

SEASONWATCH

Book of Activities (Level Two)



SeasonWatch

Book of Activities (Level Two)



SeasonWatch

Book of Activities (SeasonWatch level 2)

Tracking seasons through trees with SeasonWatch

SeasonWatch is an India-wide project that studies the changing seasons by monitoring the annual cycles of flowering, fruiting and leaf-flush of common trees. This is a Citizen Science project, which means that we invite volunteers, adults and children alike, to participate! Volunteers choose individual trees from among a selection of common tree species; these trees are then monitored once a week for their flowers, fruits and leaves.

SeasonWatch team:

Team members: Arun Ellassary, Veena HT, Raman Kumar, Nayantara Lakshman, Muhammed Nizar, Suhel Quader, Shaheen Shasa, Ashish Shah, Sreekanth Sreedharan, Vani Sreekanta, Farheen Sultana.

Content: Geetha Ramaswami, Vani Sreekanta

Author: Sriram Aravamudan

Book design and illustrations: Rohan Chakravarty

Technical Editor: Shwetha Jairam

First Edition: July 2015

Published by: SeasonWatch, Bangalore

Copyright: Nature Conservation Foundation, Mysore

Contact information

Address: SeasonWatch, Citizen Science Programme, National Centre for Biological Sciences (TIFR), GKVK campus, Bellary Road, Bangalore - 560 065

Website: seasonwatch.in

email: sw@seasonwatch.in

Facebook: facebook.com/seasonwatch.in

Letter from the Team

Dear Reader,

You have been an enthusiastic nature detective for a while now. You have watched your tree fruit, flower, and shed & sprout leaves as the seasons have changed. You must now be curious to learn more, and with this in mind, we invite you to move to the next level of SeasonWatch.

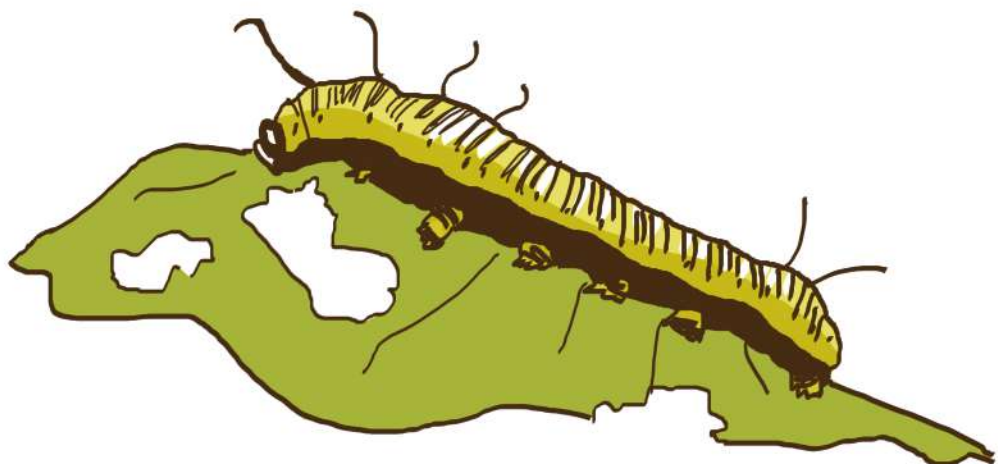
In this second level, your regular observations of your tree are accompanied by a set of fun and enjoyable activities. The activities are what this book is about.

This book has eight chapters. Each chapter comes with a set of activities meant to better acquaint you with your tree. For instance, have you ever wondered what kind of creatures live on your tree; and what lives immediately around your tree?

Each activity focuses your attention on a particular aspect of your tree's life. We're sure you and your tree will be steady friends by the time you are through with the exercises in the book. Now go out and enjoy yourself!

As always, we look forward to hearing from you. Do write to us with your questions and thoughts on sw@seasonwatch.in

Regards,
Team SeasonWatch.



CONTENTS

Introduction: Meeting Vishala.....	1
Chapter One: Leaves and Bark.....	3
Exercise 1A : Know your tree.....	4
Exercise 1B: Bark Rubbing.....	6
Exercise 1C: Leaf Vein pattern.....	7
Chapter 2: Vishala's friends.....	9
Exercise 2: Marking your tree quadrants.....	11
Chapter 3: Meeting the residents.....	13
Exercise 3: Who is your tree home to?.....	15
Chapter 4: Tree Power.....	17
Exercise 4: Is your tree damaged?.....	18
Chapter 5: Trees and their many uses.....	20
Exercise 5 – Your tree and its many uses.....	21
Chapter 6: Tree Stories.....	23
Exercise 6: The cultural background of your tree.....	24
Chapter 7: Catching up with Vishala's friends.....	26
Exercise 7: What grows around your tree during this season?.....	27
Chapter 8: A year since you met your tree.....	29
Exercise 8: Draw and write about your tree friend.....	31





Ouch!' said Priya, as she looked up to see what hit her head. She and her best friend Satish were passing under the beautiful old tree at the end of the street, on their way home. Satish looked up too, when another twig bounced off his shoulder and fell to the ground.

'Hey, who's up there, throwing sticks at us?' Priya said angrily. There was no answer. Satish picked up a fallen twig and threw it back into the tree's canopy. Nothing happened.

All of a sudden, a whole bunch of sticks and leaves came raining down on them. 'Ow! Ow! Ow!' said the kids as they covered their heads, trying to avoid the twig attack. They heard a deep chuckle from somewhere within the tree. 'Don't worry, I'm just teasing you,' a voice said.



'Hey, who's that?' said Satish, looking curiously up the tree. 'You're looking at me,' said the voice, gently.

'Is... is the tree talking to us?' Priya whispered nervously to Satish. Satish ran around the tree to see if someone was fooling them.

'I can see you here too, you know,' the voice said. 'Not just through my trunk, but with my branches and leaves too!'

Satish and Priya looked at each other excitedly. 'It's really true! The tree is talking to us!' said Priya.

'That's right, it's me! I don't talk

to anyone usually, but I've seen you kids come and sit under my branches every day on your way back from school, and I thought it was time to make friends with you!

'I'm S..s..satish and this... is my friend Priya', said Satish nervously.



'What's your name?' asked Priya, equally nervously. The tree laughed. I've been known by various names all my life. Why don't you pick a name for me?'

'Pick a name? Hmm... Let's see...' said Priya. 'You're big, broad and tall, so how about Vishala? I have a cousin by that name and he told me the meaning.'

'Perfect! That's what you can call me then! Would you like to learn about my life and all the adventures I have every day?'

'Of course!' said the kids together.

