

# Back up Data for S.S.T

## Class VII

History 1-5

The Medieval Architecture

The Medieval period saw great development in the field of architecture.

Architecture was a major activity during the Medieval period. It was a medium by which rulers used to express their power and position. All kings of the period built several famous monuments.

- Temples were centres of social, cultural, economic and educational life. Many beautiful 'nagara' style temples were built in the north during the early medieval period.
- The chola dynasty of the south was also famous for pravidian style temples.
- The most famous temple built under the chola architecture is the Brihadeswara Temple at Tanjore.
- During the sultanate period, The Turkish and the Afghan architectural styles were combined with the Indian style to form Indo-Islamic style of architecture. The true arch, the dome and the minaret were used in the monuments constructed during this period.
- Regional kingdoms also contributed to the development of architecture. Many monuments were constructed in Gujarat, Malwa, Bengal, Jaunpur, Rajputana, and Hampi, Gulbarga and Bidar.
- In the Mughal period, the Indo- Islamic style of architecture was further improved. After Shah Jahan, building activity entered a period of decline.
- Architectural activities reached their peak under Shah Jahan. He constructed many beautiful buildings such as the Moti Masjid and the Taj Mahal in Agra, and the Jamia Masjid and the Red Fort in Delhi. These monuments were made by white marble or red sand stone.

Some important terms

1. Baolis = Step wells, used to store water.
2. Synagogue = A building where Jews meet for religious worships and teaching.
3. Dome = Large, Semi- circular roof.
4. Minaret = Tall, Slim tower usually tapering in shape.

History L – 6

Administration and Society under the Mughals.

Under the great Mughals, an efficient system of administration was introduced. This was mainly due to the efforts of Akbar. According to Abul Fazl, a true ruler should love all his people Hindus, Muslims, Sikhs or Christians like a father.

- The Mughal administration was highly centralized and the emperor's word was law. In Akbar's administration he diwan controlled the revenue collection and also supervised all the other ministers.
- Mir Bakshi was the emperor's Chief Military Advisor and head of the military department.
- The Chief qazi was the head of the judicial department.
- The Chief Sadr looked after all the religious land.
- Akbar divided the empire into twelve subas or provinces. Each suba had a governor, diwan, a bakshi a qazi and a wagya nawis.
- A seal, cast in brass, of Emperor, Shah Jahan, was used instead of signatures on farmans and other royal documents.
- Akbar organized the mansabdari system. In this system, each officer was given a rank called mansab. The princes received higher ranks.
- The Mansabdars were loyal official through whom the emperor controlled the empire.
- Akbar's land revenue system was designed by Raja Todar Mal.
- Revenue system or Kharaj was the Chief source of income. Mughals also raised money through custom duties, sales tax and taxon property.
- Rebellions were started by peasants against the heavy tax burden.
- Economic and social conditions. Many foreign traders and travelers visited India as it was wealthy and prosperous but there were marked differences in the lifestyle of people depending on their occupation and income.
- Village life the landless peasants had a hard life, landed peasants had pay land revenue and could also get a loan from government. Zamindars owned a lot of land and employed may labourers.

Children received education in a temple or a mosque or under the shade of a tree. Women of the royal family also gained powers some royal ladies founded schools and gave scholarship-s to encourage education.

Civics L – 27

Women Change the world

- Girls are often forced to give up education or stay back home to help out in the domestic chores.
- Indian women work very hard for longer hours than men and she faces many challenges.
- The constitution of India guarantees equality of sexes and in fact grants special favours to women.
- Most women who work in the informal sector depend on subsistence agriculture for their livelihood.
- SEWA helps women take control of their lives, resulting in greater self – confidence and financial independence.
- Women, individually and collectively, have struggled to bring about these changes. This struggle is known as the women's movement.

- Indian women and western women are going to see some issues in completely different lights such terms are: Hunger, Poverty, Disease, Infant deaths, use of their bodies in labour by landlords, Ruthlessness of custom, Burden of tradition, unrelenting demands of rituals.
- Beginning of the Feminist movement in India. India's movement was initiated by men later joined by women. Like Raja Ram Mohan Roy, Dr Babasaheb Ambedkar I shwar Chandra Vidyasagar etc.
- Women's movement centre.

Different strategies have been used to spread awareness, fight discrimination and seek justice.

Some Glimpses of this struggle are:-

Campaigning

Raising Awareness.

Protesting.

