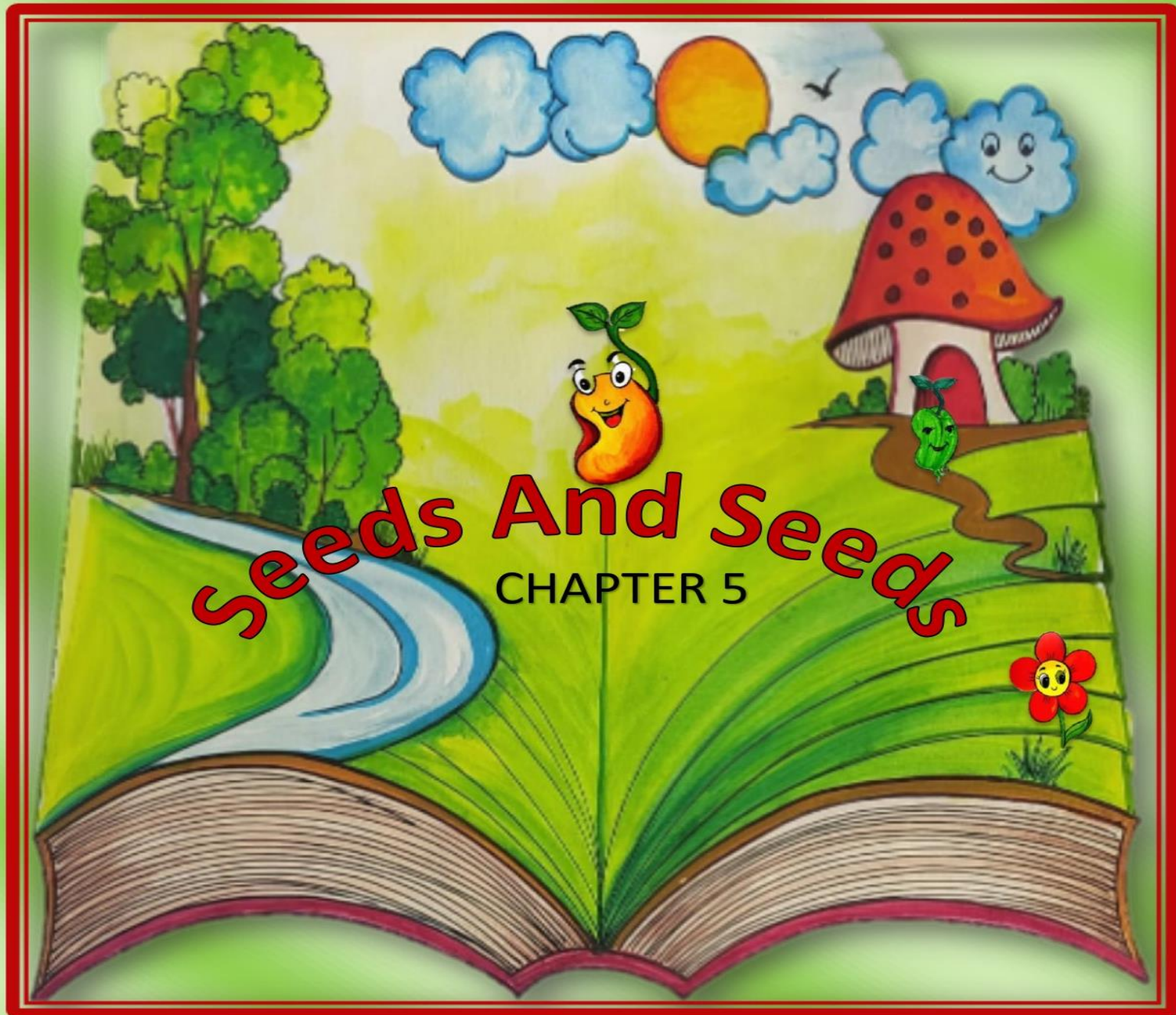


CLASS 5

NCERT ENVIRONMENTAL STUDIES

LOOKING AROUND



K. L. INTERNATIONAL SCHOOL, MEERUT
(Affiliated to Central Board of Secondary Education)

ACKNOWLEDGEMENT

In the accomplishment of this novel, the team has bestowed the optimum support. We extend our special gratitude to the Principal, Mr. Sudhanshu Shekhar who provided us a platform to execute this idea and encouraged us to do our best.

We extend our heartfelt thanks to Mr. Sandeep Sethi (Director Education, M.S.M.S.II, Museum Trust) for providing us the golden opportunity to do this task. It's because of his prestigious mentorship that an influential novel could be created.

Vision	Mr. Sandeep Sethi (Director Education, M.S.M.S.II, Museum Trust) Mr. Sudhanshu Shekhar (Principal, KLI School, Meerut)
Advisory Body	Mr. Sandeep Sethi (Director Education, M.S.M.S.II, Museum Trust) Mr. Sudhanshu Shekhar (Principal, KLI School, Meerut) Ms. Sandhya Singhal (Coordinator III-V wing)
Training and Ideation	Mr. Sandeep Sethi (Director Education, M.S.M.S.II, Museum Trust)
Concept, Script, Dialogues and Editing	Ms. Rashi Chawla (PRT) Ms. Surabhi Singh (PRT) Ms. Alka Gaur (PGT)
Art Support	Ms. Punam Singhal (PRT) Ms. Malvika Singhal(TGT)
IT Support	Ms. Archana Chauhan (PRT) Ms. Aarushee (PRT)

INDEX

<u>CONTENTS</u>	<u>PAGE NO.</u>
1) Preface	1
2) Learning Outcomes	2
3) Story Board	3
4) Characters	4
5) Introduction	5
6) Seed Structure	7
7) Seed Germination	17
8) Seed Dispersal	29
9) Worksheet	43
10) Glossary	49
11) Bibliography	50
12) Disclaimer	51
13) Summary	52
14) From The Principal's Desk	53



To access the comic book and additional interactive digital content, download DIKSHA app from Google Play Store on your android smart phone or tablet. And scan the QR code using DIKSHA app.



0529CH05



Preface

Seeds and Seeds is a graphic novel which aims to create the interest of students in the structure and development of seeds.

In this chapter, we have explained the structure, germination process and dispersal of the seeds through a story of a little boy who is very inquisitive about the journey of a seed to a plant.

Our teams of subject experts, IT teachers and Art teachers have put in their sincere efforts in developing this novel.

We hope our novel will be a valuable source of information for the learners and facilitators as well.



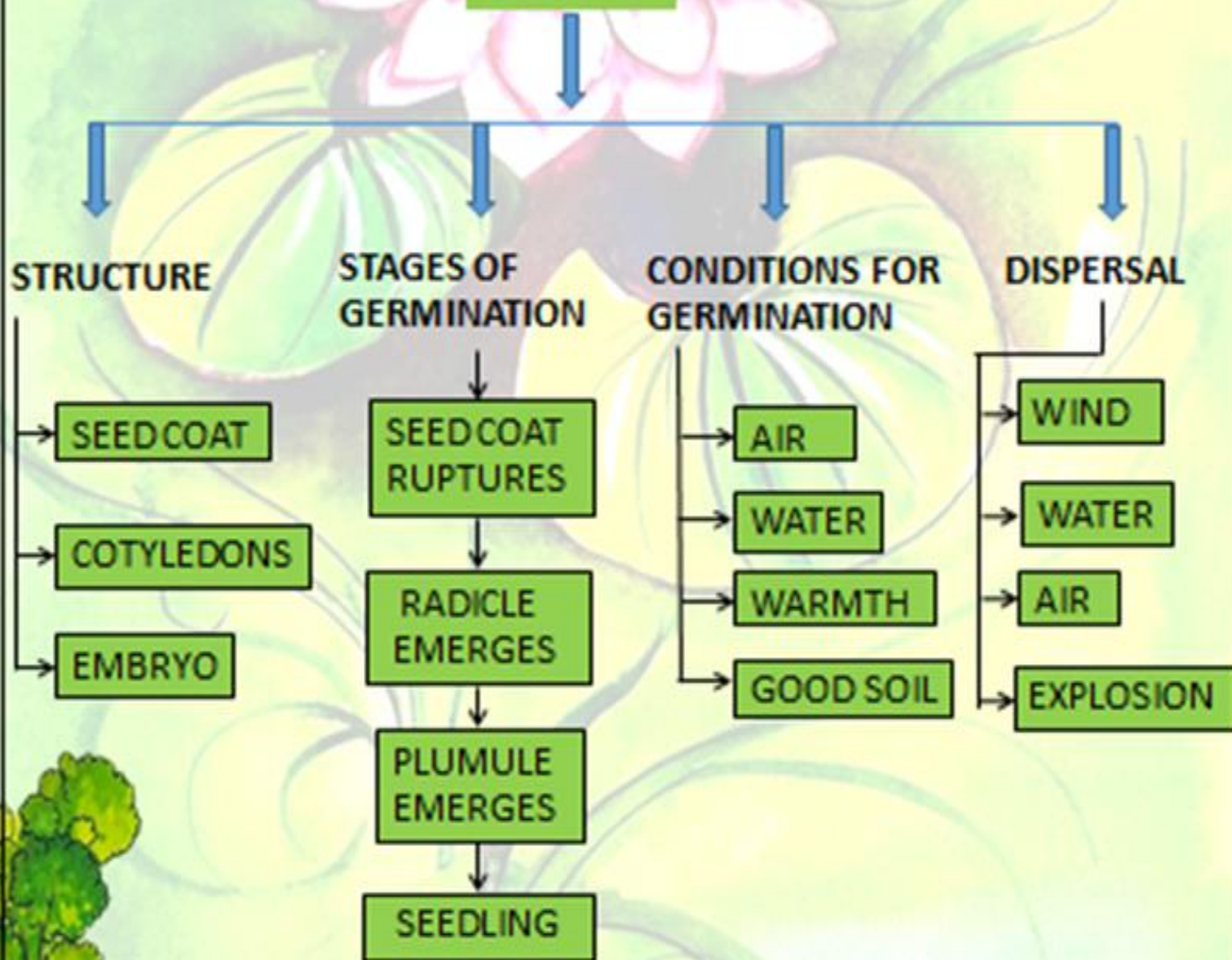
LEARNING OUTCOMES

- *Observes and shares experiences for different phenomena and conducts simple experiments and stages of seed germination*
- *Observes to infer the requirements of the plant for its growth*
- *Describes the interdependence among animals, plants and humans*
- *Encourages learners to grow plants*
- *Develops sensitivity towards saving our environment for better future*

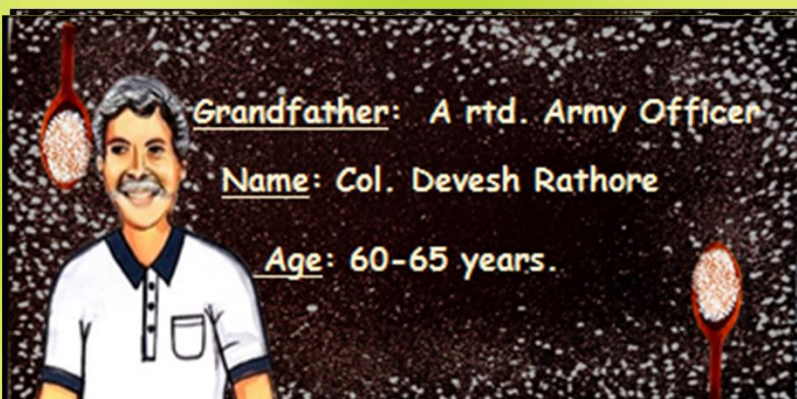
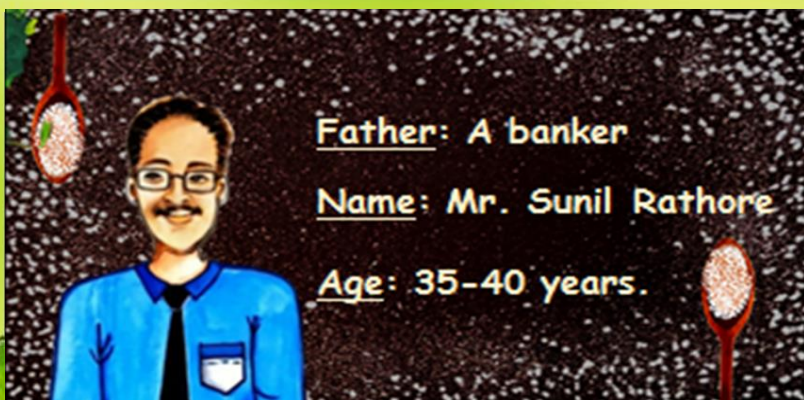
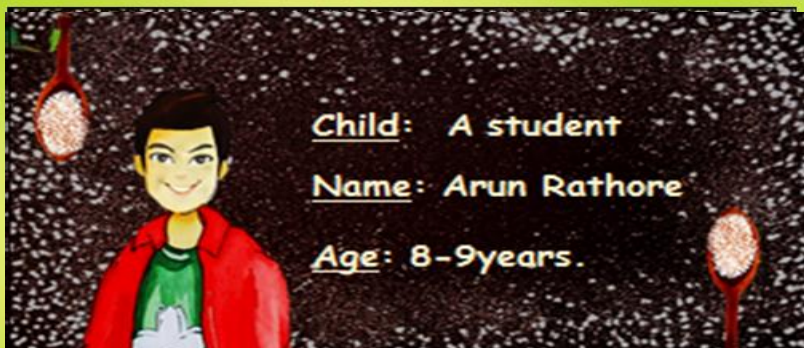


STORY BOARD

SEED



INTRODUCING CHARACTERS





INTRODUCTION



Arun is having his breakfast. His mother enters with a bowl of sprouts.



Arun looks at the bowl.

Arun, have some sprouts too.

Ma, you know I don't like eating them.



Mother sits on the chair near him

They are good for your health and morning is the best time to have them.



But Ma... they are not at all tasty. How can they make me healthy?



Every morning, they spoil the taste of my breakfast.



Okay, if you finish eating sprouts, I will show you how to make them.



I'm done. Now, show me how to make them?

Follow me.



Both move to the Kitchen



Mother takes a bowl and fills it with moong seeds.

Arun, moong seeds take less time to sprout as compared to other seeds.





SEED STRUCTURE



You make daal as sprouts! We daily eat them cooked. What's the difference?



Mother laughs, Arun gets confuse

Sprouts are more nutritious as they are rich in fibre, Vitamin B,C,K, minerals and proteins too!

That just went over my head!



Come over here and wash these Moong seeds.



While washing

Can we sprout all pulses?

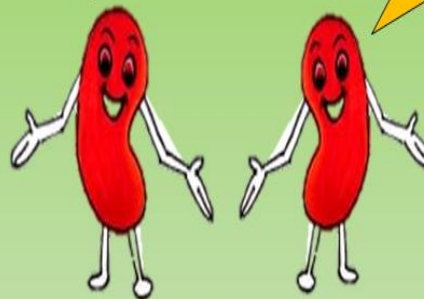


We can sprout **whole** seeds. They all take their time to sprout.

Moong seed is one of the winners in 'SPROUTRACE'.

Oh no! we cannot sprout now.

Yes, as we are now split, our sprouting capacity is lost.



TRY IT YOURSELF...

Take a few split gram (*chanas*) and a few whole gram (*chanas*) and observe which one sprouts.

All grains that we eat are seeds.

BLACK CHANA
(Brown chickpeas)

MOTTH
(Turkish gram)

MOONG
(Green gram)

RAJMA
(Kidney beans)

KABULI CHANA
(Garbanzo beans)

METHI DANA
(Fenugreek Seed)

I have washed them, now what?

