



Master Lesson Plan

For

Seeds and Seeds

Board	Standard	Subject	Chapter	Language	Reference Link	Creation
CBSE	STD V	EVS	Seeds and Seeds	English	Seeds and Seeds	2020-08

Seeds and Seeds

1. MS_Objectives-Seeds and seeds

The student will be able to:

- examine the nutritional benefits of sprouts.
- experiment on the process of germination.
- explain the factors affecting germination.
- discover the various facts of seeds.
- revere their parents.
- describe the methods of growing plants without seeds.
- take delight on the facts of insectivorous plants.
- sort seeds based on colour, shape, size and texture.
- discuss methods of seed dispersal.
- respond to questions related to seeds.

Time to teach	Asset Type	Theme	SubTheme
2 Minutes	Main Script	Plants	Germination, Germination

2. Sprouting of seeds

Sprouts are super foods.

Sprouts make our salads so tasty, healthy and colourful.

How does your mother make them?

a) She usually washes and soaks either Bengal gram, green gram, black-eyed beans or a mix of these in a bowl with water.



b) The next morning, she drains the water, rinses them with fresh water.

c) She ties them in a wet cloth and hangs them up to sprout.



It's very exciting to watch beans and grains awaken and sprout in front of our eyes.



Why should we eat sprouts?

1. Sprouts are a storehouse of essential nutrients like proteins, vitamins, minerals and enzymes that are not very costly.
2. The process of sprouting increases the vitamins and mineral content of seeds and our body can easily absorb them.
3. Sprouts are very good source of proteins and anti-oxidants that are easily available to us. The antioxidant content increases 10 times after 3 days of sprouting and helps in preventing many diseases.
4. During sprouting, the water and fibre content increases largely which is very beneficial for the digestive system.
5. Sprouting process helps in breaking down starch, proteins and fats to an easily digestible form.
6. Sprouts have anti-bacterial properties.

Source of images:

1. Pulses soaked.- original contribution.(saivij9@gmail.com)
2. Pulses hung in wet cloth-original contribution.(saivij9@gmail.com)
3. Sprouted green gram-original contribution.(saivij9@gmail.com)

Time to teach	Asset Type	Theme	SubTheme
3 Minutes	Day-to-day Relevance	Food	Nutrition, Nutrition

3. Our Class Garden

Aim:

The students will be able to experiment on the process of germination.

Resources Required:

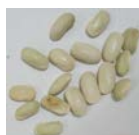
1. Garden pot / disposable container with holes/glass jar for one group.
2. Potting Soil to fill $\frac{3}{4}$ th of the pot / 3 -4 paper towels per jar.
3. 10 Seeds per group.
4. Water (Approximately 100ml per day per pot)
5. Gardening fork or trowel.
6. Thread.
7. Sketch pen.
8. Scale.
9. Observation sheet.
10. Drawing sheet.
11. Colour pencils.

Setting for the Activity [Indoor/Outdoor] OUTDOOR

Type of Activity: [Demonstration / Experiment/ Field Trip/ Project] EXPERIMENT

Procedure:**Instructions for the activity:**

- 1) The class could be divided into groups of 4 students each.
- 2) Students would be asked to volunteer to bring pot with soil and seeds for each group. Alternatively, students can also bring paper towels spread on glass jars for better observation.
- 3) Each group should take up one particular type of seed for germination. The students can choose to bring any one type of seeds from the given list of easily available seeds. The group can be named after the chosen type of seed. (Example: Green gram group).
- 4) Each group will sow around 10 seeds after digging and loosening the soil in the container. These seeds have to be sown with enough space between them. Each seed should be placed inside a small hole 1 cm deep in the soil and then covered up later after sowing.
- 5) In case of wet paper towels, the seeds can be placed at varied points inside a glass jar.
- 6) Each group would be given an observation sheet where they would note down the observations. The day the seeds are sown to be considered as day 0.
- 7) The containers should be carefully placed on a suitable spot such as class room corridor or school garden where enough sunlight is available.
- 8) This experiment will be on going for around 15 days, with the students taking turns to water their seeds and plants at least twice a day.
- 9) The time taken for each seed to germinate will be recorded as number of days and a seed will be considered ungerminated after 1 week of no growth.
- 10) After the seeds germinate, growth will be measured by measuring the height of the plant in cm. Markings can be made with a thread and length measured with the help of ruler.
- 11) The students should draw their observation in the drawing sheets individually.