'Well then, come here every week around this time, and I'll tell you all about myself, my life, the little creatures that live in my branches and all the little plants that grow around me. Would you like that?'

'Yaaaay! Yes! We have a new tree friend! We have a new tree friend!' they sang, dancing around in joy. Vishala chuckled deeply again.

'But remember, this is our little secret. To everyone else, I'll still be a regular tree. We'll have our secret conversations when nobody's looking, OK?' 'Yippee!' the kids said. So the next time you come to see me, why don't you bring a notebook, a pencil and some paints, so that you can make some beautiful drawings of my bark and leaves?'

'Sure!' said Priya. 'We'll see you soon, then! Bye Vishala!' said the kids, waving goodbye.

This was going to be an interesting adventure indeed!





‘Hello, hello!’ said Vishala, the children’s new friend, as they ran up towards him. ‘You’re early today!’

‘Yes, Vishala, the school bus dropped us off at the bus stop early,’ said Priya.

‘Well you’ve come at a perfect time. Are you ready to do some painting?’

‘Yes!’ said Priya, pulling out a notebook and a bottle of purple paint.

‘Purple?’ said Satish, wrinkling his nose. ‘Who ever paints with purple?’

‘Well, I only had a little bit of red and a little bit of blue, so I mixed them up together to get this colour. Besides, you haven’t brought any paints yourself, so you had better not complain!’ replied Priya indignantly.

‘That’s true, Satish, you shouldn’t complain,’ said Vishala. ‘All dark colours are great to take some interesting leaf prints with. Here, pick one of my leaves, paint one side of it with your purple paint and make a print of it on a piece of paper.’

‘Wow!’ said Satish, looking at the leaf print he had just made. ‘I can see all the veins, the midrib, and even the little projections on the side of the leaf!’

‘Yes! And that’s just one leaf,’ said Vishala. ‘Do you know that each one of my leaves is actually a little kitchen? Leaves make food out of sunlight, water and the carbon dioxide that you breathe out. And the veins that you see, carry the food and water to various parts of my body.’

‘Cool!’ said Satish. Can you ask your leaves to make us some Bhel-puri, then?’ Vishala laughed loudly again. ‘I wish that was possible! But I have to make do



with glucose for now!’

‘Now, would you like to take some prints of my bark?’ said Vishala.

‘Bark? What’s that?’ said Satish.

‘Come, let me show you. Step up a little closer to my trunk. When you touch it, do you feel something rough and woody? That’s my bark. It’s actually my skin, and protects my trunk from bad weather, heat, cold and even attacks by insects and pests. You can take a print of it too! But first, why don’t you write down my name and describe all that you see about my leaves and branches? You can even try to guess my height by looking at my shadow!’

Exercise 1A (2 weeks): Know your tree

Have you named your tree yet? Go ahead, think of a name that suits it. Take a long, hard look at your tree and write down as many details as you can:



1. How tall would you say it is approximately?



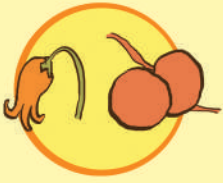
2. How large is its trunk in circumference?



3. Observe its leaves, its flowers, its fruit, and its bark. Describe them in detail.



4. What sort of shape does the tree take? Square? Round? Oval? Triangular? Or any other?



5. Does your tree have fruits or flowers? Do the shapes and colours remind you of anything? Some flowers, for example, look like bells. Some fruits look like cricket balls! Go ahead, use your imagination! Don't worry if your tree doesn't have fruit or flowers. If it produces them later, you can always come back and fill this section up.



6. Does your tree have any special marks or hollows in it? Do you see any places where branches have broken off, or been cut? Write down as much as you can see.

Pictures and Drawings: Take some pictures of your tree if you can. Take a close at the flowers, fruit, buds, and bark. Also take pictures of any damage. Don't forget to shoot anything else you find interesting. Remember to take a picture of the whole tree as well. Try and take a picture of the tree with something else beside it, such as a car, a person, or a building. That way, you can tell how big the tree is, compared to the object next to it!

If you don't have access to a camera, you can try drawing the shape of your tree, its leaves, flowers and fruits and colour them in. You might notice that some features make your tree appear very different from other trees in the neighbourhood. Make a note of these features.



Exercise 1B (1 week): Bark Rubbing

The bark of your tree is as unique as the tree itself. Come, let's make an exact print of your tree's bark using this interesting method.



You will need

1. A blank sheet of white paper which isn't too thick.
2. Some pencils or charcoal or crayons.

How to go about it



1. Take your paper and press it against the bark of your tree.



2. Rub your hands across the sheet firmly so you can feel the texture of the bark against your palms. Be careful so as to not tear the sheet of paper.



3. Now take your pencil/charcoal/crayon and hold it almost horizontally against the paper while putting your forefinger on tip.



4. Start colouring and soon you'll find an imprint of the bark forming on the paper. Keep going till your sheet is completely coloured. The more you colour the darker the impression will be.



5. Experiment with colours.

Exercise 1C (1 week): Leaf Vein pattern

Now take a look at a leaf from your tree. Can you see the veins on the underside of the leaf? Notice that some of these veins reach the very ends of the leaf, while some others stop within the leaf's surface. Every species of tree has a special branching pattern. Come, let's create some beautiful leaf prints with the leaves you picked.



You will need

1. Some leaves from your tree. Make sure they're not dry.
2. A rough sheet of paper, like handmade paper or rough cardboard
3. Paints or ink
4. Brush
5. A small flat rock or ask your parent for the instrument they use to grind masala in the kitchen.
6. An old newspaper
7. A waste cloth