Now, we will soak them. Fill the bowl with water and keep it aside for 7-8 hours.

After soaking, we keep them in a covered container for warmth and moisture.

But why?

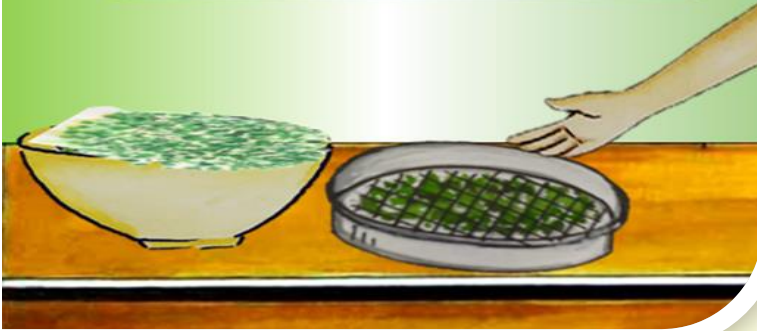
Mother pointing at the Moong seeds.

Right now they are hard, we have to soften them for sprouting.

Arun listens attentively.

Ma, the green outer part has broken in these sprouted seeds.

That's because when we soak them, the upper, hard layer which is called the 'seed coat' absorbs the water and swells up.



When the seed coat absorbs water, it provides water to the embryo.

Embryo?

What's that?



Every seed contains a baby plant called embryo, inside it.



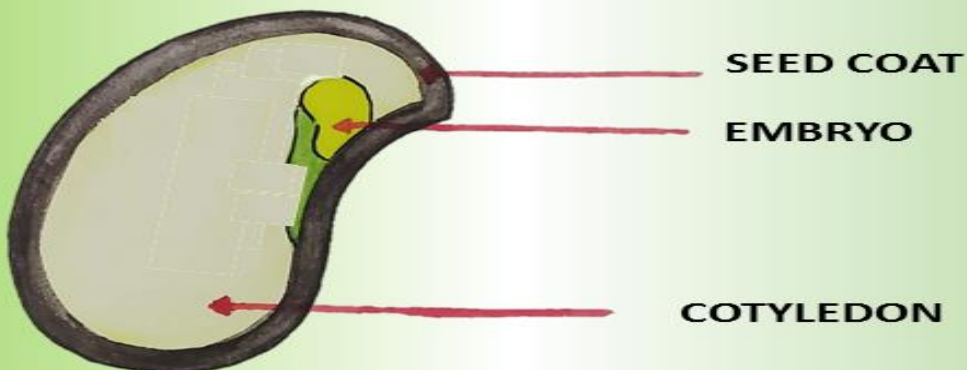
Arun looks surprisingly at the sprouted daal

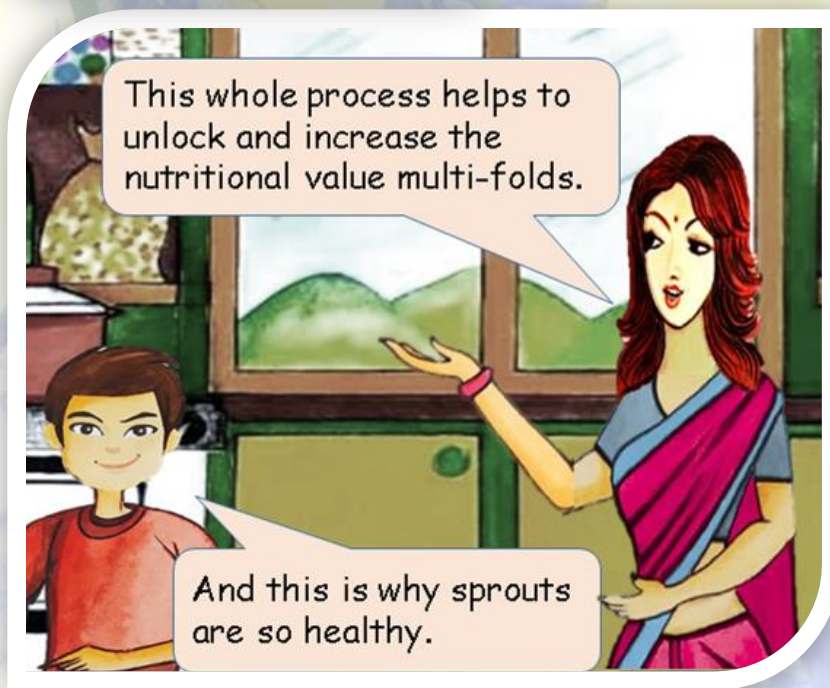
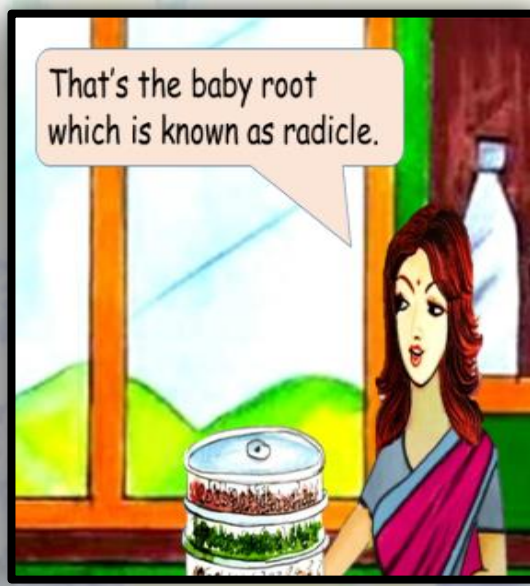
From where does this embryo gets its food?

It gets its nutrition from the fleshy seed leaves called the '*cotyledons*'.



STRUCTURE OF SEED





Father, Mr. Sunil enters the kitchen.

What's keeping you two busy today?

Learning how to sprout seeds papa. Ma knows so much about them.

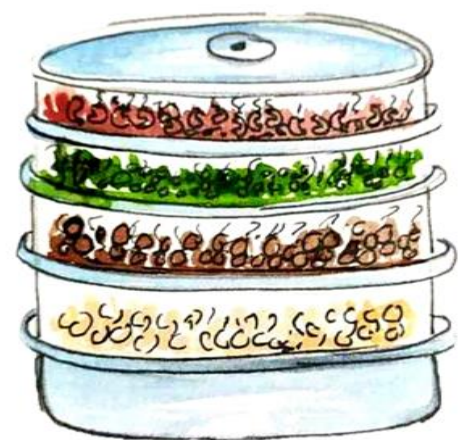
Good, I was planning to make the Sprout Chaat today.

Wow! that's great.

Are my ingredients ready Reena?

Yes Sunil, everything is ready.

Hands him the sprout maker.



Sprout Maker is full of many sprouts



We need



Now, I want you to mix all the sprouts in a bowl.

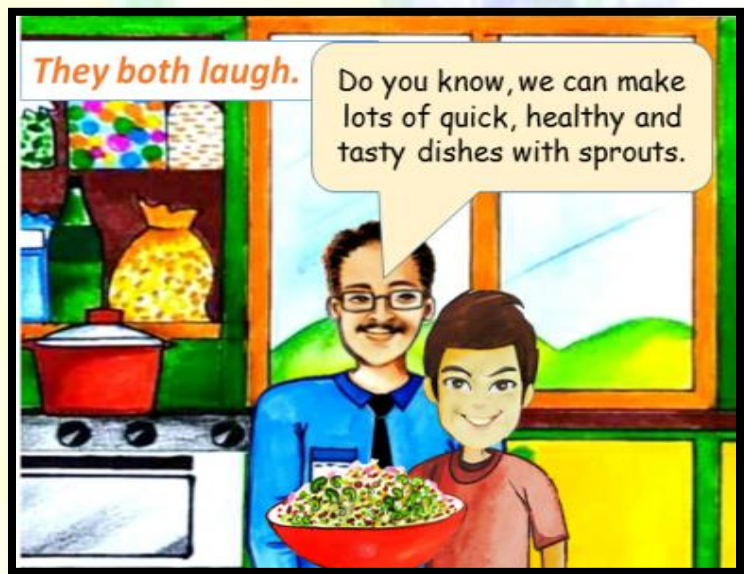
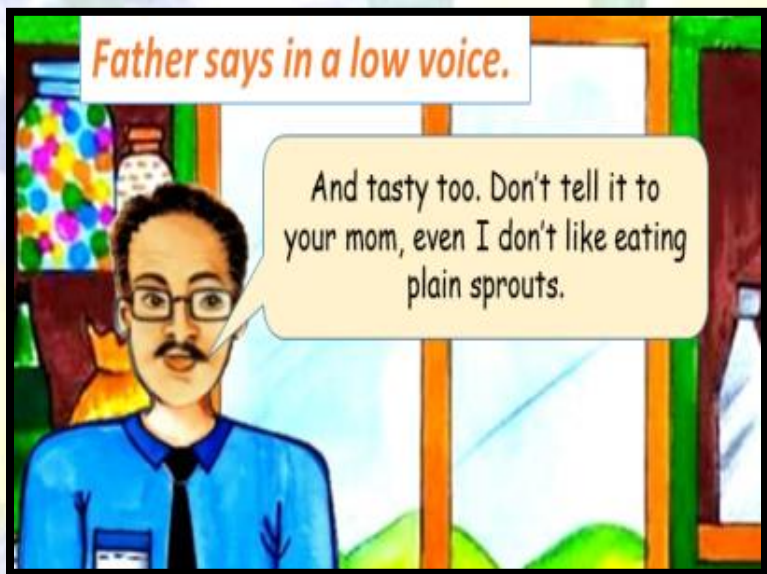


Arun does as instructed.

Now add chopped onion, tomatoes, both the chutneys, salt and pepper.

Wow papa! See how colourful it has become!





CRISPY
OMELETTE
BASKETS

LOW
CALORIE
BHEL PURI

MATKI
SALAD

METHI AND
MOONG
SPROUT
WRAP

SPROUTS
DHOKLA

MIX
SPROUTS
CORN CHAT

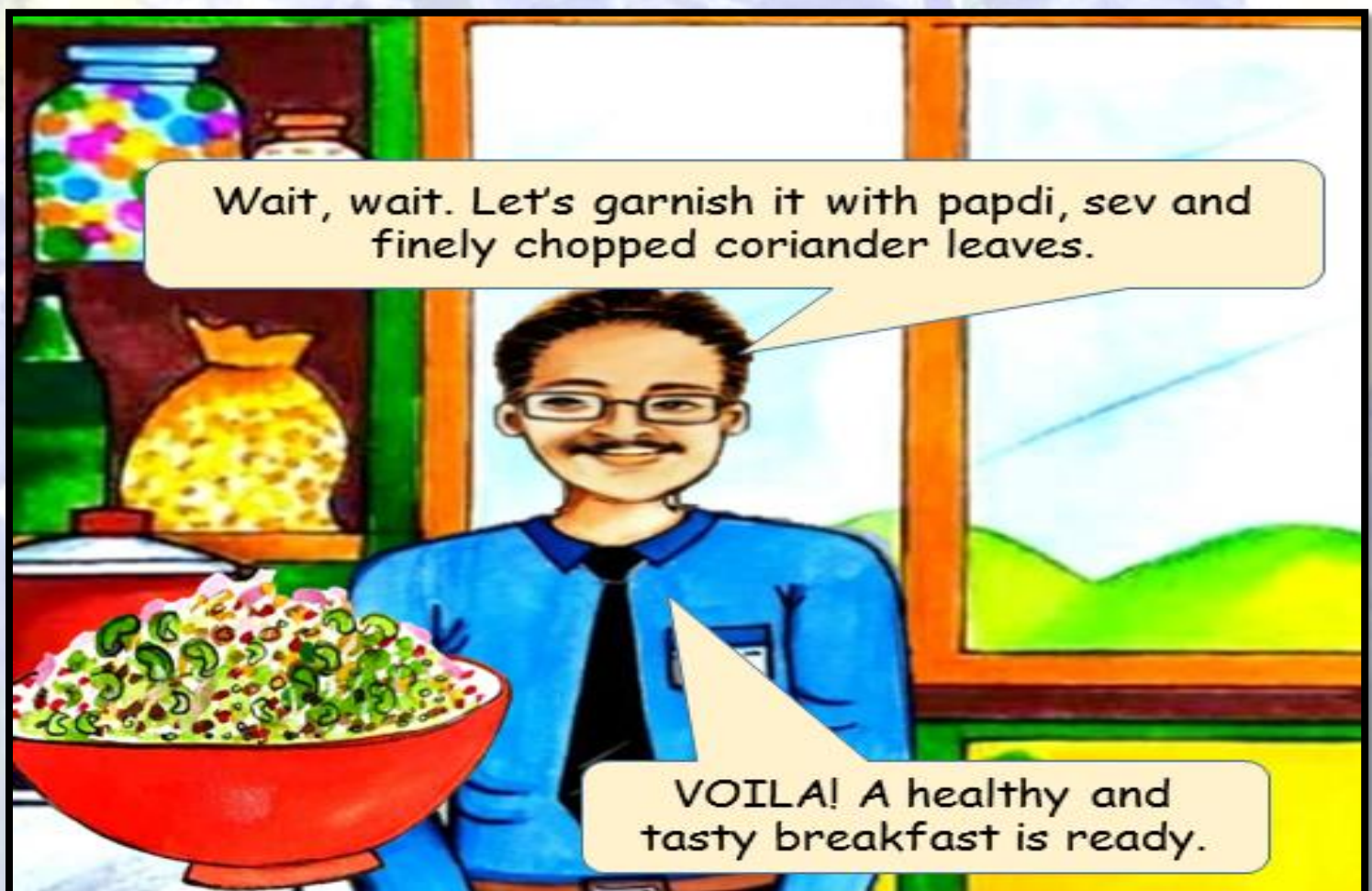
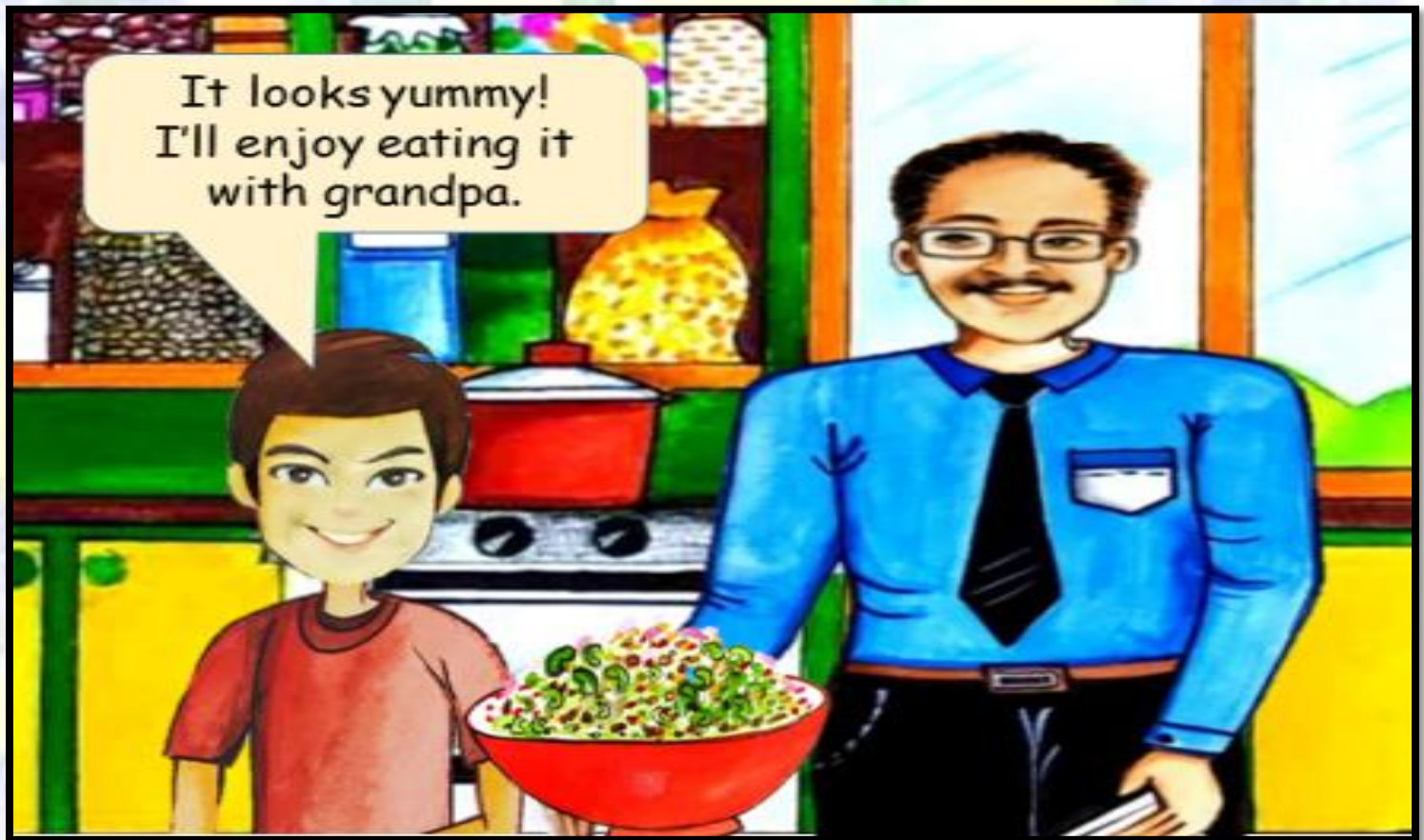
SPROUTS
JALFREZI

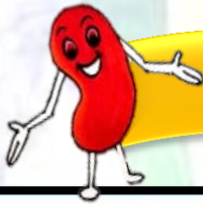


TRY IT YOURSELF

Make your own sprouts and prepare your favourite sprout dish. Garnish it and relish it with green chutney. Do share the recipe with your friends.







