

# Teacher's Notes

## Topic: Living and Non-living Things

Worksheet No.	Specific Instructional Objective(s)	Process Skills	Related Topic(s) Covered	Suggested Lesson Lead-in / Follow-up + Remarks
1.	Students are tasked to study given pictures and state the similarities / differences.	<ul style="list-style-type: none"> <li>observing</li> <li>comparing</li> <li>inferring</li> </ul>	<ul style="list-style-type: none"> <li>Plants</li> <li>Animals</li> </ul>	<ul style="list-style-type: none"> <li>Note the similarities / differences which can be seen in the pictures versus those that must be inferred based on past knowledge.</li> </ul>
2.	Students are tasked to classify a list of given items into different groups and subgroups.	<ul style="list-style-type: none"> <li>comparing</li> <li>analysing</li> <li>classifying</li> <li>communicating</li> </ul>	<ul style="list-style-type: none"> <li>Materials</li> <li>Plants</li> <li>Animals</li> </ul>	<ul style="list-style-type: none"> <li>Point out to students that things which are divided into groups can sometimes be further subdivided into smaller groups.</li> </ul>
3.	The first question tasks students to compare two objects while the second question deals with what plants need so as to survive and grow well.	<ul style="list-style-type: none"> <li>comparing</li> <li>observing</li> <li>predicting</li> <li>inferring</li> </ul>	<ul style="list-style-type: none"> <li>Materials</li> <li>Plants</li> </ul>	
4.	This worksheet examines the characteristics of living things and how to classify a given list of objects.	<ul style="list-style-type: none"> <li>classifying</li> <li>communicating</li> <li>inferring</li> </ul>	<ul style="list-style-type: none"> <li>Materials</li> </ul>	
5.	This worksheet examines the interaction of living things in a controlled environment so as to determine their survival chances.	<ul style="list-style-type: none"> <li>predicting</li> <li>inferring</li> <li>analysing</li> </ul>	<ul style="list-style-type: none"> <li>Plants</li> <li>Animals</li> </ul>	
6.	This worksheet examines in detail how each characteristic of living things is displayed in plants and animals.	<ul style="list-style-type: none"> <li>communicating</li> <li>inferring</li> </ul>	<ul style="list-style-type: none"> <li>Plants</li> <li>Animals</li> </ul>	<ul style="list-style-type: none"> <li>This worksheet can serve as a thorough revision on the characteristics of living things as applied to plants and animals</li> </ul>
7.	This worksheet deals with how people respond to environmental changes and external stimuli.	<ul style="list-style-type: none"> <li>observing</li> <li>inferring</li> <li>predicting</li> </ul>		
8.	This worksheet tasks students to derive information from a line graph to answer questions about the growth of a living thing.	<ul style="list-style-type: none"> <li>observing</li> <li>communicating</li> <li>predicting</li> </ul>		
9.	The first two questions are about the characteristics of non-living things. The third question looks at what a living thing needs to survive.	<ul style="list-style-type: none"> <li>observing</li> <li>inferring</li> <li>analysing</li> <li>communicating</li> </ul>		<ul style="list-style-type: none"> <li>Note that inflating an object with air does not indicate growth.</li> </ul>
10.	This worksheet tasks students to correct some wrong ideas about living things.	<ul style="list-style-type: none"> <li>inferring</li> <li>evaluating</li> </ul>	<ul style="list-style-type: none"> <li>Plants</li> <li>Animals</li> </ul>	

**Topic: Plants**

Worksheet No.	Specific Instructional Objective(s)	Process Skills	Related Topic(s) Covered	Suggested Lesson Lead-in / Follow-up + Remarks
11.	This worksheet is about the shapes of trees and how the shape of a tree affects the suitability of planting it at a particular location.	<ul style="list-style-type: none"><li>• comparing</li><li>• inferring</li><li>• evaluating</li></ul>		<ul style="list-style-type: none"><li>• Teachers may revise the shapes and uses of trees with students.</li></ul>
12.	This worksheet involves a comparison between different types of leaves.	<ul style="list-style-type: none"><li>• comparing</li><li>• observing</li><li>• inferring</li><li>• communicating</li></ul>		<ul style="list-style-type: none"><li>• Students may be asked to collect photographs of different types of leaves in the school garden or neighbourhood park and study the similarities / differences of these leaves.</li></ul>
13.	This worksheet is about two carnivorous plants — the Venus flytrap and the pitcher plant.	<ul style="list-style-type: none"><li>• inferring</li><li>• predicting</li><li>• observing</li></ul>		<ul style="list-style-type: none"><li>• Teachers may initiate a classroom discussion on carnivorous plants.</li></ul>
14.	This worksheet involves the classification of land plants and aquatic plants.	<ul style="list-style-type: none"><li>• analysing</li><li>• inferring</li><li>• communicating</li><li>• observing</li></ul>		<ul style="list-style-type: none"><li>• Teachers may introduce students to the common types of aquatic plants, pointing out that aquatic plants may be floating, partially submerged or submerged in water. If possible, teachers should organize a trip to the school pond.</li></ul>
15.	This worksheet looks at a plant with a weak stem and tracks its growth over a period of time.	<ul style="list-style-type: none"><li>• observing</li><li>• inferring</li><li>• communicating</li></ul>		
16.	This worksheet tasks students to analyse the common characteristics of some plants listed in a table.	<ul style="list-style-type: none"><li>• observing</li><li>• communicating</li><li>• inferring</li><li>• comparing</li></ul>		<ul style="list-style-type: none"><li>• Teachers may explain to students how to read, compare and obtain information from a table.</li></ul>
17.	The first question tasks students to compare two different trees. The second question tasks students to draw a labelled diagram of a leaf given its key characteristics.	<ul style="list-style-type: none"><li>• comparing</li><li>• analysing</li><li>• inferring</li><li>• communicating</li></ul>		
18.	This worksheet examines the function of the roots of plants, including underground storage roots and aerial prop roots.	<ul style="list-style-type: none"><li>• observing</li><li>• inferring</li></ul>		<ul style="list-style-type: none"><li>• Teachers may point out to students that certain plants such as the tapioca and sweet potato store food in their roots.</li></ul>
19.	The first question examines how a plant will grow in the direction of sunlight. The second question looks at the conditions necessary for germination and which part of the plant grows first.	<ul style="list-style-type: none"><li>• observing</li><li>• predicting</li><li>• inferring</li></ul>		
10.	The first question tracks the number of flowers on a plant over a certain period. The second question tasks students to classify some plants into flowering and non-flowering plants.	<ul style="list-style-type: none"><li>• observing</li><li>• analysing</li><li>• communicating</li><li>• classifying</li></ul>		<ul style="list-style-type: none"><li>• Note that the pine tree belongs to the group called conifers which do not produce flowers.</li></ul>
21.	The first question tasks students to compare a kiwi fruit and a dragon fruit. The second question tasks students to classify a list of fruit according to the number of seeds they have.	<ul style="list-style-type: none"><li>• comparing</li><li>• inferring</li><li>• classifying</li></ul>		<ul style="list-style-type: none"><li>• Note that bananas and pineapples do not have seeds; they reproduce from suckers.</li></ul>
22.	The first question analyses some key facts about a plant. The second question is about the mimosa plant.	<ul style="list-style-type: none"><li>• observing</li><li>• inferring</li><li>• predicting</li></ul>		