How to go about it



1. Wipe your leaves clean with your waste cloth.



2. Flatten your leaves in a book for a couple of hours.



3. Cover a table with the old newspaper.



4. Now gently coat one side a leaf with paint or ink.



5. Use the waste cloth to gently wipe away the excess.



6. Place the now painted leaf on the rough paper and press it down firmly but gently making sure not to damage it.



7. Cover the leaf with another sheet of newspaper.



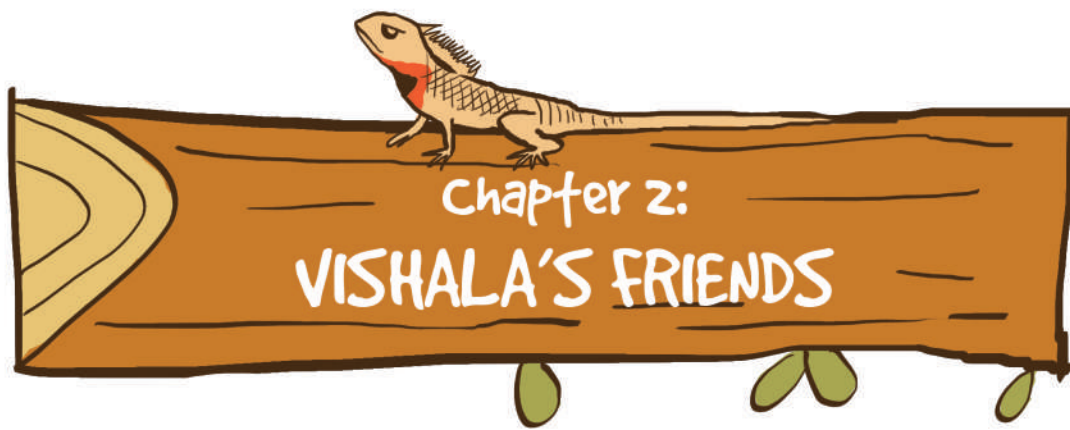
8. Use your flat rock and softly hammer over the leaf. First in one direction, then the opposite.



9. Carefully remove the newspaper and after a couple of minutes gently peel away the leaf: your beautiful print is ready!



10. Repeat the process with a fresh leaf. If you created a print of the face of the leaf, now create a print of the underside.



‘Hello Vishala’, the kids called out as they walked up to the tree.

‘Hey hey! Nice to see you,’ said Vishala. ‘How was your day?’

‘It was good,’ said Satish. ‘We were playing football near our school, and I scored two goals! You should have seen big Jagga’s face. He was the goalkeeper and missed the ball each time!’

‘Mine wasn’t so great,’ said Priya. ‘I was showing my classmate Shalini some of yesterday’s leaf prints, and she accidentally spilled some water all over them!’ ‘Ah, don’t worry, I have thousands of leaves, you can always make some more. Here, pick a few from here,’ said Vishala, offering Priya a leafy branch.

As the kids stepped up, they heard a little squeak near their feet. ‘Hey! Be careful! You almost stepped on me!’ said the little voice. The kids stepped back, startled.

‘Oh kids! I forgot to introduce you to my little friends. That over there, is little Nandu. He’s a herb.’

The kids peered down at their feet. ‘Hi,’ said a little voice again. It came from a small green plant close to Vishala’s trunk. ‘You really should be more careful when you walk around, you know! You almost crushed me!’

‘Sorry Nandu,’ said Priya. ‘We’ll be more careful next time! But what pretty little leaves you have. They look like little beads!’ ‘Hmph!’ said Nandu. ‘You should see me when I have flowers. I have the best flowers among all the plants here!’ ‘Stop showing off, Nandu!’ piped up another voice. ‘You may have pretty flowers, but I have the best looking leaves here.’

‘And who are you?’ asked Satish, looking closely at the little leafy plant a few metres away.

‘Oh, that’s Francis, the fern,’ said Vishala.

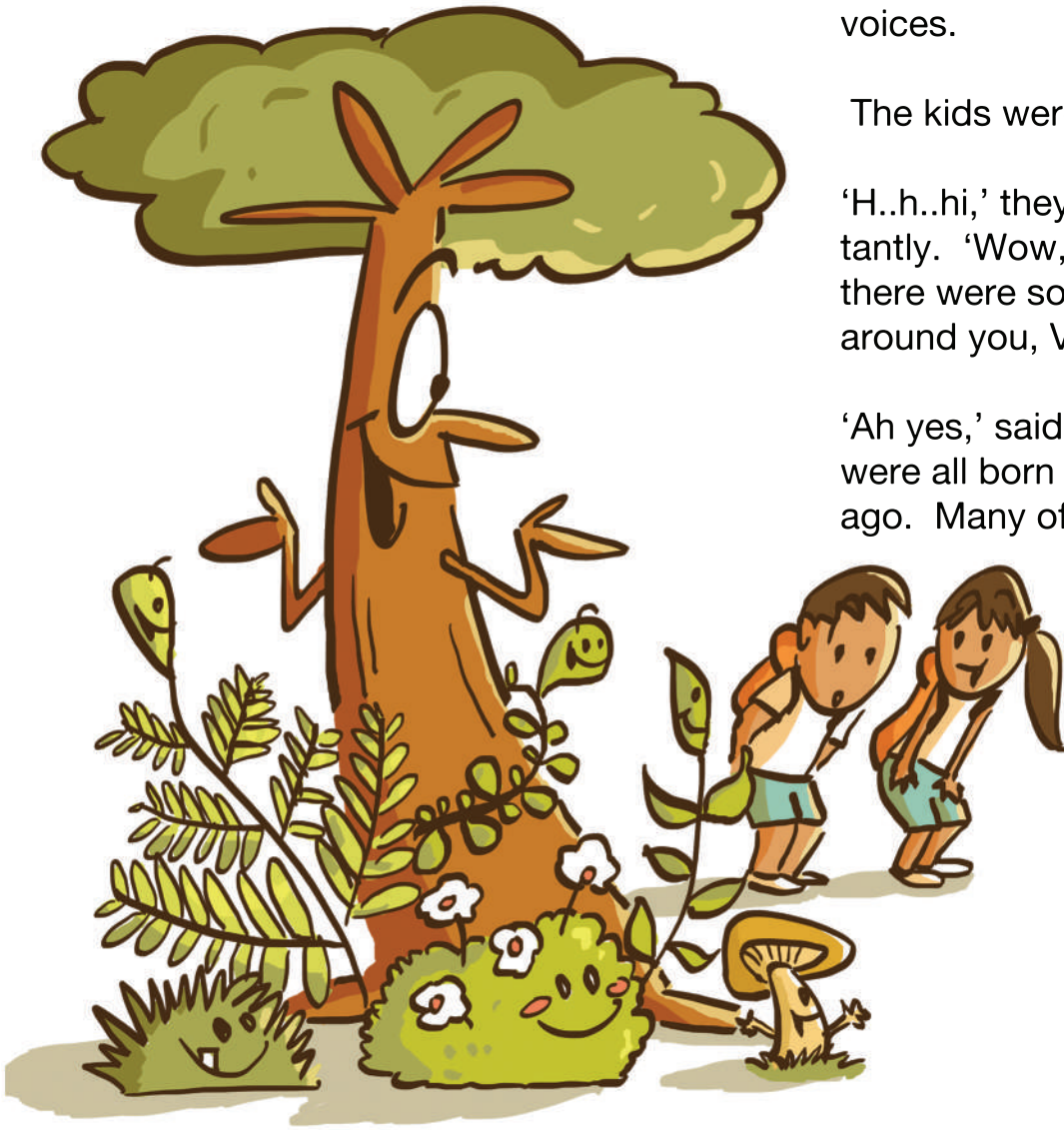
‘Let me also introduce you to my other friends. Here is Malti the creeper, Gul, the flowering bush, Girija, the grass patch and Mani, the mushroom.’