SEED GERMINATION



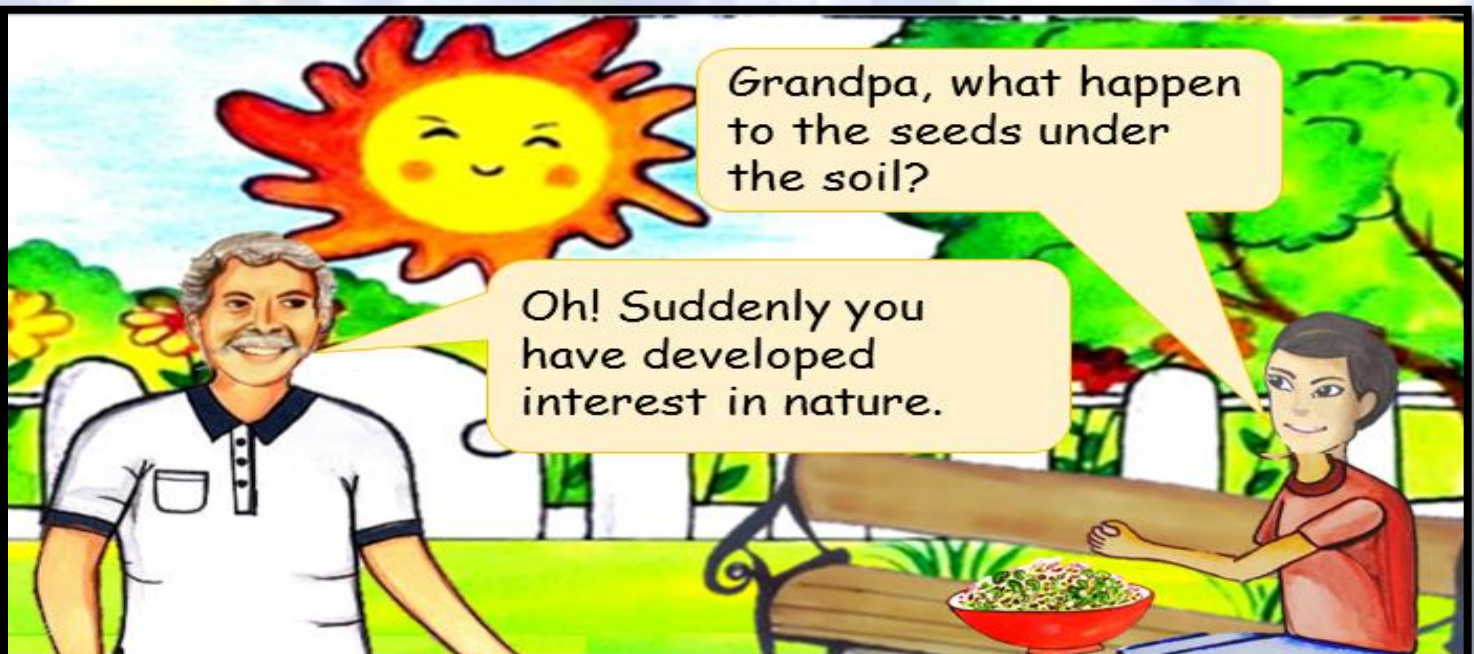
Grandfather, Rtd. Col. Rathore is watering the plants.

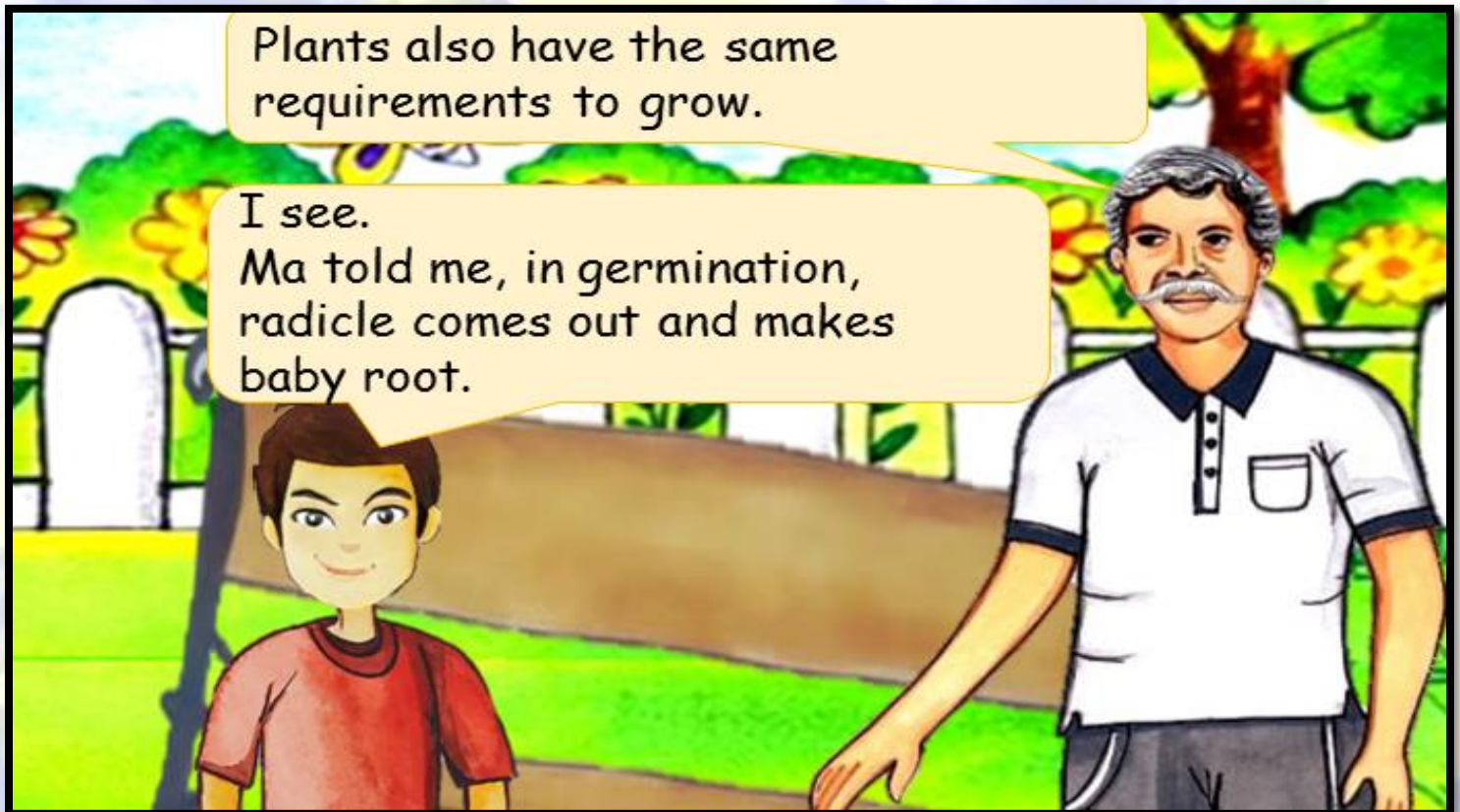
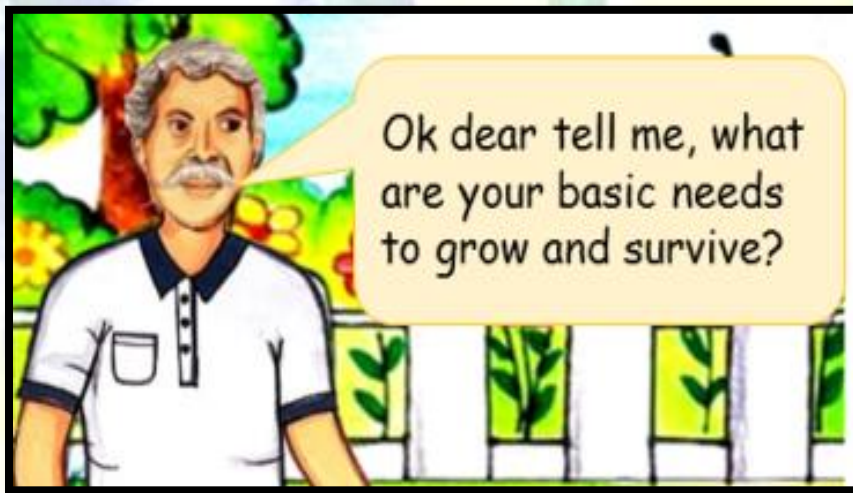


Arun comes to the garden with the bowl of sprout chaat.



Arun hands over the bowl to grandpa.





DO YOU KNOW??

Some seeds need light to germinate like poppies, lettuce etc. whereas some seeds germinate in darkness like marigold, tomato etc,



Arun and grandfather move towards the seed bed. Grand father gives a packet of seeds to Arun.

Take some marigold seeds and sow them in the soil.

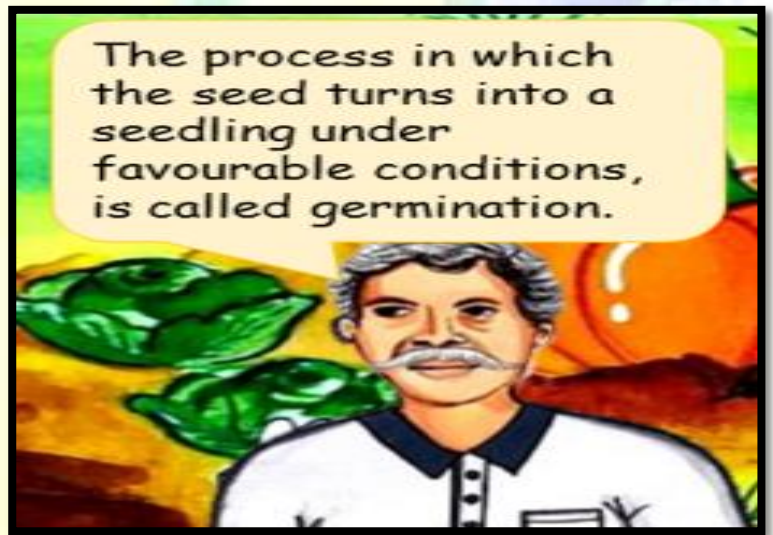


Arun sows the seeds.

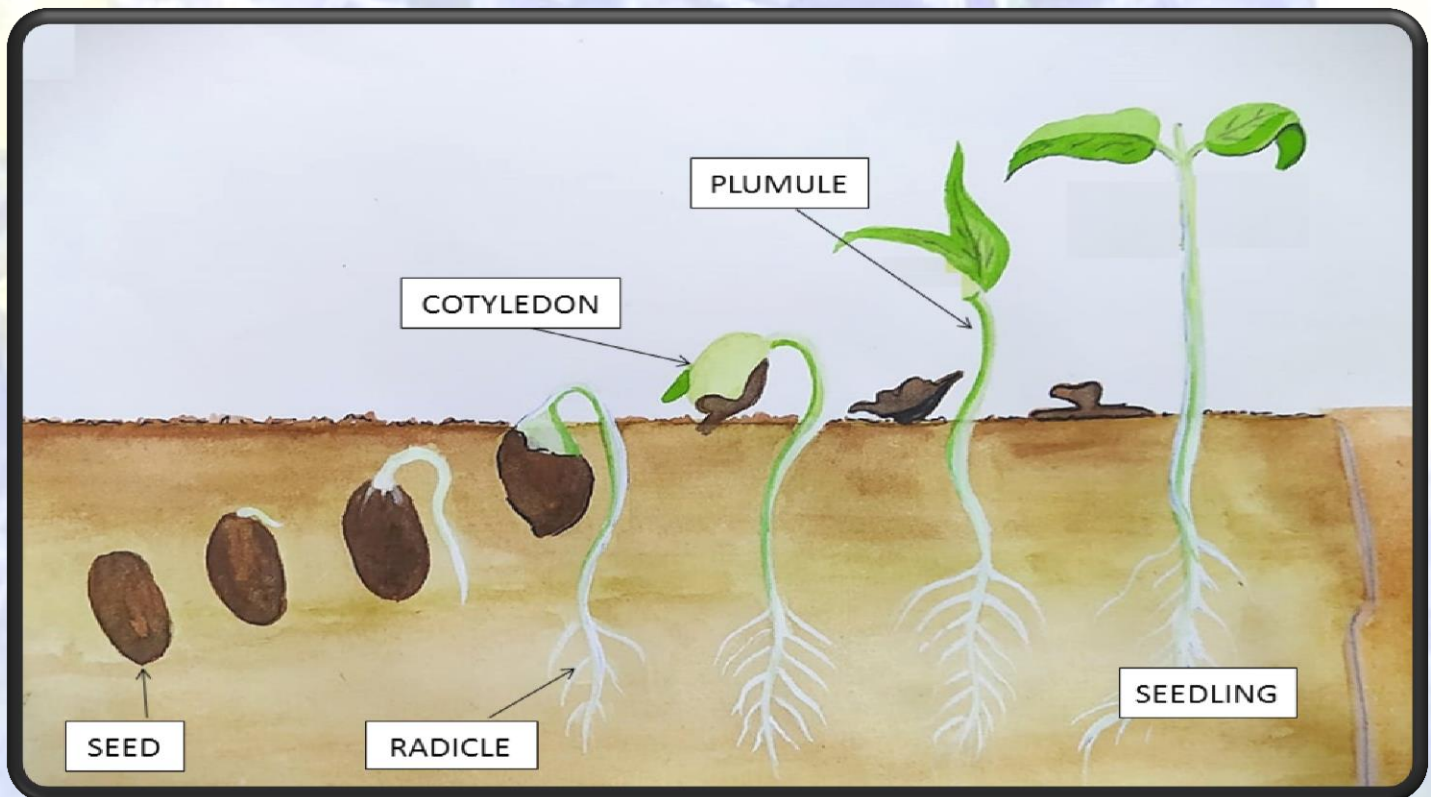
Grandpa, how much time will they take to grow?