- Modern influences are affecting the younger generations in parts of India.

## Geography L- 17

### Natural Vegetation and Wild Life.

The plant cover on the surface of the earth which grows naturally without human interference is known as natural vegetation.

Factors affecting Natural Vegetation are:-

Temperature, rainfall, slope of land, thickness of soil etc.

Types of natural vegetation:-

1. Forests
2. Grasslands
3. Shrubs.

#### **Types of Forests:-**

- (i) Tropical Evergreen Forests are generally found along the eastern margins of the continents.
- (ii) Tropical Deciduous forests are mainly found in India, Northern Australia and in Central America.
- (iii) Temperate Evergreen Forests are found in the mid- latitudinal coastal region.
- (iv) Temperate Deciduous Forests:- are found in the areas located in higher latitudes. These are found in the north eastern part of U.S.A. china, Newzeland, Chile and also in the Coastal regions of western Europe.
- (v) Mediterranean Vegetation are found in the west and south- west margins of the continents. Mostly found in the areas around the Mediterranean sea in Europe, Africa and Asia.
- (vi) Coniferous Forest are found between 55° and 70° Latitudes in Northern Hemisphere only.
- (vii) Thorny Buses are found in the desert areas.

(viii) Thundra Vegetation:- Thundra region lies roughly beyond  $65^{\circ}$  N on the northern side of the coniferous forests.

**Grasslands:-** Two kinds of grasslands are found in the world.

- (i) Tropical Grassland
- (ii) Temperate Grassland

**Wildlife:-** It refers to plants, animals, birds and other organisms which live in their natural habitat.

**Cause of Extinction of Wildlife:-**

- (i) Habitat Destruction.
- (ii) Hunting and Poaching
- (iii) Pollution

**Measures taken by Government:-**

- (i) Biosphere reserves are being set up to preserve the genetic diversity.
- (ii) Periodic census is undertaken to preserve endangered species.
- (iii) national parks and sanctuaries have been set up to preserve wildlife in its natural setting.
- (iv) Various projects such as “Project Tiger” and “Project Rhino” have been launched to save wild animals.

## **BACK-UP PLAN ENGLISH**

### ENGLISH: FOOLISH QUESTIONS

American Folk Rhyme adapted by William Cole.

TITLE; Foolish Question.” It means that the questions asked in this poem are not intelligent and that they don’t need any answer because there aren’t any.

Paraphrase: The author is enumerating all the different parts of the body that have another meaning {s} such as the bridge of the nose and the drum of the ear.

Connotation: There are a lot of metaphors because he is comparing the parts of the body with other things without any comparison tool.

Attitude: The tone of the author is humoristic and he is also asking questions knowing that there aren’t any answers but he makes us believe that he doesn’t know it.

Theme: There isn’t really a theme for this poem. The only thing that could be found is that there are lot of terms in the English language that have very different meanings.

### POEM: WHERE THE MIND IS WITHOUT FEAR.

It’s a poem written by Rabindranath Tagore .It is one of his vastly read and discussed poem .The poem is written in the form of a prayer to the God, the Almighty for a true freedom for his country. And thus Tagore reveals his own concept of freedom throughout the poem, Where the Mind is Without Fear.

Tagore, in his poem wishes for a world which is not fragmented by prejudice based on caste, creed, colour, or other baseless superstitions. Prejudice and superstition should not divide the people in groups and break their unity.

He prays to the lord for the nation’s freedom and to awaken the society to have noble thought and action in an independent country.

### Chapter: Henry A Chameleon

This story about an unusual pet – a chameleon named Henry and is written by Ruskin Bond, the most popular children’s writer. The chameleon is saved from an angry crowd by the grandfather of a boy and is given shelter in his home. The crowd unknowingly claimed that the chameleon was very poisonous and hazardous for the people. In fact, Henry was a harmless fellow and didn’t cause any harm to anyone. He spent his days in the garden where he kept the insect population in check.

At a deeper level, the story conveys the message that we should never react in ignorance and prejudice against one.

### CHAPTER-----ONE EARTH TO ONE WORLD

This chapter deals with the origin of the earth as a hot planet with swirling seas and volcanoes. However, this turbulent lifeless earth held within it the seed of life, and the lifeless planet became a living world. Every plant and every animal took its place in the web of life. Then man arrived on the scene.