‘Hi kids!’ said a chorus of plant voices.

The kids were taken aback.

‘H..h..hi,’ they said back hesitantly. ‘Wow, we never knew there were so many little plants around you, Vishala!’ said Priya.

‘Ah yes,’ said Vishala. ‘They were all born here a few years ago. Many of them grew from the seeds that were blown here by the wind, or dropped by passing birds and animals.’



But Malti here grew from a twig that fell out of a crow’s nest high up on my branches!’

‘That’s amazing!’ said Satish. ‘Can we take a closer look at all your friends?’

‘Of course!’ said Vishala. Be careful not to step on any of them, though. You don’t want to hear another bunch of squeaks, do you?’

‘Yes, we’ll be very careful,’ said Priya.

‘Hey Priya! Come here and look at my flower buds,’ Malti said in a soft voice. ‘No no, you should come look at my interesting capped head first!’ yelled out Mani. All the other plants around Vishala started calling out to the kids, as they happily skipped about from plant to plant, noting down as much as they could in their little notebooks.

Exercise 2: Marking your tree quadrants



Have you noticed that your tree is not growing alone? The bark of your tree may be covered in flat, greenish-yellow patches of strange shapes. These are strange and fascinating creatures called lichen. Have you seen spongy green patches on your tree? Those are tiny plants called mosses. You will need a magnifying glass to see them properly. There may be other plants growing on your tree as well. You can easily tell them apart from your tree. Take a closer look and see if you can spot leaves, flowers or fruits that look different from that of your tree. You might see beautiful ferns with feathery leaves, orchids with bizarre and enchanting flowers and parasitic plants with showy flowers and sticky fruit! Don't worry if you can't spot any. Not all trees have them. You might even spot something a few weeks later in a portion of the tree that you hadn't looked in before.

Now look around the tree, below its canopy. Are there any grasses around? What about small herbs (with colourful flowers perhaps)? The little umbrella-like things are mushrooms – a kind of fungus that grows on dead and rotting plant material. The plants that grow on and around your tree are taking or fighting for valuable nourishment in the soil. Your tree is also affecting the plants growing around it by blocking out sunlight that they use for making their food! That's why there are so few of them growing underneath the tree.

Do you want to study all the plants that grow on and around your tree in details? Well here is how to go about it:

You will need

1. A 5m length of rope
2. A little spade or shovel
3. Some twigs and
4. Some coloured pieces of ribbon or cloth.



How to go about it



1. Make a circle around the tree:

a. Measure and cut a rope/string 5m in length.



b. Ask your friend to hold one end of the rope and stand at your tree.

c. Now hold the other end of the rope and walk in a circle around your tree.




d. Make some flags with the twigs and ribbons and stick them into the soil along the circle boundary. You need to do this so that you can find your circle again the next time round.

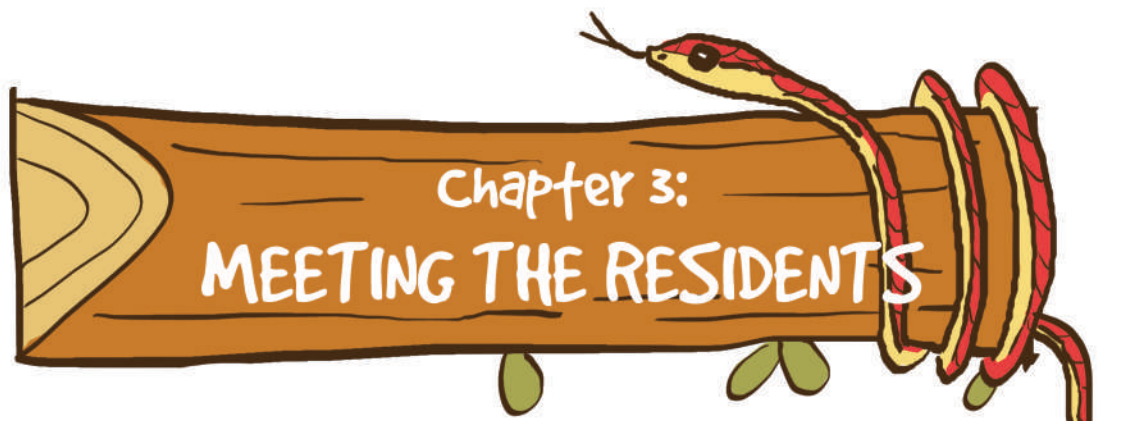


e. Now imagine that the circle is cut into 4 equal parts or quadrants and mark the lines within the circle.



2. Once the circle is made, all you need to do is to observe and record (by taking samples, photographs or drawings of) all the plants, ferns and mushrooms that grow within the circle. You can record details from one of the four parts at a time, and one part every week. How many different plants grow on and around your tree? Are they different from the ones around other trees that friends are monitoring? You can note down your observations in a table. Here is an example:

S No.	Date	Quadrant No.	Plant description	Comments
1.	30/10/2015	1.	Looks like this: 	There were 4 of these plants in this quadrant.



‘Hello Vishala!’ said the kids as they ran up to the tree as usual. ‘And hello to Malti, Nandu, Gul, Mani and all our new plant friends!’ said Priya. ‘Hi Priya... Hi Satish!’ said Vishala and a chorus of little plant voices. ‘Well, kids,’ said Vishala after they had greeted to everyone.

‘You know, in all the commotion last time, I forgot to introduce you to some more of my friends,’ said Vishala. ‘You have more friends?’ said Satish excitedly. ‘Yes, I do! But they aren’t plants. Hang on, let me show you. And be quiet, OK?’ said Vishala. The kids held their fingers to their lips while Vishala shook one of his branches gently.

‘H..hey!!’ said a harsh scratchy voice from one of the branches. You’re making all the twigs fall out of my nest, Vishala!’ Vishala chuckled. ‘That’s Kaagey the crow. She’s so possessive about her nest that even the slightest shake gets her all upset!’ ‘Oh, it’s all very well for you to say!’ said Kaagey indignantly. ‘Do you know how far I go to collect all these twigs to build my nest with?’ The kids looked up in wonder at Kaagey’s rather untidy nest. ‘And after I build my nest and lay my eggs in it, I have to protect it from other animals and birds as well. It’s tough work,’ said Kaagey.