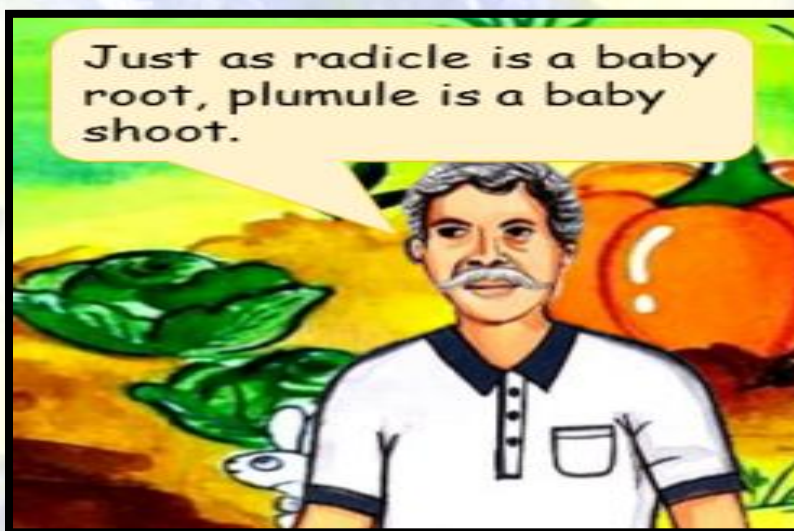
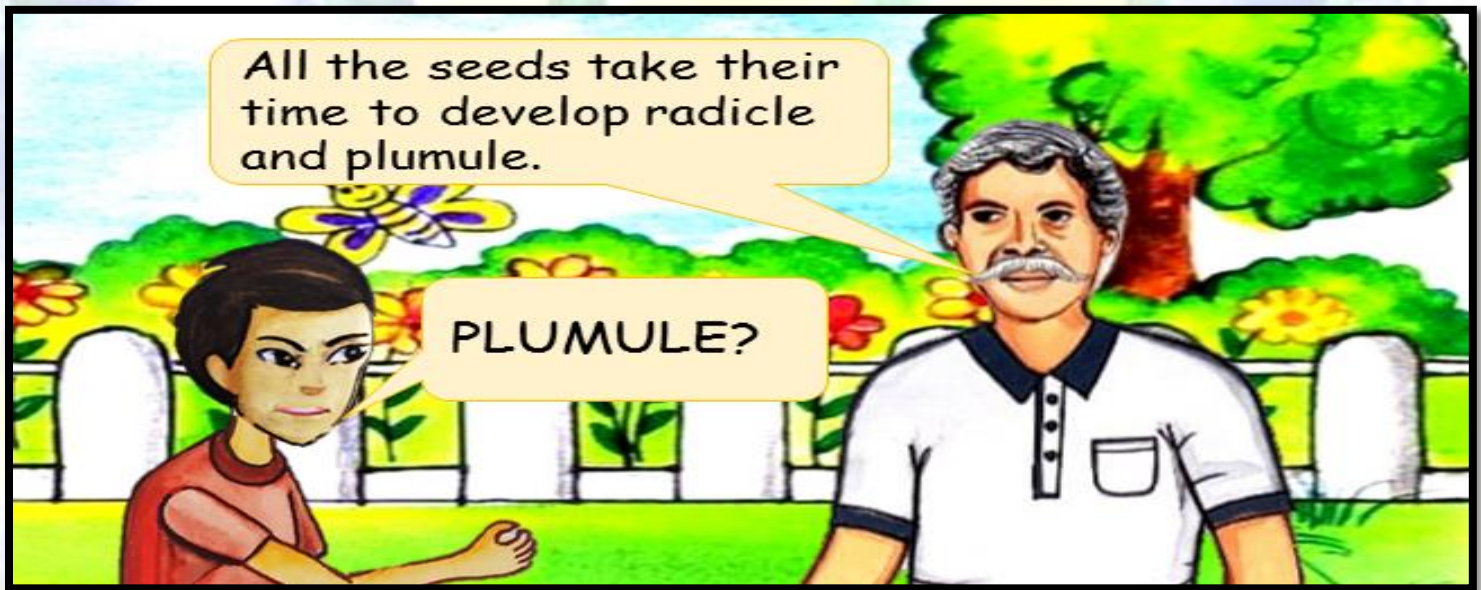
Different seeds take different time to germinate.





STAGES OF GERMINATION





L
E
T
'S
T
E
S
T



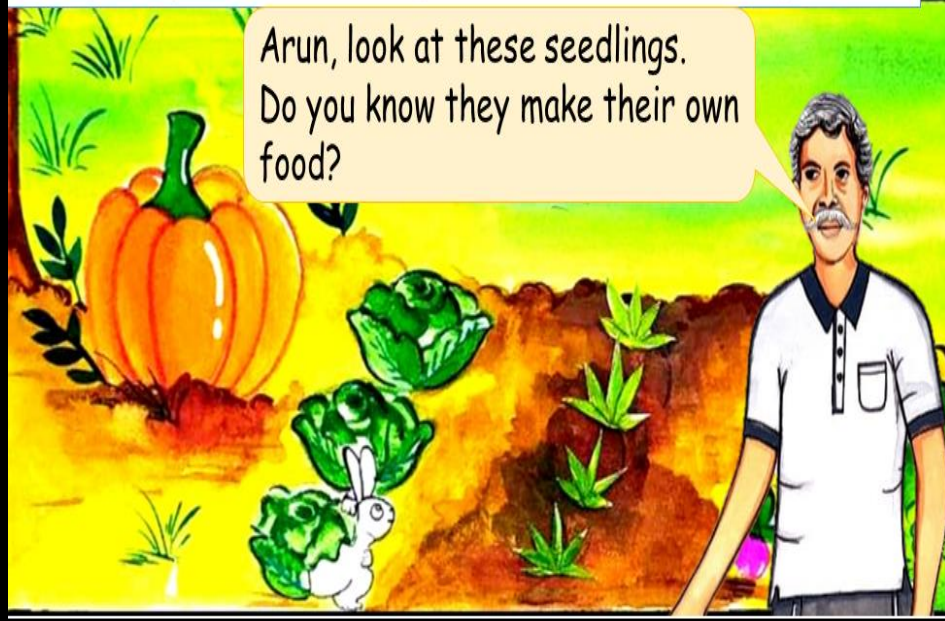
Seeds!

Choose the correct option:

- What comes out of the seed first during germination?
a. Radicle ☐
b. Plumule ☐
- Plumule of a seedling forms
a. Root ☐
b. Shoot ☐

Grandfather points at the other flower bed with some small plants.

Arun, look at these seedlings.
Do you know they make their own food?



How, what do they eat?

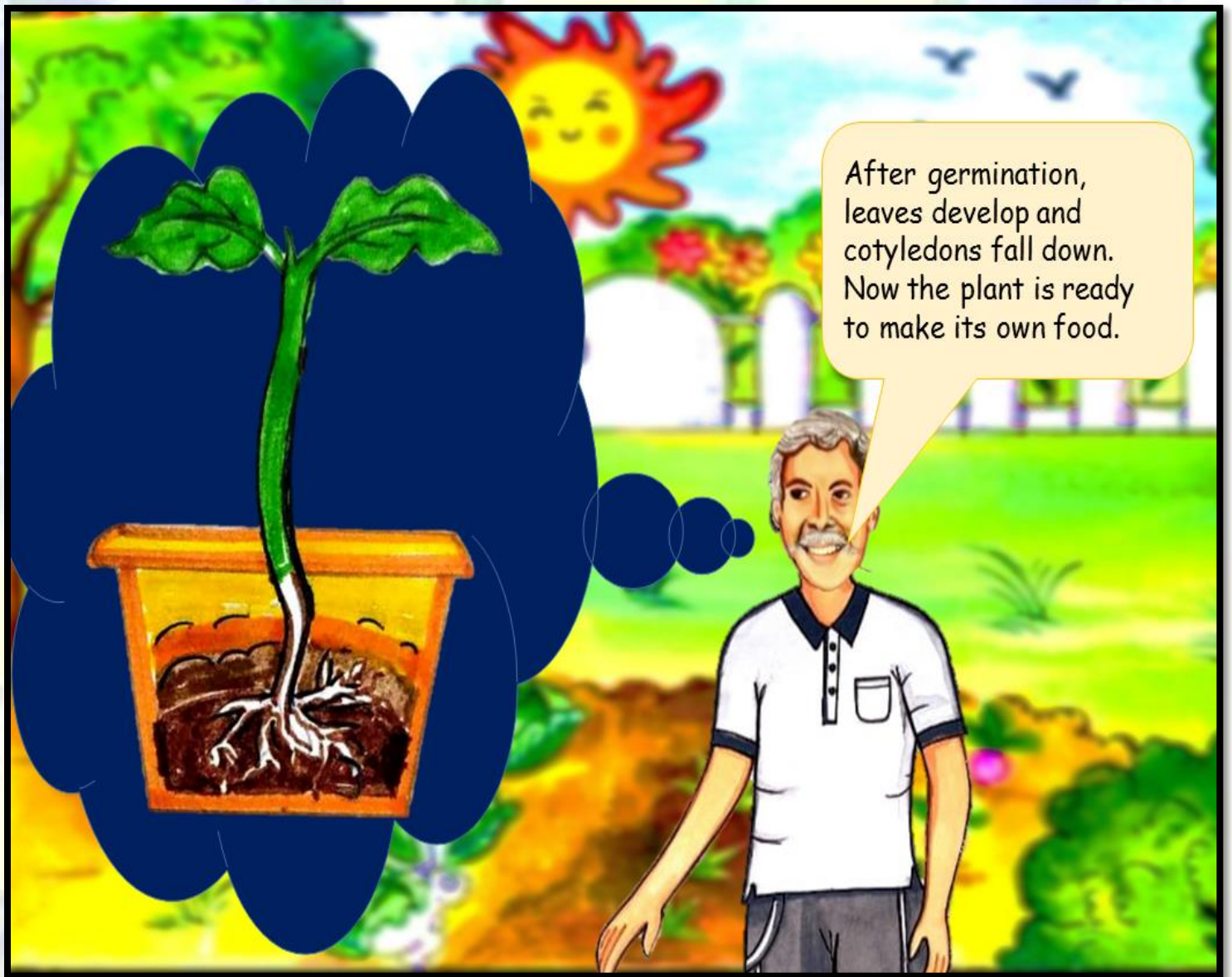


Every seed needs the right combination of soil, water and sunlight to grow. If any of these fall short, the seed will not germinate.

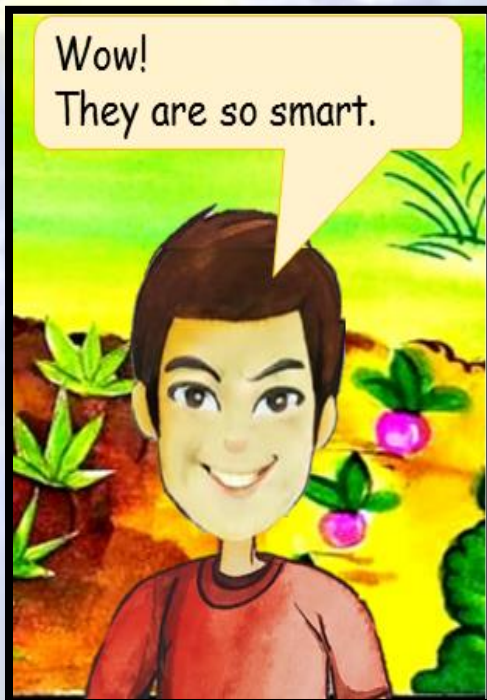


Remember, the seed should be healthy and undamaged.

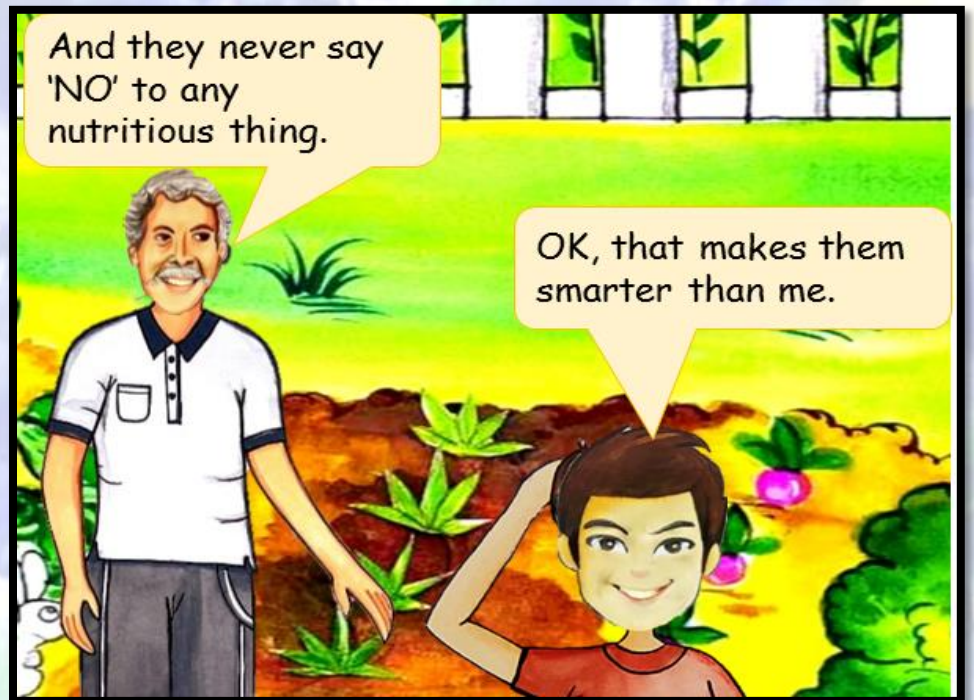




After germination, leaves develop and cotyledons fall down. Now the plant is ready to make its own food.



Wow!
They are so smart.



And they never say
'NO' to any
nutritious thing.

OK, that makes them
smarter than me.

Let's do and learn

1. Take some chanas and three bowls.
2. Put five chanas in the first bowl and fill it up with water.
3. Put a damp piece of cloth or some cotton wool in the second bowl. Now keep the same number of chanas in it. Make sure that the cotton wool or cloth remains wet.
4. Put the same number of chanas in the third bowl. Do not put anything else in it. Cover all the three bowls.