As man developed and progressed, he saw the earth as belonging to him to use for his comfort as he saw fit. The result of this has been a tremendous overuse of the earth’s resources and inequality in the world. The earth provided for the needs of all life to live and thrive but this has changed. The earth is unable to regenerate and recycle resources fast enough. This has disturbed the delicate ecological system and we act to have a collective, healing impact on the biological and ecological system that sustains us.

**RESPIRATION IN ANIMALS**

Respiration is a process by which organism takes in oxygen to release energy and then removes the waste products like carbon dioxide and water. Respiration can be divided into two phases

**1. External respiration or breathing:**

In external respiration, an organism takes in oxygen from its environment and releases carbon dioxide. The process of breathing consists of two steps, inspiration i.e. breathing in and expiration i.e. breathing out. During inspiration also called inhalation, air from the atmosphere is drawn in, while during expiration or exhalation, air is expelled out.

**2. Internal respiration or cellular respiration:**

The chemical process of breakdown of food in the presence of oxygen to produce energy. This takes place in all the body cells.

Three basic requirements for respiration:

1. A respiratory system by which the air from the environment enters the body of the organism and the carbon dioxide, the end product of respiration is removed from the body.
2. A transporting medium, the blood which carries the oxygen to every cell of the body.
3. Organic food that must be chemically broken down in the cells to liberate energy.

**TYPES OF RESPIRATION:**

Depending on whether oxygen is used in the process or not respiration is of two types.

**1. AEROBIC RESPIRATION :**

This type of respiration occurs in the presence of oxygen, where food (glucose) is broken down into carbon dioxide and water and energy is released which is stored as ATP molecules.

**2. ANAEROBIC RESPIRATION :**

This type of respiration takes place in the absence of oxygen. It is a normal feature in certain microscopic organisms like bacteria and yeast. Such organism that can survive in the absence of oxygen are called anaerobes. In the absence of oxygen, glucose breaks partially into carbon dioxide and ethyl alcohol. The energy released during anaerobic respiration is much less than aerobic respiration.

The process whereby micro organisms like yeast and bacteria respire anaerobically to produce alcohol and carbon dioxide from food is called fermentation.

**RESPIRATION IN OTHER ANIMALS**

The basic process of respiration is similar in all living beings and result in release of energy. In animals, like cockroach, earthworm and fish there are specialised organs that help in breathing and respiration

**Through Air Holes**

Insects like cockroaches, grasshoppers and bees have special air holes in their body surface called spiracles. The spiracles are connected to a network of air tubes inside the body of insects called trachea. The smaller branches of a trachea are called tracheoles that allow diffusion of respiratory gases to the cells and tissues. Air enters through an insect body through these spiracles and reach the entire body through the trachea and tracheoles. Oxygen is thus, directly absorbed by the body cells through simple diffusion and carbon dioxide is sent out through the spiracles.

**Through Moist Skin**

Animals such as earthworm have a moist and slimy skin. Exchange of gases takes place through the surface of the skin that is richly supplied with blood capillaries. In every segment of the body of the earthworm, these capillaries

are connected to the main blood vessels. The thin walled capillaries absorb oxygen from, the skin and return the carbon dioxide to the skin by diffusion

### Through Gills

Aquatic animals such as fishes have special organs called gills, which are adapted to take up the oxygen dissolved in water. Each gill consists of gill Arch, which bears a double row of thin walled filaments, gill filaments that are richly supplied with blood capillaries. Water entering the mouth, flows over the gills. The blood in the capillaries absorb oxygen from water and gives out carbon dioxide, by the process of diffusion

Simple unicellular organisms like amoeba and paramecium take in oxygen directly from water and give out carbon dioxide through diffusion

## RESPIRATORY SYSTEM IN HUMANS

Human beings have a more extensive and complex respiratory system. This is because their metabolic rate is high and so is the energy demand. Since our body cannot store oxygen so we need to breathe day and night to move air into and out of our system

The respiratory system of human beings include;

### Respiratory Track

**Nostrils and Nasal Passage;** Nostrils are the pair of slits that open into left and right nasal chambers. The nasal chamber possesses a border of hairs, which trap dust particles and germs in the air and filter them. Its richly supplies with blood vessels that warm the incoming air. The sticky mucus lining of the nasal chamber moistens the air and filters dust particles.

