Theme 1: Plant Life

Plants play an important role in our lives. As learnt in the previous classes, there exists a great variety of plant life on the planet Earth. Plants vary in size from minute microscopic forms to complex tall trees. Most of the tall trees belong to higher plants. Herbs and shrubs also constitute a large proportion of higher plants. In previous classes, children have already been familiarised with parts of a plant body (root, stem, leaf, flower, fruit and seed) and their functions. This topic aims at enabling children to know and learn more about the leaf, flower and fruit, including the arrangement, characteristics and functions of the parts of a leaf and flower. Modifications of leaves for performing special functions will also be covered in this topic.

Learning Outcomes:

Children will be able to:

- distinguish between leaves (reticulate vs parallel venation /simple vs compound leaves);
- recognize, identify and draw figures of leaf modifications for support, protection, reduction in water loss and vegetative propagation in leaf;
- recognize that flowers are of various shapes, sizes and colours and are an important part of the plant;
- collect and preserve various types of flowers;
- explain the structure and function of each whorl of flower (complete flower);
- list the agents of cross pollination;
- learn the process of seed germination and list the conditions required for germination;
- list common names of locally available plants;
- list the various types of modifications for special functions such as vegetative propagation and storage.

Plant Life

Key Concepts	Suggested Transactional Processes	Suggested Learning Resources
THE LEAF ▸ External structure (parts of a leaf in detail). ▸ Kinds of leaves (simple & compound). ▸ Types of venation (reticulate and parallel). ▸ Functions of leaf (main functions). ▸ Modifications (tendrils, spines, scale leaves). ▸ Insectivorous plants. Need for modification with an example. ▸ Vegetative propagation in leaf (example bryophyllum).	▸ Revisiting previous concepts and building on past learning. ▸ Promoting children's observation of plants in their surroundings, and drawing pictures with the common names of the plants written below the pictures. ▸ Providing opportunities for children to observe plants, leaves and flowers through organizing a visit to a nearby garden or forest area. ▸ Asking children to draw different types of leaves, their structure and kinds and types of venation and modifications. ▸ Observing a pea plant, noting the tendril which is a modified leaf.	▸ Visit to school or nearby garden or park/ forest with teachers/ parents. ▸ Specimens of different types of leaves, school garden /herbarium. ▸ Charts /specimens of leaf modifications. ▸ Demonstration

Plant Life

Key Concepts	Suggested Transactional Processes	Suggested Learning Resources
THE FLOWER • Parts (4 whorls), structure and function of each whorl. • Pollination (self and cross): An idea about agents of cross pollination (wind, water and insects – their examples). • Fertilization: process in simple terms. • Formation of fruit – fate of each part (whorl) of flower after fertilization. • Parts of fruits: dry and fleshy, examples of dry and fleshy parts; parts of the pericarp of fleshy fruits (epicarp, mesocarp, endocarp) and function of each part. • Seed- parts (cotyledon, embryo: Radicle, plumule) and types (monocot, dicot) • Germination – conditions required for germination (moisture, warmth), seed germination of different seeds.	• Discussing the function of a tendril. • Conducting activities to demonstrate photosynthesis and transpiration in leaves. • Observing spines in the Cactus plant and stating their function. • Drawing a diagram of the Cactus plant and labelling it. • Organising activities to observe vegetative propagation in leaf and discussing. • Asking children to observe a flower (such as petunia, china rose or mustard) and studying its different parts and whorls. • Encouraging children to draw pictures of different flowers and labelling the parts observed (only complete flowers showing all 4 whorls). • Discussing the process of fertilization in plants using models/ charts, etc. • Studying and drawing pictures of different fruits (like pea, bean, mango, tomato, coconut); and seeds of maize, wheat/paddy (rice). • Asking children to soak seeds in a petri dish containing a wet blotting paper to observe germination phenomenon. • Asking learners to classify fruits as dry and fleshy. • Developing a herbarium of flowers / leaves. • Conducting simple activities to identify: cotyledon, monocot seeds, dicot seeds. • Setting up experiments for seed germination in different seeds.	• Flowers – petunia, China rose and/or mustard; • Charts /specimens of inflorescence, flowers, fruits, dicot and monocot embryo, vs mango or any other fruit. • Fruits such as, pea, bean, mango, tomato, coconut. • Germinating seeds.