Topic: Animals				
Worksheet No.	Specific Instructional Objective(s)	Process Skills	Related Topic(s) Covered	Suggested Lesson Lead-in / Follow-up + Remarks
23.	By observing the change in the number of leaves and flies in a tank with an animal inside, students have to answer some questions regarding the animal's feeding habits and how it survives.	<ul style="list-style-type: none"> <li>• observing</li> <li>• analysing</li> <li>• predicting</li> <li>• inferring</li> </ul>	• Plants	
24.	Students are tasked to answer some questions based on a table and a flow chart.	<ul style="list-style-type: none"> <li>• observing</li> <li>• analysing</li> <li>• communicating</li> </ul>		• Teachers may explain to students how to read and interpret data from a table and a flow chart.
25.	This worksheet is about fish as well as some other sea mammals that are commonly mistaken to be fish.	<ul style="list-style-type: none"> <li>• observing</li> <li>• communicating</li> <li>• inferring</li> <li>• comparing</li> </ul>		• Students may be reminded that whales / dolphins are considered mammals. They breathe using their lungs and give birth to living young.
26.	This worksheet examines different types of birds.	<ul style="list-style-type: none"> <li>• observing</li> <li>• inferring</li> <li>• communicating</li> </ul>		
27.	This worksheet examines the similarities and differences between plants and animals.	<ul style="list-style-type: none"> <li>• communicating</li> <li>• comparing</li> <li>• classifying</li> </ul>	• Plants	• The graphic organizer in question 1 serves as a revision of the similarities / differences between plants and animals.
28.	This worksheet examines insects and their characteristics.	<ul style="list-style-type: none"> <li>• communicating</li> <li>• comparing</li> <li>• observing</li> </ul>		
29.	This worksheet analyses the characteristics of some house pets.	<ul style="list-style-type: none"> <li>• inferring</li> <li>• predicting</li> </ul>		
30.	This worksheet is about the classification of animals and the characteristics of some groups of animals.	<ul style="list-style-type: none"> <li>• classification</li> <li>• analysing</li> <li>• communicating</li> <li>• evaluating</li> </ul>		
31.	The first part of the worksheet involves the comparison of a prawn and a fish. The second part of the worksheet involves the classification of a list of animals according to where they live.	<ul style="list-style-type: none"> <li>• comparing</li> <li>• observing</li> <li>• classification</li> <li>• communicating</li> </ul>		
32.	The first part of the worksheet examines the necessary conditions for the survival of a grasshopper that is kept inside a bottle. The second part of the worksheet tasks students to study a tree diagram to compare the characteristics of some pets.	<ul style="list-style-type: none"> <li>• inferring</li> <li>• predicting</li> <li>• classifying</li> <li>• analysing</li> <li>• communicating</li> </ul>		

**Topic: Fungi and Bacteria**

Worksheet No.	Specific Instructional Objective(s)	Process Skills	Related Topic(s) Covered	Suggested Lesson Lead-in / Follow-up + Remarks
33.	By interpreting a flow chart, students have to identify some living organisms and compare their characteristics.	<ul style="list-style-type: none"> <li>• analysing</li> <li>• inferring</li> <li>• classifying</li> </ul>		
34.	The first question examines the necessary conditions for the growth of bread mould. The second question is about decomposition of food.	<ul style="list-style-type: none"> <li>• analysing</li> <li>• inferring</li> </ul>		<ul style="list-style-type: none"> <li>• Note that fresh food exposed to air, water (moisture) and warmth becomes bad due to the growth of bacteria which breaks down the food.</li> </ul>
35.	This worksheet compares the characteristics of a fungi (mushroom) and a fern.	<ul style="list-style-type: none"> <li>• communicating</li> <li>• comparing</li> <li>• inferring</li> </ul>		
36.	The first question examines the functions of yeast. The second question compares an amoeba and a paramecium.	<ul style="list-style-type: none"> <li>• analysing</li> <li>• inferring</li> <li>• comparing</li> </ul>		
37.	This worksheet examines microorganisms that are present in dirty water and shows how boiling water can kill the microorganisms present in it.	<ul style="list-style-type: none"> <li>• observing</li> <li>• analysing</li> <li>• inferring</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may use this worksheet as a platform for a discussion on hygiene and why cooking / boiling is important (because heat kills bacteria).</li> </ul>
38.	This worksheet examines how fresh milk exposed to the external environment at room temperature can go bad, as opposed to a sealed packet of UHT milk.	<ul style="list-style-type: none"> <li>• analysing</li> <li>• inferring</li> <li>• predicting</li> <li>• formulating hypothesis</li> </ul>		
39.	The first question examines mould growth on damp leather. The second question examines the need for fungi to grow on another organism, in this case, a rotting log.	<ul style="list-style-type: none"> <li>• analysing</li> <li>• communicating</li> <li>• inferring</li> <li>• predicting</li> <li>• evaluating</li> </ul>		<ul style="list-style-type: none"> <li>• Note that leather is prone to mould growth because it is a natural material. Even if leather is kept in a 'dry' place, moisture is still present in the air.</li> </ul>
40.	The first question examines how the use of a drying agent removes moisture in the air and inhibits the growth of microorganisms. The second question highlights how a slice of cake in a sealed jar will not become mouldy due to a lack of air.	<ul style="list-style-type: none"> <li>• inferring</li> <li>• predicting</li> </ul>		

