

## 4th GRADE MINIMUM CONTENTS-NATURAL SCIENCE

### UNIT 13: MATTER AND MATERIALS

#### ► WHAT IS MATTER?

Matter is everything around you.

Matter has two basic properties:

- Mass**: It is the quantity of matter something has.
- **Volume** :It is the space something occupies.

#### ► MATTER AND ITS CHANGES

Each type of matter is called a **substance**. Some examples of substances are water and steel.

There are **pure substances** and **mixtures**.

-Pure substances. They are substances that consist of only one type of matter. (sugar, water...)

-Mixtures. They are substances that consist of two or more types of matter.

Mixtures can be **homogeneous mixtures** or **heterogeneous mixtures**.

In a homogeneous mixture, the substances that compose it cannot be seen with **the naked eye**.

In a heterogeneous mixture, the substances that compose it can be seen with **the naked eye**.

#### -CHANGES IN MATTER

-**Physical changes**. Substances undergo physical changes when their shape or characteristics are altered, but their nature remains the same. For example, water that changes of state.

-**Chemical changes**. Substances undergo chemical changes when their nature is altered. For example, burning paper produces gases and **ash**; the nature of the paper has been altered.

**Combustion** occurs when a combustible substance (gas, wood...) burns with

the oxygen in the air. It produces light, heat and, usually ashes.

In general, when a substance reacts with the oxygen in the air, **oxidation** takes place. For example, when iron is left outdoors and it rusts.

**Fermentation** is a chemical reaction caused by microbes. For example, when milk turns into yoghurt.

### -TECHNIQUES FOR SEPARATING MIXTURES

Mixtures can be separated in different ways.

-**Filtration**. A solid is separated from a liquid by passing the mixture through porous filter paper, which retains the solid.

-**Decantation**. To separate a heterogeneous solid-liquid mixture. If the solid is at the bottom of the container, we can separate the liquid by carefully pouring it into another container using a glass rod.

-**Dissolution**. Sometimes the easiest way to separate a solid mixture is to dissolve and then filter it.

- **Distillation**. A liquid mixture is heated and the component that evaporates first is separated from the rest.

-**Evaporation**. The liquid solvent evaporates and the dissolved solid crystallises.

### ► WHAT ARE MATERIALS?

Material is every type of matter that is used to make an object.

There are two different types of materials:

-**Natural materials** are found directly in nature( wool, wood...)

-**Man-made materials** are made by people from natural materials and include plastic, glass and paper.

### ► WHERE MATERIALS COME FROM

-**Plant origin**. Some materials come from plants. (wood , cotton...)

-**Mineral origin**. Others come from rocks. (marble , coal...)

-**Animal origin**. Other materials come from animals. (wood, leather, silk)

## ► PROPERTIES OF MATERIALS

Every material has specific properties that are different from the properties of other materials.

- **State:** Materials can be in solid state, liquid state and gaseous state.
- **Solubility:** This is the ability of a material to dissolve itself in another material.( salt dissolves in water)
- **Odour:** It is a property of materials that we perceive with the sense of smell.
- **Colour:** Every material has a characteristic colour.(Coal is black)
- **Texture:** It's a property that we perceive with the sense of touch.
- **Buoyancy:** A material floats on another if its mass occupies more volume (it is less **dense**) Less dense materials float on denser ones.
- **Strength:** It indicates its capacity to withstand a weight without breaking.
- **Malleability:** When we can change the shape of a material.( clay)
- **Magnetism:** When a material can attract iron and steel objects (Magnetite)
- **Thermal conductivity:** A material is a good thermal conductor if heat passes through easily.( iron)
- **Thermal insulation:** A material is a good thermal insulator if heat does not pass through easily.(wood)

## ► MEASURING INSTRUMENTS

We can measure some properties of materials, which means we can compare them. We use measuring instruments to do this.

To measure the **length** of an object, we use a **tape measure**. Length is generally expressed in **metres** (m), **centimetres** (cm) or **millimetres** (mm)

To measure the weight of an object, we use scales. This is called **weighing**.

