

Science Course Structure - Class VII (Theory)

1. Food

Food from where

Questions	How do plants get their food?
Key Concepts	Autotrophic and heterotrophic nutrition; parasites, saprophytes; photosynthesis.
Resources	Coleus or any other plant with variegated leaves, alcohol, iodine solution, kit materials.
Activities/Processes	Need for light, green leaf for photosynthesis, looking at any saprophyte/parasite and noting differences from a green plant.

Utilisation of food

Questions	How do plants and animals utilise their food?
Key Concepts	Types of nutrition, nutrition in amoeba and human beings, Digestive system – human, ruminants; types of teeth; link with transport and respiration.
Resources	Model of human teeth, charts of alimentary canal, types of nutrition etc., chart and model of amoeba. The story of the stomach with a hole.
Activities/Processes	Effect of saliva on starch, permanent slide of Amoeba. Role play with children.

2. Materials

Materials of daily use

Questions	Do some of our clothes come from animal sources? Which are these animals? Who rears them? Which parts of the animals yield the yarn? How is the yarn extracted? What kinds of clothes help us to keep warm? What is heat? What is the meaning of 'cool' / 'cold' and 'warm' 'hot'? How does heat flow from/to our body to/ from the surroundings?
Key Concepts	Wool, silk - animal fibres. Process of extraction of silk; associated health problems. Heat flow; temperature.
Resources	Samples of wool and silk; brief account of silkworm rearing and sheep breeding. Potassium permanganate, metal strip or rod, wax, common pins, spirit lamp, matches, tumblers, Thermometer etc.

Activities/Processes Collection of different samples of woollen and silk cloth. Activities to differentiate natural silk and wool from artificial fibres. Discussion. Experiment to show that 'hot' and 'cold' are relative. Experiments to show conduction, convection and radiation. Reading a thermometer.

Different kinds of materials

Questions Why does turmeric stain become red on applying soap?

Key Concepts Classification of substances into acidic, basic and neutral; indicators.

Resources Common substances like sugar, salt, vinegar etc, test tubes, plastic vials, droppers, etc.

Activities/Processes Testing solutions of common substances like sugar, salt, vinegar, lime juice etc. with turmeric, litmus, china rose. Activity to show neutralisation.

How things change/react with one another

Questions What gets deposited on a tawa/khurpi /kudal if left in a moist state? Why does the exposed surface of a cut brinjal become black? Why is seawater salty? Is it possible to separate salt from seawater?

Key Concepts Chemical substances; in a chemical reaction a new substance is formed. Substances can be separated by crystallisation.

Resources Test tubes, droppers, common pins, vinegar, baking powder, CuSO_4 , etc. Urea, copper sulphate, alum etc, beaker, spirit lamp, watch glass, plate, petridish etc.

Activities/Processes Experiments involving chemical reactions like rusting of iron, neutralisation (vinegar and baking soda), displacement of Cu from CuSO_4 etc. Introduce chemical formulae without explaining them. Making crystals of easily available substances like urea, alum, copper sulphate etc. using supersaturated solutions and evaporation.

3. The World of the Living (Periods - 42)

Surroundings affect the living

Questions Why are nights cooler? How does having winters and summers affect soil? Are all soils similar? Can we make a pot with sand? Is soil similar when you dig into the ground? What happens to water when it falls on the cemented/ bare ground?

Key Concepts	Climate, soil types, soil profile, absorption of water in soil, suitability for crops, adaptation of animals to different climates.
Resources	Data on earth, sun – size, distance etc, daily changes in temperature, humidity from the newspaper, sunrise, sunset etc.
Activities/Processes	Graph for daily changes in temperature, day length, humidity etc.; texture of various soils by wetting and rolling; absorption / percolation of water in different soils, which soil can hold more water.

The breath of life

Questions	Why do we/animals breathe? Do plants also breathe? Do they also respire? How do plants/ animals live in water?
Key Concepts	Respiration in plants and animals.
Resources	Lime water, germinating seeds, kit materials.
Activities/Processes	Experiment to show plants and animals respire; rate of breathing; what do we breathe out? What do plants 'breathe' out? Respiration in seeds; heat release due to respiration. Anaerobic respiration, root respiration.

Movement of substances

Questions	How does water move in plants? How is food transported in plants? Why do animals drink water? Why do we sweat? Why and how is there blood in all parts of the body? Why is blood red? Do all animals have blood? What is there in urine?
Key Concepts	Herbs, shrubs, trees; Transport of food and water in plants; circulatory and excretion system in animals; sweating.
Resources	Twig, stain; improvised stethoscope; plastic bags, plants, egg, sugar, salt, starch, Benedicts solution, AgNO ₃ solution.
Activities/Processes	Translocation of water in stems, demonstration of transpiration, measurement of pulse rate, heartbeat;after exercise etc. Discussion on dialysis, importance; experiment on dialysis using egg membrane.