**Topic: Materials**

Worksheet No.	Specific Instructional Objective(s)	Process Skills	Related Topic(s) Covered	Suggested Lesson Lead-in / Follow-up + Remarks
41.	This worksheet looks at classifying materials. The second question tasks students to give the advantages / disadvantages of different types of materials used to make a chair.	<ul style="list-style-type: none"><li>classifying</li><li>evaluating</li><li>decision-making</li></ul>		<ul style="list-style-type: none"><li>Teachers should point out to students that some objects can be made using different materials. Each material used can have their own advantages / disadvantages.</li></ul>
42.	This worksheet examines whether objects made of different materials will float or sink in water and the criteria for floatation.	<ul style="list-style-type: none"><li>observing</li><li>inferring</li><li>using apparatus / equipment</li></ul>		<ul style="list-style-type: none"><li>Emphasize to students that an object will float if it is made of a material that is lighter than the liquid it is placed in. (The concept of density need not be introduced.) Also mention that non-waterproof objects may float at first but sink once water is absorbed.</li></ul>
43.	This worksheet deals with examining how brittle some materials are.	<ul style="list-style-type: none"><li>predicting</li><li>inferring</li><li>classifying</li><li>comparing</li></ul>		<ul style="list-style-type: none"><li>With reference to part (f), teachers may explain that heat from the drink will travel to the mug, making it hot. This can be linked to the topic on 'Heat'.</li></ul>
44.	This worksheet examines the absorbency of different materials.	<ul style="list-style-type: none"><li>observing</li><li>inferring</li><li>evaluating</li><li>analysing</li></ul>		<ul style="list-style-type: none"><li>Note that a material which is unable to absorb any liquid is known as waterproof.</li></ul>
45.	This worksheet examines the characteristics of different materials used to make clothes.	<ul style="list-style-type: none"><li>communicating</li><li>analysing</li><li>inferring</li></ul>		
46.	The first question tasks students to list examples of objects made of different materials. The second question looks at the raw materials used to make certain materials.	<ul style="list-style-type: none"><li>classifying</li></ul>		<ul style="list-style-type: none"><li>Teachers may make use of question 2 to initiate a discussion about raw materials and their processed counterparts.</li></ul>
47.	The first question looks at the different parts of animals which can be used as materials for different functions. The second question looks at objects which are made of only one type of material, or two or more different materials.	<ul style="list-style-type: none"><li>communicating</li><li>inferring</li></ul>		<ul style="list-style-type: none"><li>Teachers may initiate a discussion on animals as a source of natural materials.</li></ul>
48.	The first question looks at how materials can be classified into different groups. The second question examines the different materials used to make a television set.	<ul style="list-style-type: none"><li>analysing</li><li>inferring</li><li>comparing</li></ul>		<ul style="list-style-type: none"><li>Teachers may initiate a discussion on natural and man-made materials.</li></ul>
49.	This worksheet is about an experiment to test the strength of a material.	<ul style="list-style-type: none"><li>using apparatus / equipment</li><li>analysing</li><li>inferring</li></ul>		<ul style="list-style-type: none"><li>Teachers may emphasize to students the difference between the strength and flexibility of a material.</li></ul>
50.	The first question is about transparent, translucent and opaque materials, although these terms are not used. The second question is about how the overuse of plastic grocery bags can affect the environment.	<ul style="list-style-type: none"><li>analysing</li><li>comparing</li><li>communicating</li><li>predicting</li><li>inferring</li></ul>		<ul style="list-style-type: none"><li>Teachers may initiate a discussion about saving the environment and how cutting down on the use of plastic bags can help to achieve this.</li></ul>