Tell and Write

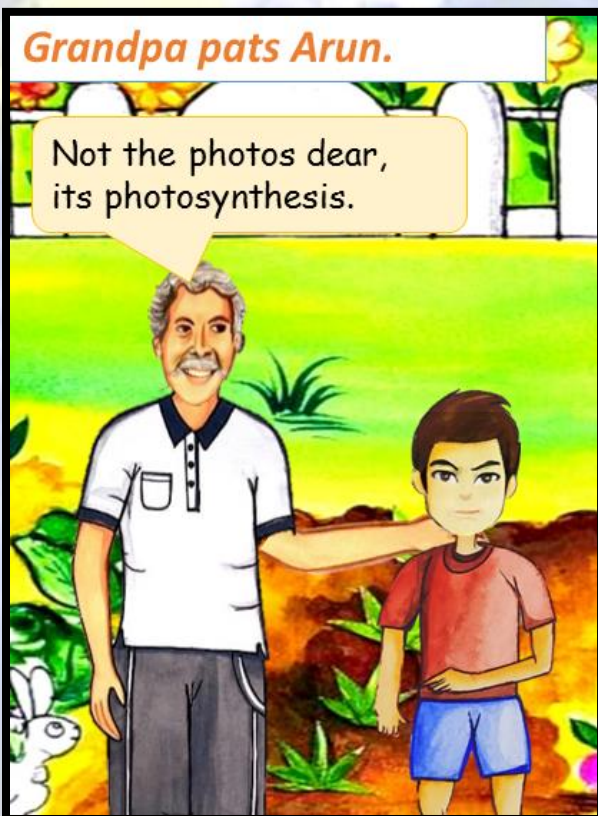
- In which bowl did the seeds sprout? What difference did you see between this bowl and the other two?



Now imagine, if there is no air around you, what do you think will happen?

I will turn blue and die for sure.

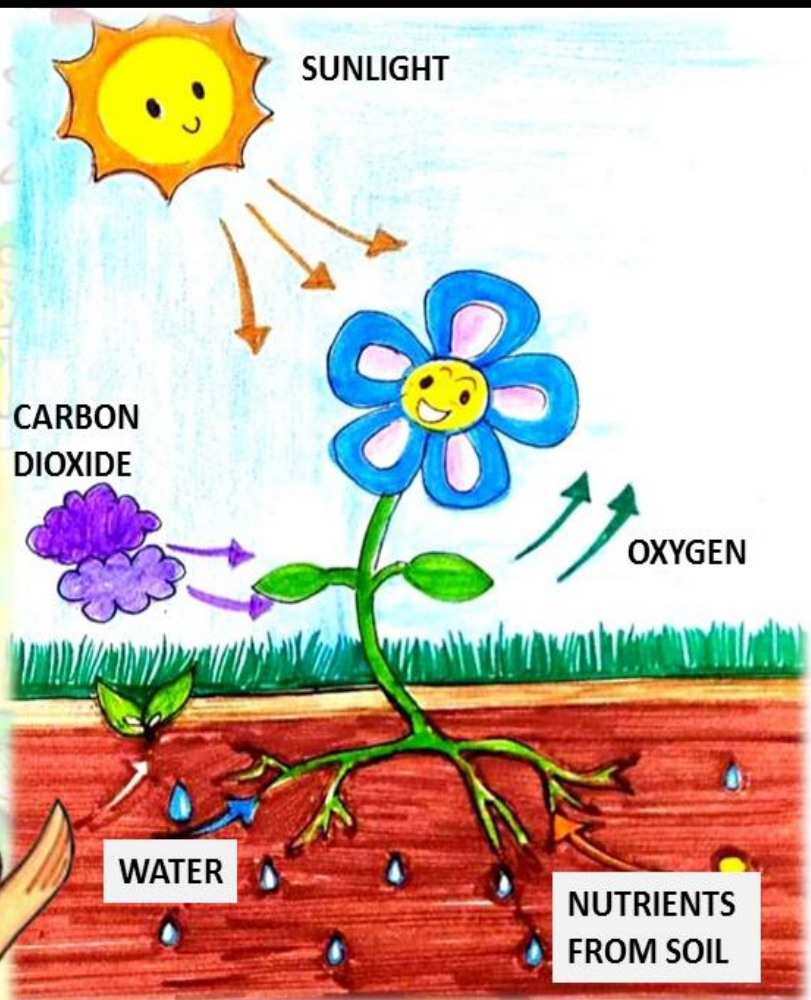
Right. Plants need carbon dioxide from air for photosynthesis and to release oxygen.



DO YOU KNOW?

Jan Ingenhousz was the scientist who discovered the process of photosynthesis.

Photosynthesis is the process by which green plants make their own food with the help of water, carbon-di-oxide and nutrients from the soil in the presence of sunlight.



Carbon dioxide + Water $\xrightarrow{\text{Light energy}}$ **Glucose(Food) + Oxygen**

What in the world is going inside you little plant?

Turning towards the third bed with fully grown carrots.

A lot of things my boy. Look here Arun.

Carrots. Yummy!



Yes!
See how beautiful they become
when their all requirements
are met .



Now, let's enjoy the
chaat that you have
made.

LET'S DO IT

Sow some healthy seeds of your favourite plant in a pot or a bowl. Click pictures after every five days and observe its growth to make a collage.



let's Crack it...

Rearrange the words:

1. The thick covering of a seed is called –DSEETOAC
2. In a seed, food for the baby plants is stored in- NOEYCTLOD.
3. The baby plant inside the seed is called- OMBREY
4. The fleshy leaves inside a seed are also called as- EEDS VELAES
5. Once a baby plant changes into young plant it starts making its food through- SIETPYOHOTSNHS

Answers: 1. SEEDCOAT, 2. COTYLEDON, 3. EMBRYO
4. SEED LEAVES, 5. PHOTOSYNTHESIS



SEED DISPERSAL



Arun is sitting in the drawing room waiting for his father to return from the office.



Good evening papa !



Good evening my boy !

You promised to take me to the park today.



Okay dear, give me a minute to change.

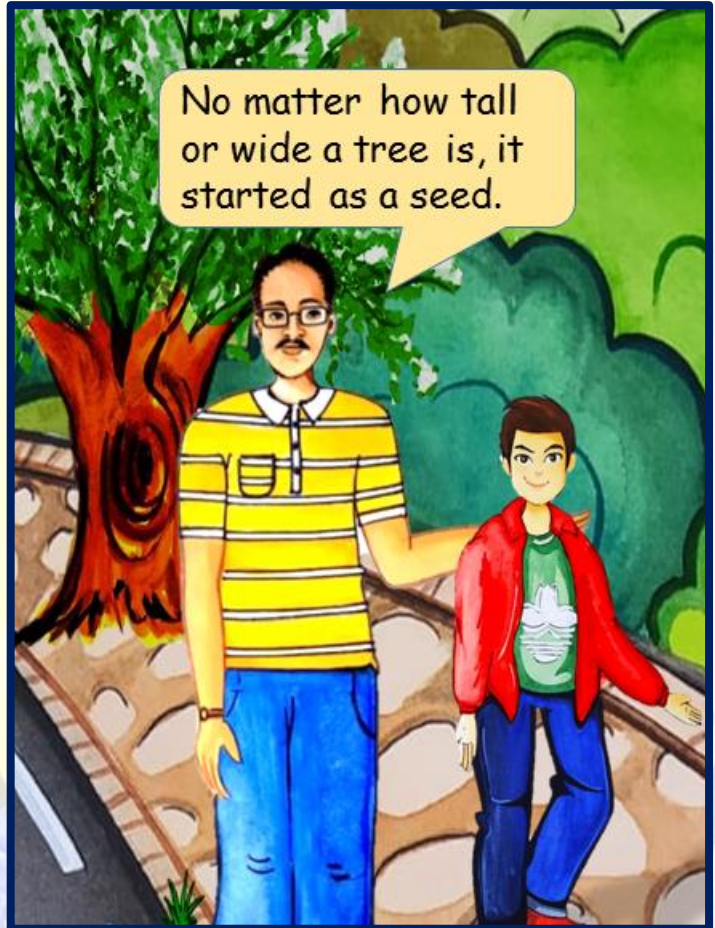
Both start walking on the sidewalk

Papa, I often wonder about the power of a seed.

So tiny, yet so magical.

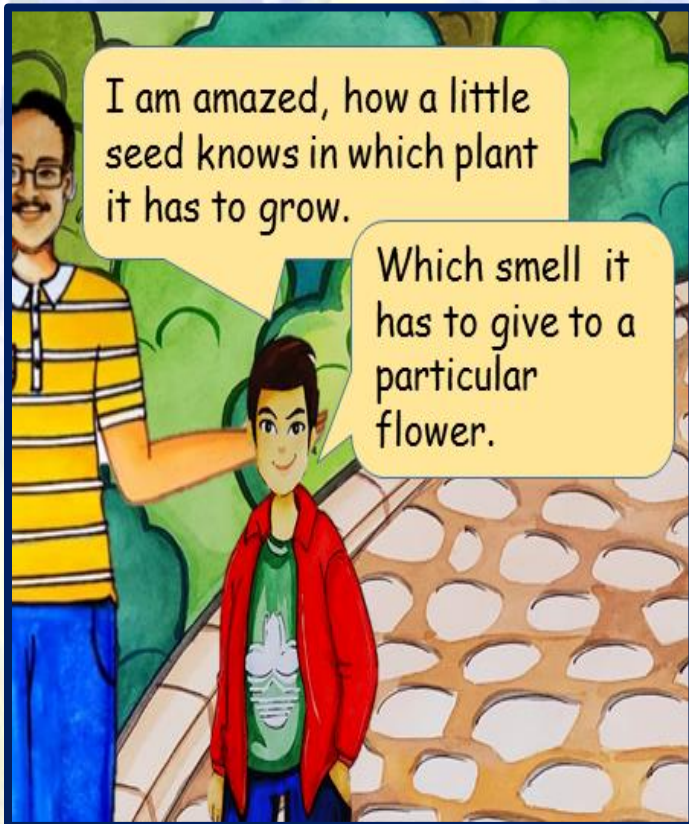


No matter how tall or wide a tree is, it started as a seed.



I am amazed, how a little seed knows in which plant it has to grow.

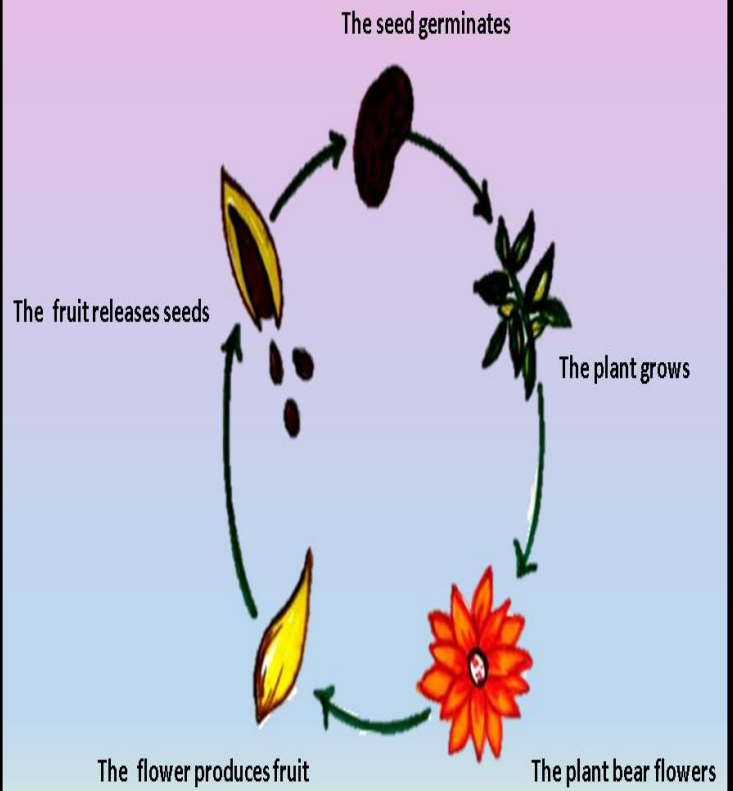
Which smell it has to give to a particular flower.



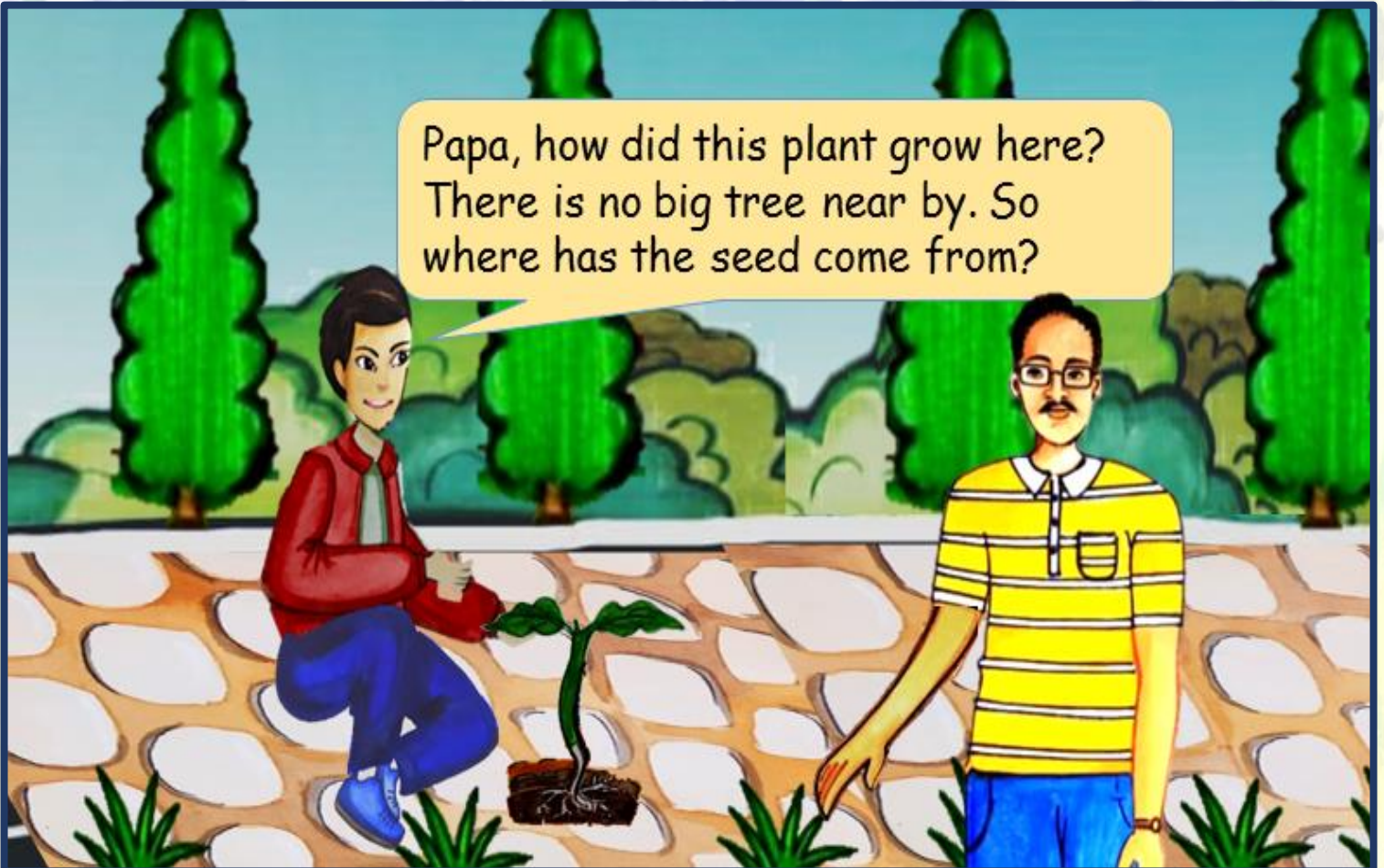
Also, which taste is to be given to a particular fruit.



Most of the plant bears flowers. These flowers develop into fruits. Now these fruits bear seeds which develop into new plants of the same type as the parent plant.



Papa, how did this plant grow here? There is no big tree near by. So where has the seed come from?



Baby plants do not always grow near the parent plants.