List of easy to grow seeds:**1. Green gram:****2. Beans:**

3. Peas:**4. Coriander:****5. Mustard:****6. Chickpeas:****7. Fenugreek:****8. Chilli seeds:**



9. Horsegram:

Note to the teacher:

- 1) The teacher shall encourage students to reuse old plastic containers instead of buying new flower pots. Holes have to be made in the plastic containers for proper aeration.
- 2) The teacher should ensure that all the students in a group are involved in the activity by taking turns to water the plant, measure the growth and note down the observations in the sheets provided to them.
- 3) The teacher should ensure that students do not excessively water the seeds and seedlings.
- 4) At the end of the 15 day session, the teacher shall hold a group discussion on the germination activity. The students can be encouraged to share their experiences on watching the growth of young seedlings. Questions based on what they learnt about seed germination can be asked.
- 5) The teacher can summarize the growth observed in various seeds with comparisons to day of sprouting and length of the seedlings.
- 6) The teacher can motivate and monitor the maintenance of the class garden for further duration exceeding the 15-day period.
- 7) The students can be motivated to grow their mini kitchen garden in their houses.

Observation sheet: (for each group)

1. Type of seed planted :
2. Date of sowing(Day 0) :
3. Date when germination starts:
4. Date of completion of the activity:
5. Length of the plant above the soil: (in cm)

	1	2	3	4	5	6	7	8	9	10
Day 1										
Day 2										
Day 3										
Day 4										
Day 5										
Day 6										
Day 7										
Day 8										
Day 9										
Day10										
Day11										
Day12										
Day13										
Day14										
Day15										

Drawing sheet: (For each student)

Diagrams representing germination of seed to plant:

Day 0	Day 2	Day 4	Day 10	Day 15

Sample images:**1. Sample drawing sheet:**

Diagrams representing germination of seed to plant:

**Conclusion:**

The students are able to experiment the process of seed germination. They are able to appreciate the role of water and light in germination.

Source of images:

1. Green gram: Original contribution (saivij9@gmail.com)
2. Beans: Original contribution (saivij9@gmail.com)
3. Peas: Original contribution (saivij9@gmail.com)
4. Coriander seeds: Original contribution (saivij9@gmail.com)
5. Mustard seeds: Original contribution (saivij9@gmail.com)
6. Chickpeas: Original contribution (saivij9@gmail.com)
7. Fenugreek: Original contribution (saivij9@gmail.com)
8. Chilli seeds: Original contribution (saivij9@gmail.com)
9. Horse gram: Original contribution (saivij9@gmail.com)
10. Sample drawing sheet: Original contribution (saivij9@gmail.com)

Time to teach	Asset Type	Theme	SubTheme
20 Minutes	Suggested Activity	Plants	Germination, Germination

4. Factors affecting germination of seeds

We have seen how the dry seeds turn into sprouts while learning about sprouts and their importance.

What factors are required for seeds to become young plants?

Water, air.

Demonstration:

Let's find out watching the sprouts kept in three different bowls. I had placed around 10 chickpeas in each bowl two days earlier and covered all of them. Observe how the chickpeas have changed in the bowls.

i. First bowl containing water**ii. Second bowl containing wet cloth or cotton****iii. Third bowl without water.*****Why have the seeds not sprouted in the third bowl?***

Because the third bowl does not have water.

It is clear that water is very essential for sprouting. The first bowl has water content. The second bowl has cloth that remained wet always.

Are the seeds getting air? How are they sprouting in the first and second bowl?

- The seeds do not get air in the first bowl. So the seeds have not sprouted in the first bowl. The seeds
- have sprouted in second bowl because the cloth allows air to pass through.

Just as how we humans need air for breathing, seeds also need air for breathing.

What is germination?

The process by which a seed grows into a seedling or young plant is called germination. During germination, the covering of the seed i.e, seed coat breaks and small parts of young plant come out of the seed.

Green gram germination:

What are the essential factors for germination?

We know that a seed needs air and water for germination.

Let's discuss in detail about the factors that are essential for germination and how each factor helps the hard seed to become a seedling.

1. WATER

Seeds are generally dry and have food in the form of starch, protein and oil stored in them. This food helps the seed for further growth.

The seed has to absorb water in order to become active because the enzymes within the seed become functional only after they get dissolved in water. The seed then begins to swell. That softens the seed coat and the process of germination starts.

2. TEMPERATURE

The common temperature for germination is between 65 to 75 degree Fahrenheit. But exceptions may occur. e.g: Lettuce germinates best at 65°F, while peppers and eggplants prefer warmer temperature around 80°F and will not germinate well at cooler temperature. So the temperature varies from seed to seed. It depends upon the seed type.

3. OXYGEN

Oxygen present in air is required for breathing, which is the main source of the seedling's energy until it grows into leaves. Seed finds oxygen through the pores in the soil.