Weight is generally expressed in **kilogrammes** (kg) or **grammes** (g)

We can find out the **volume** of a solid object by putting the object into a **measuring cylinder** containing water. First, you have to note the level of the water, then, immerse the object you want to measure and note the new level of the water, and finally, subtract the second measurement from the first and the result will give you the volume of the object.

Volume is generally expressed in **litres (L)** or **centilitres (cl)**

### ► USING AND RECYCLING MATERIALS

-**Plastic** is an artificial material obtained from oil. We use plastic to make toys, bottles and even parts of vehicles...

- **Paper** is manufactured from wood. It has many uses: for writing on, for printing books, for wrapping things...

-**Metal**. There are many metals and their use depends on their properties. They are very important because they allow us to transport electricity, construct buildings and make cars.

-**Wood** is one of the main materials of plant origin and it is obtained from trees. It is used in all kinds of construction, especially for building homes and furniture. The properties of wood, such as hardness and colour, depend on the tree it comes from. It is also used to make paper.

-**Fabric**: There are a huge variety of fabrics that have different properties for different needs.( They can be waterproof, lightweight or strong)

- **Glass** is made from sand. It is a solid, fragile and transparent material used to make drinking glasses, bottles, mirrors, lenses ...

We have to care after the environment. To do this, it is important to follow the rule of the 3 R's.

- **Reduce**: We need to avoid buying things that quickly become rubbish, like plastic bags and packaging.
- **Reuse**: We can fully use things before we throw them away. For example, we can use both sides of a piece of paper.

- **Recycle:** Sometimes we can recycle materials like paper or glass to make new products.

## UNIT 13: MATTER AND MATERIALS

### ACTIVITIES

1.-Classify these substances: water-air-granite-sugar-salt-gold-oxygen-sugar and tea.

Pure substances	Mixtures

2.-Complete with these words: physical change- chemical change-combustion- oxidation-fermentation.

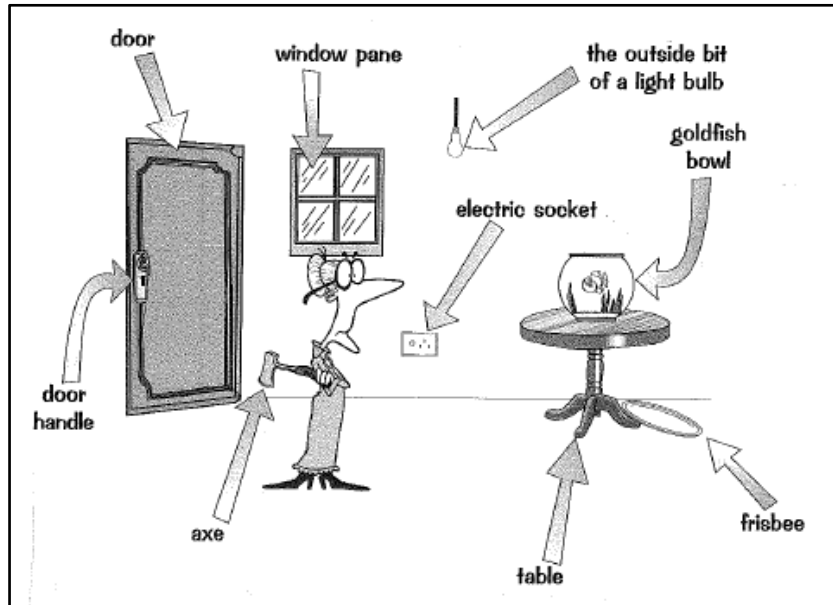
- Wine turns into vinegar. ....
- A rock that breaks. ....
- A candle that burns. ....
- Cooking an egg. ....
- A bike made of iron that rusts. ....