Seeds are dispersed away from parent plant by natural means.



By various agents like air, water, animals, birds, insects and human beings.



Insects



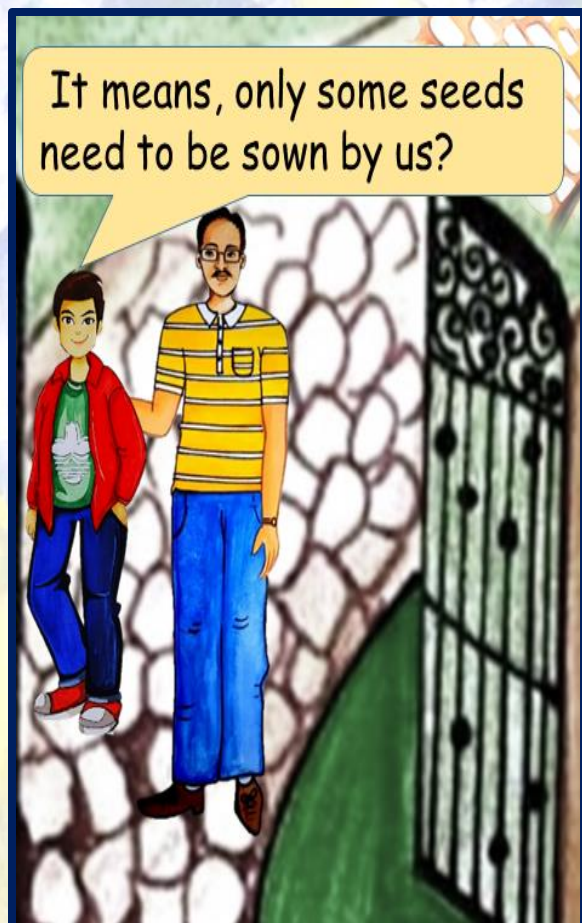
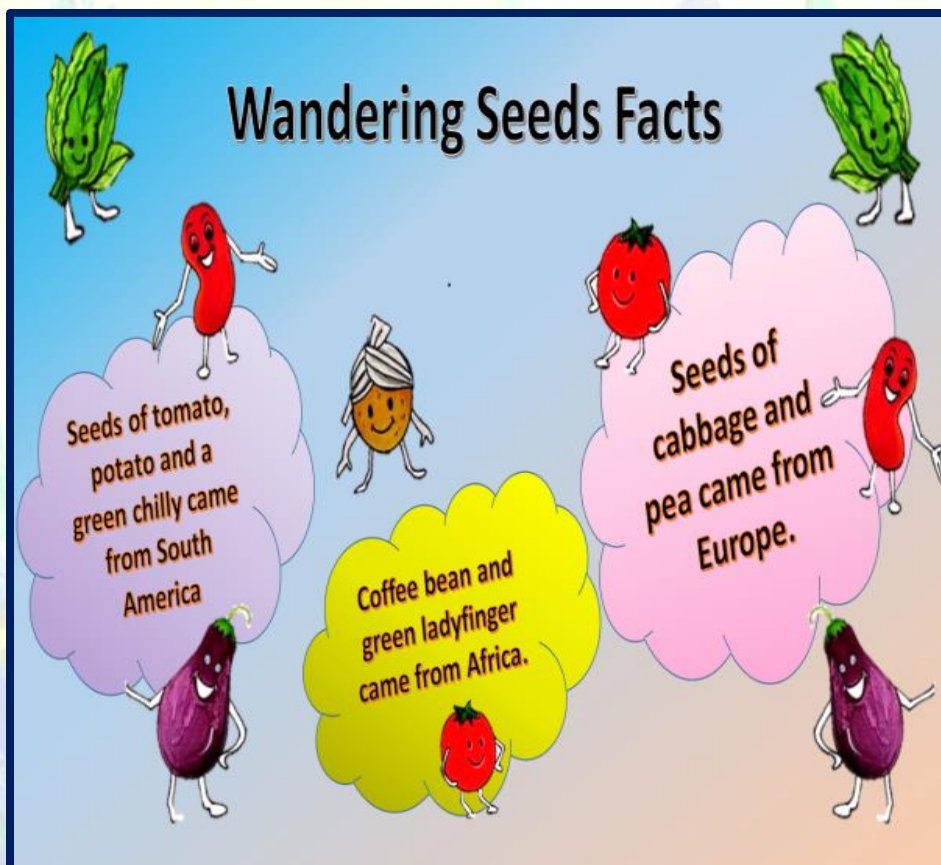
Birds

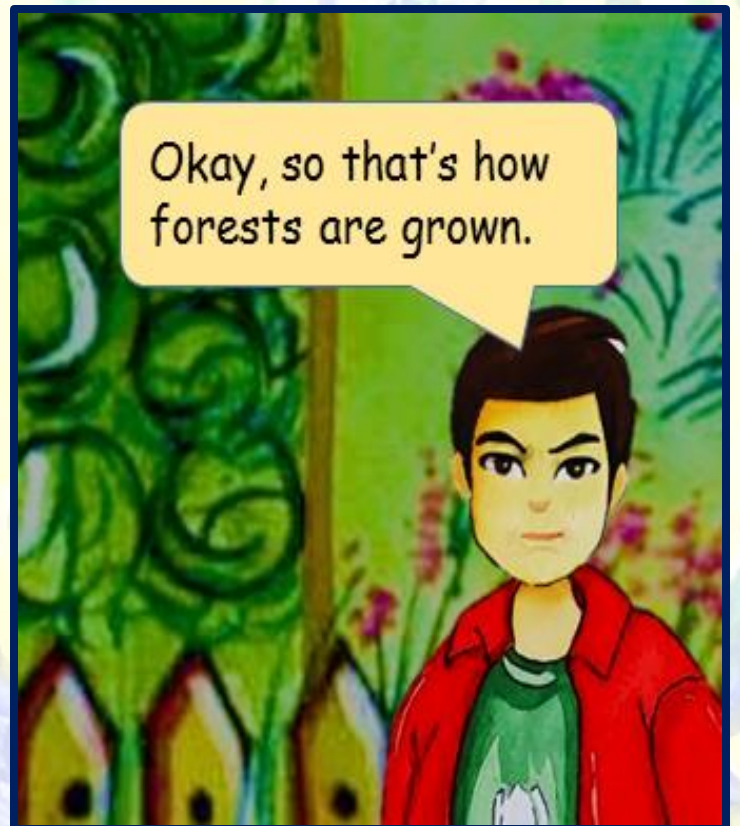
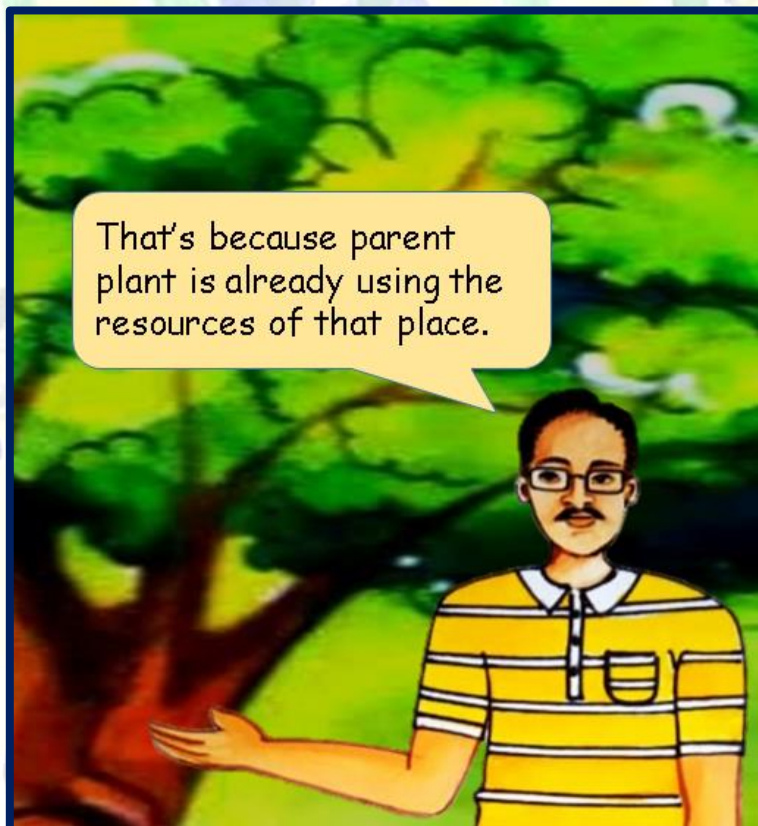


Water



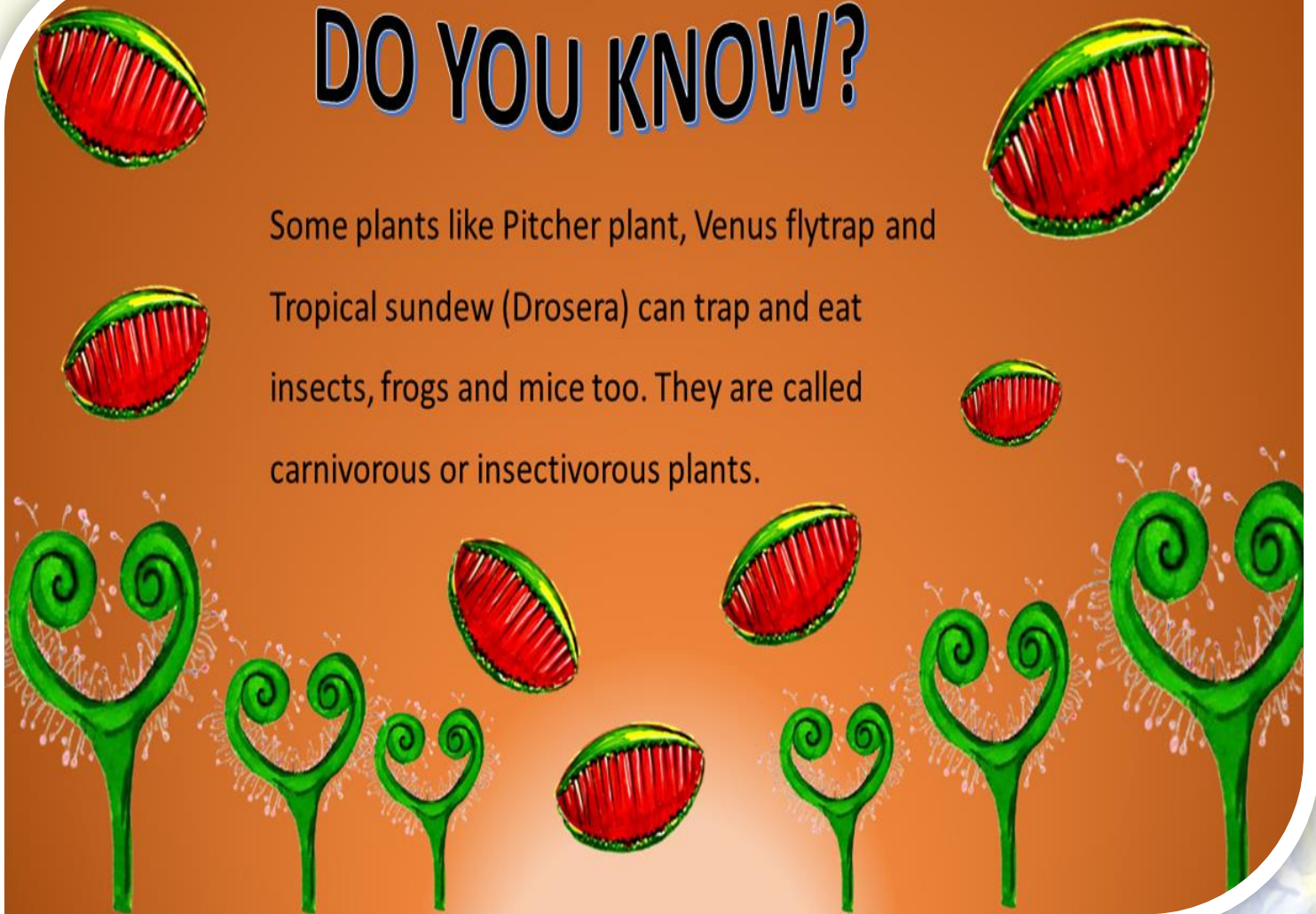
Rodents



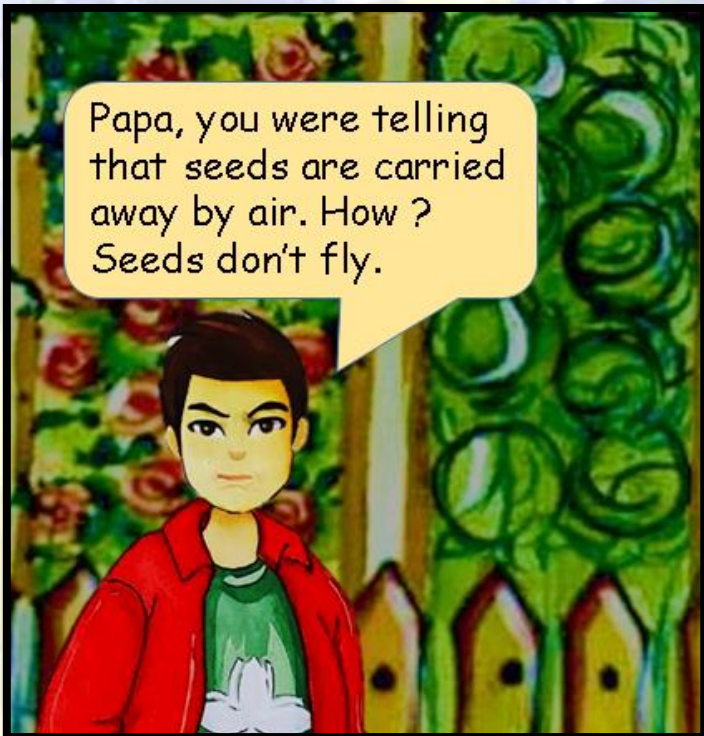


DO YOU KNOW?

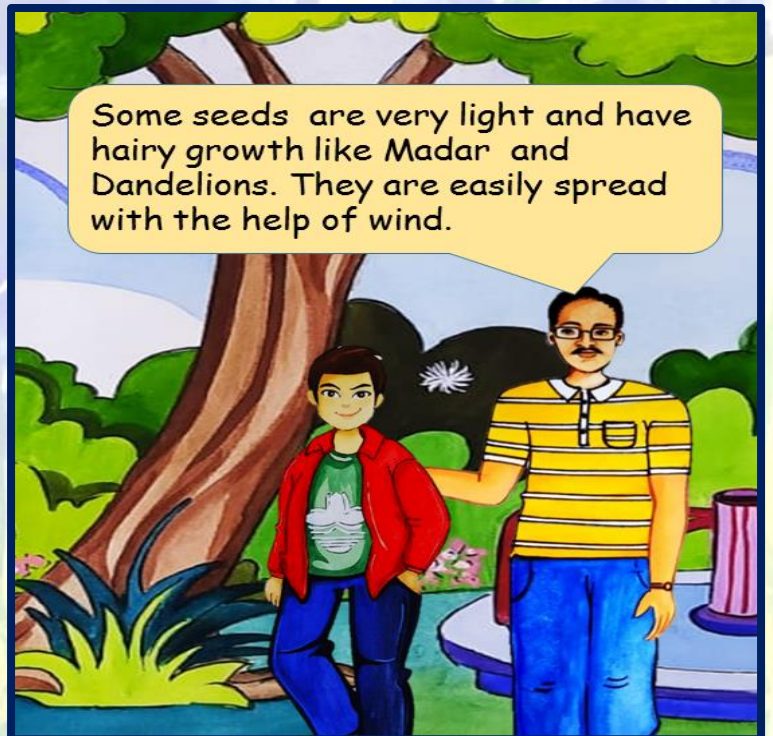
Some plants like Pitcher plant, Venus flytrap and Tropical sundew (Drosera) can trap and eat insects, frogs and mice too. They are called carnivorous or insectivorous plants.