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**Topic: Life Cycles**

Worksheet No.	Specific Instructional Objective(s)	Process Skills	Related Topic(s) Covered	Suggested Lesson Lead-in / Follow-up + Remarks
51.	The first part of the worksheet examines the life cycle of a frog. The second part of the worksheet tasks students to classify a group of given animals into two separate ways: how they reproduce and the number of stages in their life cycles.	<ul style="list-style-type: none"> <li>comparing</li> <li>observing</li> <li>inferring</li> <li>classifying</li> </ul>	<ul style="list-style-type: none"> <li>Classification of animals</li> </ul>	<ul style="list-style-type: none"> <li>Teachers may discuss with students in detail the different stages in the development of a frog. Although frogs / toads have a 3-stage life cycle, the tadpole stage may be subdivided into the different stages of development as it evolves into a frog.</li> <li>Teachers may highlight to students how the same group of animals can be classified in different ways and into different numbers of subgroups based on different classification criteria.</li> </ul>
52.	This worksheet examines the life cycle of a mosquito and looks at how this pest can be eradicated.	<ul style="list-style-type: none"> <li>observing</li> <li>predicting</li> <li>inferring</li> <li>comparing</li> </ul>	<ul style="list-style-type: none"> <li>Health education</li> </ul>	<ul style="list-style-type: none"> <li>Apart from discussing the life cycle of a mosquito, teachers may talk about the diseases that mosquitoes can spread, especially dengue fever. Emphasize to students that since mosquitoes breed in stagnant water, it is advisable not to leave stagnant water around.</li> </ul>
53.	This worksheet aims to raise the awareness that only flowering plants can reproduce from seeds.	<ul style="list-style-type: none"> <li>observing</li> <li>communicating</li> <li>inferring</li> </ul>	<ul style="list-style-type: none"> <li>Classification of plants</li> <li>Plant systems</li> </ul>	<ul style="list-style-type: none"> <li>Teachers may initiate a discussion about alternative methods of growing plants (e.g. stem-cutting, leaf-cutting etc) although the plants may be grown by seeds.</li> <li>Teachers may also talk about the reproduction methods of non-flowering plants, e.g. ferns.</li> </ul>
54.	This worksheet examines the life cycle of a mealworm beetle and compares its larval stage to that of a butterfly's.	<ul style="list-style-type: none"> <li>communicating</li> <li>classifying</li> <li>comparing</li> <li>analysing</li> </ul>		<ul style="list-style-type: none"> <li>Teachers may initiate a discussion of the life cycle of a mealworm beetle and highlight its similarities and differences with that of a butterfly and a mosquito.</li> </ul>
55.	This worksheet examines life cycles with 3 and 4 stages and the animals which undergo such life cycles.	<ul style="list-style-type: none"> <li>analysing</li> <li>inferring</li> <li>communicating</li> </ul>		<ul style="list-style-type: none"> <li>Teachers should point out to students that animals which undergo a 2-stage life cycle give birth to their young alive.</li> </ul> <div style="text-align: center;"> <pre> graph TD     young --&gt; adult     adult --&gt; young             </pre> </div> <p>However, such animals also go through the stage when they were eggs, but this happened while they were still developing inside their mother's uterus before they were ready to be born alive.</p>
56.	This worksheet examines the life cycle of a cockroach and the similarities and differences between a nymph and an adult cockroach.	<ul style="list-style-type: none"> <li>communicating</li> <li>predicting</li> <li>comparing</li> <li>inferring</li> </ul>		<ul style="list-style-type: none"> <li>Teachers may initiate a discussion about the class of creatures which undergo the 'egg → nymph → adult' life cycle.</li> </ul>
57.	This worksheet tasks students to compare a caterpillar and a wriggler.	<ul style="list-style-type: none"> <li>communicating</li> <li>observing</li> <li>comparing</li> <li>inferring</li> </ul>		<ul style="list-style-type: none"> <li>Teachers should point out to students that some creatures may be harmful to humans at one stage during their life cycle but useful to humans at another stage.</li> </ul>
58.	This worksheet examines the life cycle of a string bean plant and analyses each stage of its development.	<ul style="list-style-type: none"> <li>observing</li> <li>analysing</li> <li>inferring</li> </ul>	<ul style="list-style-type: none"> <li>Plant systems</li> </ul>	<ul style="list-style-type: none"> <li>In discussing the typical life cycle of a flowering plant, teachers may revise with students the process of germination and the functions of various plant parts.</li> </ul>
59.	This worksheet tasks students to construct / identify different animal life cycles given their separate parts.	<ul style="list-style-type: none"> <li>observing</li> <li>communicating</li> <li>analysing</li> </ul>		<ul style="list-style-type: none"> <li>Teachers should bring to students' attention that the life cycles of the animals covered in this worksheet are the key animals covered in the syllabus for this topic. It is important to be familiar with them.</li> </ul>
60.	This worksheet examines the life cycle of a kangaroo and tasks students to pick out the relevant information from a given passage about a subject.	<ul style="list-style-type: none"> <li>communicating</li> <li>analysing</li> <li>inferring</li> </ul>		<ul style="list-style-type: none"> <li>Teachers may introduce another marsupial — the koala.</li> <li>As an additional activity, teachers may challenge students to look for information about the life cycle of an animal beyond their syllabus.</li> </ul>
61.	This first part of the worksheet examines the stages of growth of a bean plant and deals with plant nutrition before the first real leaves appear. The second part of the worksheet looks at the effects of overcrowding on plant growth.	<ul style="list-style-type: none"> <li>analysing</li> <li>comparing</li> <li>inferring</li> </ul>	<ul style="list-style-type: none"> <li>Plants</li> <li>Life cycle of a plant</li> </ul>	<ul style="list-style-type: none"> <li>Note that this worksheet overlaps with the topics on plants and life cycle of a plant.</li> </ul>

