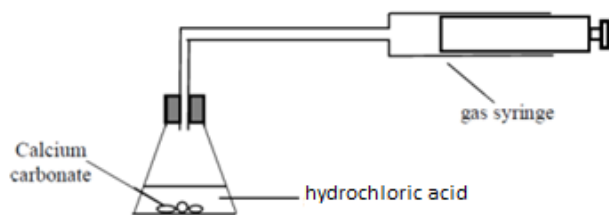


**Dawood Public School**  
**Course Outline 2020-21**  
**General Science**  
**Grade VIII**

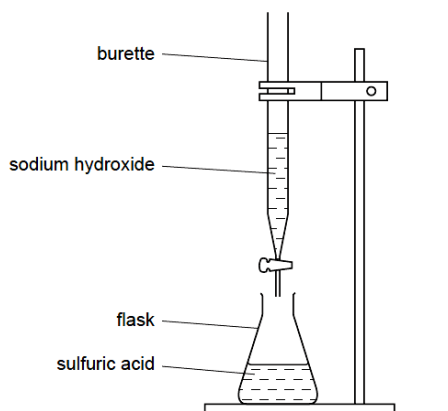
| Months           | Content                                | Reference Book   |
|------------------|--|--|
| <b>August</b>    | <b>Solutions (Acids and Alkalis)</b>   | <b>International Lower Secondary Science Book 2<br/>Chapter 05</b> |
|                  | <b>Periodic Table</b>                  | <b>Chemistry Matters<br/>Chapter 16</b>                            |
| <b>September</b> | <b>Magnetism</b>                       | <b>International Lower Secondary Science Book 3<br/>Chapter 12</b> |
|                  | <b>Respiration and Circulation</b>     | <b>International Lower Secondary Science Book 3<br/>Chapter 02</b> |
| <b>October</b>   | <b>Heating and Cooling</b>             | <b>International Lower Secondary Science Book 3<br/>Chapter 09</b> |
| <b>November</b>  | <b>Revision</b>                        | <b>Work Sheets</b>   |
| <b>December</b>  | <b>MID-YEAR EXAMINATION</b>            |  |
| <b>January</b>   | <b>Ecology</b>                         | <b>International Lower Secondary Science Book 3<br/>Chapter 04</b> |
|                  | <b>Food chain and food web</b>         | <b>International Lower Secondary Science Book 3<br/>Chapter 05</b> |
|                  | <b>Man's Impact on Ecosystem</b>       | <b>International Lower Secondary Science Book 3<br/>Chapter 06</b> |
| <b>February</b>  | <b>Writing and Balancing Equations</b> | <b>Hand out</b>  |
|                  | <b>Sound and Hearing</b>               | <b>International Lower Secondary Science Book 3<br/>Chapter 11</b> |
| <b>March</b>     | <b>Light</b>                           | <b>International Lower Secondary Science Book 3<br/>Chapter 10</b> |
| <b>April</b>     | <b>Revision</b>                        | <b>Work Sheets</b>   |
| <b>May</b>       | <b>FINAL EXAMINATION</b>               |  |



produces a chemical compound called a salt, a gas and water.



- a) The gas produced can be identified using limewater. Name the gas and the result of this test. The experiment was repeated but with magnesium metal instead of calcium carbonate and a different salt and a different gas were produced.
  - b) What gas is produced in the reaction between magnesium and hydrochloric acid?
  - c) Describe the test you would use to identify this gas and the result that you would obtain.
5. The figure shows apparatus used to react dilute solutions of sodium hydroxide and hydrochloric acid.



Sodium hydroxide is added slowly from the burette to the flask until it is in excess.

- a) Suggest a value for the pH of the acid before any sodium hydroxide solution is added.
  - b) Describe the changes in the pH of the liquid in the flask as the sodium hydroxide is added until in excess.
  - c) Suggest how you could observe the change in pH.
  - d) Write an equation for the reaction that takes place.
6. Complete the table to show the gases formed, if any, when each of the substances listed react with dilute hydrochloric acid.

| Substance added  | Gas, if any, formed |
|------------------|---------------------|
| Magnesium        |                     |
| Sodium carbonate |                     |

**Work book Activities:**

- Activity 5.3, 5.4 and 5.5 from International Lower Secondary Science Work Book 2.

**Activities:**

- Identify unknown substances as acids or alkalis using litmus paper.
- Use Coca Cola as a source of acid for removing stains.
- Test for properties of alkalis; observations to be recorded while using:
  - detergent
  - soap
  - shampoo
  - toothpaste

**Laboratory Experiments:**

- To identify the acidity or alkalinity of unknown substances using different indicators.
- To demonstrate that an **acid** or **base** of known concentration neutralizes an **acid** or **base** of unknown concentration.

**Surf IT:**

- <https://www.youtube.com/watch?v=1eePYyq2a6U>

- [https://www.youtube.com/watch?v=Rp4cki\\_eZhk](https://www.youtube.com/watch?v=Rp4cki_eZhk)

## Chapter 01: The Periodic Table (Chemistry Matters)

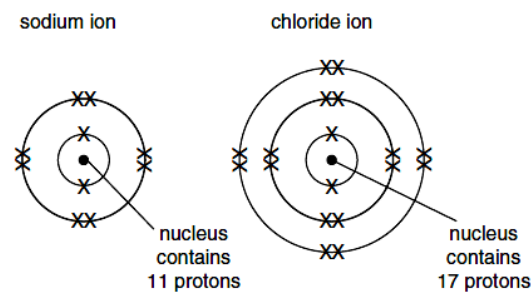
Pages no: 1-27

| Contents  | Learning Objectives  |
|---|--|
| <b>Features of the Periodic Table</b>                               | <ul style="list-style-type: none"> <li>• Identify the correct placement of an element in the Periodic table on the basis of its atomic number.</li> <li>• Draw the atomic structure and write down the electronic configuration of first twenty elements.</li> <li>• Find out the number of protons/neutrons/nucleon/electron from the given structure or configuration.</li> <li>• Find out the valency of an element or ion from its atomic number or electronic configuration.</li> </ul>   |
| <b>Periodic Trends</b><br>Metallic and Non-metallic Characteristics | <ul style="list-style-type: none"> <li>• State the reason for a change in metallic to non-metallic characteristics of elements from the left to right of the Periodic Table.</li> <li>• Provide examples and differentiate between metals and non metals.</li> <li>• Provide examples for, and define the following: <ul style="list-style-type: none"> <li>➤ metalloids</li> <li>➤ ionic compounds</li> <li>➤ covalent compounds</li> </ul> </li> <li>• Describe and illustrate the formation of metal ion/s by the loss of electron/s.</li> <li>• Describe and illustrate the formation of non-metal ion/s by the gain of electron/s.</li> <li>• Identify covalent compounds and ionic compounds by the formulae.</li> </ul> |
| <b>Group I Elements- Alkali Metals</b>                              | <ul style="list-style-type: none"> <li>• Define alkali metals with examples.</li> <li>• State the physical properties of alkali metals. State the chemical properties of alkali metals with chemical equations.</li> </ul>   |
| <b>Group VII Elements-Halogens</b>                                  | <ul style="list-style-type: none"> <li>• Define halogens with examples.</li> <li>• State the physical properties of halogens. State and describe the displacement reactions of halogens.</li> </ul>  |
| <b>Group 0 Elements-Noble Gases</b>                                 | <ul style="list-style-type: none"> <li>• List the noble gases in Group 0.</li> <li>• State why group VIII elements are called noble gases. State the uses of noble gases in our daily life.</li> </ul>   |
| <b>Transition Elements</b>  | <ul style="list-style-type: none"> <li>• List the names of some transition elements. State the properties of transition elements.</li> </ul>   |

**Keywords:**  
atoms, element, atomic structure, electronic configuration, atomic number, nucleon number, groups, periods, reactivity, flame test, displacement reaction, mono atomic, inert, catalyst

- Types of Questions:**
- Multiple choice questions
  - Structured questions
  - Short answer reasoning
  - Descriptive questions
  - Writing equations of chemical reactions
  - Drawing structures of atoms/ions

- Sample Questions:**
1. Sodium chloride is an ionic compound. The figure shows how the electrons are arranged in a sodium ion and a chloride ion.