Integration: Geography, Languages
Life Skill: Sensitivity towards environment

Theme 2: The Cell

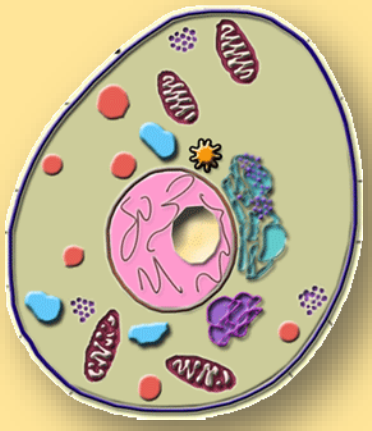
In this theme children will be introduced to the Cell. All living things consist of cells. A few organisms are single- celled (unicellular), while majority of the organisms are many-celled (multicellular). In structure, cells in plants and animals are quite similar, except for a few differences. Cells contain organelles which perform important functions for the sustenance of life. Plant cells are characterized by presence of a cell wall, plastids and a large vacuole whereas animal cells do not possess cell wall and plastids.

Learning Outcomes:

Children will be able to:

- identify difference in unicellular and multicellular organisms and cite examples;
- observe cell (plant and animal) under microscope and discuss in class;
- identify the different cell organelles (cell wall, cell membrane, nucleus, chloroplast, vacuole) and learn about their primary functions;
- distinguish and draw diagrams of a plant cell and an animal cell.

The Cell

Key Concepts	Suggested Transactional Processes	Suggested Learning Resources
▸ Plant cell: Cell organelles and their functions. ▸ Animal cell: Cell organelles and their functions. ▸ Diagrams of plant and animal cell. ▸ Only the following to be included: Cell wall, Cell membrane, Plastids, Nucleus, Vacuole, Cytoplasm – their structure and functions ▸ Differences between plant and animal cells.	▸ Organising visits to the laboratory to show children slides on the theme. ▸ Asking children to observe and draw the structures seen in the permanent slides of: ☛ *cells from onion peel* ☛ *human cheek cells* ☛ *blood Cells* ☛ *Amoeba* ☛ *Chlamydomonas* ▸ Asking children to differentiate between plant and animal cells based on their observations of slides. ▸ Showing videos and PPTs on structure of the Cell. ▸ Assigning projects and preparation of models (individually or in groups) on plant and animal cell; ▸ Discussing the structure and functions of cell organelles; ▸ Appreciating the discovery and use of the microscope in human life.	▸ Permanent slides of onion peel, human cheek cells, blood cells, *Amoeba*, *Chlamydomonas using* a microscope. ▸ Microscope. ▸ Models and charts of the above -listed materials ▸ Videos, E.M. photographs and PPTs of plant and animal cell, listed cell organelles. 

Theme 3: Human Body

The human body consists of a number of organ systems. Some of the major organ systems are the digestive, respiratory, circulatory, excretory, nervous and skeletal system. Each of these systems consists of organs, which help them perform specific functions. The expectation of this theme is to develop an understanding in children of the functioning of the digestive, respiratory and circulatory systems in the human body.