4. LIGHT

Many seeds are not affected by light or darkness. They remain inside the soil mostly. But the seedlings that come out into the open air require sunlight to grow further.

Notes to the teacher for demonstration:

1. Soak around 10 chickpeas in each of three bowls as shown in the images three days prior to the day of demonstration.
2. Maintain the cloth or cotton in the second bowl wet by watering often.

Source of images:

1. First bowl : Original (Self clicked) aravindansaideepa0@gmail.com
2. Second bowl: Original (Self clicked) aravindansaideepa0@gmail.com
3. Third bowl: Original (Self clicked) aravindansaideepa0@gmail.com
4. Greengram germination: Original (Self clicked) aravindansaideepa0@gmail.com

Time to teach	Asset Type	Theme	SubTheme
10 Minutes	Main Script	Plants	Germination, Germination

5. Seeds and seed cover

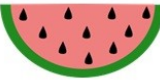
1. Question: I grow into a beautiful baby plant when you rest me in soil. Who am I? Where do you usually find me?

Suggested Answer: Seed and found inside fruits.



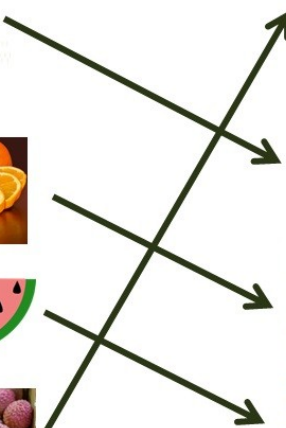
2. Question: Can you match the seeds with the fruits they are found in?

Match me:

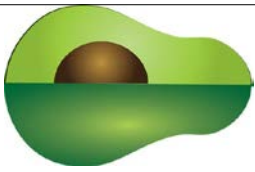
	A	B
1		
2		
3		
4		

Suggested Answer:

Match me:

	A		B	
1				4
2				1
3				2
4				3

3. Question: Why am I so nicely covered by the seed cover?



Suggested Answer: To protect the baby plant inside me from injury and harsh climatic conditions.

4. Question: Do all the seeds have seed covers like I do?

Suggested Answer: No, seeds of “naked-seeded plants” do not have seed covers.



Conifer seeds



Cycas seeds

5. Question: Are all seed-covers/fruits fleshy? Can you name a few that aren't?

Suggested Answer: No. Cashewnut/paddy/maize/castor.

6. Question: What about the seeds of fruits that are not fleshy and juicy??(Like, pea seeds). How do they come out of their seed cover and grow?

Suggested Answer :The fruit wall opens up on its own along ridge-like areas to release the seeds. They fall to the ground and grow into plantlets.



Peas with cover

7. Question: If a mango tree bears 400 mangoes and all of them fall to the ground under the tree, can 400 mango trees grow in that area?

Suggested Answer: No, they will compete for space, soil, water, sunlight etc. and very few will actually survive.

8. Question: Can you guess why most fruits are fleshy, tasty and juicy?

Suggested Answer:It is in fact, one of the master plans of Nature! They are taken by animals like monkeys, birds, bats, humans etc, as food and their seeds are thrown away. This is how the mature seeds, free from their covers, are distributed in all directions, up to huge distances from the parent plant. Wastage of seeds is prevented as the future plants get a chance to be spread out over a wider area.

Source of images:

1. Watermelon with seeds: <https://pixabay.com/illustrations/watercolor-watermelon-watermelon-5250895>
2. Mango fruit: <https://pixabay.com/vectors/mango-fruit-food-natural-summer-42898/>
3. Orange fruit: <https://pixabay.com/photos/oranges-fruits-fruit-3919388/>
4. Watermelon fruit: <https://pixabay.com/vectors/slice-fruit-watermelon-summer-48655/>
5. Litchi fruit: <https://pixabay.com/photos/litchi-fruit-food-sweet-fresh-3653171>
6. Litchi seed: Original image: <https://pixabay.com/photos/lychee-litchi-nut-tree-3399362>
7. Mangoseed: <https://search.creativecommons.org/photos/76de1e28-29e6-4b5e-bb72-cac9f1635f74>:CCO 1.0
8. Orange seeds: <https://pixnio.com/flora-plants/seeds/lemon-seed-orange-citrus-fruit-seeds#>
9. Watermelon seeds: <https://www.publicdomainpictures.net/en/view-image.php?image=69021&picture=watermelon-seeds>: CCO 1.0
10. Avocado seed: <https://pixabay.com/vectors/avocado-half-cut-diet-food-fresh-1223228/>
11. Conifer seed: <https://pixabay.com/photos/pine-cones-seeds-conifer-evergreen-5013190/>
12. Cycas seed: <https://pixabay.com/photos/cycas-cycadaceae-sago-from-japan-4784716>
13. Peas with cover: <https://pixabay.com/photos/peas-pod-pea-pod-green-fresh-580333>

Time to teach	Asset Type	Theme	SubTheme
10 Minutes	Inquisitive Questions	Plants	Facts about Plants and Tree Plants and Trees

6. Love your parents

Plants cannot move around. Once they grow, they remain in the same place. But their seeds are great travellers! They can reach far and wide.