- a) Use the information in Fig. to explain why a sodium ion has an electrical charge of +1.
- b) Explain why there is no significant difference in mass between a chloride ion and a chlorine atom.
2. Group 0 of the Periodic Table contains noble gases. The noble gases are all chemically unreactive.
- a) Complete the table.
- | name of noble gas | one use of the gas |
|-------------------|--------------------|
|                   |                    |
|                   |                    |
- b) Explain why noble gases are chemically unreactive.
3. Give the number of the Group of the Periodic Table that contains:
- a) alkali metals
- b) halogens
4. Write the chemical formula of the compound that is formed when potassium reacts with bromine.
5. The figure shows the arrangement of the electrons in the atoms of six different elements, R–W. The letters are not the chemical symbols of the elements.

|                      |       |       |     |       |     |     |
|----------------------|-------|-------|-----|-------|-----|-----|
| atom                 | R     | S     | T   | U     | V   | W   |
| electron arrangement | 2,8,6 | 2,8,4 | 2,6 | 2,8,8 | 2,7 | 2,2 |

- Use the letters in Fig.to answer the following questions.
- Each letter may be used once, more than once or not at all.
- a) Which element has an atomic number 14?
- b) Which two elements are in the same group of the Periodic Table?

c) The table gives information about the atoms and ions of magnesium and chlorine. Fill in the two gaps in the table.

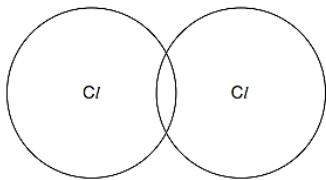
|                | formula          | number of electrons | arrangement of electrons |
|----------------|------------------|---------------------|--------------------------|
| magnesium atom | Mg               | 12                  | 2,8,2                    |
| chlorine atom  | Cl               | 17                  | 2,8,7                    |
| magnesium ion  | Mg <sup>2+</sup> | 10                  |                          |
| chloride ion   | Cl <sup>-</sup>  | 18                  |                          |

d) Hydrogen also reacts with chlorine forming hydrogen chloride. The compound hydrogen chloride is a gas.

- What sort of bonding is present in hydrogen chloride?
- How is the bonding in hydrogen chloride different from that in magnesium chloride?

6. Chlorine is a diatomic gas in Group VII of the Periodic Table.

a) Complete Fig.to show the outer shell electrons in a molecule of chlorine.



b) State how the boiling point of the elements in Group VII changes as the group is descended.

**Activities:**

- Students will play game to gauge Periodic Table.
- Students will view a power point presentation on properties of alkali metals and halogens.

**Laboratory Experiments:**

- Identify dancing sodium metal.
- Identification of metal ion and a non-metal ion.

**Surf IT:**

- <https://www.youtube.com/watch?v=l8tOtZKpi04>
- <https://www.youtube.com/watch?v=rBhMWpyO7Ts>
- <https://www.youtube.com/watch?v=QNojS6ZZ4og>

**September**

**Chapter 12: Magnetism (ILSS Book 3)**

**Pages no: 269–292**

| Contents   | Learning Objectives  |
|--|--|
| <b>Magnets and magnetic materials</b>  | <ul style="list-style-type: none"><li>• Define magnets.</li><li>• Differentiate between magnetic and non magnetic materials with examples.</li><li>• State the properties of magnets.</li><li>• Explain why repulsion, not attraction, is the test for magnet.</li><li>• Identify the poles of magnet.</li></ul> |
| <b>Making a Magnet</b><br>Magnetising by stroke method<br>Magnetising by the electrical method | <ul style="list-style-type: none"><li>• Describe the process of making a magnet using stroke method.</li><li>• Describe the process of making a magnet using electrical method.</li><li>• Define electromagnets.</li><li>• Identify the factors that affect the strength of electromagnet.</li></ul>             |

|   |   |
|---|---|
| <b>Magnetic Field</b><br>Wires carrying electric current produce magnetic field | <ul style="list-style-type: none"> <li>Define magnetic field.</li> <li>Determine that magnetic field always arises from the North pole.</li> <li>Recognize that magnetic field lines can show the direction of magnetic field</li> <li>Compare the magnetic fields of small and large size magnet by using iron filings.</li> <li>Describe how a magnetic field is set up when a current flows through a wire or coil.</li> <li>Plot a compass corresponding to the direction of the magnetic field.</li> <li>Describe the magnetic effect of a current while making a compass for navigation.</li> </ul> |
| <b>Uses of Magnets</b>  | <ul style="list-style-type: none"> <li>Discuss the uses of magnets and electromagnets in industries and home for example; electric bell, lifting heavy objects, bullet train etc.</li> <li>Explain the working of electric bell.</li> </ul>   |

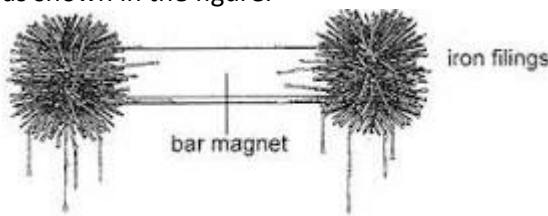
**Keywords:**  
magnetite, lodestone, ferrite, alnico, North seeking pole, South seeking pole, magnetic force of attraction, magnetic field, stroking, electromagnet, temporary magnet, permanent magnet, magnetic field

**Types of Questions:**

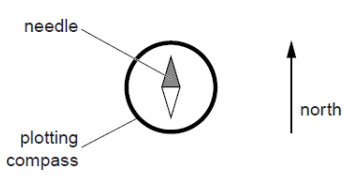
- Multiple choice questions.
- Structured questions.
- Short answer reasoning.
- Descriptive questions.
- Drawing of magnetic line of forces.

**Sample Questions:**

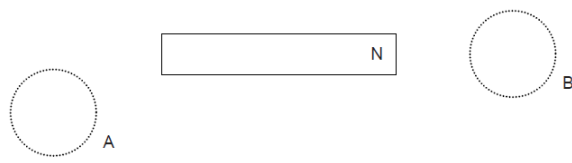
- Arham dipped a bar magnet in a heap of iron fillings and pulled it out. He found that iron fillings got stuck to the magnet as shown in the figure.



  - Which regions of the magnet have more iron fillings sticking to it?
  - What are these regions called?
  - You are provided with two identical metal bars. One out of the two is a magnet. Suggest two ways to identify the magnet.
- When there are no other magnetic fields present, the needle of a plotting compass points due north in the Earth’s magnetic field. This is shown in the figure.

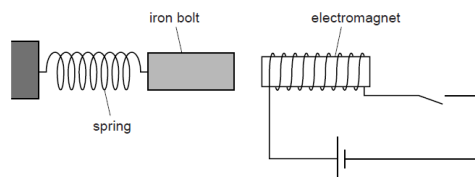


The plotting compass is placed close to a permanent magnet, first at position A and then at position B, as shown in the figure.



  - On the figure, draw needles in the two circles to show the direction in which the compass needle points when the compass is at A and at B.

3. An electromagnet is used in a simple lock. The figure shows part of this lock.



When the current is switched on, the iron bolt is pulled towards the electromagnet to lock the door.

When the current is switched off, the spring pulls the iron bolt away from the electromagnet, unlocking the door.

- a) Suggest why the bolt is made of iron rather than steel.
- The connections to the cell in Fig. are reversed.
- b) State the difference, if any, that this makes to the working of the lock.
- c) Suggest a material that is used to make a permanent magnet.
- d) State two ways by which the strength of the electromagnet may be increased.

**Workbook Activities:**

- Work book activities 12.1, 12.2, 12.3, 12.4, 12.5, 12.6, 12.7, 12.8 and 12.9.

**Activities:**

- Separating a non-magnetic material from a magnetic material using a magnet.
- Observe that a magnet can be distinguished from magnetic materials because it shows repulsion to any one pole of a magnet.

**Laboratory Experiments:**

- To plan an investigation to find out whether a larger magnet is always stronger than a smaller magnet.
- To make a magnet using stroke method and electrical method.

