



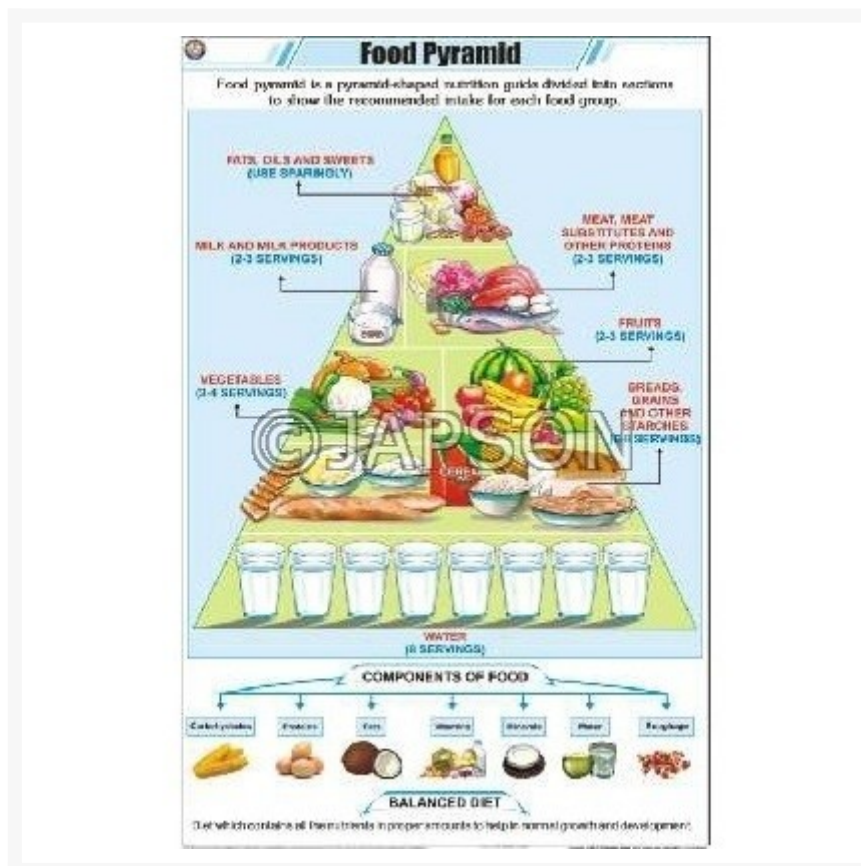
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# General Science (II) Charts, School Education

## Product Image



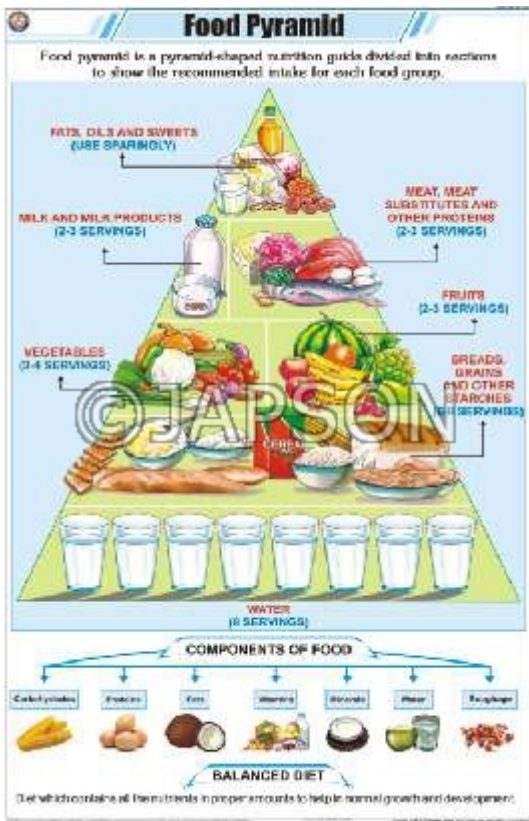
## Description

**Standard Size:** 58x90cms

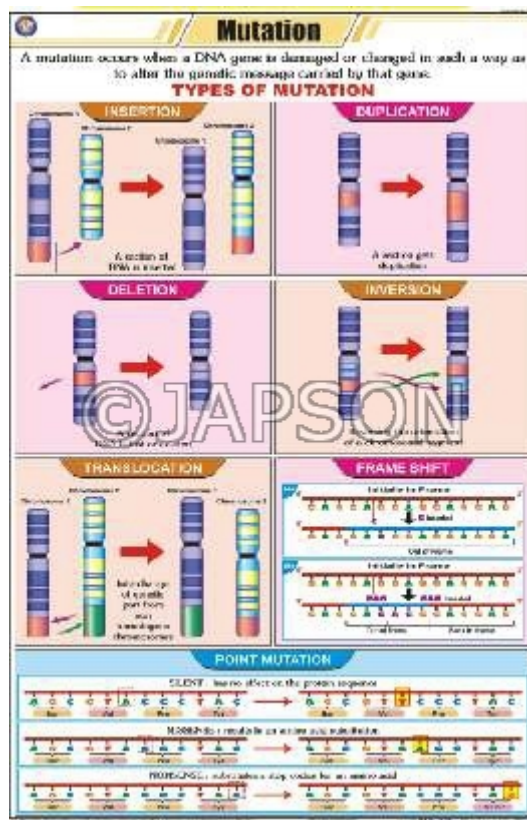
**Language:** English

Laminated Paper Charts with Plastic Rollers. These Charts have technically accurate and detailed description in vivid colours.