‘How many eggs do you have, Kaagey?’ asked Priya, all excited. ‘Oh! I laid two beautiful eggs just last week,’ said Kaagey proudly. And here they are... one... two... three! Oh my god, where did this third egg come from?’ said Kaagey worriedly. ‘Let me see,’ said Vishala. ‘Hmm... it looks ever so slightly different from the other two, doesn’t it? Are you thinking what I’m thinking, Kaagey?’ ‘Ahh! I knew it!’ said Kaagey. ‘This is the work of Kuhu, that annoying Koel, that has been hovering around the tree since last Thursday. She’s laid one of her eggs in my nest. Why can’t she build one of her own? That lazy old bird!’ ‘Never mind, Kaagey,’ said Vishala. ‘Kuhu does this all the time. You’ll soon have a little Koel baby to keep your chicks entertained while you go out looking for food for them. But make sure the baby Koel doesn’t push your own babies out of the nest!’

‘Let’s not disturb Kaagey anymore,’ said Vishala, giving her branch another playful shake. ‘But kids, there are so many more of my friends I need to introduce you to. ‘Hey Anil, come down here and meet my friends,’ Vishala said. ‘Chik..chik..chik.. Hello kids,’ said a cute brown squirrel, as he ran down Vishala’s trunk to meet them. ‘It’s a pleasure to meet you. Would you like a berry to eat? They’re delicious!’

‘Oh thank you, Anil,’ said Priya, taking the berry from the squirrel. Satish too, stretched out his palm and got one. ‘Bzzzzz... Hello kids! I’m Madhu, the bee. I was just going to get bzzzzzy gathering some nectar from Malti’s flowers, but I thought I’d szzstop and szzzay Hi first!’

‘Nice to meet you Madhu!’ said Priya. ‘Can you show me where your hive is... Ouch!’ said Satish. Something small and round hit him on the head from above.

‘Stop monkeying around, Manga, and come down!’ said Vishala sternly. The branches shook slightly as a cheeky monkey bounded down, grinning at the kids.

‘And this guy is Manga. He’s only a year old, but look how naughty he is already! Where is the rest of your family, Manga?’



‘Oh... they’ve all gone to another tree to find something to eat,’ said Manga. ‘But I thought I’d stay back and meet the kids. Now... catch me if you can!’, said Manga, as he tickled Satish’s ear with his tail, and disappeared up Vishala’s trunk again.

‘Hey! I’m coming to get you,’ said Satish, clambering up behind Manga. ‘Looks like Satish has found himself a new playmate,’ chuckled Vishala.

In the meantime, Priya was looking carefully at another branch. ‘What a beautiful silky web!’ she said in wonder. ‘Oh, thank you my dear. It took me almost a day to build,’ a voice said from behind the web.

‘I am Saleena, the spider, and have been spinning my web here for months now. My sticky web catches small insects for my dinner,’ said the spider gleefully. ‘Oh!’ said Priya. She knew about spiders already, but had never spoken to one. ‘Nice meeting you, Saleena. I hope you catch a juicy fly this evening!’

‘Thank you my dear. Now run along, or you’ll frighten all the flies away!’

‘Well kids, those were just a few of my animal and insect friends. Come back another time and I will introduce you to more of them. In the meantime, why don’t you write something in your notebooks about all the animals and insects you’ve met today?’

Exercise 3: Who is your tree home to?





Take a close look at your tree. Can you see any creatures flying around it, or running up and down its branches? There could be bees buzzing around flowers, maybe a sunbird or two are drinking nectar from them as well. There might be a coppersmith barbet sitting in the branches gorging on fruit; stopping only to emit a loud 'tuk-tuk-tuk' call. A house crow might be hopping around looking for emerging termites. Ants might be scurrying up and down the trunk of the tree busy looking for treasures to carry back home. All these animals use the excellent hospitality services provided by your tree. Some animals may even make their homes in your tree. Birds make nests or live in holes in the tree trunk, spiders build webs on and around the bark, ants and termites have colonies at the base. Can you imagine what will happen to all these creatures if your tree were not there?



How to go about it





Week 1-2: Every day for about a week, spend 20-30 minutes at your tree. Sit 5-10m away from the tree, at a place where you can see at least one side of the entire tree clearly. Every 5 minutes, look at the tree for insects and animals. Note down what insects and animals you see and what activity they are doing. Here is an example of how your observation sheet will look like:

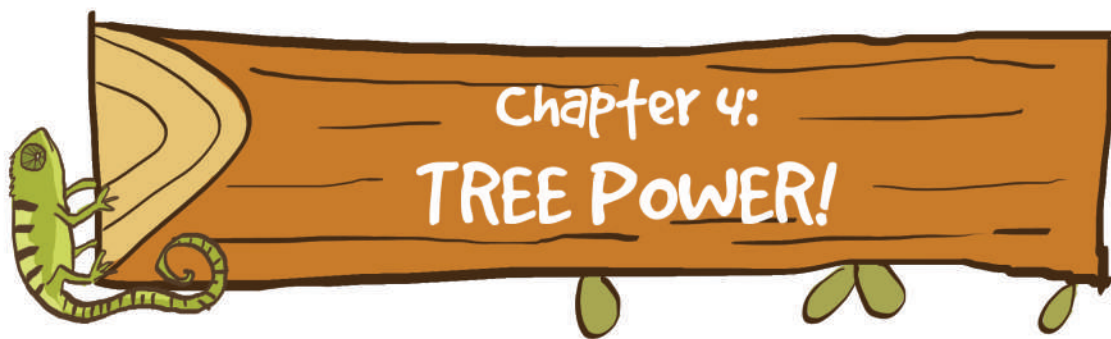


Date	Time	Animal/Insect	Activity
7.10.14	15:30	Bumble Bee 	Sitting at flower 
7.10.14	15:35	Sunbird 	Drinking nectar from flower 

These activities can be performed better if the tree is fruiting or flowering. If your tree is not fruiting or flowering, you can do week 3-4 activities in week 1-2 as well.

Week 3-4: In week 3 and 4 of this month, observe your tree for 20-30 mins and find out what kinds of insects and animals live on the tree (apart from the ones that visit it) and what kind of homes they have. A sample data sheet would look like this:

Date	Animal/Insect	Type of home	Observations
20.10.14	Giant wood spider 	Large web 	Had caught fly in web
20.10.14	Common Crow 	Nest 	



‘Hey Priya, did you hear the thunder and lightning last night?’ said Satish. ‘Yes, it was scary!’ said Priya. ‘There was so much rain too! I wonder how Vishala managed. The poor guy can’t take shelter anywhere, and he must have been cold and wet! Let’s go find out how he is doing today.’