**Surf IT:**

- <https://www.youtube.com/watch?v=T8aoHwcN02M>
- <https://www.youtube.com/watch?v=Kx7FwUue87w>

| Contents   | Learning Objectives   |
|--|---|
| <b>Respiration and Breathing</b><br>Respiration<br>Breathing | <ul style="list-style-type: none"><li>• Define respiration.</li><li>• State the use of energy produced as a result of respiration.</li><li>• Define and differentiate between aerobic respiration and anaerobic respiration.</li><li>• State the chemical equation of aerobic respiration and anaerobic respiration.</li><li>• Discuss the importance of fermentation industrially and state the chemical equation of fermentation.</li><li>• Define breathing.</li><li>• Compare the composition of inhaled air and exhaled air.</li><li>• Differentiate between breathing and respiration.</li><li>• Identify the organs of respiratory system.</li><li>• Explain the working of respiratory system during inhalation and exhalation.</li><li>• Explain the structural and function adaptations of trachea.</li><li>• Relate the adaptation of alveoli to the quick and efficient exchange of gases.</li><li>• Describe the causes and effects of the following diseases on the human body:</li></ul> |

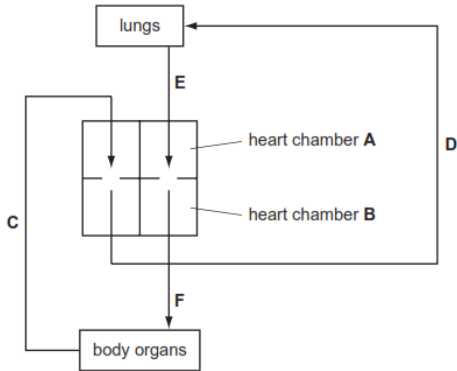


|   |   |
|---|---|
|   | <ul style="list-style-type: none"><li>➤ asthma</li><li>➤ bronchitis</li><li>➤ emphysema</li><li>➤ lung cancer</li></ul>   |
| <b>Transport in human beings</b><br>Heart<br>Blood Vessels<br>Blood<br>Circulation of Blood | <ul style="list-style-type: none"><li>• Compare the transport system in man with the transport system of a city.</li><li>• Label the structure of heart.</li><li>• Explain what is meant by double circulation.</li><li>• Draw a flow chart to illustrate double circulation by the human heart including the valves and main vessels.</li><li>• Describe in detail blood flow in the human heart.</li><li>• Compare the properties, functions and adaptations of arteries and veins.</li><li>• Describe how the structure of capillaries is related to its function.</li><li>• Describe the formation of tissue fluid.</li><li>• State the function of tissue fluid.</li><li>• Describe the importance of blood in the circulatory system.</li><li>• Identify the organs of respiratory system.</li><li>• List the main components of blood.</li><li>• State the function of blood.</li><li>• Describe the adaptation of the structure of blood cells with its functions.</li><li>• Differentiate between blood plasma and tissue fluid.</li><li>• Identify and name the blood vessels that carry blood to and from the respective organs of the body.</li><li>• Explain what is meant by coronary heart diseases.</li></ul> |

**Keywords:**  
aerobic respiration, anaerobic respiration, fermentation, breathing, inhalation, exhalation, diffusion, diaphragm, intercostals muscles, ciliated epithelial cells, valves, plasma, tissue fluid, centrifugation

- Types of Questions:**
- Multiple choice questions
  - Structured questions
  - Labeling
  - Short answer reasoning
  - Descriptive questions
  - Drawing of flow chart to show blood circulation in human heart

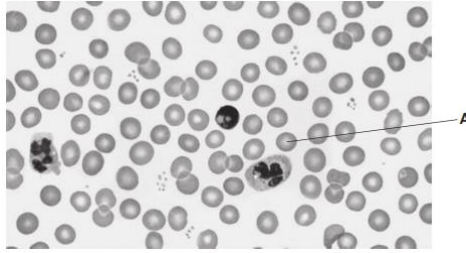
**Sample Questions:**  
1. The figure shows the route taken by blood around the body.



- a) Name the heart chambers A and B.
- b) Use information shown in fig. to identify the type of blood vessel C as either an artery or a vein.

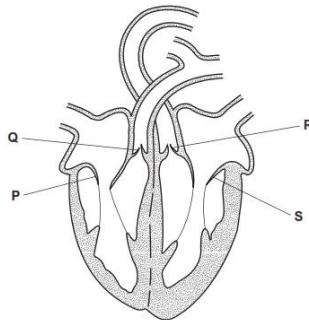
- c) State and explain two differences between the contents of the blood flowing in vessels C and E.
- d) Suggest and explain which of the blood vessels contains blood at the highest pressure.

2. The figure shows a photomicrograph of a human blood smear.



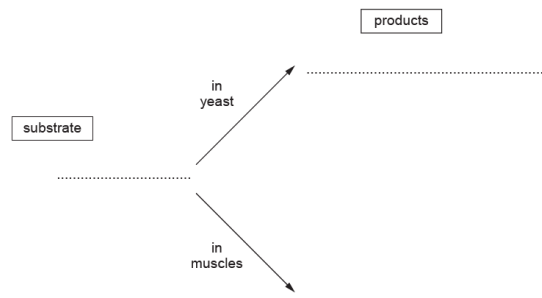
- a) Draw label lines and name three different types of blood cell.
- b) Name two parts of the blood that can pass through the capillary walls.
- c) State the function of cell A.

3. The figure shows a section through the heart.



- a) Name the two blood vessels, shown on fig. that carry oxygenated blood.
- b) State the letter that identifies the tricuspid valve.
- c) State a letter that identifies a semilunar (aortic) valve.

4. The figure is an incomplete flow chart of the process of anaerobic respiration in yeast and in muscles.



- a) Complete the figure to show the substrate/reactant and products for anaerobic respiration in yeast and in muscles.
- b) Suggest why anaerobic respiration does not release as much energy as aerobic respiration.
- c) Describe what occurs in the student's thorax to cause air to be breathed out.

#### Workbook Activities:

- Work book activities 2.1, 2.2, 2.3.

#### Activities:

- Physical exercise for 5 minutes and to record observations before and after exercise.
- Inhale and exhale practice to observe the changes in the position of diaphragm.
- Audiovisual presentation.

#### Laboratory Experiments:

- To determine blood group.
- To demonstrate the internal structure of heart by dissecting goat/cow heart.

#### Surf IT:

- <https://www.youtube.com/watch?v=oHMmtqKgs50>
- <https://www.youtube.com/watch?v=q0s-1MC1hcE>

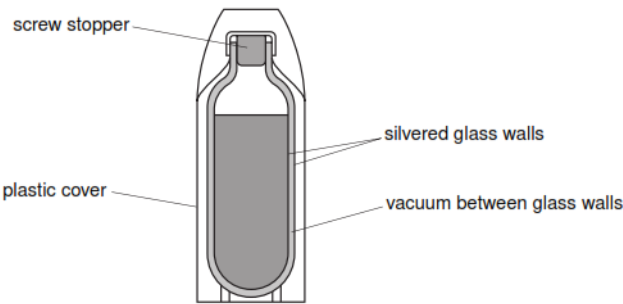
| Contents   | Learning Objectives  |
|--|--|
| <b>Temperature and Heat</b><br>Thermometer<br>Upper fixed (steam) point and Lower fixed (ice) point<br>Sensitivity and Range   | <ul style="list-style-type: none"><li>• Differentiate between heat and temperature.</li><li>• Define thermometer.</li><li>• Differentiate between clinical thermometer and laboratory thermometer.</li><li>• Define upper fixed point / boiling point of water.</li><li>• Define lower fixed point / freezing point of water.</li><li>• Define sensitivity of a thermometer.</li><li>• Define range of a thermometer.</li><li>• Calculate the range of a thermometer.</li></ul>  |
| <b>Effect of heat gain and heat loss (in terms of particle model of matter).</b><br>Change in Volume<br>Thermal expansion and contraction of solids<br>Thermal expansion and contraction of liquids<br>Thermal expansion and contraction of gases<br>Effect of thermal expansion and contraction<br>Application of thermal expansion and contraction | <ul style="list-style-type: none"><li>• Define the following terms:<ul style="list-style-type: none"><li>➤ melting</li><li>➤ boiling</li><li>➤ freezing</li><li>➤ condensation</li><li>➤ sublimation</li><li>➤ evaporation</li></ul></li><li>• Describe the change of state in terms of particle model of matter.</li><li>• Label the heating curve and cooling curve of water.</li><li>• Explain the following factors affecting evaporation:<ul style="list-style-type: none"><li>➤ temperature</li><li>➤ surface area</li></ul></li><li>• Describe the change in volume of an object as an effect of heat gain (expansion) and heat loss (contraction) in terms of particle model of matter.</li><li>• Explain thermal expansion and contraction of solids with the example of bimetallic strip.</li><li>• Explain thermal expansion and contraction of liquid with the example of thermometer.</li><li>• Explain thermal expansion and contraction of gases with the example of:<ul style="list-style-type: none"><li>➤ rising of dough</li><li>➤ hot air balloon</li><li>➤ CNG kit</li><li>➤ cold drink cans</li></ul></li><li>• Discuss the problems caused by thermal expansion and contraction in our daily life and explain how they may be overcome in case of the following:<ul style="list-style-type: none"><li>➤ concrete road surfaces or pathways</li><li>➤ railway tracks</li><li>➤ overhead power and telephone line</li><li>➤ bridges</li><li>➤ glass</li></ul></li><li>• Describe various appliances/processes from daily life which work on the principle of expansion and contraction. For examples:<ul style="list-style-type: none"><li>➤ riveting</li><li>➤ wheel and axle</li><li>➤ thermometers</li><li>➤ thermostat</li><li>➤ hot air balloon</li><li>➤ land breeze/sea breeze</li></ul></li></ul> |
| <b>Transfer of Heat</b>  |  |