Papa, you were telling that seeds are carried away by air. How? Seeds don't fly.



Some seeds are very light and have hairy growth like Madar and Dandelions. They are easily spread with the help of wind.



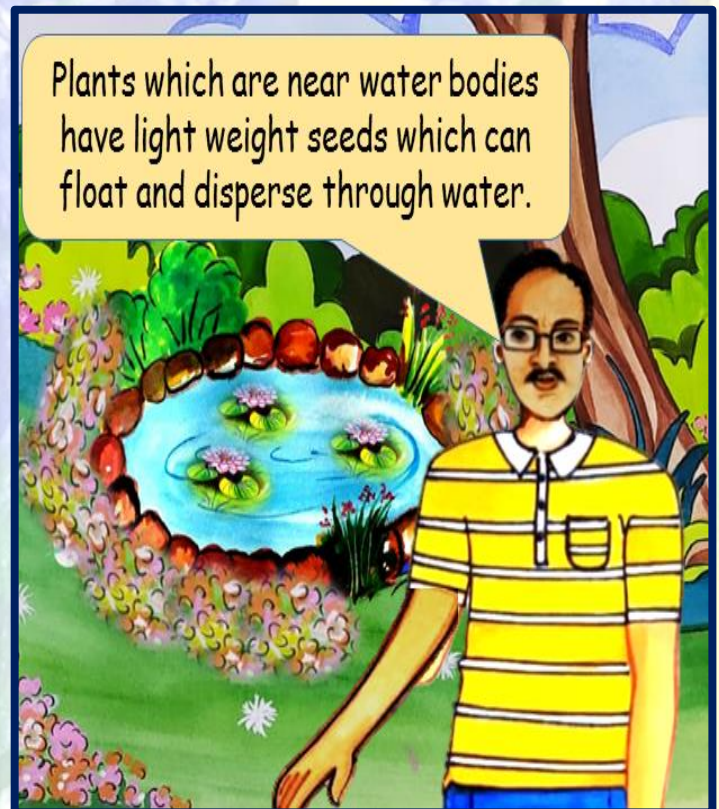
Arun picks a Dandelion flower and blows it.



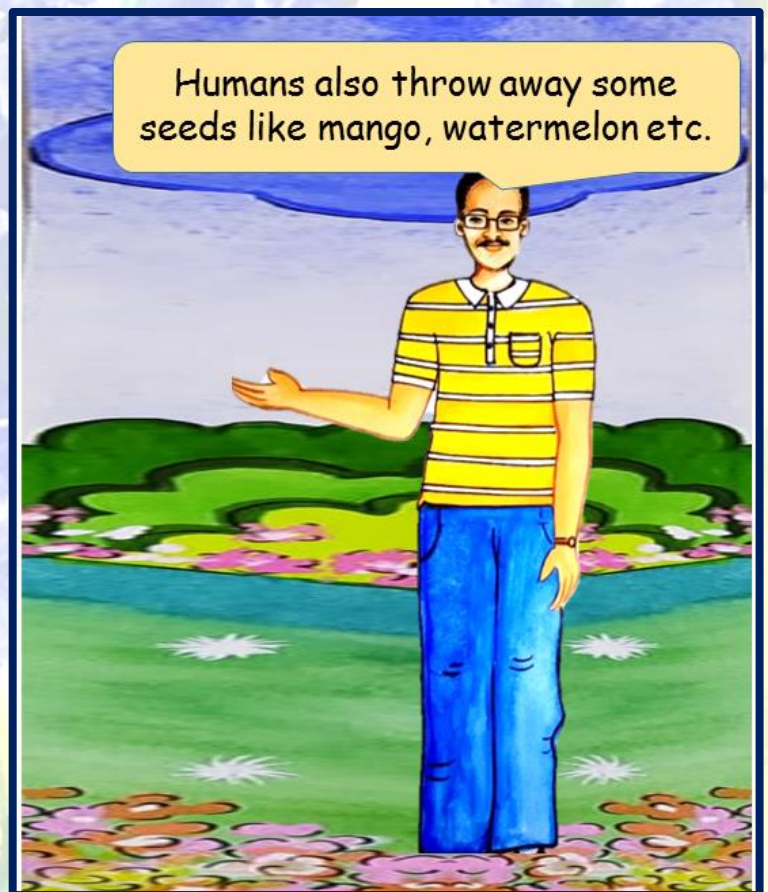
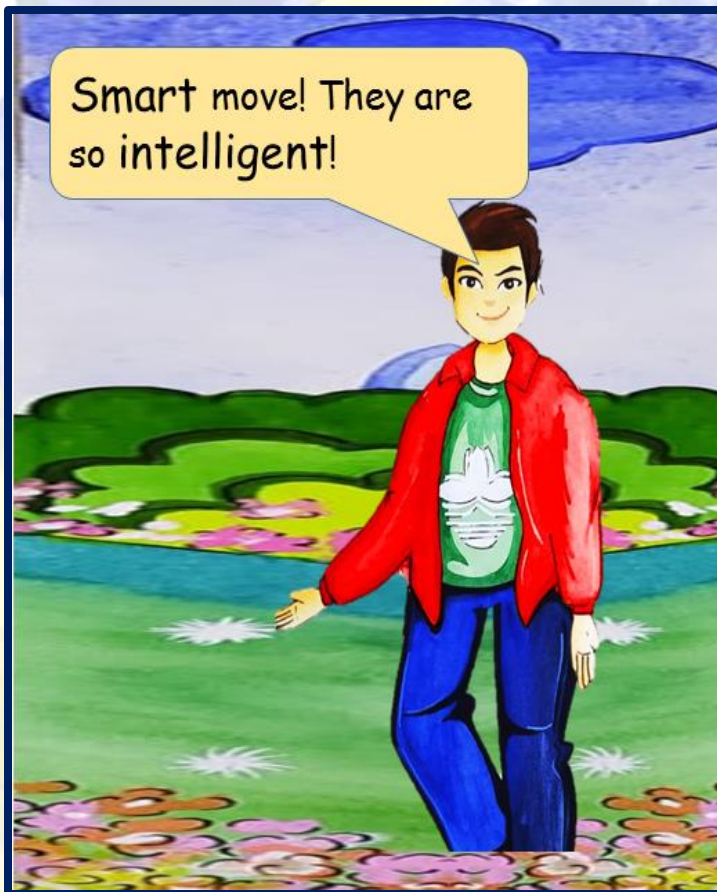
Wow! that's so beautiful.

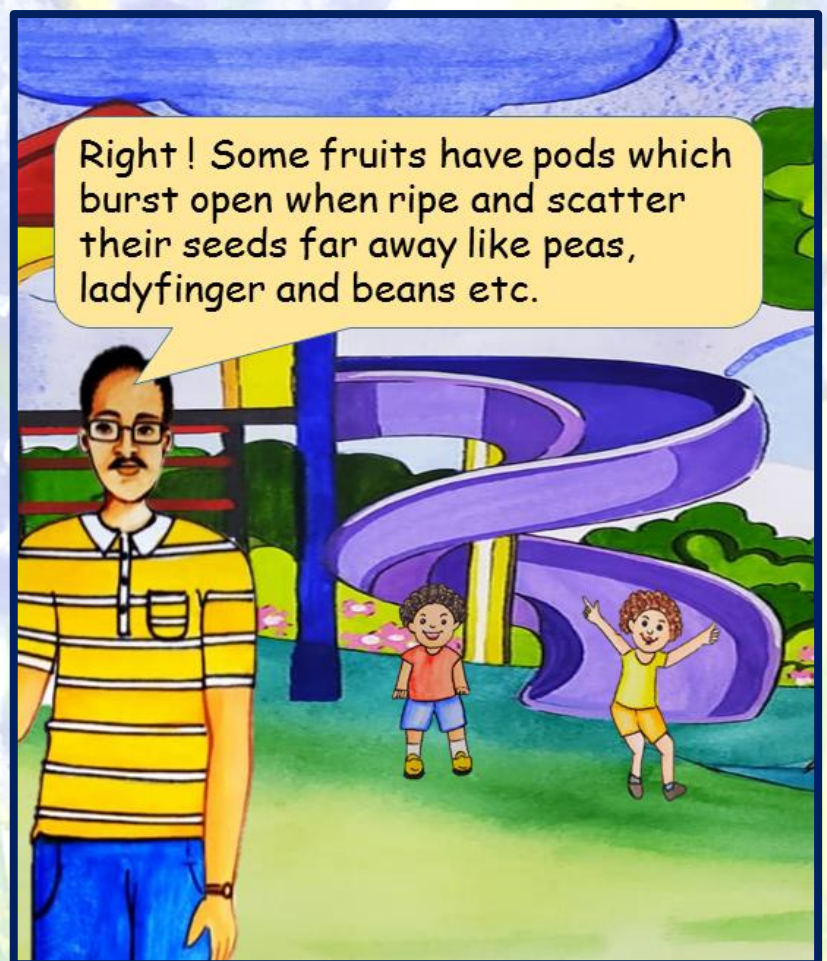
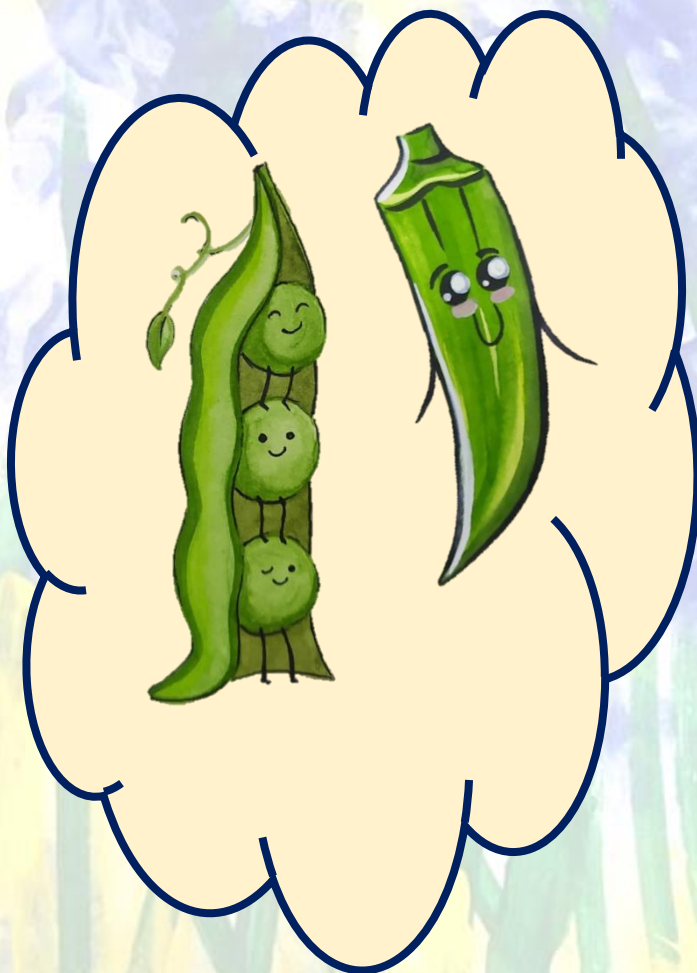
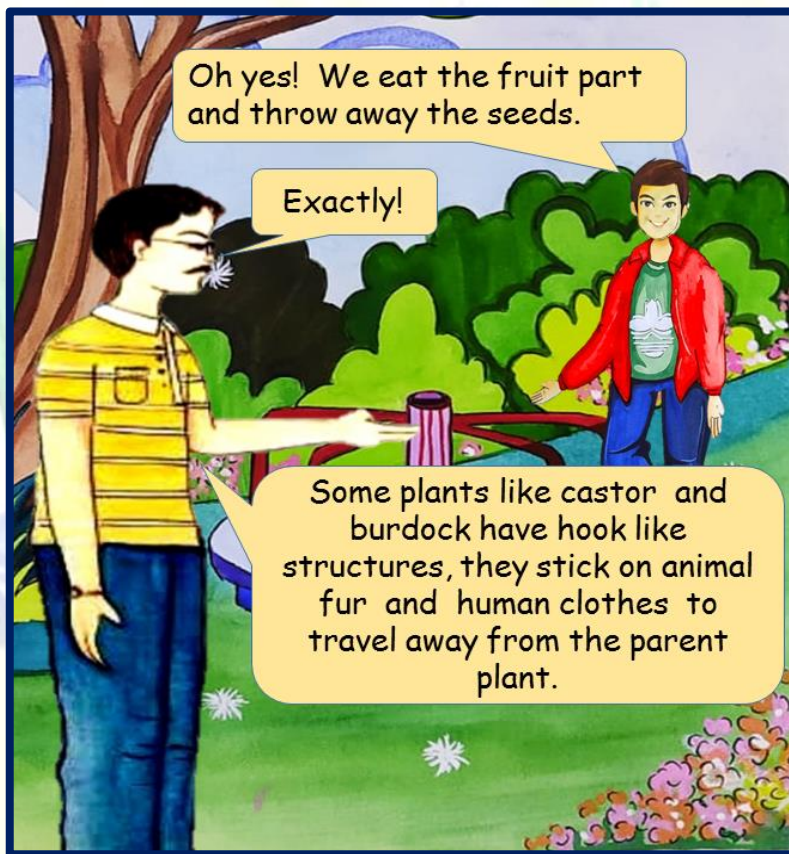


But certainly they can't move this freely in water.



Plants which are near water bodies have light weight seeds which can float and disperse through water.