You can see, it applies to human life as well. Once you finish your studies and take up a full time career, you may have to move away from your home. And you travel a lot. But your parents who have become old enough, stay in one place. They are unable to move around. However, remember, they would love if you visit them and spend time with them.

Here is a story of an apple tree and a boy.

A long time ago, there was a huge apple tree. A little boy loved to come and play around it everyday. He climbed to the treetop, ate the apples and took a nap under the shadow. He loved the tree and the tree loved to play with him. Time went by. The little boy had grown up and he no longer played around the tree every day.

One day the boy came back to the tree and he looked sad. 'Come and play with me', the tree said to the boy. "I am no longer a child. I do not play around trees any more," the boy replied.

"I want toys. I need money to buy them."

'Sorry....but I do not have money, but you can pick all my apples and sell them. So, you will have money.'

The boy was so excited. He grabbed all the apples on the tree and left happily. The boy never came back after he picked the apples.

The tree was sad.

One day the boy who now turned into a man returned and the tree was excited.

'Come and play with me' the tree said.

"I do not have time to play. I have to work for my family. We need a house for shelter. Can you help me?" 'Sorry.... but I do not have any house. But you can chop off my branches to build your house.'

'So the man cut all the branches of the tree and left happily. The tree was glad to see him happy but the man never came back since then. The tree was again lonely and sad.

One hot summer day, the man returned and the tree was delighted.

'Come and play with me!' the tree said.

'I am getting old. I want to go sailing to relax myself, can you help me build a boat?' said the man. "Use my trunk to build your boat. You can sail far away and be happy."

So the man cut the tree trunk to make a boat. He went sailing and never showed up for a long time.

Finally, the man returned after many years. 'Sorry, my boy. But I do not have anything for you anymore. No more apples for you', the tree said.

"No problem, I do not have any teeth to bite' the man replied.

'No more trunk for you to climb on.'" 'I am too old for that now.'" The man said.

"I really cannot give you anything, the only thing left is my dying roots,' the tree said with tears. "I do not need much now, just a place to rest. I am tired after all these years,' the man replied. 'Good! Old tree roots are the best place to lean on and rest. Come sit down with me and rest.' The man sat down and the tree was glad and smiled with tears.

This is a story of everyone. The tree is like our parents. When we were young, we loved to play with our Mum and Dad. When we grow up, we leave them... only come to them when we need something or when we are in trouble. No matter what, parents will always be there and give everything they could just to make you happy.

Time to teach	Value Type	Value Sub Type	Value Attribute
10 Minutes	Love		Stories

7. Plants that grow without seeds

Baby plants

Many plants produce seeds to give rise to baby plants. Are there plants that form new ones without seeds?

You must have observed your mother discarding potatoes with tiny green sprouts on them as they are not fit for eating.



Potato with buds

If small sections of such potatoes containing buds or eyes are planted on soil, they will grow into whole new potato plants. The buds use the nutrients stored in the starchy portion of potato tuber to sprout.

Thus, new plants can grow from other parts of the parent plant without seeds.

I Plants that grow from other parts naturally:***i. By Stems:***

- Potato and onion plants have underground stems that produce buds to develop into young ones.

**Onion plant**

- Strawberry plants send out runner stems that have buds at their ends. These runners grow horizontally above the ground and new plants arise from buds.

**Straw berry plant*****ii. By Leaves:***

- Bryophyllum plants develop plantlets on the edges of its leaves.

**Bryophyllum plant**

- Begonia plants form plantlets on the veins of its leaves.

**Begonia plant*****iii. By Roots:***

Sweet potato plants and dahlia plants have enlarged food storing roots which produce buds. The side buds at the stem base grow into new plants.



Sweet potato plant

II Plants that are grown from other parts artificially:

Farmers grow new plants from other different parts of old plants without seeds. They use simple methods such as cutting the different parts of the plants and sowing them in nutrient rich soil.

Ex: Rose, Hibiscus, Sugarcane and Money plants are grown easily by stem cuttings.