E. Charts, Fire and Fire Extinguishers F. Charts, Mutation



G. Charts, Water Harvesting

H. Charts, Solar Cooker

### Water Harvesting

Water Harvesting is a way to capture the rain water when it rains, store that water above ground or direct it into a well and use it later. This happens naturally in open rural areas. But in congested, over-grown metropolitan cities, we need to create methods to capture the rain water.

The total amount of water that is received in the form of rainfall over an area is called **rainwater endowment** of the area. Out of this the amount that can be effectively harvested is called the **Water Harvesting Potential**.

**Water Harvesting in a Town**

Water Harvesting Potential = Rainfall (mm) × Collection Efficiency

**Flow Chart Showing Ways of Water Harvesting**

**Water Harvesting in a Village**

Water harvesting can serve the following purposes:

- Provide drinking water.
- Provide irrigation water.
- Increase groundwater recharge.
- Reduce storm water discharges, urban floods and overloading of sewage treatment plants.
- Reduce sewer water ingress in coastal areas.

### Solar Cooker

The solar cookers are safest and cheapest mode of cooking. They utilize solar energy to cook the food. Depending upon the method in which the solar energy is utilized in the solar cookers, they are divided into various types.

**Box Type Solar Cooker**

Box type solar cooker consists a double box having aluminium lining from inside. A thin metal of aluminium is placed inside the window lens. The outer side of the aluminium lens is painted black. The top is closed by a glass sheet. A silver mirror is fixed on the inner lid. The glass top reflects the light into the box. The temperature inside the box is about 100 - 150 °C. This price and capacities are for household cooking. See inside the box.

**Parabolic Type Solar Cooker**

The parabolic type of solar cooker comprises of reflective metal sheet joined together to form a satellite dish or shape. When the sun rays fall on the metal sheet the rays are highly concentrated into a small area, which is the place for keeping the cooking vessel. They are the latest type of all the solar cookers.

**Panel Type Solar Cooker**

The panel type solar cooker comprises thin panels, which are covered with the reflective material like aluminium foil. The sunlight falling on the panels is reflected on the middle portion where the cooking vessel is kept. Due to concentration of the heat rays heated area is created. They are less expensive in price as the large glass sheet used. They are also not able to absorb sufficient quantity of heat in cloudy atmosphere.

I. Charts, Microorganisms

J. Charts, How Soil is Formed and Soil Profile

### Microorganisms

Microorganisms are the living organisms around us which require magnification to see and resolve their structures. Microorganisms have a high degree of adaptability and can survive in almost all kinds of environments like hot springs, ice-cold waters, saline waters, desert or even marshes. Microorganisms are grouped as bacteria, fungi, protozoa, algae and viruses.

**Bacteria**

- The Bacterial Flagellum
- Lactobacillus, Penicillium

**Fungi**

- Aspergillus
- Bread Mold

**Algae**

- Spirogyra
- Chara
- Nostoc
- Rhizopus

**Viruses**

- Bacteriophage
- Tobacco Mosaic Virus
- Influenza Virus
- HIV - Aids Virus
- Ebola Virus

**Protozoa**

- Amoeba
- Paramecium
- Plasmodium
- Trypanosoma

### How Soil is Formed and Soil Profile

Earth scientists who study the soil is called **pedology**. When Earth was formed, the ground was mostly solid rock. The rocks gradually eroded due to weathering. Weathering is breaking of large rocks into smaller particles of the surface of the Earth.

**AGES OF WEATHERING**

**Physical Weathering**

- **CRACKS**: In summer, when the temperature of rocks is higher, the water freezes and expands. This expansion and contraction weakens the rocks, and eventually causes them to break.
- **WIND**: Wind blowing with water erodes the soil and causes of rock. As they bang against the ground and rock after they break into smaller pieces, smaller soil.
- **GLACIERS IN WINTER**: Large icebergs in temperate areas cause weathering. The icebergs push the rocks and boulders along the way. Also expansion and contraction weakens the outer layer of rocks, eventually causing them to break.