Multiplication in plants

Questions	Why are some plant parts like potato, onion swollen – are they of any use to the plants? What is the function of flowers? How are fruits and seeds formed? How are they dispersed?
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Key Concepts	Vegetative, asexual and sexual reproduction in plants, pollination - cross, self pollination; pollinators, fertilisation, fruit, seed.
Resources	Bryophyllum leaves, potato, onion etc.; yeast powder, sugar.
Activities/Processes	Study of tuber, corm, bulb etc; budding in yeast; T.S./ L.S. ovaries, w.m.pollen grains; comparison of wind pollinated and insect pollinated flowers; observing fruit and seed development in some plants; collection and discussion of fruits/seeds dispersed by different means.

4. Moving Things, People and Ideas

Moving objects

Questions	Why do people feel the need to measure time? How do we know how fast something is moving?
Key Concepts	Appreciation of idea of time and need to measure it. Measurement of time using periodic events. Idea of speed of moving objects – slow and fast motion along a straight line.
Resources	Daily-life experience; metre scale, wrist watch/ stop watch, string etc.
Activities/Processes	Observing and analysing motion (slow or fast) of common objects on land, in air, water and space. Measuring the distance covered by objects moving on a road in a given time and calculating their speeds. Plotting distance vs. time graphs for uniform motion. Measuring the time taken by moving objects to cover a given distance and calculating their speeds. Constancy of time period of a pendulum.

5. How Things Work

Electric current and circuits

Questions	How can we conveniently represent an electric circuit? Why does a bulb get hot? How does a fuse work? How does the current in a wire affect the direction of a compass needle? What is an electromagnet? How does an electric bell work?
Key Concepts	Electric circuit symbols for different elements of circuit. Heating effect of current. Principle of fuse. A current-carrying wire has an effect on a magnet. A current-carrying coil behaves like a magnet. Working of an electric bell.

Resources	Recollection of earlier activities. Pencil and paper. Cells, wire, bulb. Cells, wire, bulb or LED, aluminium foil. Wire, compass, battery. Coil, battery, iron nail. Electric bell.
Activities/Processes	Drawing circuit diagrams. Activities to show the heating effect of electric current. Making a fuse. Activity to show that a current-carrying wire has an effect on a magnet. Making a simple electromagnet. Identifying situations in daily life where electromagnets are used. Demonstration of working of an electric bell.

6. Natural Phenomena

Rain, thunder and lightning

Questions	What causes storms? What are the effects of storms? Why are roofs blown off?
Key Concepts	High-speed winds and heavy rainfall have disastrous consequences for human and other life.
Resources	Experience; newspaper reports. Narratives/stories.
Activities/Processes	Making wind speed and wind direction indicators. Activity to show “lift” due to moving air. Discussion on effects of storms and possible safety measures.

Light

Questions	Can we see a source of light through a bent tube? How can we throw sunlight on a wall? What things give images that are magnified or diminished in size? How can we make a coloured disc appear white?
Key Concepts	Rectilinear propagation of light. Reflection, certain surfaces reflect light. Real and virtual images. White light is composed of many colours.
Resources	Rubber/plastic tube/ straw, any source of light. Glass/metal sheet/metal foil, white paper. Convex/concave lenses and mirrors. Newton’s disc.
Activities/Processes	Observation of the source of light through a straight tube, a bent tube. Observing reflection of light on wall or white paper screen. Open ended activities allowing children to explore images made by different objects, and recording observations. Focussed discussions on real and virtual images. Making the disc and rotating it.

7. Natural Resources

Scarcity of water

Questions	Where and how do you get water for your domestic needs? Is it enough? Is there enough water for agricultural needs? What happens to plants when there is not enough water for plants? Where does a plant go when it dies?
Key Concepts	Water exists in various forms in nature. Scarcity of water and its effect on life.
Resources	Experience; media reports; case material.
Activities/Processes	Discussions. Case study of people living in conditions of extreme scarcity of water, how they use water in a judicious way. Projects exploring various kinds of water resources that exist in nature in different regions in India; variations of water availability in different regions.

Forest products

Questions	What are the products we get from forests? Do other animals also benefit from forests? What will happen if forests disappear?
Key Concepts	Interdependence of plants and animals in forests. Forests contribute to purification of air and water.
Resources	Case material on forests
Activities/Processes	Case study of forests.

Waste Management

Questions	Where does dirty water from your house go? Have you seen a drain? Does the water stand in it sometimes? Does this have any harmful effect?
Key Concepts	Sewage; need for drainage/sewer systems that are closed.
Resources	Observation and experience; photographs.
Activities/Processes	Survey of the neighbourhood, identifying locations with open drains, stagnant water, and possible contamination of ground water by sewage. Tracing the route of sewage in your building, and trying to understand whether there are any problems in sewage disposal.