III Plants that produce spores:

Some plants like mushroom, ferns and mosses are non-flowering plants that produce spores instead of seeds. Spores are tiny structures that are scattered by wind. They grow into new plants after falling on damp soil.



Ferns with spores

Source of images:

1. Potato with buds: Original contribution (saivij9@gmail.com)
2. Onion plant: <https://ccsearch.creativecommons.org/photos/c4016c99-f7f8-4d24-93c5-64f820911faa>
3. Strawberry plant: Original contribution (laavanyasai@gmail.com)
4. Bryophyllum plant: Original contribution (saivij9@gmail.com)
5. Begonia plant: <https://ccsearch.creativecommons.org/photos/fad42634-6095-4bd7-8500-6edeb1ec4900>
6. Sweet Potato plant: <https://pixabay.com/photos/vegetable-sweet-potato-sprouting-5341298/>
7. Ferns with spores: <https://ccsearch.creativecommons.org/photos/0ae25ccf-cef1-42b1-9c6b-90cfaa1f7410>

Time to teach	Asset Type	Theme	SubTheme
5 Minutes	Main Script	Plants	Types of Plants, Types of Pl

8. Hunting plants

Insectivorous plants

We have heard that some insects feed on plants. But have you heard of plants that feed on insects? They are insectivorous plants that trap insects and even frogs and feed on them.

How do they attract insects?

These plants have special features to attract insects like:

- bright and shiny appearance sweet
- smell
- flavoured nectar.

How do they trap the insects?

The attracted insects are quickly drawn inward by many tricks.

i. Quick acting snap trap as in Venus fly trap.

The leaves snap shut usually after an insect touches the sensitive hairs twice.



Venus fly trap

Please show the video: Gory nature: A Venus fly trap gets its lunch.

ii. Pitfall trap as in Pitcher plant.

The leaves are modified to form large cups of liquid with a lid. The insects slide and fall into the liquid and cannot come out of the slippery well.



Pitcher plant

iii. Fly-paper trap with sticky hairs as in Sundews.

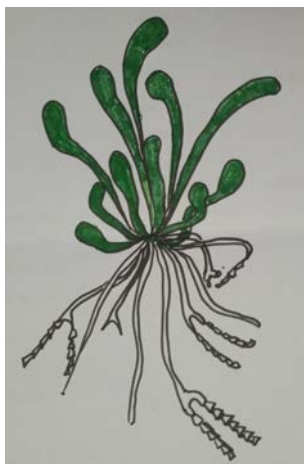
The leaves have glue-like substance on their tips that resemble rain drops and engulf the insects that get stuck.



Sundews

iv. Lobster pot traps as in Cork-screw plant

The Y-shaped leaves force the insects to enter a digestive chamber and do not allow them to exit.



Cork screw plant

How do they use the insects?

- Once the insects are swallowed, these plants secrete digestive juices that dissolve the body parts and draw the nutrients from them.
- One large insect is enough for these plants to sustain for a long time.

The seeds of these plants take a very long time to grow and are not often dispersed by insects. So, when leaves fall on fertile soil with a root at the base, they grow into a new plant easily.

Source of images:

1. Venus fly trap: <https://pixabay.com/en/venus-fly-trap-carnivorous-plant-962575>
2. Pitcher plant: https://commons.wikimedia.org/wiki/File:Sarracenia_pitcher_anatomy_basic.svg – Public Domain
3. Sundews: <https://pixabay.com/photos/sundew-drosera-carnivorous-4206807/>
4. Cork screw plant: Original Contribution - saivij9@gmail.com

Time to teach	Asset Type	Theme	SubTheme
3 Minutes	Interesting Asides	Plants	Parts of a Plant, Parts of a P

9. Sorting of seeds

Aim:

The student will be able to sort the seeds based on size, shape, colour and texture.

Resources Required:

i. Any one of the following type of seed per student:

1. Green gram (Moong Dal)
2. Red lentils (Masoor Dal)
3. Kidney beans (Rajma)
4. Black gram (Uraddal)
5. Horse gram (Kulthi)
6. White Chick peas (Safed Channa)

7. Brown Chick peas (Kala Channa)
8. Pearl millet (Bajra)
9. Soy beans
10. Moth peas (Matki)
11. Rice grains
12. Sesame seeds (Til)
13. Coriander seeds (Dhaniya)
14. Fenugreek seeds (Methi)
15. Ground nuts
16. Badam nuts
17. Cashew nuts
18. Fennel seeds (Saunf)
19. Chilli seeds
20. Pepper seeds (Kali mirch)
21. Pumpkin seeds (Kaddu)
22. Green peas (matar)
23. Yellow pigeon peas (Toor dal)
24. Black eyed peas (Lobhia)
25. Sweet corn
26. Cardamom seeds (Elaichi)
27. Chia seeds (Sabja)
28. French beans.
29. Mango seeds
30. Apple seeds
31. Lemon seeds
32. Papaya seeds
33. Tomato seeds
34. Sunflower seeds

ii. Fevicol

iii. White charts -4

iv. Piece of silk or satin cloth

v. Piece of jute or denim cloth or canvas.