**Pharynx ;** Pharynx is a common passage at the back of the mouth for air and food. Air enters the front tube called the windpipe. The entrance of the foodpipe and the wind pipe is guarded by a stiff-like structure, the epiglottis. It helps in controlling and directing food to the food pipe and air along the wind pipe respectively. It opens during breathing, but closes the passage of wind pipe while swallowing or drinking, thus preventing the food from entering the lungs. If food were to go down the wind pipe, you would choke.

**Trachea ;** The pharynx leads to trachea, a tube lying in front of the food pipe. It passes through the neck and extends into the chest cavity. Its wall is supported by C shaped cartilaginous ring.

**Bronchi and Bronchioles;** At its lower end, trachea splits into two bronchi that leads to the lungs on their respective side. Each bronchus further divides and sub divides into smaller tubes known as bronchioles. Each bronchiole ends in tiny air sacs called alveoli. It is here that exchange of gases takes place. Each lung of an adult human contains about 300-400 million alveoli. Alveoli have very thin walls and are richly supplied with blood capillaries. The oxygen present in air, we breathe in goes into the blood and carbon dioxide present in the blood passes out of the blood into the alveoli. Thus exchange of gases takes place.

### Respiratory organ

**LUNGS ;** These are the pair of respiratory organs that are spongy bag-like structures, lying in the chest cavity on either side of the heart. The left lung is two lobed and slightly smaller than the right lung which is three lobed

The two lungs are protected by the flexible ribcage and sternum on the front and the vertebral column at the back. Just beneath the lungs, is a dome-shaped muscular sheet, the diaphragm.

The co-ordinated action of diaphragm and ribcage help in the mechanism of drawing oxygen [inhalation] and expelling the carbon-dioxide [exhalation]

## MECHANISM OF BREATHING

Inhalation or breathing in

Exhalation or breathing out

### Inhalation

- 1 The sternum is pulled out.
- 2 The ribcage is pulled upward and outward.
- 3 The diaphragm muscles contract and they are flattened.
- 4 The volume of chest cavity increases leading to its enlargement.
- 5 Air rich in oxygen is forced into the lungs through the nose.

### Exhalation

- 1 The sternum is pulled in
- 2 The ribs are also pulled downwards and inwards.
- 3 The diaphragm muscles relax and return to its dome-shape
- 4 This reduces the volume of the chest cavity.
- 5 Air rich in carbon dioxide is forced out of the lungs.

## RESPIRATION IN PLANTS

Plants use atmospheric oxygen to breakdown glucose the food manufactured during photosynthesis into carbon dioxide and water, with the release of energy. The majority of gas exchange in plants take place by simple diffusion process through small openings in the leaves, the stomata . Stomata can thus be compared to our nose . You have learnt about stomata in chapter 1

Sugar+ Oxygen ----- Carbon dioxide + Water + Energy

Roots of plants buried underground need constant supply of air. This is because, like other living cells, the root cells also need to respire, releasing carbon dioxide and energy. Have you noticed about your school gardener using his trowel to loosen soil near roots of small herbaceous and shrubby plants? Loosening the soil creates tiny air spaces around the soil particles, So plant root hairs can easily take in oxygen trapped between the soil particles. Oxygen diffusing into the root hairs to passed into the neighbouring root cells, Thus carbon dioxide is diffused out onto soil

Thus in plants :

- 1 All living cells of roots, stem and leaf taken in oxygen independently and give out carbon dioxide.
- 2 Respiration occurs at a much slower rate as compared to animals.
- 3 There is little transport of gases from one part of plant to other..

## Reproduction in Plants

The ability of living organism to produce new individuals of their own kind is called reproduction. However, reproduction is not essential for an organism's survival, but it ensures that the organism leaves behind more individuals of its own kind, so that the species does not perish from earth.

### REPRODUCTION IN PLANTS:

Plant body consists of two main parts.

1. Vegetative part: These are concerned with nutrition and growth. They comprise of the roots, stems and leaves.
2. Reproductive part: This is essentially concerned with reproduction of the plants. It comprises of the flower. A plant may have both male and female parts borne on the same flower or they may be borne by different flowers.

### TYPES OF REPRODUCTION:

There are two basic types of reproduction in plants

#### 1. ASEXUAL REPRODUCTION:

Reproduction by a single parent without the production of sex cells or gametes is called asexual reproduction. In such type of reproduction, there is no seed formation. It is a faster means of producing offsprings. The new individuals produced are identical to their parents. Asexual reproduction is characteristic of bacteria, algae and fungi. Among the higher plant groups like sugarcane, rose, potato and ginger, asexual reproduction takes place by their vegetative parts.