Topic: Matter and Its Three States				
Worksheet No.	Specific Instructional Objective(s)	Process Skills	Related Topic(s) Covered	Suggested Lesson Lead-in / Follow-up + Remarks
62.	In this worksheet, students have to read a flow chart to identify the states of matter. Students are also tasked to explain why some solids can be 'compressed' when a force is applied.	<ul style="list-style-type: none"> <li>analysing</li> <li>classifying</li> <li>communicating</li> <li>inferring</li> </ul>		<ul style="list-style-type: none"> <li>Teachers may point out to students that the reason some solids can be 'compressed' is due to the air spaces present inside them. Thus, it is actually the air which is being compressed. They can also point out to students that a force is needed to compress the solids in such cases.</li> </ul>
63.	This worksheet introduces students to classification using a flow chart.	<ul style="list-style-type: none"> <li>analysing</li> <li>classifying</li> <li>communicating</li> </ul>	<ul style="list-style-type: none"> <li>Classifying things</li> </ul>	<ul style="list-style-type: none"> <li>Teachers may discuss the importance of classifying a group of items and the possible ways of doing so (by using Venn diagrams, tables etc).</li> </ul>
64.	The first part of the worksheet introduces students to a class of solids which can absorb water. The second part of the worksheet tasks students to calculate the volume of some solids immersed in a measuring cylinder of water.	<ul style="list-style-type: none"> <li>analysing</li> <li>evaluating</li> <li>predicting</li> <li>using apparatus / equipment</li> </ul>	<ul style="list-style-type: none"> <li>Simple mathematics</li> </ul>	<ul style="list-style-type: none"> <li>Teachers may point out to students that apart from using a solid which absorbs water, having small, irregularly-shaped solids in a measuring cylinder will also bring about the same result of having the water level lower than expected. In the second case, this is because water enters to fill the small empty spaces between the objects (e.g. sand, pebbles or marbles).</li> </ul>
65.	This first part of the worksheet tasks students to measure out a precise volume of liquid given two beakers with a fixed volume. The second part of the worksheet compares two objects with the same volume but different mass. The third question deals with the masses of three objects, using beam balances.	<ul style="list-style-type: none"> <li>observing</li> <li>evaluating</li> <li>comparing</li> <li>using apparatus / equipment</li> </ul>	<ul style="list-style-type: none"> <li>Simple mathematics</li> </ul>	<ul style="list-style-type: none"> <li>Teachers may do a laboratory demonstration for question 1 or let students conduct the experiment by themselves.</li> <li>Teachers may remind students that two objects with the same volume may not have the same mass. Mass and volume are independent characteristics.</li> <li>Teachers may explain to students that a flame is a mixture of gases (i.e. matter) but the light and heat given out by a flame are forms of energy. This can be a lead-in to introduce the future topic of energy.</li> </ul>
66.	This worksheet deals with finding the volume of a regular-shaped and irregularly-shaped object as well as how an object which absorbs water may make the result of finding the volume inaccurate.	<ul style="list-style-type: none"> <li>observing</li> <li>communicating</li> <li>predicting</li> <li>evaluating</li> </ul>	<ul style="list-style-type: none"> <li>Simple mathematics</li> </ul>	<ul style="list-style-type: none"> <li>Teachers may plan a laboratory lesson where students mould plasticine and find the volume of their figurines. This activity helps students to learn how to find the volume of an irregularly-shaped object, as well as how to read the volume of a liquid in a measuring cylinder.</li> </ul>
67.	The two experiments in this worksheet demonstrate that air occupies space and has mass.	<ul style="list-style-type: none"> <li>communicating</li> <li>predicting</li> <li>inferring</li> <li>using apparatus / equipment</li> </ul>		<ul style="list-style-type: none"> <li>Teachers should emphasize to students that air is a form of matter and as such, it has weight and occupies space.</li> </ul>
68.	The first part of this worksheet examines the similarities and differences between the three states of matter and, matter and non-matter in different ways. The second part of this worksheet deals with the nature of fire. The third question tasks students to examine the similarities and differences between a solid and a liquid.	<ul style="list-style-type: none"> <li>analysing</li> <li>classifying</li> <li>communicating</li> <li>inferring</li> </ul>		<ul style="list-style-type: none"> <li>Teachers may emphasize the similarities and differences between the three states of matter as a revision exercise.</li> </ul>
69.	This worksheet examines the process of mixing two gases.	<ul style="list-style-type: none"> <li>using apparatus / equipment</li> <li>inferring</li> <li>predicting</li> </ul>		<ul style="list-style-type: none"> <li>Teachers should explain to students that gas particles are able to move quickly and freely throughout their container, so two gases placed together will mix evenly.</li> <li>Teachers may also elaborate on the uses of oxygen (for breathing / burning) and when it is produced (during photosynthesis).</li> </ul>
70.	The first part of the worksheet deals with the speed of gases. The second part of the worksheet deals with the relative mass of a gas as compared to air and how this affects floatation.	<ul style="list-style-type: none"> <li>using apparatus / equipment</li> <li>observing</li> <li>analysing</li> <li>inferring</li> </ul>		<ul style="list-style-type: none"> <li>Teachers may mention to students that the heavier a gas, the slower its speed. They can also point out to students that the balloons that they blow themselves cannot float like those bought from a store because the latter are usually filled with helium, a gas that is lighter than air.</li> </ul>
71.	The first part of the worksheet is about why having two holes in a tin can will speed up the pouring process. The second part of the worksheet involves calculating the space occupied by air in a carton.	<ul style="list-style-type: none"> <li>creative problem-solving</li> <li>analysing</li> <li>observing</li> <li>inferring</li> </ul>	<ul style="list-style-type: none"> <li>Simple mathematics</li> </ul>	<ul style="list-style-type: none"> <li>Teachers should point out to students that the number of milk tins which can fit into the carton <u>cannot</u> be calculated from the formula <math>\frac{\text{volume of carton}}{\text{volume of 1 milk tin}}</math>.</li> </ul>