|  |   |
|--|---|
| Conduction<br>Convection<br>Radiation<br>Dull/Rough surfaces<br>Silver, Shiny/ Smooth surfaces | <ul style="list-style-type: none"><li>• Define the following methods of heat transfer:<ul style="list-style-type: none"><li>➤ conduction</li><li>➤ convection</li><li>➤ radiation</li></ul></li><li>• Differentiate between conductors and insulators.</li><li>• Elaborate the principle of conduction to make use of conductors and insulators.</li><li>• Describe and illustrate the establishment of convection current by drawing arrows in given diagrams.</li><li>• Elaborate the principle of convection to explain natural phenomena and the working of different appliances/ technologies.</li><li>• Compare the process of radiation with conduction and convection.</li><li>• Relate the properties of rough and smooth surfaces with their uses in our daily life.</li><li>• Identify the type of surface use under different given conditions.</li></ul> |
|--|---|

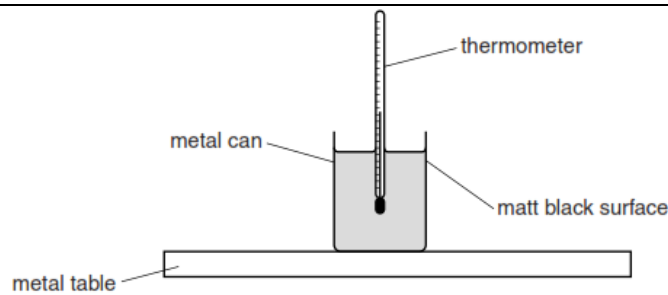
**Keywords:**  
heat, temperature, upper and lower fixed point, sensitivity, range, constriction, bore size, kinetic energy, coolness, vibrations, expansion, contraction, volume, rivet, thermostat, bimetallic strip, conductors, insulators, convection, convection current, radiation, vacuum

- Types of Questions:**
- Multiple choice questions.
  - Structured questions.
  - Short answer reasoning.
  - Descriptive questions.
  - Diagram based questions.

- Sample Questions:**
1. Fig.shows a vacuum flask, designed to allow liquids such as coffee to remain hot forseveral hours.



- Explain how each of the following helps to keep the coffee hot.
- a) the screw stopper
  - b) the silvered glass walls
  - c) the vacuum between glass walls
2. A metal can is filled with hot water and placed on a metal table, as shown in Fig.

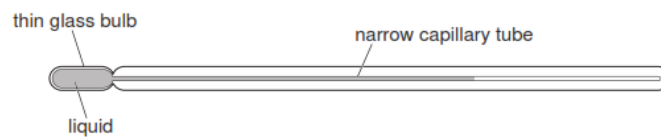


The surface of the metal can is matt black.

The temperature is seen to fall quickly.

- a) Explain why the temperature falls more slowly when
  - the can is placed on a wooden table
  - the surface of the can is shiny white instead of matt black
- b) Air above the can becomes heated and rises. Explain why hot air rises.
- c) A laboratory liquid-in-glass thermometer is used to measure the temperature of the water.

3. An unmarked liquid-in-glass thermometer is shown in Fig.



- a) Explain one difference between a laboratory liquid-in-glass thermometer and a clinical liquid-in-glass thermometer.
- b) State one change that could be made to the capillary tube to make a liquid-in-glass thermometer more sensitive.
- c) The mercury-in-glass thermometer has a large bulb that is made of thin glass. State and explain why each of the following features is an advantage:
  - the large bulb
  - the thin glass

#### Work book Activities:

- Work book activities 9.1, 9.2, 9.3, 9.4, 9.5, 9.7 and 9.8.

#### Activities:

- Students will observe the expansion and contraction of mercury in a glass thermometer.
- Students will observe how mixing warm water with cold water can show how heat travels from higher temperature to lower temperature.

#### Laboratory Experiments:

- To predict and measure temperatures using laboratory and clinical thermometer.
- To plot heating curve of water.
- To find out about heat conduction in solids.
- To observe convection of heat in water.

#### Surf IT:

- <https://www.youtube.com/watch?v=EwzkYTfHFbo>
- <https://www.youtube.com/watch?v=21CR01rlmv4>
- [https://www.youtube.com/watch?v=Atnjo7dD\\_bA](https://www.youtube.com/watch?v=Atnjo7dD_bA)
- [https://www.youtube.com/watch?v=gcY6832h\\_Nw](https://www.youtube.com/watch?v=gcY6832h_Nw)
- <https://www.youtube.com/watch?v=EkQ2886Sxpg>

November

|                                   |
|-----------------------------------|
| Revision for Mid-Year Examination |
|-----------------------------------|

December

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| Mid-Year Examination |
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January

Chapter 04: Ecology (ILSS Book 3)

Pages no: 69 - 110

| Contents   | Learning Objectives   |
|--|---|
| <b>Ecology</b><br>Habitat, Population and Community  | <ul style="list-style-type: none"><li>Define ecology.</li><li>Define the following with examples:<ul style="list-style-type: none"><li>➤ habitat</li><li>➤ population</li><li>➤ community</li></ul></li><li></li></ul>  |
| <b>Environment</b><br>Abiotic environment<br>Adaptations to abiotic environment<br>Biotic environment<br>Food relationship<br>Predator-Prey relationship | <ul style="list-style-type: none"><li>Define environment.</li><li>Explain the influence of abiotic environment on the survival of an organism.</li><li>Outline the abiotic environment of an organism in terms of:<ul style="list-style-type: none"><li>➤ light</li><li>➤ temperature</li><li>➤ air</li><li>➤ water</li><li>➤ pH</li></ul></li><li>Match given adaptations to provided environment types.</li><li>Differentiate between abiotic and biotic environment.</li><li>Differentiate between cooperation and competition among the living organism; with examples.</li><li>Define the following with examples:<ul style="list-style-type: none"><li>➤ herbivore</li><li>➤ carnivore</li><li>➤ omnivore</li><li>➤ scavengers</li></ul></li><li>Predict types of relationship among different organisms.</li><li>State the adaptation of predator to catch its prey and of prey to hide from its predator in given examples.</li></ul> |

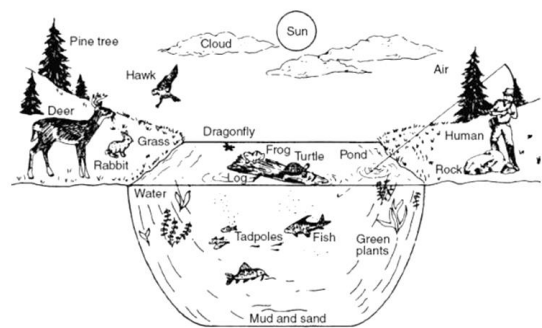
**Keywords:**  
ecology, environment, abiotic, biotic, hibernation, aestivation, camouflage, herbivore, carnivore, omnivore, scavengers, predator, prey, parasite, mutualism

**Types of Questions:**

- Multiple choice questions.
- Structured questions.
- Short answer reasoning.
- Descriptive questions.
- Column matching

**Sample Questions:**

1. Study the ecosystem picture below.



Write any one of the abiotic factors, producers, primary consumers, secondary consumers and decomposers that are found in the ecosystem above.

| ABIOTIC FACTORS | PRODUCERS | PRIMARY CONSUMERS | SECONDARY CONSUMERS |
|-----------------|-----------|-------------------|---------------------|
|                 |           |                   |                     |

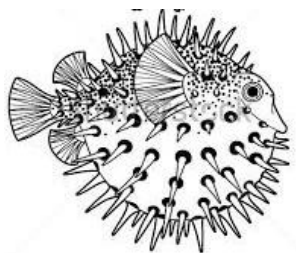
- a) Explain what might happen if the sun stops shining in this ecosystem?

b) Explain what might happen if there is no rainfall for several months in this ecosystem.

c) Explain what might happen if the population of hawks in this ecosystem grows very large?