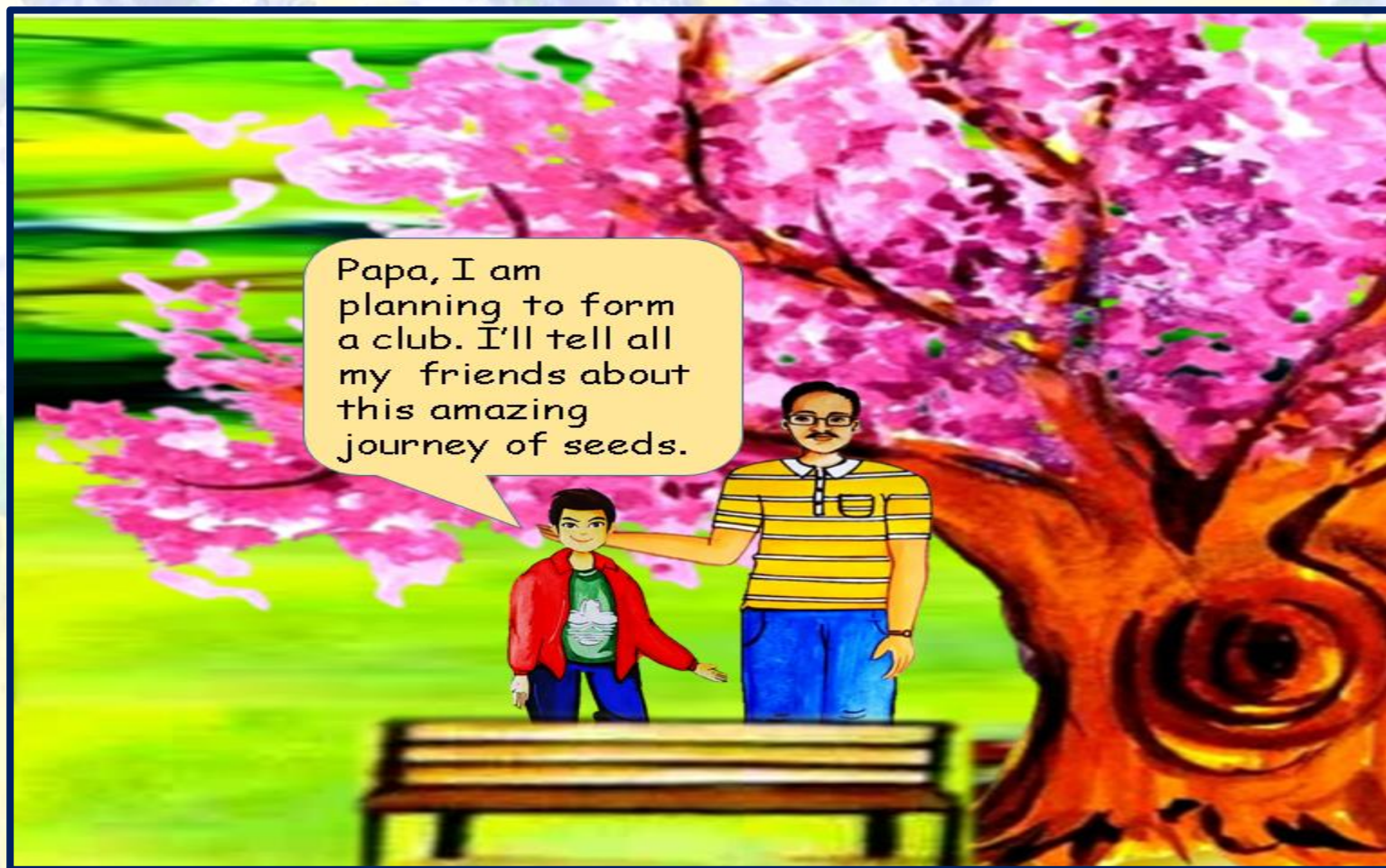
Oh papa, they use so many ways to grow at different places. I never thought about seeds like this before.



Yes Arun, it's amazing how nature finds new ways to grow.



Papa, I am planning to form a club. I'll tell all my friends about this amazing journey of seeds.





ACTIVITY TIME

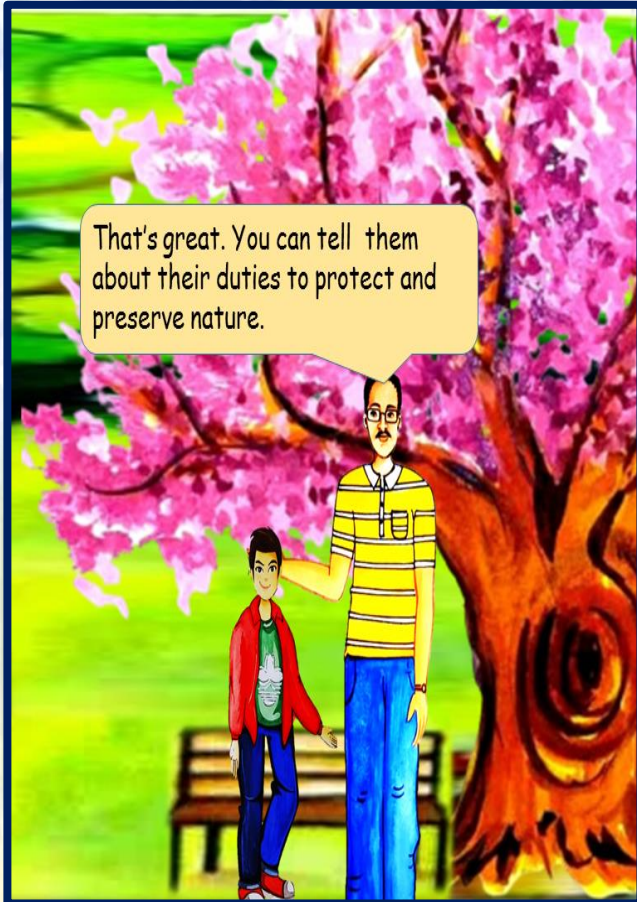
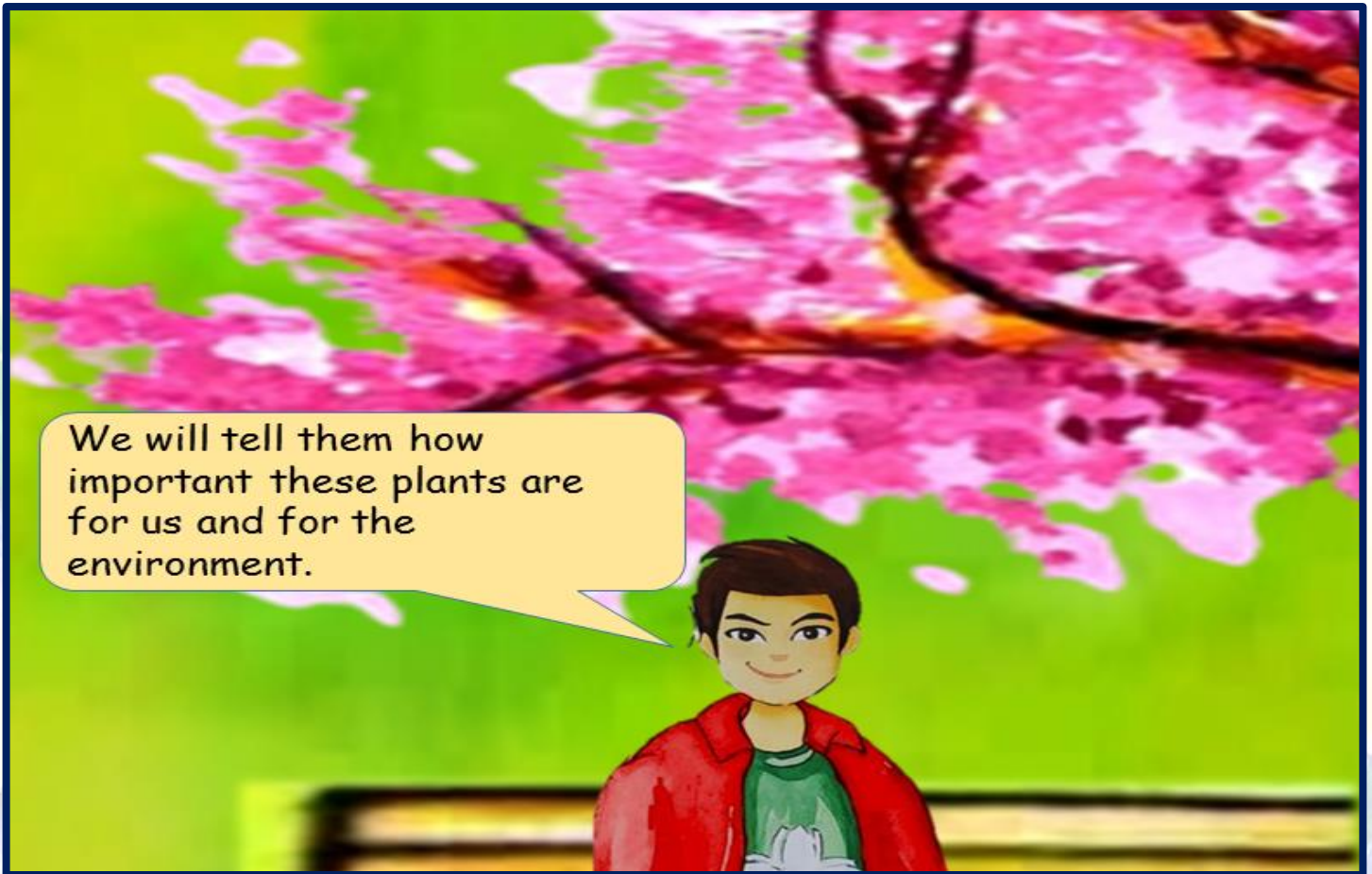


Match the seeds with their dispersal agents:

COLUMN A	COLUMN B
1) Mango	a. Air
2) Dandelion	b. Humans
3) Lotus	c. Explosion
4) Ladyfinger	d. Water

Answers

- 1) Mango - humans
- 2) Dandelion - air
- 3) Lotus - water
- 4) Ladyfinger - explosion







Let's find out:

Highlight the various agents of seed
dispersal:

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

Answers: WATER, EXPLOSION, WIND, HUMANS



Let's find names of:

1. Any two fruit seeds
2. Any two vegetable seeds
3. Any two edible seeds
4. Any two seeds dispersed by wind

Answers:

1. Apple, Orange
2. Tomato, Bitter gourd
3. Peanuts, Pulses
4. Dandelion, Madar





When Arun went to school he explained the steps of germination to his friends but he got confused and was not able to explain the steps of germination in proper sequence. Help Arun to arrange the steps in the correct order.

1. Plumule comes out
2. Embryo gets its food from cotyledons
3. Seed receives water
4. Radicle comes out
5. Seed coat bursts out



Answers: 3, 5, 2, 4, 1.



Answer the following questions:

1. What is the process in which seeds are carried to the new places away from the parent plant?
2. What are the fleshy seed leaves known as?
3. What is the term used to describe the growth of a plant from a seed into a new plant?
4. Do humans help in seed dispersal?
5. What is the other name for baby root?

Answers:

1. Seed dispersal
2. Cotyledons
3. Germination
4. Yes
5. Radicle





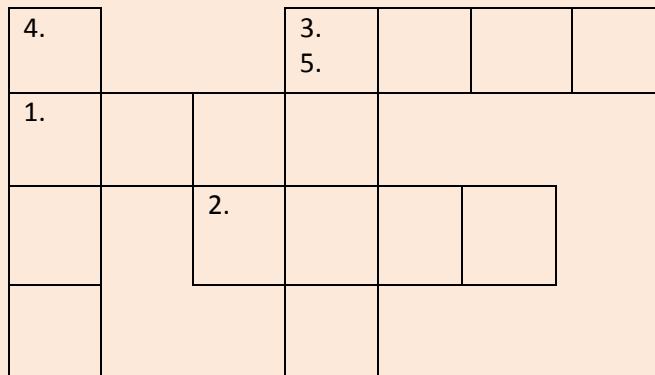
CROSSWORD PUZZLE

ACROSS

1. I give anchorage to the plant and absorb nutrients for them.
2. When I am sown, the life of plant starts from me.
3. I am needed to bury the seed.

DOWN

4. I am a big living creature that give you oxygen and food.
5. I give support to the plant and carry nutrients to them.



Answers:

4. T			3. 5. S	O	I	L
1. R	O	O	T			
E		2. S	E	E	D	
E			M			





Think and Answer:

Q1. What can we do to protect our environment?

Q2. Why is seed dispersal necessary?

Q3. Why plants are considered as the green lungs?

Answers:

1. We should plant more trees.
2. For the healthy growth of plants
3. Plants give us oxygen to breathe.





GLOSSARY

- 1) Burst open- to come open or fly apart suddenly.
 - 2) Cotyledons- an embryonic leaf in seed bearing plants, one or more of which are the first leaves to appear from a germinating seed.
 - 3) Dispersal – the process of distributing or spreading things/seeds over a wide area.
 - 4) Ingredients – food items that are required to make a particular dish.
 - 5) Nutritious – food that provides nourishment.
 - 6) Nutritional value – measure of a well-balanced diet.
 - 7) Parent plant – a plant that can produce more plants similar to itself.
 - 8) Scatter – disperse, sprinkle or loosely spread.
 - 9) Seedbed – ground prepared for the planting of seeds.
 - 10) Seedling – a young plant, especially one raised from a seed.
 - 11) Survive – continue to live or exist in spite of danger or hardship.
- 



Bibliography

- N.C.E.R.T Class 5 Environmental Studies Looking Around
- Lakhmir Singh's Science for Class 5
- Our Living World 5
- <https://youtu.be/1RiKqFrJsVU>
- https://youtu.be/JSe_VUMymjo
- <https://youtu.be/TE6xptjgNR0>
- https://youtu.be/dmz_lc7h6yc
- <https://youtu.be/ebITYzhDOCo>
- <https://youtu.be/crFJIYLCMrE>
- <https://youtu.be/-BpxVSZbMX4>
- Microsoft Power Point Presentation software
- Microsoft Word software



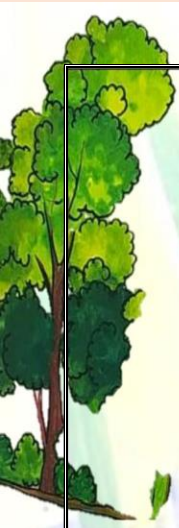


Disclaimer

The idea of this novel is science based while some fiction is added for better understanding of the content. All the images and background characters are created by the art teachers of our institution and are not duplicated or plagiarized from other resources.

The book bears the information about actual facts and figures related to seeds. It has been shaped to educate the readers of a certain age group and are compiled from trustworthy resources.





Summary of the chapter

Chapter ‘Seeds And Seeds’ tells the readers about the importance of seeds with the help of a story.

This novel is designed to help the readers to learn about the process of germination and it also allows them to discover how seeds grow and develop into plants. The conditions that are required for a seed to develop are also described. Dispersal of seeds through various agents like air, water, birds, insects, animals and humans is also explained in a detailed manner.

Through this novel our team has tried to give information about, how nature finds its way to grow through seeds.



FROM THE PRINCIPAL'S DESK

Dear Readers

*'To embark on a journey towards the goal requires initiation,
To remain on that path requires determination,
To bridge the two requires commitment.'*



Today, schools across the globe are trying to decipher the best case scenario that would provide pertinent knowledge outflow to learners in a consistently changing educational set-up. This calls for deviation from the traditional chalk and talk method towards practical, experiential learning.

In these changing times the need of the hour is to root students firmly in an enabling constructive work ethic for their meaningful blossoming.

Graphic novel just like traditional forms of literature can be a useful tool for helping students critically examine aspects of Social Science, Science, Mathematics, Languages and Art. Hence fostering of acquisition of critical reading skills is brought about.

In modern era, graphic novels will definitely prove to be a boon not only for publication but also for the young readers. The team has tried to infuse creative work with more meaning, a greater purpose for the readers to set the mood to understand important concepts. It is a great pleasure to announce the accomplishment of this graphic novel based on Seeds and Seeds.

It has the potential to appeal to almost any reader. It is a vibrant and compelling tool for teaching. I extend a heartfelt and sincere thanks to honourable Mr. Manoj Ahuja, Chairman CBSE for providing our school the privilege of being in the league of futuristic schools. My sincere thanks to Mrs. Anita Karwal, Secretary (SE&L) and to Dr. Biswajeet Saha, Director Skill Education and Training CBSE and a special vote of thanks to Mr. Sandeep Sethi (Director Education, M.S.M.S II, Museum Trust) for his perseverance and guidance.

I congratulate my entire team for putting their hard work and dedication in the making of this graphic novel. The reflection of the teachers' creativity is the epitome of the novel that will surely stir the minds of the readers and take them to the fantastic world of unalloyed joy and pleasure.

It is anticipated that this graphic novel would find acceptance and appreciation from all.

Happy Reading!
God Bless All

Sudhanshu Shekhar
Principal
K. L. International School
Meerut



K. L. INTERNATIONAL SCHOOL

(Affiliated to Central Board of Secondary Education)

Near Somdutt Vihar, Garh Road, Meerut-250005 (U.P.)

E-mail: info@klischool.com

Website: www.klischool.com