**Biological Weathering**

- **Root Growth**: After the roots of plants grow through rocks, they exert great pressure on the rocks, breaking them into smaller pieces, thereby forming soil. Likewise, lichens grow on the surface of rocks and produce acids responsible for weathering of rocky surfaces. Roots break and produce fine soil particles in process of slow downward growth and eventually help in formation of soil.

**Chemical Weathering**

- **ACIDIC SOILS**: In hot and humid areas, the minerals in rocks react with oxygen to form acid. This acid reacts with the rocks and eventually helps in formation of soil.

**Soil Profile**

**Uppermost Layer (O-Horizon)**

Above ground level, it is layer of freshly or partially decomposed organic matter made of dead plants. Thickness is least in arid areas and soil is very dark humus rich soil.

**Top Soil (A-Horizon)**

It is also called **Lithomel**. It is formed as the soil gives 1-4 inch below. The upper portion most of the moisture is retained in this layer. The sub-surface plants are rooted in this layer.

**Subsoil (B-Horizon)**

It is an upper portion of the soil, it is a soil with humus, but not as much as the top soil. It is made from the soil that comes from the top soil.

**Parent Rock (C-Horizon)**

Below the subsoil is the parent rock, consisting of unconsolidated soil made of minerals. It is a layer of soil that is not yet weathered. It is a layer of soil that is not yet weathered. It is a layer of soil that is not yet weathered.

**Bed Rock (D-Horizon)**

Bed rock is a layer of solid rock that is the base of the soil. It is a layer of solid rock that is the base of the soil. It is a layer of solid rock that is the base of the soil.

K. Charts, Types of Soils in India

L. Charts, Carbon Cycle

### Types of Soils in India

Soil is the most important natural resource. We depend on it for our needs, especially food. India is rich in natural resources such as soil and the rich variety of soil increases the vegetation and food products. India has six main types of soils.

<h4>DESERT SOIL</h4> <p>Found in Thar Desert, parts of Rajasthan, Gujarat, Madhya Pradesh, Karnataka, Andhra Pradesh and West Bengal. These soils are sandy and have low water holding capacity. They are rich in calcium carbonate and gypsum. They are not suitable for growing crops.</p>	<h4>RED SOIL</h4> <p>Found in Deccan trap, parts of Karnataka, Maharashtra, Madhya Pradesh, Andhra Pradesh, West Bengal, Odisha, Jharkhand and Chhattisgarh. These soils are rich in iron and aluminum oxides. They are not suitable for growing crops.</p>
<h4>BLACK SOIL</h4> <p>Found in Deccan trap, parts of Maharashtra, Karnataka, Andhra Pradesh, West Bengal, Odisha, Jharkhand and Chhattisgarh. These soils are rich in iron and aluminum oxides. They are not suitable for growing crops.</p>	<h4>ALLUVIAL SOIL</h4> <p>Found in Indo-Gangetic plains, Indo-Brahmaputra valley, coastal plains and river valleys. These soils are rich in nutrients and are suitable for growing crops.</p>
<h4>DESERT SOIL</h4> <p>Found in Thar Desert, parts of Rajasthan, Gujarat, Madhya Pradesh, Karnataka, Andhra Pradesh and West Bengal. These soils are sandy and have low water holding capacity. They are rich in calcium carbonate and gypsum. They are not suitable for growing crops.</p>	<h4>RED SOIL</h4> <p>Found in Deccan trap, parts of Karnataka, Maharashtra, Madhya Pradesh, Andhra Pradesh, West Bengal, Odisha, Jharkhand and Chhattisgarh. These soils are rich in iron and aluminum oxides. They are not suitable for growing crops.</p>

### Carbon Cycle

The percentage of carbon dioxide in air is around 0.03% by volume. A series of processes taking place in the atmosphere keep this value almost constant. Carbon Cycle is the sequence, which maintains the balance between the formation and removal of carbon.

**Release of Carbon Dioxide**

- Carbon dioxide (CO<sub>2</sub>) is released from the atmosphere.
- Respiration in animals and plants releases CO<sub>2</sub>.
- Decomposition of organic matter releases CO<sub>2</sub>.
- Burning of fossil fuels releases CO<sub>2</sub>.

**Utilization of Carbon Dioxide**

- Plants use CO<sub>2</sub> for photosynthesis to produce food.
- Animals eat plants and release CO<sub>2</sub> through respiration.
- Plants and animals die and their remains are buried in the ground, forming fossil fuels.

M. Charts, DNA Replication

N. Charts, Food Chain in Forest Ecosystem

### DNA Replication

DNA Replication is a biological process in which each of the two strands of DNA molecule serves as template for the formation of complementary strands. The process is SEMI-CONSERVATIVE REPLICATION.

**INITIATION**

Helicase unwinds the DNA. Topoisomerase relieves the strain on the remaining DNA.