vi. Markers.

vii. Hand lens

Setting for the Activity [Indoor/Outdoor] INDOOR

Type of Activity: [Demonstration / Experiment/ Field Trip/ Project] PROJECT

Procedure:

Instructions to the teacher:

The students should be instructed to start collecting seeds three days prior to the day of activity. They can choose one type of seed that is easily available from the given list to avoid repetition amongst themselves.



Lemon seeds, French bean seeds, Chilli seeds, Tomato seeds

1. The class could be divided into 4 groups.
2. The seeds brought by students could be collected at one table in the class. The teacher shall then evenly distribute all types of seeds amongst the groups for sorting.
3. The students shall be given few minutes' time to spend looking at the seeds with the hand lens and touching them to analyse and observe the shape, size, texture and colour of seeds.
4. Each group would be asked to sort seed samples based on any one of the following criteria:

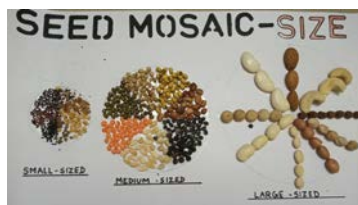
- Shape
- Size
- Texture
- Colour.

- 1) The students shall stick the seeds with glue and create new designs to make a colourful display by grouping them according to the given criteria.
- 2) Each group would be given charts where they would stick the seeds in patterns as given below:

i. **Shape group:** The following basic shapes of seeds can be drawn on the chart.



ii. **Size group:** Three circles could be drawn to represent small, medium and large sizes of seeds on the chart.



iii **Texture group:** Soft satin or silk cloth and canvas or denim cloth could be pasted on the chart to represent soft and rough texture of seeds.



iv. **Colour group:** A simple design should be drawn that has many compartments to represent different colours on the chart.



- 1) The students shall incorporate as many types of seeds in their seed mosaic as possible if not all.
- 2) At the conclusion of this activity, a representative of each group should explain their seed patterns and summarise how they sorted the seeds.

Note to the teacher:

- The teacher can bring certain seeds like sunflower seeds from shops to supplement the seeds brought from home to include variety.
- The teacher can use the local vernacular names of seeds for allotment as the students can easily identify and procure them.
- The teacher can reuse polythene covers or empty assorted chocolate boxes or transparent plastic bottles or egg carton box for easy distribution of seeds to the different groups.
- The teacher can allot one or more type of seeds for each student depending on the class strength. A minimum of 20 types of seeds per group will make the sorting activity an enriching experience.
- The teacher can demonstrate how to sort and stick seeds on the chart to each group for better clarity.
- The teacher should ensure that students handle the chilli seeds without touching their eyes and wash hands as they finish sticking seeds.
- The seed mosaic charts can be displayed in the notice board for everyone to learn.

Source of images:

Original contribution (saivij9@gmail.com), (laavanyasai@gmail.com)

Time to teach	Asset Type	Theme	SubTheme
20 Minutes	Suggested Activity	Plants	Parts of a Plant, Parts of a P

iv. Seeds on the move

SEED

A seed contains an embryo (baby plant) deep inside. The seed has everything it needs to sprout in a new location and then grow into a big plant.

WHAT IS SEED DISPERSAL?

Seeds need to spread themselves away from the parent plant to stop overcrowding. The movement or transport of seeds away from the parent plant is called seed dispersal.

WHY DO SEEDS NEED TO DISPERSE?

All plants need sun, water, space in order to grow. A seed cannot get these things if it falls immediately below the parent plant because the parent plant is already using the resources available in that location. Therefore, seeds need to find a new location in order to find the resources available for growth. This relocation is known as dispersal.

Seeds lack the fundamental structures and innovations animals use, to move from one place to another.

As such, seeds have developed different ways to travel and reach new locations. Seeds get scattered by:

- i. Wind
- ii. Water
- iii. Animals
- iv. Fire
- v. Explosion.

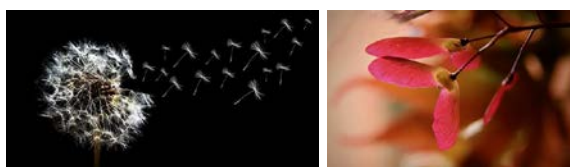
DISPERSAL BY WIND

Have you seen any seed that can fly? You must have ran behind and tried to catch them as they fly. Some seeds use wind power to transport them from one place to another.

