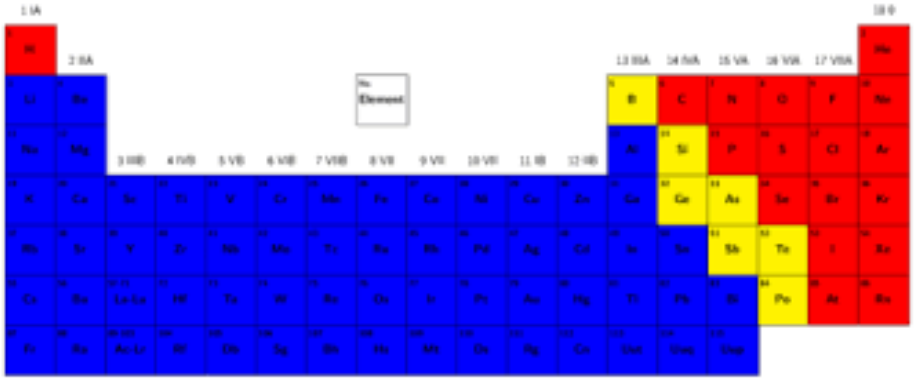
SUBJECT and GRADE	Physical Sciences Grade 10	
TERM 1	Week 3	
TOPIC	MATTER AND MATERIALS: Revise matter and classification CONTINUED	
AIMS OF LESSON	The learners must: 1. Identify substances based on their properties 2. Classify substances as metals, metalloids, non-metals, electrical conductors, semiconductors, insulators, magnetic and non-magnetic.	
RESOURCES	***Paper based resources***	***Digital resources***
	Use your own textbook to read up on Substances, their properties and uses. Complete the activities in your textbook based on this section.	
INTRODUCTION	From your previous lesson, you have learnt: - What chemical formulae represents - How to name compounds - How to write formulae - How to use ions to write formulae In this lesson you will learn about different substances, their properties and uses.	

CONCEPTS AND SKILLS

The Periodic Table



Metals – are found on the left-hand side and middle of the Table (blue section)
Metalloids (semi-metals) – are found between the metals and non-metals (yellow section)
Non-metals – are found on the right-hand side of the Periodic Table (red section)

PROPERTIES OF METALS and NON-METALS

METALS	**NON-METALS**
Shiny	Dull (except graphite and diamond)
Good conductors of heat and electricity	Poor conductors of heat and electricity (except graphite)
Opaque	Some solids and all gases are transparent
Ductile and malleable	Brittle and break easily, especially in the solid phase

All solids at room temperature (except Mercury)	Can be gases, liquids or solids at room temperature
High melting- and boiling points	Low melting- and boiling points

PROPERTIES OF METALLOIDS (semi-metals or semi-conductors)

METALLOIDS
7 elements on the Periodic Table
Have properties of metals and non-metals
Can be shiny or dull
Electrical conductivity of metalloids increases as temperature increases
Conducts electricity and heat better than non-metals but not as good as metals

Electrical conductor – substance that allows electric current to pass through it easily, e.g. copper, silver, zinc and gold. Copper is the best conductor of electricity. Silver is an even better conductor but is too expensive to use in this way.

Semi-conductor – poor conductor of electricity and its electrical conductivity is between that of a conductor and insulator. These substances cannot conduct electricity when they are cold, but their conductivity increases when there is an increase in temperature. The metalloids are semi-conductors.

Electrical insulators – are very poor conductors of electricity. These substances resist the flow of electric current. Non-metals are insulators and examples include plastics, glass and wood.

Thermal conduction – is the transfer of energy from areas of high energy to areas of lower energy. For example, if you put a cold spoon into a hot cup of coffee, the teaspoon will heat up quickly.

	Thermal conductor – is a substance that allows energy, in the form of heat, to move easily through it. In a good thermal conductor, a small amount of energy causes a large energy change. Good examples are iron (Fe) and copper (Cu). **Thermal insulator** – is a substance that does not allow heat or energy to move through it. Non-metals are thermal insulators and examples include plastic, glass and wood. <u>Magnetism</u>: **Ferromagnetic materials** – are materials that have strong magnetic effects. They either form magnets or are attracted to magnets. Examples include all metals, alloys of metals, or compounds that contain a magnetic field. **Magnetic substance** – is formed when it forms a permanent or temporary magnetic field, and is attracted to iron (Fe), cobalt (Co) or nickel (Ni). Magnets are used in appliances such as speakers, telephones and electric motors. **Non-magnetic substance** – is not capable of being magnetized and is <u>not</u> attracted to magnets. Examples are copper (Cu), manganese (Mn) and tin (Sn).

ACTIVITIES/ASSESSMENT

ACTIVITY:

1. Choose 5 elements in each group and write the names and symbols in the table.

METALS	**METALLOIDS**	**NON-METALS**
Fe	Polonium	Xenon

2. Refer to the Physical properties provided below and match it to the elements listed.

Brittle	Conductivity increases when temperature increases	
Heat and electrical conductivity	Malleable and ductile	Transparent
Low melting point	Shiny or dull	Opaque

2.1 Aluminium
2.2 Silicon
2.3 Phosphorus

3. Write 2 Physical Properties of:

	3.1 Hydrogen 3.2 Lead 3.3 Boron 4. Explain what property of metalloieds is used in electronics. 5. Aluminium is a good thermal conductor. Name 2 uses of aluminium in everyday life. 6. Why are insulators so important? 7. Use the internet and find the differences between soft and hard magnets.
CONSOLIDATION	• Remember to study your definitions • Ensure that you understand the properties of the different substances such as metals, metalloids, non-metals, electrical conductors, semi-conductors, insulators, thermal conductors, thermal insulator, magnetic and non-magnetic materials, • Complete the activities in your textbook – based on this section of Matter and Materials
VALUES	The correct paring of materials is important to form new substances (products).