**ELONGATION**

Synthesis occurs in opposite direction to the template DNA. The leading strand elongates continuously in 5' to 3' direction whereas the lagging strand is synthesized discontinuously as a series of segments called as Okazaki Fragments.

**TERMINATION**

At termination site, the replication terminates and two daughter DNA strands are formed.

### Food Chain in Forest Ecosystem

**A Simple Food Chain in Forest**

Producers (Tree) → Herbivores (Deer) → Carnivores (Tiger)

**A Food Web in Forest**

Producers (Tree) → Primary Consumers (Deer, Rabbit, Squirrel) → Secondary Consumers (Fox, Snake, Hawk) → Tertiary Consumers (Tiger, Eagle)

O. Charts, Osmosis

P. Charts, Purification of Water

## Osmosis

Osmosis is the net movement of freely moving water molecules from a region of their higher concentration to a region of their lower concentration through a partially permeable membrane. The pressure exerted by freely moving water molecules in a system is called the water potential. A solution with a high water potential has a high number of freely moving water molecules.

**Microscopic View of Osmosis**

**A hypotonic means solution is** Water molecules wander across a partially permeable membrane from the solution with a higher water potential to the solution with a lower water potential.

**Net movement of water molecules** occurs from the hypotonic solution to the hypertonic solution cause the fluid level to rise in the hypertonic solution.

### Osmosis in Animal Cells & Plant Cells

<p><b>Animal Cell in Isotonic Solution</b></p> <p>Animal cells in isotonic solution are in equilibrium with their surroundings. There is no net movement of water.</p>	<p><b>Plant Cell in Isotonic Solution</b></p> <p>Plant cells in isotonic solution are in equilibrium with their surroundings. There is no net movement of water.</p>
<p><b>Animal Cell in Hypotonic Solution</b></p> <p>In hypotonic solution, more water enters the animal cell and animal cell may burst or swell. In plant cell, it is known as turgor pressure. The cell wall of the animal cell cannot withstand the pressure of the water. There is net inflow of water.</p>	<p><b>Plant Cell in Hypotonic Solution</b></p> <p>Plant cells in hypotonic solution are in equilibrium with their surroundings. There is no net movement of water.</p>
<p><b>Animal Cell in Hypertonic Solution</b></p> <p>In hypertonic solution, more water leaves the animal cell and animal cell may shrivel or die. In plant cell, it is known as plasmolysis. The cell wall of the animal cell cannot withstand the pressure of the water. There is net outflow of water.</p>	<p><b>Plant Cell in Hypertonic Solution</b></p> <p>Plant cells in hypertonic solution are in equilibrium with their surroundings. There is no net movement of water.</p>

## Purification of Water

**BOILING**  
It is a simple method of water purification. Boiling kills many bacteria and micro-organisms.

**DISTILLATION**  
99.9% pure water can be obtained by distillation. It involves boiling of water to produce water vapours. The vapours on cooling condense as a pure liquid.

**FILTRATION**  
Slow sand filters are used for treating raw water to produce a potable product. Apart from impurities, it also removes 90-95% bacteria.

**CHLORINATION**  
Chlorination is one of the most common and relatively cheap method of water purification. Chlorine tablets deactivate most of the micro-organisms.

**REVERSE OSMOSIS**  
R.O. is used to purify water on large scale to remove salts and impurities in order to improve the colour, taste or properties of fluid. Mechanical pressure is applied to impure water to force pure water through a semi-permeable membrane.

**DOMESTIC R.O. SYSTEM**

### Q. Charts, Sericulture

### R. Charts, Enzymes

## Sericulture

### Life Cycle of Silkworms (Bombyx Mori)

There are four different species of silk worms:

1. Mulberry
2. Tassar
3. Muga
4. Eri

### Stages of Production

1. Silkworms are fed on mulberry leaves. Rearing silkworms should be done in clean and hygienic conditions. 2. Rearing silkworms should be done in clean and hygienic conditions. 3. Rearing silkworms should be done in clean and hygienic conditions. 4. Rearing silkworms should be done in clean and hygienic conditions.

## Enzymes

Enzymes are globular proteins with enormous catalytic power with which they greatly enhance the rate at which specific reactions approach equilibrium by lowering the activation energy. Activation energy is the minimum energy required to initiate a chemical reaction.

### Structure

**Mechanism of Enzyme**

$$E + S \rightleftharpoons ES \rightarrow EP \rightleftharpoons E + P$$

**Enzymes Lower the Activation Energy of a Reaction**

### Classification of Enzyme

- 1. Oxidoreductase / Oxidoreductase
- 2. Transferase
- 3. Hydrolase
- 4. Lyase
- 5. Ligase

### Factors Affecting Enzyme Activity

<b>Temperature</b> 	<b>pH</b> 	<b>Change in Substrate Concentration</b> 	<b>Inhibitors of Specific Chemicals to Enzyme</b> 
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