Seeds that are dispersed by wind have several modifications:

- They are usually lighter and smaller than the other seeds. This makes it easy for the wind to carry them.
- They have special structures that catch the air, such as wings or fluff. These parachute-like structures allow the seed to travel far distances.

Winged seeds such as those produced by maples can travel about 180 metres while some seeds of dandelion can travel over 500 miles.



Maple seeds Dandelion seeds

DISPERSAL BY WATER

Have you observed the coconut covered with a shiny and light shell? It is for travelling on water to different locations. Some plants that grow in water or near water, use water to disperse their seeds. Such seeds are waterproof and have fluff and other corky structures to help them stay afloat in water.

- Lilly seeds float on water for a while and sink to bottom of the ponds to grow new lilies.

**Lilly seeds**

- Seeds of Palm trees that grow near oceans are carried away by ocean currents over long distances, allowing the seeds to be dispersed as far as other continents.
- In special case of coconuts, the waterproof wooden casings allow them to be transported to extremely long distances in salt water.



Coconut dispersed from one place to another by floating in water.

DISPERSAL BY ANIMALS

You might have seen cartoons of squirrels carrying acorns and hiding them for later use by burying them. These squirrels actually help the acorns to spread themselves and get them planted as well. There are several ways that plants use to get animals to carry their seeds.

1. Fruits have bright colour and nutrient rich flesh that attract birds and mammals to eat them. The animals then disperse the seeds when they defecate or spit them.
2. The seed itself becomes an attractive food item for an animal that likes to cache food for winter Eg: Squirrels. Any seed the animal forgets has the opportunity to germinate into a new plant.
3. Seeds can develop special structures such as prickly hairs or hooks that allow them to get stuck in an animal's fur and get carried away to new locations.

DISPERSAL CAUSED BY FIRE

Plants cannot run away from a fire, so some plants have developed a way to help their seeds survive. There are some species of pine tree that require the heat from a fire before their cones will open and release seeds. Eucalyptus and other Australian plants depend on fire.

DISPERSAL BY EXPLOSION

Have you heard of cracker plants that explode their pods when sprinkled with water? Watch the video to see the explosion:

(The video -Cracker seed with sound_Final.mp4 can be shown to the students).

The seeds remain in the pod and as the pod dries out, it eventually bursts expelling seeds in every direction. Some plants of peas, balsam and flax open their fruit walls by a sudden force when they are ripe.



Opened Pea pods

Source of images:

1. Maple seeds: <https://pixabay.com/photos/maple-japanese-maple-red-4239849>
2. Dandelion seeds: <https://pixabay.com/photos/dandelion-close-up-seeds-333643>
3. Lilly seeds: <https://www.pikist.com/free-photo-xqzgt>
4. Coconut dispersed from one place to another by floating in water: <https://www.pikist.com/free-photo-xjado>
5. Pea pod: <https://pixabay.com/illustrations/pod-peas-pods-png-855267/>

Time to teach	Asset Type	Theme	SubTheme
10 Minutes	Main Script	EVS_Agriculture	Dispersal of Seeds, Dispers

11. Germination and Dispersal of seeds

1. What is germination?

Answer: Germination is a process by which a plant grows from a seed.

2. What happens to the hard seed during the process of germination?

Answer:

- The seed swells up as it absorbs water and becomes active. The seed coat gets softened.
- The seed uses oxygen for breathing.
- Small parts come out of the seed above the soil. Thus the seed gets germinated into a seedling.

3. What are the different types of dispersal of seeds?

Answer: Different types of dispersal are:

- Wind
- Water
- Animals
- Fire
- Explosion.

4. Can you guess the tree that has little helicopter seeds?

Answer: Maple tree.

5. Can you guess the type of dispersal of maple seeds?

Answer: Wind.

6. Can you guess the type of dispersal of water lily seeds?

Answer: Water.

7. What mode of dispersal of seed does the picture represent?



Answer: Dispersal of seeds by animals.

8. How do animals help in seed dispersion? Answer:

- Animals get attracted to fleshy fruits, ingest them and defecate the seeds elsewhere.
- Hooks or spines are present which attach the seeds to the animals' fur and get dropped by them in a new location.
- Some animals such as squirrels and rodents collect and bury the seeds in different areas.