**Topic: Our Body Systems**

Worksheet No.	Specific Instructional Objective(s)	Process Skills	Related Topic(s) Covered	Suggested Lesson Lead-in / Follow-up + Remarks
72.	This worksheet presents a general overview of 'True / False' questions about various body systems. Students have to correct the statements which are false.	<ul style="list-style-type: none"> <li>• analysing</li> </ul>		<ul style="list-style-type: none"> <li>• Note that part (h) mentions the excretory system. Apart from bowel movements and the urinary system, note that there are other excretory organs which may not be so obvious at first glance, e.g. the skin. It can be considered an excretory organ that secretes waste substances during perspiration.</li> </ul>
73.	This worksheet summarizes the various parts of the different body systems and emphasizes the importance of each system by asking students to think about the consequences about missing certain body parts.	<ul style="list-style-type: none"> <li>• analysing</li> <li>• classifying</li> <li>• communicating</li> <li>• inferring</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may make use of this worksheet to revise the main body systems, their parts and functions.</li> </ul>
74.	This worksheet examines the process of digestion starting in the mouth where starch is partially digested into sugar. It also touches on how long the entire process of digestion usually takes.	<ul style="list-style-type: none"> <li>• predicting</li> <li>• inferring</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may allow students to conduct the experiment stated in the worksheet to realize first-hand that starch is converted into sugar in the mouth.</li> </ul>
75.	This worksheet consists of several questions related to the process of digestion, as well as a comparison between the small and large intestine.	<ul style="list-style-type: none"> <li>• inferring</li> <li>• comparing</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may make use of this worksheet to revise the roles of the small and large intestine in the digestive system.</li> </ul>
76.	This worksheet examines the digestive system of an imaginary alien and tasks students to recognize the parallels with the human digestive system.	<ul style="list-style-type: none"> <li>• inferring</li> <li>• comparing</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may point out to students that apart from the strange sounding names, the alien's digestive system is identical to that of a human's.</li> </ul>
77.	This worksheet examines how different types of food are digested in different parts of the digestive system.	<ul style="list-style-type: none"> <li>• analysing</li> <li>• inferring</li> <li>• communicating</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may discuss the benefits of consuming vegetables, emphasizing on their high fibre content.</li> </ul>
78.	This worksheet deals with the muscular and skeletal systems and how they work together to enable movement of the body.	<ul style="list-style-type: none"> <li>• observing</li> <li>• communicating</li> <li>• inferring</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may make use of this worksheet to explain how different body systems may work together to perform a function.</li> </ul>
79.	This worksheet deals with what happens to food as it travels through the digestive system.	<ul style="list-style-type: none"> <li>• communicating</li> <li>• inferring</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may mention to students that fibre is not digestible but still plays an important role in a balanced diet.</li> </ul>
80.	The first part of this worksheet examines how some of our body systems can work together. The second part of the worksheet tasks students to think about the consequences about missing certain body systems.	<ul style="list-style-type: none"> <li>• communicating</li> <li>• inferring</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may make use of this worksheet to initiate a discussion on how each body system does not stand alone but work together with other systems to ensure the smooth functioning of the entire organism.</li> </ul>
81.	The first part of this worksheet presents an overview of all the body systems covered in the syllabus. The second part of the worksheet is an experiment on digestion.	<ul style="list-style-type: none"> <li>• communicating</li> <li>• inferring</li> <li>• predicting</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may make use of this worksheet to revise the key points of each body system.</li> </ul>



Topic: Plant Systems				
Worksheet No.	Specific Instructional Objective(s)	Process Skills	Related Topic(s) Covered	Suggested Lesson Lead-in / Follow-up + Remarks
82.	This worksheet deals with the function of the fruit and the process of germination.	<ul style="list-style-type: none"> <li>• inferring</li> <li>• predicting</li> </ul>	<ul style="list-style-type: none"> <li>• Classification of plants</li> </ul>	<ul style="list-style-type: none"> <li>• Teachers may discuss about fruit and how they can be classified, e.g. edible / inedible, one seed / many seeds, smooth skin / rough skin etc. so as to introduce students to the diversity of fruit.</li> </ul>
83.	This worksheet deals with the function of the leaf of a plant.	<ul style="list-style-type: none"> <li>• communicating</li> <li>• analysing</li> <li>• inferring</li> </ul>		<ul style="list-style-type: none"> <li>• Students may be asked to collect several leaf samples and examine them to identify their parts.</li> </ul>
84.	This worksheet examines the flowers and stems of different plants.	<ul style="list-style-type: none"> <li>• observing</li> <li>• analysing</li> <li>• inferring</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may point out to students that apart from the usual functions of roots and stems, some of them may store food in these parts.</li> </ul>
85.	The first part of the worksheet deals with the underground storage roots of some plants. The second part of the worksheet allows students to make inferences about the movement of water through a plant.	<ul style="list-style-type: none"> <li>• observing</li> <li>• using apparatus / equipment</li> <li>• inferring</li> <li>• predicting</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may do a demonstration of the experiment in question 2.</li> </ul>
86.	This worksheet tests students on their ability to extract information from a table.	<ul style="list-style-type: none"> <li>• analysing</li> <li>• comparing</li> <li>• communicating</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may point out to students that all flowering plants must be green plants, i.e. they must have leaves which contain chlorophyll to make food (even if chlorophyll is hidden so leaves do not appear green). However, not all green plants are flowering plants. Ferns are green non-flowering plants which reproduce from spores.</li> </ul>
87.	This worksheet examines the other functions of some stems, namely underground stems and creepers.	<ul style="list-style-type: none"> <li>• observing</li> <li>• inferring</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may discuss with students the characteristics of the stems of creepers and how underground stems store food.</li> </ul>
88.	The first part of this worksheet compares a balsam plant and a fern. The second part of this worksheet examines the functions of each plant part of a flowering plant.	<ul style="list-style-type: none"> <li>• comparing</li> <li>• communicating</li> <li>• observing</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may emphasize to students that fruit contain seeds for reproduction.</li> </ul>
89.	This worksheet examines the stomata and its functions.	<ul style="list-style-type: none"> <li>• observing</li> <li>• using apparatus / equipment</li> <li>• inferring</li> <li>• analysing</li> <li>• predicting</li> </ul>	<ul style="list-style-type: none"> <li>• Photosynthesis and respiration (Upper Block 5/6)</li> </ul>	<ul style="list-style-type: none"> <li>• Teachers may elaborate on the stomata and the gases that enter and exit from them during gaseous exchange.</li> </ul>
90.	The first part of the worksheet compares creepers, shrubs and trees. The second part of the worksheet examines the functions of leaves.	<ul style="list-style-type: none"> <li>• analysing</li> <li>• communicating</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may make use of this worksheet to revise plants with different types of stems and the function of leaves.</li> </ul>