#### A:- BUDDING

This type of asexual reproduction occurs in yeast, a fungus that is microscopic and unicellular. It takes place under normal conditions when the yeast cell grows in sugar solution. Each cell produces one or more tiny outgrowths called buds which increases in size. The nucleus divides and one of them passes on to each bud. These buds ultimately cut off from the parent cell and are released as an independent, identical copy of the parent. Budding may be repeated resulting in the formation of one or more chains of bead-like cells.

#### B:- FRAGMENTATION [ Binary fission]

Spirogyra, which is a filamentous green algae reproduced rapidly by this asexual mode of reproduction on availability of nutrients in water. Here, the filament breaks up into a number of short segments, due to force of water current or friction. Each segment then develops into a complete organism and the process continues.

#### C:- SPORE FORMATION

The spores are asexual reproductive bodies found in plant groups like fungi, mosses and ferns. If a piece of bread is kept in a warm and moist place, mass of fine thread-like structures which are the hyphae grow from the spores after they have settled on it. At the tips of the hyphae, spores are formed. This is enclosed in a special structure called sporangium, that is borne on a stalk, the sporangiophore. Spores are produced in large numbers and are very light and minute. These are easily dispersed by air currents. Spores are protected by a hard protective covering to withstand unfavourable conditions. Under favourable conditions of moisture and temperature, they germinate in suitable medium into a new individual.

#### D:- VEGETATIVE PROPAGATION

This type of reproduction is observed in higher plant groups. New plants are produced from vegetative parts of the parent plant like roots, stems, leaves. Some common organs of vegetative propagation are described below.

1] **Runner:-** The most common example is grass. The runner arises as an axillary bud. It creeps horizontally some distance away from the mother plant, then strikes roots at the nodes and grows into a new plant.

2] **Tuber:-**

This is the swollen end of a special underground stem. It arises from the axil of a lower leaf and becomes swollen with heavy store of food material. A potato is an example of tuber.

3] **Rhizome:-**

It is horizontally growing underground stem, swollen with stored food. Ginger and turmeric are examples.

4] **Foliar Buds:-**

In Bryophyllum, rows of foliar buds are produced on the notch at the end of leaf margins. These buds may drop from the leaves and grow up into new plants.

5] **Root Tubers :-**

These are swollen adventitious roots. Examples are dahlia and sweet potato. These roots have food stored in them.

## E:- Artificial Propagation

These man-made methods are called artificial propagation. These are:

1] **Cutting:-**

This is a simple procedure in which a healthy, young branch of a plant like rose and sugarcane having nodes and internodes is cut off and planted in moist soil. It produces roots and grows into a new plant.

2] **Grafting**

This method is used in horticulture, to develop new varieties of fruit plants. In this method, a healthy stem of one plant with oblique cut surface is inserted over the cut stem of another rooted plant.

3] **Layering**

In this method, the branch of a plant is bent towards the ground and covered by moist soil. After some time, roots develop from the covered part. The bent branch is later cut and made to grow into a new plant.

## SEXUAL REPRODUCTION

You have learnt in class 6<sup>th</sup> that flower is the reproductive organ of the plant. It bears the male and female reproductive parts, the stamen and the carpel respectively. These reproductive parts may be borne by the same flower or separately in different male and female flowers. They produce the male and female gametes. Sexual reproduction involves production of new individual by the fusion of these male and female gametes to produce a zygote.

The act of fusion is called fertilization. After fertilization seeds and fruits are produced. Seeds, on getting favourable conditions produce new plants.

The following terms are applied to describe a flower:

1] **COMPLETE FLOWER:-** In a flower, if all the four whorls, i.e., sepals, petals, stamens and carpels are present, it is said to be a complete flower. Complete flowers are normally bisexual having both the reproductive whorls. The china rose is an example of bisexual flower.

2] **INCOMPLETE FLOWER:-** Such flowers lack in one or more floral whorls. Incomplete flowers are normally unisexual having only one of the reproductive whorls. They may either be a male flower bearing stamens only or a female flower having carpels (pistil) as their reproductive whorls. Plants like cucumber and corn

have different male and female flowers on the same plant. The male and the female flower may also be borne on separate plants as in papaya and mulberry.

Each stamen consists of filament, anther and connective. The anther has two anther lobes containing pollen grains. Pollen grains are very minute in size like particles of dust. Each pollen grain develops double layered thick wall. The outer wall is made of waterproof substance and is often provided with spinous outgrowths. Lying internal to it is a thin and smooth layer. Male gametes are formed inside the pollen grains.