‘Oh hello, kids! Did you enjoy the storm last night?’ said Vishala as the kids walked up to him. ‘We were safe at home, Vishala. But we were very worried about you. Are you ok?’ said Priya.

‘Oh... yes I am! The rain knocked off some of my leaves and weaker branches, but I will manage,’ said Vishala. ‘You see, nature has given me a lot of tools to protect myself from weather changes and attacks by insects, animals and even human beings!’

‘What do you mean, Vishala? You can’t run away and escape from anybody, can you?’ wondered Satish.

‘Ah, no! That’s precisely why we trees have developed many methods to repair ourselves and fight off attackers, while standing exactly where we are! For instance, when a branch breaks off in the wind, I repair it by letting out a sticky substance called sap. It hardens around the broken area and acts like a bandage.

‘Wow!’ said Satish, as he felt the sticky sap that was slowly hardening around the broken parts of Vishala’s branches.

‘That’s not all,’ said Vishala. ‘We trees get attacked by hundreds of insects, birds and animals every day. Some of them want to eat our leaves and bark, while some of them snap off our branches and leaves accidentally while climbing them. We have many methods to fight them. Do you see the little green bumps at the crooks of my young twigs?

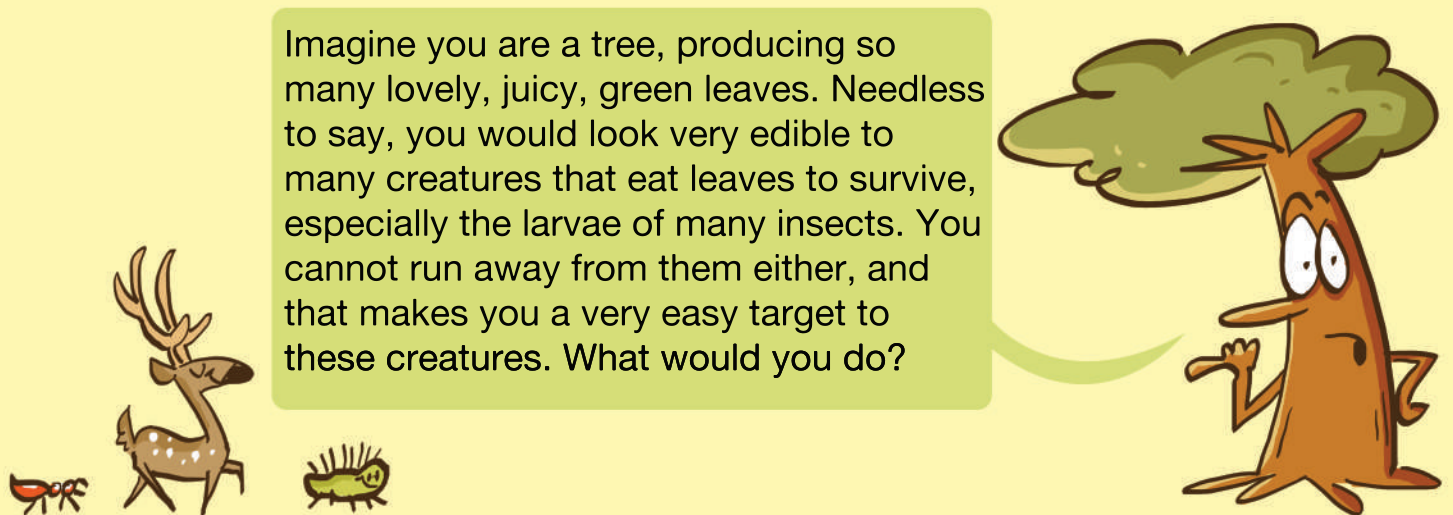


These are buds that will grow into new leaves or branches. Buds help us expand our canopies so we can gather more sunlight and also to replace leaves and twigs lost to animals and the weather.

‘Some trees have poisonous sap, which makes the insects that eat them feel very ill. Once they take a bite, they’ll never come back again! Some other trees have sharp thorns on their branches, so that none of the animals can get to his juicy leaves. Others have thick, hairy leaves that the insects cannot reach easily. It’s a tough job, defending ourselves, but we do manage somehow!’ said Vishala. ‘It’s only the human beings that we cannot defend ourselves from! Maybe you kids can tell your friends and families not to harm trees so much. We are living beings too, after all!’

‘Of course, Vishala!’ said Priya. ‘We’re going to tell everybody we know to protect and save all the trees and plants around us!’

Exercise 4: Is your tree damaged?



Over millions of years, trees have figured out some ways to avoid getting eaten up by hungry herbivores. They have covered their leaves with wax or hair and pumped toxic latex into their veins. But as the trees get smarter, so do their herbivores! Trees and herbivores are always trying to outdo one another – herbivores want to eat up all leaves and trees want them not to!

Have you noticed that some leaves of your tree look very out-of-shape? If you look closely, you would see that the leaf-edges have been eaten up. Some leaves of your tree may have transparent squiggles. These are ‘tunnels’ created inside the green leaf by larvae of insects.

How to go about it

Would you like to know more about what creatures eat your tree and how? Here is a bunch of things you can do:



Week 1-2: Observe your tree carefully. Collect ten leaves each time you go to the tree and observe the following:

1. Colour of leaves – are they mostly green? Are there lots of brown patches?



2. Shape and size of leaves – are the leaves small or large? Do they have pointed tips or rounded tips? You can trace the outline of the leaf on your note book and colour it the way you see it.



3. Texture of leaf – is it waxy or hairy? Go to your biology lab and look at a hairy leaf under a dissecting microscope or a compound microscope (you will need a teacher to help you with this).



4. Crush a leaf and smell it. Does it have a strong odor? Does it have a white milky sap or clear sticky sap?



Week 3-4: look for the following:

5. Signs of damage – take ten leaves from the tree and trace out their shape in a notebook. Do the edges look damaged? Can you see bite marks around the edges? Are there bumps on the leaf surface (these are most likely galls made by insect larvae)? Is any leaf discoloured or has brown patches? Are there any 'tunnels' in the leaves. Trace out these damages on the outline of your leaf.



6. Observe your tree for a few minutes each day and make a note of caterpillars that you see. Can you tell if some of these caterpillars are eating leaves on your tree?



You should also periodically look at the bark of your tree. Is the bark eaten by any insect? Why do you think leaves are eaten more than bark of trees? Draw pictures, take photographs, collect specimens or write a description of all the things you saw.