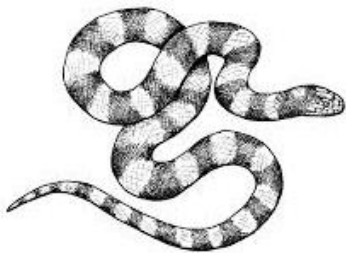
d) Explain what might happen if a local water treatment plant leaks raw sewage into the stream in this ecosystem?

e) Name one other action that could occur in this ecosystem and the effects they might have on it.
2. What is camouflage?
- a) How does a stonefish show protective coloration?



- b) What adaptation for protection does a walking stick have?

c) Why is mimicry a helpful adaptation?
3. A figure of a king snake is given below:



- a) In what ways is the harmless king snake similar to the poisonous coral snake?

b) How does this adaptation help the king snake to survive?

c) How can you differentiate the two snakes?

**Workbook Activities:**

- Work book activities 4.3 and 4.4.

**Activities:**

- Students will visit the botanical garden of the school to observe various populations and communities.

**Laboratory Experiments:**

- Identify the biotic and abiotic factors of garden and pond habitat.

**Surf IT:**

- <https://education.seattlepi.com/topics-experiments-ecology-3734.html>
- [www.biologydiscussion.com/experiments/experiments-on-ecology-biology/56545](http://www.biologydiscussion.com/experiments/experiments-on-ecology-biology/56545)

**Chapter 05: Food Chain Food Web (ILSS Book 3)**

**Pages no: 111-129**

| Contents   | Learning Objectives   |
|--|---|
| <b>Food Chains andFood Webs</b>  | <ul style="list-style-type: none"><li>• Define the terms food chains and food webs.</li><li>• Differentiate between food chains and food webs.</li><li>• Define the following terms:<ul style="list-style-type: none"><li>➤ producer</li><li>➤ primary consumer</li><li>➤ secondary consumer</li><li>➤ tertiary consumer</li><li>➤ herbivore</li><li>➤ carnivore</li><li>➤ omnivore</li><li>➤ decomposers</li><li>➤ links</li><li>➤ trophic level</li></ul></li><li>• Construct a food chain and a food web.</li><li>• Identify the trophic level of each link in a given food chain and food web.</li><li>• Describe the influence of the population of one organism on the population of another in a food web.</li></ul> |
| <b>Energy Transfer in a Food chain</b><br>Pyramid of number<br>Pyramid of biomass<br>Sun as the principle source of energy | <ul style="list-style-type: none"><li>• Describe how the flow of energy decreases along the food chain.</li><li>• Explain the importance of sun as the principle source of energy.</li><li>• Suggest why food chains usually have fewer than five trophic levels.</li><li>• Define pyramid of number.</li><li>• Construct a pyramid of number from the given food chain.</li><li>• Define pyramid of bio mass.</li><li>• Compare pyramid of number and biomass.</li></ul>   |
| <b>Decomposers</b>   | <ul style="list-style-type: none"><li>• Identify decomposers in a given food chain.</li><li>• Explain the role of decomposers in a food chain.</li></ul>  |



**Keywords:**

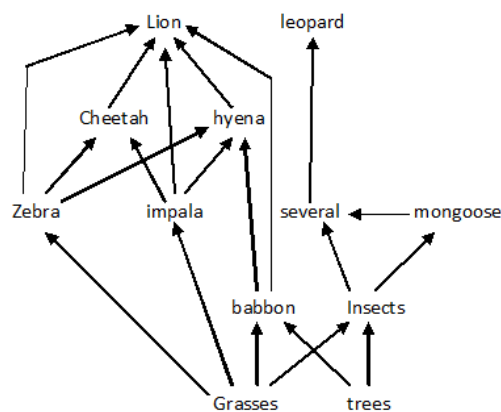
food chain, food web, trophic level, link, pyramid of number, pyramid of biomass, decomposition

**Types of Questions:**

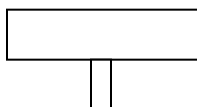
- Multiple choice questions
- Structured questions
- Short answer reasoning
- Descriptive questions
- Construction of food chain and food web
- Construct pyramid of number and biomass

**Sample Questions:**

1. The figure shows part of a food web in African grassland (savannah).



- Explain what the arrows in the food web represent.
  - Use the information in Fig. to write down a food chain containing four organisms.
  - From THE FIGURE, write down the name of:
    - a herbivore:
    - a producer:
  - Explain how grasses and trees get their food?
  - The numbers of Impala greatly decreased.
- I. A scientist predicts that this would cause the numbers of Zebras to increase. Explain why this increase could happen.
- II. Another scientist disagreed, and predicted that the numbers of Zebras would decrease. Explain why this decrease could happen.
2. A student described a food chain found in his garden:  
One bush has hundreds of Aphids on it.  
The Aphids suck liquid from the phloem of the bush to get their foods.  
The Aphids are eaten by large beetles.  
All the beetles have many parasites on their bodies.  
The parasites suck liquids from the bodies of the beetles for their food.
- The figure shows part of the pyramid of numbers for this food chain.
- Complete the figure by sketching in the two missing boxes.
  - Label the four boxes with the names of the organisms.



3. Draw arrows to illustrate the food relationship among organism in the given food web.

a) Name the animals at trophic level 3.

b) This food chain does not show decomposers. Describe the role of decomposers in a food web.

4. Look at this food chain.

Lettuce → green fly → ladybird → thrush → cat

Draw the pyramid of biomass for the food chain

**Workbook Activities:**

- Work book activities 5.1, 5.2 and 5.3.

**Activities:**

- Students will visit school ground to construct food chains or web in different habitat.

**Surf IT:**

- <https://www.onlinemathlearning.com/food-chain-web.htm>

| Chapter 06: Man’s Impacts on Ecosystem (ILSS Book)   |  | Pages no: 130–150   |  |
|--|--|---|--|
| Contents   |  | Learning Objectives   |  |
| <b>Effects of Human Activities on the Ecosystem</b><br>Pollution<br>Air Pollution<br>Water pollution<br>Land Pollution<br>Carbon Cycle<br>Water Cyle<br>Introduction of foreign specie<br>Over exploitation of natural resources |  | <ul style="list-style-type: none"><li>• Define ecosystem.</li><li>• Define pollutants.</li><li>• Discuss the main causes of pollution.</li><li>• Describe the formation and effect of acid rain.</li><li>• Define green house effect.</li><li>• Explain what is meant by enhanced green house effect.</li><li>• Suggest some causes of global warming.</li><li>• Describe the effect of global warming.</li><li>• List some of the causes of water pollution.</li><li>• Explain the effect of water pollution.</li><li>• List some of the causes of land pollution.</li><li>• Describe the effect of land pollution.</li><li>• Describe how carbon moves around in the environment, from one place to another.</li><li>• Identify how humans influence the carbon cycle.</li><li>• Describe how the introduction of foreign species by human can harm the environment. Provide examples.</li><li>• Identify the main stages in water cycle.</li><li>• Understand evaporation and condensation.</li><li>• Discuss how over hunting and excessive use of energy can harm the environment.</li></ul> |  |

|                                   |   |
|-----------------------------------|---|
| <b>Conserving Our Environment</b> | <ul style="list-style-type: none"> <li>• Explain why it is important to conserve the environment.</li> <li>• Suggest some ways for how environments can be conserved by: <ul style="list-style-type: none"> <li>➤ an individual</li> <li>➤ an organization</li> <li>➤ government</li> </ul> </li> </ul> |
|-----------------------------------|---|

**Key Words:**  
ecosystem, pollutants, haze, acid rain, global warming, algal bloom, landfills, over-exploitation, conservation of energy

**Types of Questions:**

- Multiple choice questions
- Structured questions
- Short answer reasoning
- Descriptive questions

**Sample Questions:**

- The given figure shows the carbon cycle.
  - What is the name of process B?
  - What is the name of process C?
- Process A in the figure is respiration. Both aerobic respiration and anaerobic respiration produce carbon dioxide.
  - Write the word equation for anaerobic respiration.
  - Explain how processes A and B maintained a constant percentage of carbon dioxide in the air for thousands of years.
  - Suggest how process C has helped to increase the percentage of carbon dioxide in the air during the past 100 years.
- Sulphur dioxide is produced when coal is burnt in air. Sulphur dioxide causes acid rain.
  - When the sulphur dioxide dissolves in rain water what happens to the pH value of the rain water?
  - State two environmental problems caused by acid rain.
- The figure shows the carbon cycle.
  - Describe the importance of respiration in the carbon cycle.
  - Give the word equation for respiration.