Each carpel is made up of three parts- the terminal knob-like part which may be lobed is called stigma, and tubular stalk connecting the stigma and ovary is the style and the swollen basal portion of the carpel is called ovary. The ovary contains one or more oval bodies, the ovules inside which female gametes or egg is formed.

## POLLINATION

When the anthers are mature, they rupture and burst open, releasing the pollen grains. The pollen grains being light, are carried away by agents such as wind, water, insects, animals. They land on stigma of the same flower or a different flower. This transfer of pollen grains from an anther to a stigma is called pollination.

Pollination is of two types:

- 1] Self pollination:- In this process, the transfer of pollen grains takes place from the anther of the flower to the stigma of the same flower, evidently bisexual.
- 2] Cross pollination:- In this process, the pollen grains are transferred from anther of one flower to stigma of another flower. Cross pollination may take place between two flowers on the same plant or between flowers on different plants of the same species.

## AGENTS OF POLLINATION

Insects and wind are the most common agents of pollination. For aquatic plants, water serves as a pollinating agent. Pollen grains are released in water and carried out to other flowers by water currents. Other agents like squirrels, bats and birds also help in pollination. One such bird the hummingbird has long beak to drink nectar. While visiting the flowers, it accidentally rubs off the anthers, some of which fall on the stigma.

## FERTILIZATION

Once a pollen grain has landed on the stigma of the same species it germinates. A sugary solution is secreted by the stigma that stimulates the germination of the pollen tube from weak spots, on the pollen grain. The pollen tube carries the male gametes. After reaching the ovule, the tip of the tube bursts, releasing the male gametes. The male gamete fuses with the female gamete to form zygote. This process is called fertilization.

## SEED FORMATION

After the formation of zygote, the petals, sepals and stamens wither away and fall. The style and stigma also fall. Only the ovary remains. It contains the fertilised ovule which contains the zygote. The zygote begins to divide and forms the embryo. Meanwhile, the walls of the ovule develop hard layers. Thus, ovules develop into seeds consisting of a baby plant, the embryo. The embryo contains one or two cotyledons with stored food. They are covered by hard protective seed coat.

## FRUIT FORMATION

All flowering plants are characterised by having seeds enclosed by a fleshy covering, the fruit. The fruit is the ripened ovary. As seed formation proceeds, the ovary begins to swell and changes into fruit. Some fruits

like those of fleshy, mangoes are sweet and juicy. Others like those of almond and walnut become hard and dry. A fruit can have one or more seeds in them.

### DISPERSAL OF SEED

What would happen if all seeds of a plant were to fall directly below the mother plant? They would soon use up the soil's essential nutrients and compete for the available space, sunlight, water and air. There would be a struggle for their existence. As a result these seeds would not grow into healthy plants. In order to guard against these conditions seeds and fruits have developed special devices for their wide distribution. The germination and healthy growth is called dispersal.

Following are the different ways by which the seeds are dispersed:

1] Dispersal by wind:- wind dispersed seeds are light and dry. They may have one or more appendages in the form of thin, flat membranous wings, as a drumsticks and maple. In sun-flower, the fruit is hairy and opens out in a umbrella-like fashion that helps it to float in the air. The seeds of madar and cotton are also hairy.

2] Dispersal by water:- The seeds and fruits to be dispersed by water usually develop floating devices in the form of spongy or fibrous outer coats. The fibrous fruit of coconut is capable of floating long distances in the sea without suffering any injury. In lotus, the spongy receptacle, bearing the fruits on its top, floats about in water and drifts according to the currents of water.

3] Dispersal by animals:- Many fruits and seeds are dispersed through the agency of animals, including human beings. Sometimes when you walk through a grassy field, you may find seeds and fruits clinging to your clothes. Many fruits are provided with outgrowths like hooks, barbs, spines, bristles, stiff hairs on their body. Such structures help them to adhere to the body of woolly animals and thus the seeds are carried to distant places. The fruit of Xanthium is covered with numerous curved hooks, seeds of spear grass have cluster of minute stiff hairs, which attaches easily to passing animals.

4] Dispersal by Explosive Mechanism:- Many fruits burst with a sudden jerk. This results into seeds being scattered far away from the parent plant. Common examples of explosive fruits are balsam, pea and castor.

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