9. All seeds need _____, oxygen and the right temperature to _____ or grow.

C	J	C	M	X	S	H	G
M	O	I	S	T	U	R	E
P	S	B	V	L	N	X	R
A	A	C	I	Z	L	F	M
U	B	R	O	K	I	Y	I
N	W	Y	E	V	G	Q	N
O	X	D	Z	N	H	P	A
E	H	R	R	W	T	N	T
P	T	Z	I	Q	K	G	E

Answer :

All seeds need moisture, oxygen and the right temperature to Germinate or grow.

C	J	C	M	X	S	H	G
M	O	I	S	T	U	R	E
P	S	B	V	L	N	X	R
A	A	C	I	Z	L	F	M
U	B	R	O	K	I	Y	I
N	W	Y	E	V	G	Q	N
O	X	D	Z	N	H	P	A
E	H	R	R	W	T	N	T
P	T	Z	I	Q	K	G	E

10. Some seeds need _____ to germinate. Others need darkness.

C	J	C	M	X	S	H	G
M	O	I	S	T	U	R	E
P	S	B	V	L	N	X	R
A	A	C	I	Z	L	F	M
U	B	R	O	K	I	Y	I
N	W	Y	E	V	G	Q	N
O	X	D	Z	N	H	P	A
E	H	R	R	W	T	N	T
P	T	Z	I	Q	K	G	E

Answer :

10. Some seeds need sunlight to germinate. Others need darkness.

C	J	C	M	X	S	H	G
M	O	I	S	T	U	R	E
P	S	B	V	L	N	X	R
A	A	C	I	Z	L	F	M
U	B	R	O	K	I	Y	I
N	W	Y	E	V	G	Q	N
O	X	D	Z	N	H	P	A
E	H	R	R	W	T	N	T
P	T	Z	I	Q	K	G	E

11. Seeds don't grow well if they land right underneath the _____ plant.

C	J	C	M	X	S	H	G
M	O	I	S	T	U	R	E
P	S	B	V	L	N	X	R
A	A	C	I	Z	L	F	M
U	B	R	O	K	I	Y	I
N	W	Y	E	V	G	Q	N
O	X	D	Z	N	H	P	A
E	H	R	R	W	T	N	T
P	T	Z	I	Q	K	G	E

Answer:

Seeds don't grow well if they land right underneath the parent plant.

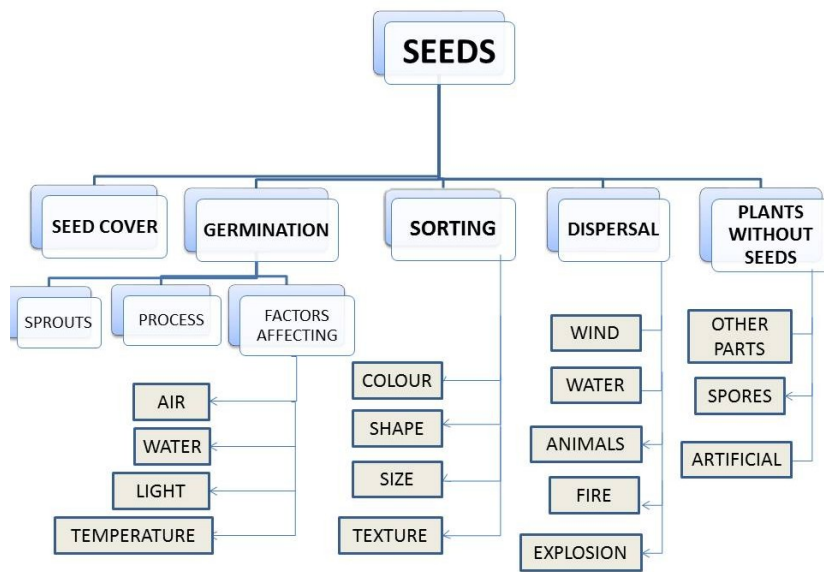
C	J	C	M	X	S	H	G
M	O	I	S	T	U	R	E
P	S	B	V	L	N	X	R
A	A	C	I	Z	L	F	M
U	B	R	O	K	I	Y	I
N	W	Y	E	V	G	Q	N
O	X	D	Z	N	H	P	A
E	H	R	R	W	T	N	T
P	T	Z	I	Q	K	G	E

Source of images:

1. Squirrel: SSSVV Gallery

Time to teach	Asset Type	Theme	SubTheme
10 Minutes	Assessments	EVS_Agriculture	Germination of Seeds, Disp Germination of Seeds, Disp

12. MS_Summary_Seeds and seeds



Time to teach	Asset Type	Theme	SubTheme
15 Minutes	Main Script	EVS_Agriculture	Germination of Seeds, Disp Germination of Seeds, Disp