Chapter 5: TREES & THEIR MANY USES

Satish and Priya were making their weekly visit to say hello to Vishala and his friends. Some women were busy gathering large twigs that Vishala had dropped on the ground beneath. They made neat bundles of the twigs and were carrying them away to the temple nearby.

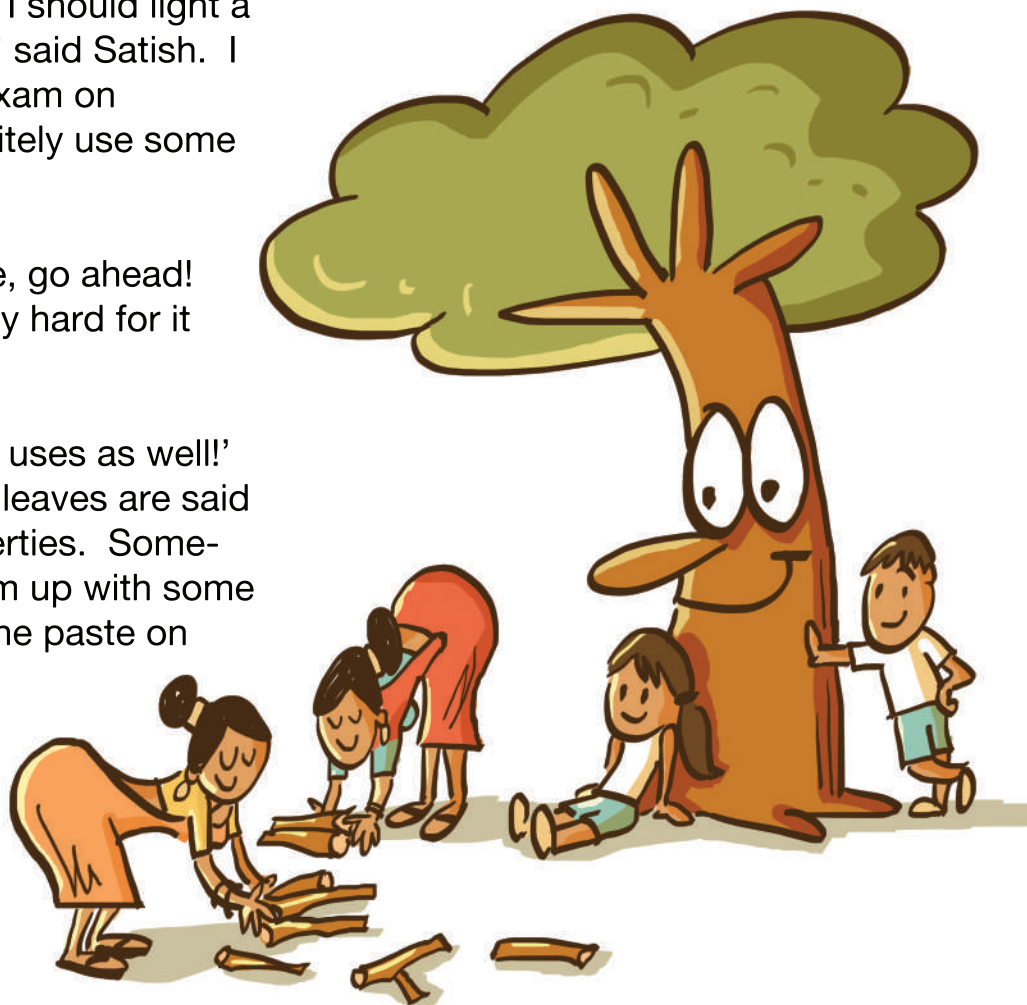
‘What are those women doing, Vishala?’ asked Priya.

‘They are carrying bundles of my twigs to light holy fires with. They believe that a fire lit with my twigs will bring them good luck and fortune,’ Vishala replied.

Oh that’s great! Maybe I should light a fire with your twigs too,’ said Satish. I have to write a maths exam on Monday and I can definitely use some good luck!’

Vishala guffawed. ‘Sure, go ahead! But make sure you study hard for it too!’

‘Other parts of me have uses as well!’ Vishala continued. ‘My leaves are said to have medicinal properties. Sometimes, people grind them up with some other herbs and apply the paste on wounds to heal them.



Sometimes, they also collect and dry out my fruit, to use as a herbal shampoo! Did you also know, that later this year, when all my tree-relatives in the area come into bloom, there is a major festival in the temple? We even get special garlands made for us at that time!’

‘Wow! We will look forward to it!’ said Satish.

‘But Vishala, how do all the trees know when to bloom? Do you talk with each other?’ asked Priya curiously.

‘Well, it’s complicated,’ Vishala replied. ‘Most of the time, it is the weather that tells us when to bloom. Each time of the year has a unique combination of sunlight, temperature, humidity, rain, and several other factors. We know it is time to bloom when we sense them all coming together.’

‘Many trees also produce chemicals which they release into the air. These chemicals contain secret messages that the trees exchange with each other. For example, an Acacia tree will release a chemical called ethylene into the air if it is being heavily attacked by insects or animals. When other acacia trees sense this chemical, they immediately produce a strong sap that makes their leaves and bark taste bitter, preventing any other animals from attacking them.’

‘So it is true!’ said Satish, who was listening to Vishala quietly. ‘Trees do have their own secret language!’

‘Of course we do! How do you think we have survived all these millions of years if we can’t communicate with each other?’

The kids happily made notes as Vishala carefully explained the many uses of his bark, leaves and fruits to them.

Exercise 5 – Your tree and its many uses



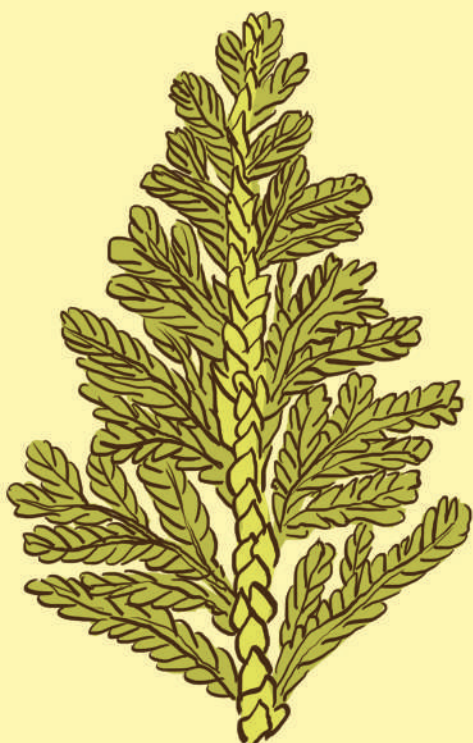
Your tree is a scientific marvel. It has evolved over many millions of years, changing with time and adapting to various conditions to become the tree it is now. It has many tricks up its sleeves. There is so much to learn about each tree. How do trees defend themselves? Do they communicate with each other? If they do, how? They don’t have telephones, don’t use the post office. Do all trees flower? Do all trees pollinate the same way? Why do some fruit taste sweet while some taste sour? Each tree is a puzzle. Let your curiosity take lead. Find out as many interesting facts about your tree as you can.



