state from a solid to a liquid?
- c. How are evaporation and boiling similar?
- d. What is the difference between evaporation and boiling?
- e. What happens when a gas is cooled?
- f. What do we call the change in state when a liquid changes to a solid?
- g. What do we call the process where water droplets form on the outside of a cold can of Coke?
- h. What change of state will happen when a liquid is put in a freezer?

DENSITY

1. The density of a material describes the amount of mass in a given volume of that material.
2. Density is a property of matter.
3. Mass is a measure of the amount of matter that an object is made of. It is measured in grams (g) or kilograms (kg).
4. There are a thousand grams in one kilogram ($1000\text{ g} = 1\text{ kg}$).
5. Volume is the amount of space an object occupies. It is measured in millilitres (ml) or litres (l).
6. There are a thousand millimetres in 1 litre (1000 ml in 1 l) and 1 millimetre is equal to 1 cubic centimetre ($1\text{ ml} = 1\text{ cm}^3$).
7. Mass and volume are physical quantities of a material. This means that we can observe and measure them.

Questions

- a. What is the relationship between density, mass and volume?
- b. What is the unit of mass?

DENSITY: DIFFERENT MATERIALS

1. Different materials have different densities.
2. The density of a material depends on the kind of particles it is made of and the way in which they are packed in the solid or liquid state.
3. When a material is made up of big particles, they will have a high mass.
4. A material with small particles will have a smaller mass.
5. It is easy to fit many particles of some materials into a small space. The particles of other materials might be too big and fewer will be able to fit into a certain space.
6. A material that has a lower density floats on a liquid with a higher density.
7. Less dense liquids float on top of denser liquids.

Questions

- a. What are the two factors that influence the density of a material?
- b. When will a solid float on a liquid?

EXPANSION OF MATERIALS

1. Only when sufficient heat energy is added to a material will the material change state.
2. In general, solids, liquids and gases tend to expand when heated.
3. Expansion is an increase in the size of an object when the temperature is increased.
4. When a material is heated, the particles move faster and push further apart. The spaces between the particles get bigger and the material expands.
5. When a material expands, the size and number of particles do not change.

Questions

- a. What happens to a material when it is heated?
- b. How do the particles change when a material expands?

CONTRACTION OF MATERIALS

1. Materials contract when they are cooled.
2. Contraction is a decrease in the size of an object when the temperature is decreased.
3. When a material is cooled, the particles move less and, as they move closer to each other, the space between them gets smaller.
4. When a material contracts, the size and number of particles does not change.
5. When materials contract, no state change takes place.

Questions

- a. What happens to a material when it is cooled?
- b. How does the particles change when a material contracts?

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