

# PHYSICAL SCIENCES

## GR 10 RESOURCE

Enrichment activity that forms part of the Gr 10 Physical Sciences 3-in-1 Class text and Study Guide. See p. 17 MODULE 1 TOPIC 1 Unit 5 for the theory.



### ACTIVITY



#### Classify metals, non-metals and metalloids

- Examine the elements in the table below.
- Indicate whether they have metallic, non-metallic or metalloid characteristics.
- Write down two important properties of each element that verify your classification.
- Indicate one use of each element in the industry.

| Element   | Metal, Metalloid or Non-metal | Properties | Use in the industry |
|-----------|-------------------------------|------------|---------------------|
| copper    |                               |            |                     |
| lead      |                               |            |                     |
| graphite  |                               |            |                     |
| zinc      |                               |            |                     |
| silicon   |                               |            |                     |
| sulphur   |                               |            |                     |
| iodine    |                               |            |                     |
| iron      |                               |            |                     |
| aluminium |                               |            |                     |
| carbon    |                               |            |                     |

## ACTIVITY ANSWER

| Element   | Metal, Metalloid or Non-metal | Properties                                                                                                                                        | Use in the industry                                                                                                                                   |
|-----------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| copper    | metal                         | reddish-brown shiny;<br>good conductor of electricity;<br>corrosion resistant;<br>malleable, ductile                                              | electric wiring, power cables;<br>plumbing and water pipes                                                                                            |
| lead      | metal                         | bluish grey;<br>high density;<br>malleable;<br>good absorber of radiation;<br>soft;<br>undergo reversible redox reactions;<br>corrosion resistant | weights and counterbalances;<br>shield against x-rays and<br>radioactive radiation;<br>lead-acid batteries                                            |
| graphite  | non-metal                     | dark grey to black;<br>good conductor of electricity and heat;<br>high melting point;<br>soft, layers slide over each other                       | electrodes in electrolytical cells;<br>furnace linings;<br>pencil core for writing and drawing                                                        |
| zinc      | metal                         | bluish white;<br>good conductor of electricity and heat;<br>easily form alloys;<br>corrosion resistant (forms protective oxide layer)             | used in dry cell batteries;<br>roofing and construction;<br>galvanising iron and steel                                                                |
| silicon   | metalloid                     | silvery grey;<br>brittle;<br>electric conductivity between metal and non-metal;<br>relatively hard                                                | electronics, e.g. computer chips;<br>solar cells and panels;<br>alloys; glass & ceramics                                                              |
| sulphur   | non-metal                     | yellow solid at room temperature;<br>crystalline or amorphous;<br>insoluble in water                                                              | manufacturing of sulphuric acid;<br>used in fertilizers;<br>used in some medicine and ointments                                                       |
| iodine    | non-metal                     | shiny, dark grey or violet-black crystalline solid;<br>sublimates easily;<br>soluble in organic solvents                                          | antiseptic to disinfect wounds;<br>used in the production of thyroid medicines and iodised salt                                                       |
| iron      | metal                         | lustrous, greyish;<br>hard;<br>high melting point;<br>magnetic                                                                                    | construction (steel);<br>manufacturing of machinery, vehicles, tools, nails;<br>magnets                                                               |
| aluminium | metal                         | silvery-white;<br>lightweight metal;<br>soft;<br>malleable;<br>corrosion resistant                                                                | aircraft & vehicles;<br>packaging (cans, foils);<br>kitchen utensils                                                                                  |
| carbon    | non-metal                     | black to dark grey;<br>exists in allotropes diamond, graphite;<br>very high melting point                                                         | jewellery (diamonds); lubricants, pencils (graphite);<br>fuels e.g. coal consist of carbon;<br>coke (carbon rich fuel) is used in steel manufacturing |