**Topic: Magnets**

Worksheet No.	Specific Instructional Objective(s)	Process Skills	Related Topic(s) Covered	Suggested Lesson Lead-in / Follow-up + Remarks
91.	The first question in this worksheet deals with attraction and repulsion between ring magnets that have been stacked up on a pole. The second question is an application of magnetic attraction used in a 'magic trick'.	<ul style="list-style-type: none"> <li>observing</li> <li>analysing</li> <li>formulating hypotheses</li> </ul>		<ul style="list-style-type: none"> <li>Teachers may allow students a hands-on session with ring magnets to explore the first question in a practical sense.</li> <li>Note that magnetic attraction may occur when the magnet and magnetic material are brought close to each other without touching.</li> </ul>
92.	This worksheet examines an electromagnet as used in a scrap yard and what materials the electromagnet will be attracted to.	<ul style="list-style-type: none"> <li>observing</li> <li>predicting</li> <li>classifying</li> <li>communicating</li> </ul>		
93.	The first question is about magnetic repulsion. The second question tasks students to give the polarities of some magnets that have been arranged in a certain way. The third question is about magnetizing an iron nail using the single-stroke method.	<ul style="list-style-type: none"> <li>observing</li> <li>inferring</li> <li>analysing</li> </ul>		<ul style="list-style-type: none"> <li>Teachers may allow students a hands-on session with magnetizing iron nails using the single-stroke and double-stroke methods. Challenge students to find out the polarity of magnets by putting two induced iron-nail magnets together or by using a plotting compass.</li> </ul>
94.	The first question examines the interaction between unknown bars to determine if it is a magnet or made of a magnetic or non-magnetic material. The second question deals with what happens to the poles of a magnet when it is cut into two.	<ul style="list-style-type: none"> <li>observing</li> <li>analysing</li> <li>inferring</li> </ul>		
95.	This worksheet is about finding the polarities of a magnet in different ways.	<ul style="list-style-type: none"> <li>observing</li> <li>inferring</li> <li>analysing</li> </ul>		<ul style="list-style-type: none"> <li>Note that the needle of the plotting compass will point towards the South pole of the bar magnet because unlike poles attract. Conversely, the needle will point away from the North pole of the bar magnet because like poles repel. (Part (e) is more challenging and is recommended as a teacher-assisted activity.)</li> </ul>
96.	The first question examines a magnet used in a conveyor belt sorting system. The second question involves identifying if some hanging spheres are magnets, or made of a magnetic or non-magnetic materials based on their interactions with one another.	<ul style="list-style-type: none"> <li>observing</li> <li>analysing</li> <li>formulating hypotheses</li> </ul>		
97.	This worksheet compares the characteristics of an electro-magnet made from iron and steel.	<ul style="list-style-type: none"> <li>observing</li> <li>analysing</li> <li>formulating hypotheses</li> </ul>		<ul style="list-style-type: none"> <li>Note that iron would make a stronger electromagnet, but steel would make a longer-lasting electromagnet.</li> </ul>
98.	This worksheet examines the magnetic field patterns between interacting bar magnets.	<ul style="list-style-type: none"> <li>observing</li> <li>analysing</li> </ul>		<ul style="list-style-type: none"> <li>Although magnetic field patterns are not included in the syllabus, this worksheet has been intended as an enrichment activity that would aid students in understanding how magnets work.</li> </ul>
99.	The first question is an application of magnetic attraction to the switching action of a fire alarm. The second question examines the role and positioning of keepers for storing magnets.	<ul style="list-style-type: none"> <li>observing</li> <li>analysing</li> <li>predicting</li> </ul>		
100.	This worksheet involves examining the interactions between different objects to determine if they are magnets, or made of magnetic or non-magnetic materials.	<ul style="list-style-type: none"> <li>observing</li> <li>analysing</li> <li>inferring</li> </ul>		



**Topic: Light and Shadows**

Worksheet No.	Specific Instructional Objective(s)	Process Skills	Related Topic(s) Covered	Suggested Lesson Lead-in / Follow-up + Remarks
101.	This worksheet deals with the shadow of an object cast on a screen and how the shape of the shadow varies according to the orientation of the object.	<ul style="list-style-type: none"> <li>• using apparatus / equipment</li> <li>• inferring</li> <li>• predicting</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers should point out to students that in order for a sharp, clear shadow to be formed, a point source of light should be used. This can be achieved by placing a cardboard with a slit in front of the light source.</li> </ul>
102.	The first part of the worksheet reinforces the concept that light travels in straight lines. The second part of the worksheet is a question about refraction.	<ul style="list-style-type: none"> <li>• using apparatus / equipment</li> <li>• communicating</li> <li>• inferring</li> <li>• formulating hypothesis</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may demonstrate the process of refraction using a straw and a glass of water. Explain to students that another consequence of refraction is that the floor of the swimming pool appears closer than it actually is, i.e. the pool appears shallower than it is. (Although refraction is not in the syllabic, it is an interesting phenomenon for students to be aware of.)</li> </ul>
103.	This worksheet examines the differences between transparent, translucent and opaque objects, as well as light sources.	<ul style="list-style-type: none"> <li>• communicating</li> <li>• classifying</li> <li>• analysing</li> </ul>		<ul style="list-style-type: none"> <li>• Students may be asked to look around them to identify the materials that are transparent, translucent and opaque, and light sources in the classroom / school.</li> </ul>
104.	This worksheet examines the behaviour of light rays incident on a pin-hole camera screen, as well as on smooth and not-so-smooth surfaces.	<ul style="list-style-type: none"> <li>• observing</li> <li>• predicting</li> <li>• inferring</li> <li>• evaluating</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may get students to have fun making their own pin-hole camera and viewing images through it.</li> <li>• Students may also be asked to research on how a film camera works.</li> </ul>
105.	This worksheet examines how the length of a shadow changes through the day as the position of the sun changes across the sky.	<ul style="list-style-type: none"> <li>• communicating</li> <li>• analysing</li> <li>• comparing</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers should explain to students that the difference in the length of the shadow is due to the difference in the position of the sun as it appears to move across the sky. In reality, the sun remains at a fixed position. It is the Earth that rotates about its own axis.</li> </ul>
106.	This worksheet deals with images of words as seen in a mirror.	<ul style="list-style-type: none"> <li>• observing</li> <li>• analysing</li> <li>• predicting</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers should point out to students the characteristics of images formed in a plane mirror. The image is:                             <ul style="list-style-type: none"> <li>- the same size as the object</li> <li>- upright</li> <li>- laterally inverted</li> <li>- the same distance behind the mirror as the object is in front of the mirror</li> </ul> </li> </ul>
107.	This worksheet shows how a person can see someone behind him by viewing the latter's image in the mirror.	<ul style="list-style-type: none"> <li>• observing</li> <li>• analysing</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may initiate a discussion of light as a source of energy and touch on the importance of conserving energy.</li> </ul>
108.	The first part of the worksheet is about the behaviour of a ray of light incident on a translucent material. The second part of the worksheet is about the periscope.	<ul style="list-style-type: none"> <li>• using apparatus / equipment</li> <li>• inferring</li> <li>• communicating</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may initiate a discussion about a periscope and other optical instruments such as an OHP projector, which rely on mirrors.</li> </ul>
109.	This worksheet consists of a series of short questions about light and reflection.	<ul style="list-style-type: none"> <li>• predicting</li> <li>• inferring</li> </ul>	• Plant systems	<ul style="list-style-type: none"> <li>• Teachers may revise the concept of photosynthesis in green plants and emphasize that light energy is necessary for this process to occur.</li> </ul>
110.	This worksheet tests students' ability to draw ray diagrams for shadow formation.	<ul style="list-style-type: none"> <li>• using apparatus / equipment</li> <li>• communicating</li> <li>• predicting</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may link this worksheet to a laboratory lesson on the formation of shadows.</li> </ul>