- c) In the figure, find a food chain containing three organisms and write the food chain.
- d) Decomposers are organisms found in the soil. Suggest the role of the decomposers in the carboncycle shown in the figure.
- e) With reference to the figure, explain why the amount of carbon dioxide in the air is increased by:
  - coal-fired factories
  - the removal of large amounts of grass
- f) Describe how increased carbon dioxide levels could affect the environment.

**Work book Activities:**

- Work book activities 6.1 and 6.2.

**Activities:**

- Multimedia presentation.

**Laboratory Experiments:**

- Students will make a model of carbon cycle or water cycle.
- Students will make useful objects from recycled material.

**February**

**Topic: Writing and Balancing Equations (Hand out & ILSS Book 2)**

**Pages no: 1 - 27**

| Contents   | Learning Objectives   |
|--|---|
| <b>Features of the Periodic Table</b>                      | <ul style="list-style-type: none"> <li>Identify the correct placement of an element in the Periodic table on the basis of its atomic number.</li> <li>Draw the atomic structure and write the electronic configuration of first twenty elements of the Periodic Table.</li> <li>Find out the number of protons/neutrons/nucleon/electron from given structures or configurations.</li> <li>Find out the valency of an element or ion from its atomic number or electronic configuration.</li> <li>Illustrate and explain the formation of positive ions and negative ions of metals and non-metals respectively.</li> <li>Identify ionic compounds and covalent compounds.</li> </ul>   |
| <b>Chemical Formula</b><br>Writing and Balancing Equations | <ul style="list-style-type: none"> <li>State the symbols of first 20 elements and symbols of the following elements:               <ul style="list-style-type: none"> <li>➤ Iron</li> <li>➤ Zinc</li> <li>➤ Silver</li> <li>➤ Copper</li> <li>➤ Gallium</li> </ul> </li> <li>Differentiate between the symbol of an element and the formula of a compound.</li> <li>Derive the chemical formulae of ionic compounds by swapping and shifting valencies.</li> <li>State the names and symbol/formulae of poly atomic or complex ions.</li> <li>Derive the chemical formula of compounds containing following complex ions:               <ul style="list-style-type: none"> <li>➤ OH<sup>-</sup>Hydroxide ion</li> </ul> </li> </ul> |

|  |   |
|--|---|
|  | <ul style="list-style-type: none"> <li>➤ <math>\text{NO}_3^-</math> Nitrate ion</li> <li>➤ <math>\text{HCO}_3^-</math> Bicarbonate or hydrogen carbonate ion</li> <li>➤ <math>\text{CO}_3^{2-}</math> Carbonate ion</li> <li>➤ <math>\text{SO}_4^{2-}</math> Sulfate ion</li> <li>➤ <math>\text{PO}_4^{3-}</math> Phosphate ion</li> <li>➤ <math>\text{NH}_4^+</math> Ammonium ion</li> <li>• State the names of compound by identifying chemical formula.</li> <li>• Balance given formula equations.</li> <li>• Complete and balance the equations for: <ul style="list-style-type: none"> <li>➤ chemical reactions of acids</li> <li>➤ chemical reactions of alkalis</li> <li>➤ Group I alkali metals</li> <li>➤ Group VII halogens.</li> </ul> </li> <li>• Convert given word equation to formula equation and balance them.</li> </ul> |
|--|---|

**Key Words:**

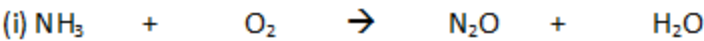
elements, ions, compounds, valency, symbol, formula, compound ions, polyatomic ions, equation, balanced equation

**Types of Questions:**

- Multiple choice questions
- Structured questions
- Short answer reasoning
- Illustrative questions
- Drawing of first 20 elements atomic structure and electronic configuration
- Derive formula of ionic compounds from their names
- Writing names of ionic compounds from the formula
- Finding number of protons/neutrons/ electrons/ mass number/ valency/ group and period of an element or of its ion
- Word equations
- Balancing formula equations
- Completing incomplete equations

**Sample Questions:**

1. State the formula of the given compounds:
  - a) zinc(II)bromide
  - b) iron(III)oxide
  - c) beryllium nitrate
  - d) aluminum phosphate
  - e) sodium iodide
2. State the balanced formula equation of the given word equations.
  - a) calcium hydroxide reacts with hydrochloric acid to form calcium chloride and water
  - b) sodium hydroxide reacts with iron(II)chloride and form sodium chloride and iron hydroxide
  - c) magnesium burns brightly in oxygen and produce magnesium oxide
3. Find out the valency of the nonmetals/compound ions from the given compounds.
  - a)  $\text{Ca}_3(\text{PO}_4)_2$
  - b)  $\text{H}_2\text{SO}_4$
  - c)  $\text{BeO}$
  - d)  $\text{Al}_2(\text{SO}_4)_3$
  - e)  $\text{Mg}(\text{OH})_2$
4. Balanced the given chemical equations



(iii)  $\text{C}_3\text{H}_8$  +  $\text{O}_2 \rightarrow \text{CO}_2$  +  $\text{H}_2\text{O}$

(iv)  $\text{Al} + \text{N}_2 \rightarrow \text{AlN}$

**Activities:**

- Work sheets

**Laboratory Experiments:**

- To construct models of atoms and their ions.
- Identification of metal ion and a non-metal ion.(other than those performed in 1<sup>st</sup> term)

**Surf IT:**

- <https://www.wardsci.com> › Home › Educational Classroom Kits and Activities
- <https://courses.lumenlearning.com/...chemistry/.../experimental-data-and-empirical-for..>

| Contents  | Learning Objectives  |
|---|--|
| <b>Hearing Sounds</b><br>How are sounds made<br>How do sounds travel<br>How do we hear sounds | <ul style="list-style-type: none"><li>• Define the following:<ul style="list-style-type: none"><li>➤ sound</li><li>➤ vibration</li><li>➤ waves</li></ul></li><li>• List the different types of waves.</li><li>• Identify longitudinal and transverse waves.</li><li>• Differentiate between longitudinal and transverse waves.</li><li>• Describe how sound travels in a series of compression and rarefaction.</li><li>• Identify the region of compression and rarefaction.</li><li>• Demonstrate an experiment to show sound needs a medium to travel.</li><li>• Label the parts of a human ear.</li><li>• Explain the function of each part of the human ear in detecting sound vibrations.</li></ul>  |
| <b>Pitch and Loudness</b><br>Pitch and Frequency<br>Loudness and Amplitude                    | <ul style="list-style-type: none"><li>• Define the following terms:<ul style="list-style-type: none"><li>➤ speed</li><li>➤ frequency</li><li>➤ wavelength</li><li>➤ pitch</li><li>➤ amplitude</li></ul></li><li>• Enumerate wavelength using graphic description.</li><li>• Calculate wavelength using formula.</li><li>• Calculate frequency using formula.</li><li>• Calculate frequency, wavelength and speed using the formula.</li><li>• State the approximate range of audible frequencies for a healthy human ear.</li><li>• Define ultrasound and infrasound.</li><li>• State the relationship between pitch and frequency.</li><li>• Describe how the frequency of sound can be increased or decreased.</li><li>• State the relationship between loudness and</li></ul> |

|  |   |
|--|---|
|  | <p>amplitude.</p> <ul style="list-style-type: none"><li>• State the unit of measurement for loudness.</li><li>• Describe how the loudness of sound can be increased or decreased.</li><li>• Define noise.</li><li>• Design an experiment to measure the speed of sound.</li><li>• Define echo.</li><li>• Determine the distance traveled by an object using echo.</li><li>• Identify the sounds of different pitch, frequency loudness and amplitude.</li></ul> |
|--|---|