Learning Outcomes:

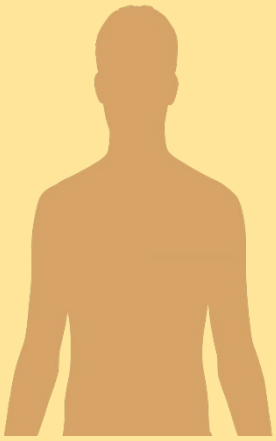
Children will be able to:

- list the main parts and functions of each part of the respiratory system;
- distinguish between respiration and breathing;
- outline the mechanism of breathing and the role of diaphragm in inhalation and exhalation;
- name some common respiratory diseases;
- explain the main parts of the circulatory system;
- list the components of blood and types of blood vessels;
- take their own/ others' pulse;
- demonstrate the significance of exercise and good food habits in keeping the heart healthy.

Human Body

Key Concepts	Suggested Transactional Processes	Suggested Learning Resources
Digestive System ▸ Revisit previous learning. ▸ Organs of the digestive system; function of each organ. ▸ Process of digestion particularly of Carbohydrates Proteins and Fats.	▸ Discussing with children about their own experiences. ▸ Providing opportunities to: ☛ *draw diagram of digestive system and label its parts.* ☛ *describe functions of each organ.* ☛ *make model / functional model of digestive system.* ▸ Discussing the process of digestion in terms of: ☛ *site of components of food;* ☛ *role of enzymes in digestion end products of the digestive process.* ▸ Discussing and finding out: ☛ *causes of indigestion.* ☛ *healthy and unhealthy food habits.* ☛ *ways to keep on oneself healthy.* ▸ Assigning Projects either in groups or individually to - interview three people and find out about their food habits. Sharing the same in class.	▸ Picture of Digestive system ▸ Working Model of the Digestive system. ▸ Children's drawings. ▸ ▸ Interview. ▸ Report on project work. ▸ Models and charts. ▸ PPTs and videos. ▸ Family doctor/Other Doctors.
Respiratory System ▸ Main parts (nose, pharynx, larynx, trachea, bronchi, lungs); functions of each part of the respiratory	▸ Asking children to: ☛ *observe through models and charts different parts of the human respiratory system;*	▸ Models and charts ▸ PPTs and videos

Human Body

Key Concepts	Suggested Transactional Processes	Suggested Learning Resources
system. ▸ Difference between respiration and breathing. ▸ Mechanism of breathing (physical process with respect to diaphragm and ribs-inhalation and exhalation). ▸ Mention of common respiratory diseases: asthma, bronchitis, pneumonia, tuberculosis (T.B.).	☛ *draw pictures of respiratory system and label its parts;* ☛ *discuss the process of respiration using working models;* ☛ *discuss the effects of increased physical activity on breathing;* ☛ *inviting a doctor to discuss health issues related to diseases.* ▸ Discussing various causes of diseases related to respiration; ▸ Identifying ways to prevent diseases related to respiration.	
Circulatory System ▸ Main parts of the circulatory system (heart, blood, blood vessels). ▸ Process of circulation in the body. ▸ Components of blood (plasma and blood cells - RBC, WBC, platelets with their functions only). ▸ Types of Blood groups (A, B, AB, O): mention only. ▸ Blood pressure (concept only); heartbeat, pulse ▸ Keeping the heart healthy through exercise and good food habits.	▸ Asking children to: ☛ *observe different parts of the human circulatory system through models and charts;* ☛ *draw the figure of a heart; circulatory system;* ☛ *identify the different types of blood vessels and components of blood through PPTs/ videos/ permanent slides.* ▸ Inviting a doctor and/or visiting a doctor to know about blood pressure and observing the instrument used to measure it and how it is done; ▸ Showing children how to measure their pulse. ▸ Demonstrating activities related to: process of deep breathing, brisk walking/ jogging. ▸ Discussing the need for a blood bank, blood donation.	▸ Models and charts ▸ PPTs and videos ▸ Permanent slides of blood cells. ▸ Instrument used to measure blood pressure.