Topic: Heat and Temperature				
Worksheet No.	Specific Instructional Objective(s)	Process Skills	Related Topic(s) Covered	Suggested Lesson Lead-in / Follow-up + Remarks
111.	This worksheet deals with the expansion and contraction of a liquid. This concept is linked to the calibration of a thermometer.	<ul style="list-style-type: none"> <li>• inferring</li> <li>• predicting</li> <li>• communicating</li> <li>• creative problem-solving</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers should point out to students that any device whose property (such as volume) changes uniformly with temperature can be used as a thermometer after calibrating a suitable temperature scale.</li> </ul>
112.	This worksheet involves determining the temperature of a mixture of equal volumes of two substances, as well as examining the difference between heat and temperature.	<ul style="list-style-type: none"> <li>• observing</li> <li>• using apparatus / equipment</li> <li>• inferring</li> </ul>	• Materials	<ul style="list-style-type: none"> <li>• Teachers should use parts (e) and (f) to emphasize the distinction between heat and temperature.</li> </ul>
113.	This worksheet illustrates to students the fact that our skin is not an accurate judge of temperature, as well as how the number of people at a place can affect the amount of heat present.	<ul style="list-style-type: none"> <li>• creative problem-solving</li> <li>• formulating hypothesis</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may ask students to conduct the experiment of dipping one hand in hot water and the other hand in cold water. Finally, get the students to place both hands in tap water to illustrate the idea behind the question.</li> <li>• Also, point out to students that people give out heat when they exhale. (Ask students to place their hands in front of their mouths and breathe out.)</li> </ul>
114.	This worksheet deals with the expansion and contraction of a liquid and its container, as well as the fact that heat travels in all directions throughout the liquid that is being heated.	<ul style="list-style-type: none"> <li>• using apparatus / equipment</li> <li>• inferring</li> <li>• predicting</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers should mention that when a liquid is heated, heat circulates throughout the liquid until the whole liquid acquires a uniform temperature. (The term 'convection' need not be introduced.)</li> </ul>
115.	This worksheet deals with heat transfer through radiation and convection, although these terms are not explicitly mentioned.	<ul style="list-style-type: none"> <li>• inferring</li> <li>• predicting</li> <li>• evaluating</li> </ul>	<ul style="list-style-type: none"> <li>• Materials</li> <li>• Energy</li> </ul>	<ul style="list-style-type: none"> <li>• Teachers may point out to students that heat can be transferred even when two objects are not touching each other (e.g. from the campfire to the scouts / from the Sun to the Earth). In the latter case, heat travels through a vacuum.</li> </ul>
116.	This worksheet illustrates to students how a sudden expansion or contraction can cause laboratory apparatus to break.	<ul style="list-style-type: none"> <li>• using apparatus / equipment</li> <li>• inferring</li> <li>• predicting</li> <li>• formulating hypothesis</li> </ul>		<ul style="list-style-type: none"> <li>• Teachers may take the opportunity to introduce the topic on safety precautions to take when using laboratory equipment, especially when related to heating.</li> </ul>
117.	This worksheet examines how different materials conduct heat to different extents.	<ul style="list-style-type: none"> <li>• analysing</li> <li>• using apparatus / equipment</li> <li>• inferring</li> <li>• predicting</li> <li>• formulating hypotheses</li> </ul>	• Materials	<ul style="list-style-type: none"> <li>• Teachers may discuss about which materials are good conductors of heat and which are not. Point out to the class that good conductors of heat are also good conductors of electricity.</li> </ul>
118.	This worksheet compares a clinical thermometer and a liquid-in-glass thermometer. It also compares the temperature of a man to that of a snake.	<ul style="list-style-type: none"> <li>• comparing</li> <li>• inferring</li> <li>• communicating</li> </ul>	• Classification of animals	<ul style="list-style-type: none"> <li>• Teachers may introduce students to various types of thermometers available on the market.</li> </ul>
119.	This worksheet examines how two different coloured containers absorb different amounts of heat. Students are also tested on how to plot a graph from a data table.	<ul style="list-style-type: none"> <li>• communicating</li> <li>• data analysis</li> <li>• formulating hypotheses</li> </ul>	• Mathematics – Graphs	<ul style="list-style-type: none"> <li>• Teachers may spend time introducing students to the techniques of plotting accurate graphs and how to interpret graphs meaningfully.</li> </ul>
120.	The first part of the worksheet examines the effect of expansion and mounting gas pressure. The second part examines the process of sublimation.	<ul style="list-style-type: none"> <li>• using apparatus / equipment</li> <li>• inferring</li> <li>• predicting</li> </ul>	• Matter and changes of state	<ul style="list-style-type: none"> <li>• Teachers should explain to students that there is a limit to which a gas can be compressed. A build-up of gases in a sealed container creates pressure on the walls of the container. The force exerted may become so great as to cause the container to explode.</li> </ul>