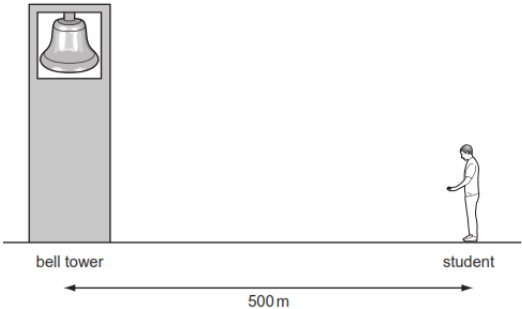
**Keywords:**  
vibration, wave, frequency, amplitude, oscillation, tension, soft sound, loud sound, infra sound, ultra sound, echo

- Types of Questions:**
- Multiple choice questions
  - Structured questions
  - Short answer reasoning
  - Descriptive questions
  - Calculations of speed, frequency, wavelength, vibrations over distance

- Sample Questions:**
1. Radio waves are electromagnetic waves. Sound waves are not.
- a) State one other way in which radio waves differ from sound waves.
- Fig. shows two lists. The first is a list of different types of electromagnetic wave. The second is a list of some of their uses.
- b) Draw lines to connect each type of radiation to its use.

| radiation | use                                 |
|-----------|-------------------------------------|
| gamma     | examining bones and teeth           |
| microwave | remote controls for television sets |
| infra-red | satellite communications            |
| X-rays    | sterilising surgical instruments    |

2. A student carried out an experiment to find the speed of sound in air by watching and listening to a bell being rung. He stood 500m from the bell.



The sound took 1.5 s to travel from the bell to the student.

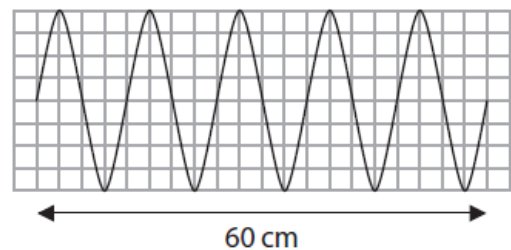
- a) Calculate the speed of sound. State the formula that you use and show your working.  
The sound wave produced by the bell had a frequency of 400 Hz.
- b) State the approximate frequency range which humans can hear.
3. The Fig. shows two dolphins communicating with each other using sound waves. How does a sound wave travel through water?



- Sound travels at different speeds through different substances.
- a) Does sound travel fastest in a solid, a liquid or a gas?
- | substance | speed of sound (m/s) |
|-----------|----------------------|
| air       | 340                  |
| steel     | 5200                 |
| water     | 1500                 |
- b) It takes 0.5 seconds for the sound wave to travel from one dolphin to the other. Calculate the distance between the two dolphins. State the formula that you use and show your working.
4. A sound wave travels through air.
- a) Explain what is meant by the wavelength of a wave.



- b) A Fig. represents air molecules in the sound wave at one instant.
- What does A and B represent in Fig.
  - State how A is different from B
- c) A short pulse of sound waves produces an echo from a wall 20 m away. The echo arrives back at the source of the sound 0.12 s after the pulse is produced. The wavelength of the sound wave is 30 mm.
- Calculate the speed of the sound.
  - Calculate the frequency of the sound.
- d) Some students are investigating waves. They produce waves by moving a piece of wood up and down in a tank of water.
- The diagram shows the waves over a distance of 60 cm in 0.02 seconds



- State the number of waves shown on the diagram.
- Calculate the wavelength of the waves.
- Calculate the frequency of the waves

**Work book activities:**

- Work book activity 11.1.



**Activities:**

- Work book activitiy 11.2.

**Laboratory Experiments:**

- To find out how sounds of different pitch are made.
- To find out the factors affecting pitch of sound.
- To demonstrate that sound travels fastest in solids.

**Surf IT:**

- <https://www.youtube.com/watch?v=79zTZYWYCRg>
- <https://www.youtube.com/watch?v=-bKy02f1pD4>
- <https://www.youtube.com/watch?v=YTZcSaPn92s>

**March**

**Chapter 10: Light (ILSS Book 3)**

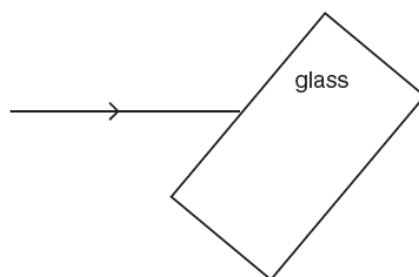
**Pages no: 217 - 252**

| Contents        | Learning Objectives  |
|-----------------|--|
| Nature of Light | <ul style="list-style-type: none"><li>• Describe the dual nature of light.</li><li>• Compare the speed of light in the following:<ul style="list-style-type: none"><li>➤ solid</li><li>➤ liquid</li><li>➤ gas</li><li>➤ vacuum</li></ul></li><li>• State the speed of light in vacuum.</li><li>• Compare the speed of light with the speed of sound.</li><li>• State the differences between light and sound.</li><li>• Use appropriate formulae to calculate:<ul style="list-style-type: none"><li>➤ the speed of light</li><li>➤ wavelength</li><li>➤ frequency of light waves</li></ul></li><li>• Define electromagnetic waves.</li><li>• List the main components of the electromagnetic spectrum.</li><li>• Draw a table to show the arrangement of electromagnetic waves in term of increasing or decreasing frequency and wavelength.</li><li>• State the uses of electromagnetic waves.</li><li>• Design an experiment to investigate that light travels in a straight line.</li><li>• Define the following terms:<ul style="list-style-type: none"><li>➤ ray</li><li>➤ beam</li><li>➤ divergent beam</li><li>➤ convergent beam</li><li>➤ luminous objects</li><li>➤ non-luminous objects</li></ul></li><li>• Define transparent materials with examples and uses.</li><li>• Define translucent and opaque materials; examples and uses.</li></ul> |

|  |   |
|--|---|
| <b>Shadows</b>   | <ul style="list-style-type: none"><li>• Define shadow.</li><li>• State what is meant by point source and extended source.</li><li>• Label the region of umbra and penumbra of a shadow.</li><li>• Predict the effect on size of shadow by:<ul style="list-style-type: none"><li>➤ increasing or decreasing the distance of an object from a point source.</li><li>➤ increasing or decreasing the distance of an object from an extended source.</li></ul></li></ul>   |
| <b>Reflection Of Light</b><br>Types of Mirror<br>Images formed by a plane mirror<br>Concave and convex mirrors | <ul style="list-style-type: none"><li>• Define reflection of light.</li><li>• Define the following terms:<ul style="list-style-type: none"><li>➤ incident ray</li><li>➤ reflected ray</li><li>➤ normal</li><li>➤ angle of incidence</li><li>➤ angle of reflection</li></ul></li><li>• List the types of reflection.</li><li>• State the importance of regular reflection.</li><li>• State the importance of irregular reflection.</li><li>• State and illustrate law of reflection.</li><li>• Measure and draw the angle of incidence and angle of reflection.</li><li>• Define real and virtual image.</li><li>• Illustrate the formation of virtual and real images from a smooth surface.</li><li>• State the types of mirror.</li><li>• Illustrate the formation of image by a plane mirror.</li><li>• State the characteristics of an image formed by a plane mirror.</li><li>• State the uses of plane mirrors.</li><li>• Define concave mirrors.</li><li>• Define convex mirrors.</li><li>• Illustrate the formation of image by a concave mirror.</li><li>• State the characteristics of image formed by a concave mirror.</li><li>• State the uses of concave mirrors.</li><li>• Illustrate the formation of image by convex mirrors.</li><li>• State the characteristics of image formed by convex mirrors.</li><li>• State the uses of convex mirrors.</li></ul> |
| <b>Refraction of light</b><br>Effects of refraction<br>Concave and convex lens                                 | <ul style="list-style-type: none"><li>• Define refraction of light.</li><li>• Define the following terms;<ul style="list-style-type: none"><li>➤ refracted ray</li><li>➤ emergent ray</li><li>➤ angle of incidence</li><li>➤ angle of refraction</li><li>➤ angle of emergence</li></ul></li></ul>   |

|   |   |
|---|---|
|   | <ul style="list-style-type: none"><li>➤ rarer medium</li><li>➤ denser medium</li><li>• Describe the effect of changing medium on the speed of light.</li><li>• Illustrate the refraction of light.</li><li>• Measure angle of incidence and angle of refraction.</li><li>• Illustrate that angle of incidence is always equal to angle of emergence.</li><li>• Explain the following effects of refraction;<ul style="list-style-type: none"><li>➤ Image formed on the retina of eye.</li><li>➤ Apparent depth</li><li>➤ Objects appear bent when partially immersed in water.</li><li>➤ Dispersion of white light.</li></ul></li><li>• Define concave and convex lens.</li><li>• Illustrate the image formed by concave lens.</li><li>• State the uses of concave lens.</li><li>• Illustrate the image formed by convex lens.</li><li>• State the uses of convex lens.</li></ul> |
| <b>Colours</b><br><b>Appearance of object in different lights</b> | <ul style="list-style-type: none"><li>• List the primary colours of light.</li><li>• List the secondary colours of light.</li><li>• Describe how any object can appear white or black.</li><li>• Predict the colour of an object using light filters.</li><li>• Predict the colour of an object under different colours of light.</li></ul>   |