Integration: Chemistry, Health and Physical Education

Theme 4: Health and Hygiene

Health is defined as a state of complete physical, mental and social well-being. When diseases occur, the normal functioning of the body is disturbed. Hygiene includes all factors that contribute to healthy living. Three factors that are important for maintaining good health are balanced diet, personal cleanliness and public sanitation. This theme focuses on enabling children to know and understand that diseases are broadly classified into communicable (or infectious) diseases, and non-communicable (non-infectious) diseases and also how diseases are transmitted and why it is essential to control them.

Learning Outcomes:

Children will be able to:

- explain the meaning of terms such as 'health', 'hygiene' and 'disease';
- relate the knowledge acquired to the personal experiences of diseases suffered, if any.
- relate the types of diseases on the basis of their transmission as infectious and non-infectious.
- spread awareness regarding diseases to friends and family.

Health and Hygiene

Key Concepts	Suggested Transactional Processes	Suggested Learning Resources
▸ Types of diseases (communicable and non-communicable). ▸ Communicable diseases: bacterial, viral, protozoal, diseases caused by worms (common examples of each). ▸ Modes of transmission of diseases (air, water, food, insects). ▸ Ways to prevent communicable diseases. ▸ Non-communicable diseases: examples, ways to prevent them. ▸ Hygiene – ways to keep the surroundings clean, safe disposal of garbage, healthy practices for hygiene.	▸ Building on previous learning and concepts. ▸ Discussing with children: ☛ names of some diseases and their symptoms; ☛ some non-communicable diseases: their causes and ways to prevent them; ☛ prevention of diseases while sharing their experiences. ▸ Asking children to relate their experiences when they had a particular disease/ seen patient in the family. ▸ Organizing brainstorming sessions to discuss: ☛ disposal of garbage, its segregation ☛ healthy practices for hygiene ☛ ways to keep the surroundings clean	▸ Charts. ▸ PPTs. ▸ Videos. ▸ Physician. ▸ Discussion on disposal practices

Integration: Health and Physical Education

Life Skill: Health awareness, concern for environmental cleanliness

Theme 5: Adaptation

All living organisms, for their survival, need to be well-suited to the environment in which they live. To attain this, organisms develop some features which help them to survive and reproduce in their environment. Features so acquired help organisms to adapt to their particular environments. This theme enables children to understand how some plants and animals are adapted to live and survive in dry habitats, whereas others can live in water or on mountains, or fly in air.

Learning Outcomes:

Children will be able to:

- define adaptation and habitat;
- recall the names of plants and animals, and their adaptations studied in earlier classes;
- record the adaptations shown by plants and animals living in desert/ aquatic conditions;
- prepare a list of plants and animals occurring in different habitats with their common names and adaptations.

Adaptation

Key Concepts	Suggested Transactional Processes	Suggested Learning Resources
▸ Habitat – definition. ▸ Adaptations of plants and animals to the following habitats along with characteristics and examples: ☛ *Aquatic habitat- floating, submerged and fixed plants; adaptations in fish.* ☛ *Desert - adaptations in cactus as desert plant and camel as desert animal.* ☛ *Mountain – adaptations in trees like Pine and Fir; mountain goat* ☛ *Air - adaptation for flight in birds, aerial plants.*	▸ Discussing the concept of habitat and adaptation in plants and animals though examples. ▸ Asking learners to study external features of: ☛ *Water lily and water hyacinth (with floating leaves)* ☛ *Hydrilla (root submerged)* ☛ *Cactus/Opuntia (desert habitat)* ☛ *Babul or Kikar (desert habitat)* ☛ *Pine/Fir (mountain region).* ▸ Drawing pictures of above-named plants and writing down the special features ▸ Asking children to - collect information and study the external features of fish, camel, bird (pigeon) and mountain goat. ▸ Drawing pictures of above mentioned animals and describing their special features.	▸ Preserved/ herbarium/ fresh specimens of plants and animals from different habitats (aquatic, desert, mountain, air). ▸ Field visit for observations in nature ▸ PPTs. ▸ Videos. ▸ Pictures and photographs.

Integration: Geography, Languages