3.- Choose one of the following words to complete the sentences.

strong - hard - flexible - fragile - elastic

1. Paper is a \_\_\_\_\_ material because it can be bent.
2. Glass is a \_\_\_\_\_ material because it is difficult to scratch.
3. Rubber is an \_\_\_\_\_ material because it can be squashed.
4. Concrete is a \_\_\_\_\_ material because it can support heavy weights.
5. Pottery is a \_\_\_\_\_ material because it can break easily.

4.- In this picture, the arrows point to the things made of wood, metal, glass or plastic. Fill in the table to show what things from the picture are made out of each material.



GLASS	WOOD	PLASTIC	METAL
1. The outside bit of a light bulb.	1.	1.	1.
2.			
3.	2.	2.	2.

5.- Find the names of 10 materials in the wordsearch and classify them.

Q	A	L	U	M	I	N	I	U	M
P	T	X	V	W	P	L	Q	W	S
L	W	O	O	D	Q	X	P	T	T
A	C	J	L	X	G	L	A	S	S
S	O	N	P	M	X	X	P	I	W
T	T	L	E	A	T	H	E	R	M
I	T	Z	F	R	Q	L	R	O	V
C	O	Q	T	B	F	T	L	N	W
W	N	S	I	L	K	T	P	Q	X

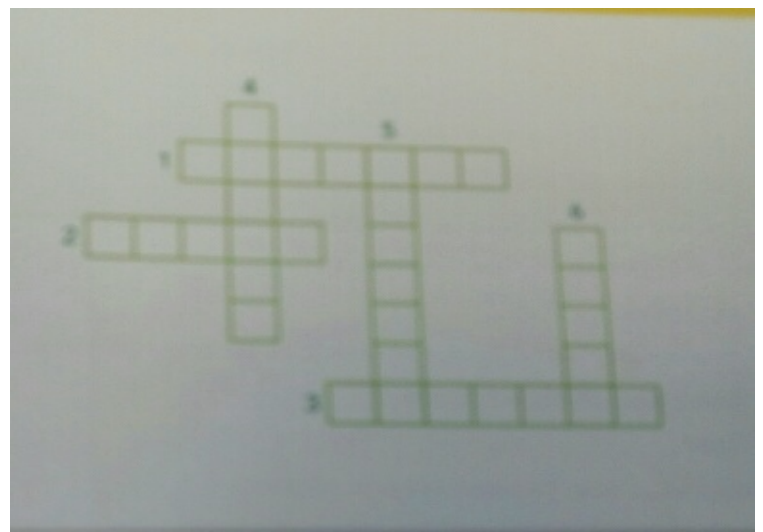
Natural materials	Man-made materials
<u>Vegetable origin:</u>	
<u>Animal origin:</u>	
<u>Mineral origin:</u>	

### 6.- Complete.

- All objects, because they are formed of matter, have m..... and v.....
- Each type of matter that we use to make an object is called a m.....
- There are two types of materials: n..... and m.....
- Materials can be of a....., p..... or m..... origin.
- Each material has some specific p..... that make it different from other materials.
- The process of reusing the materials an object is made from to make new objects is called .....

### 7.- Solve the crossword.

- 1.-Type of material that is not man- made.
- 2.-Property of materials, which can be solid ,liquid or gas.
- 3.-Property which we perceive with the sense of touch.
- 4.-It is what all things are made of.
- 5.-Reuse the material an object is made from.



6.-Property which we perceive with the sense of smell.

**8- Complete your bilingual dictionary.**

MATTER AND MATERIALS		
- Matter: _____	-Physical change : _____	-Filtration : _____
- Material: _____		-Dissolution : _____
- Property: _____	-Chemical change: _____	-Evaporation : _____
-Solubility: _____		- Distillation: _____
-Substance : _____	Fermentation: _____	- Buoyancy: _____
-Mixture : _____		-Magnetism : _____
-Homogeneous : _____	-Combustion : _____	-Reduce : _____
-Heterogeneous: _____	-Filtration: _____	- Reuse: _____
-Change : _____	-Decantation : _____	- Recycle: _____