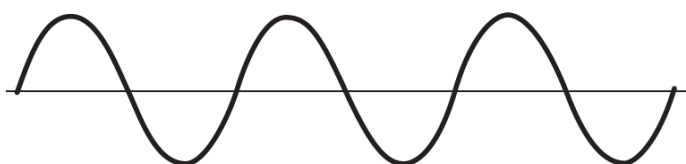
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| <p><b>Keywords:</b><br/>wave, frequency, wavelength, reflection, refraction, convergent beam, divergent beam, parallel beam, incident ray, reflected ray, refracted ray, emergent ray, real image, virtual image, lenses, converging lens, diverging lens, apparent depth, dispersion</p> <p><b>Types of Questions:</b></p> <ul style="list-style-type: none"><li>• Multiple choice questions</li><li>• Structured questions</li><li>• Short answer reasoning</li><li>• Descriptive questions</li><li>• Measurement of angles</li><li>• Column matching</li><li>• Illustration of reflection, refraction and apparent depth</li><li>• Fill in the blanks</li></ul> <p><b>Sample Questions:</b></p> <p>1. The Fig shows a ray of light passing through a glass block.</p> |
|--|



- On Fig. draw the path of the ray of light as it enters and passes through the block, and out of the other side.
- On your diagram, indicate clearly the angle of incidence  $i$  and the angle of refraction  $r$  as the ray passes into the block.

- Fig. shows a graph of a light wave. On Fig. draw labeled arrows to indicate:

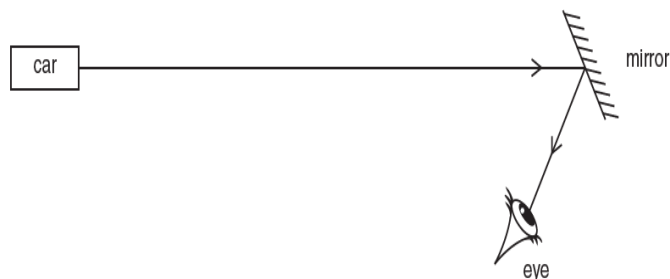
- one wavelength of this light wave.
- the amplitude of this light wave.



The amplitude of a light wave determines the brightness of the light.

- state the property of sound determined by the amplitude of a sound wave.

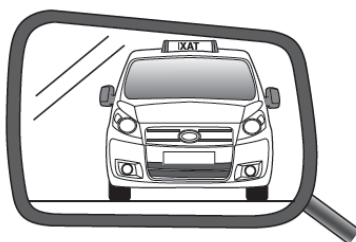
- Fig. shows how a ray of light travels from the taxi to the mirror, then to the motorcyclist so he can see the taxi behind.



The ray strikes the mirror at an angle of  $30^\circ$  to the normal. On the Fig:

- draw the normal to the mirror at the point the ray hits the mirror.
- write in the value of the angle of reflection.

- Fig. shows the view in the mirror seen by the motorcyclist.



- Explain why the word on the taxi behind is seen the wrong way round.

The motorcyclist stops in a long narrow street with a tall building at one end. He sounds his horn and hears an echo from the tall building 2 seconds later. The speed of sound in air is 330 m/s.

- Calculate the distance of the motorcyclist from the building when he sounds his horn. State formula and show your working.

- A boy looks at himself in a mirror and waves his hand. The Fig. shows what he sees in the mirror. Explain your answer.



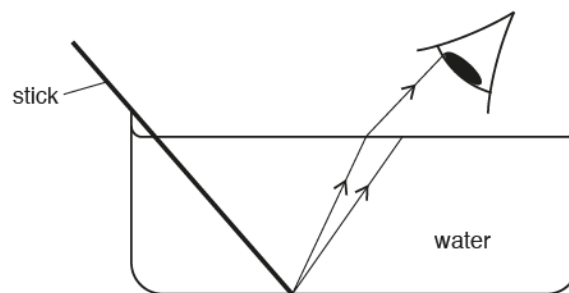
The boy uses headphones to listen to the radio. The radio emits sounds with frequencies between 100 Hz and 10 000 Hz.

- a) Explain why the boy is able to hear all the sounds emitted through the headphones. The boy has normal hearing.

The boy swims in an outdoor swimming pool. He swims one length of the 25 metre long pool in 40 seconds.

- b) Calculate his speed. State the formula you use, show your working and state the units of your answer.

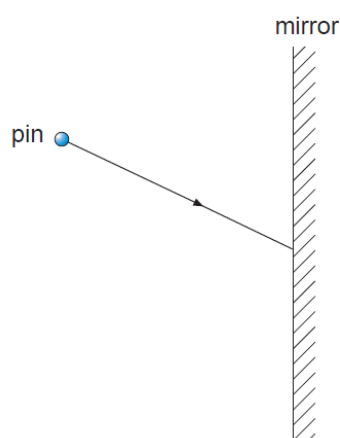
6. Fig. shows the farmer looking at a stick lying in the water trough.



The farmer says that the stick looks bent where it goes into the water.

- a) On Fig. complete the second ray on the ray diagram to reach the eye.  
b) Extend the rays and draw the image of the end of the stick as seen by the farmer.

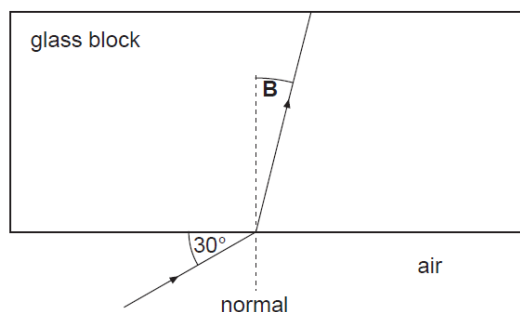
7. Fig. shows a ray of light from a pin. The light is incident on a plane mirror.



On the figure:

- a) draw the reflected ray  
b) mark with an X the position of the image of the pin

8. Fig. shows a ray of light passing from air into a glass block. The ray of light normal to the surface of the glass is shown.



- Calculate the angle of incidence.
- Name angle **B**.
- A wave has a speed of 340 m/s and a wavelength of 2 m. Calculate the frequency of this wave.

#### Work book Activities:

Work book activities 10.1, 10.2, 10.3, 10.4 and 10.5.

#### Activities:

- Students will practice shadow casting.
- Students will observe images formed by concave and convex mirrors.

#### Laboratory Experiments:

- To prove light travels in straight line.(shadow casting).
- To observe the phenomenon of reflection of light using mirror.
- To observe the phenomenon of refraction of light using glass slab.
- To observe the phenomenon of dispersion of white light using glass prism.

#### Surf IT:

- <https://www.youtube.com/watch?v=m4t7gTmBK3g>
- <https://www.youtube.com/watch?v=Ticmypo8z8s>
- <https://www.youtube.com/watch?v=xXjWpVibaY4>
- [https://www.youtube.com/watch?v=eY\\_VoB5VaGw](https://www.youtube.com/watch?v=eY_VoB5VaGw)
- <https://www.youtube.com/watch?v=30FCqf46TK8>
- [https://www.youtube.com/watch?v=I\\_3cQpJQU-s](https://www.youtube.com/watch?v=I_3cQpJQU-s)

#### April

Revision for Final Examination

#### May

Final Examination