How to go about it

Spend time with your tree. Think about it. Make a list of questions about them. Try and arrange a meeting with a botany teacher at a nearby college and discuss your tree with them. Read about your tree in books, or look up the internet.

Most Indian households have some form of home-made cures for common ailments. Ever had a cold and been given some ginger honey concoction? Or Tulsi maybe? Have your parents ever told you to apply some turmeric over a cut? Then you are familiar with the idea that plants have many medicinal uses.



You may have heard the story of Sanjeevini, a plant that healed Lakshman. It could have been a plant called Selaginella, as it is known in Latin. But Selaginella is only one tiny plant (in fact, it may be growing on or around your tree). Trees often have many medicinal uses – from root to bark to leaf and even flowers and fruits are used as medicines for various ailments.

Your tree too has many such medicinal properties. Why not learn what they are? Interview your parents and other grownups. An ayurvedic doctor will be a treasure trove of information. So try to interview one of them.



‘You look rather fresh today, Vishala,’ said Priya. Vishala’s branches were sprouting hundreds of tiny light green baby leaves.

‘Thanks! I feel great, too! I’ve been putting out new leaves this time of the year ever since I was a little plant,’ said Vishala.

‘I can’t imagine you as a young plant, Vishala. You’re so big and tall now! Where did you come from? Who planted you?’ asked Priya.

‘To be honest, I don’t know,’ said Vishala. Old Jamuna, that huge tree over there has known me since I was a child. Maybe we should ask her!’

‘I remember the day very well,’ said a soft voice. It came from an old tree a small distance away. The children ran up to it. ‘I am Jamuna, one of the oldest trees in this area,’ the tree said.

‘Young Vishala sprang up out of the earth one day, after a particularly heavy rain-storm. He probably grew from a seed dropped by a bird. Now look at him, he’s become such a big and handsome tree! You know children, there are so many interesting stories about us trees. Would you like to hear one?’ ‘Yes, yes!’ said both the kids together. ‘Let me tell you the story of the farmer and the trees then.’



“Once upon a time, a farmer wanted to go to the town to sell his cow, so that he could buy some new clothes. His wife loved the cow very much and did not want him to sell it, but the farmer was adamant. So she thought and thought, and came up with a clever idea! It would take the farmer two days to reach the town, and the farmer would have to take rest under a tree in the night.

As the farmer was leaving, his wife told him, 'Dear husband, promise me that on your way to the city, you will sleep under a tamarind tree, and on your way back, you'll sleep under a neem tree.' The farmer agreed and set off. After a whole day of walking, the farmer and the cow found a tamarind tree to sleep under. When he woke up in the morning, he felt quite unwell and couldn't continue his journey further. So he decided to go back home. He wasn't able to walk very far, and it became dark before he could reach home. He quickly found a neem tree to rest under for the night. When the farmer woke up in the morning, he felt fit as a fiddle, and ran back home with the cow to his loving wife, who was waiting for them with a big lunch!

The farmer's wife was very clever. Trees like the Tamarind have a thick cover of leaves that breathe in all the oxygen around them at night, not leaving enough for the people who sleep underneath. This sometimes makes them feel a bit giddy when they wake up in the morning. Neem trees on the other hand, are not so thick, and make people healthy because of their medicinal properties. We don't know if it was because of the trees, but the farmer's wife got her cow and her husband back hale and hearty, earlier than planned!"

The children clapped their hands and asked for another story.

'Jamuna has many more interesting stories up her sleeve,' said Vishala. 'I've heard so many of them growing up. Ask her nicely and she'll tell you one, every time you visit!'

The kids were excited and ran home to tell their parents this amazing tree story, and hoped to hear many more such stories from them!

Exercise 6: The cultural background of your tree



Who doesn't like stories? Since trees are central to human life there are plenty of stories about them. Surely, there are some about your tree. Don't you want to hear some of them?

How to go about it

Stories about trees are usually rooted in folk history so why don't you do some research? Ask if your parents, grandparents, uncles, aunts and other grown-ups around you know any tree stories.



Since trees very often have religious significance, priests are a good source of such information. Perhaps your teachers or parents can introduce you to people who are knowledgeable about trees and their history and can help you interview them. You can also visit a local library and search for cultural stories. If you have access to the internet, then look up your tree online. But it is so much more fun talking to an elder about stories of your tree! Here is how you can note down each person's stories and facts:

Date and time: _____

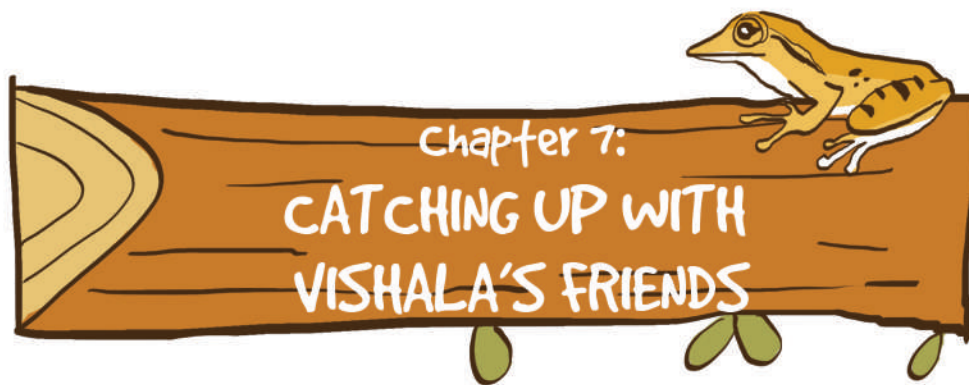
Full Name: Ramesh Kumar

Age: 42

Occupation: Postman

How do you know this person?: He works in the post office nearby

Facts about the tree:



‘Good afternoon, Vishala!’ said the kids as they walked up. ‘We thought we’d check up on all your little plant friends we made last time.’

‘Oh sure!’ said Vishala. ‘But don’t be surprised if you find some new ones!’

‘Oh hello, what’s your name?’ said Priya stooping over a shy little plant that was growing in a spot where there was nothing before.

‘That’s Rateesh,’ said Malti, the creeper, her tendrils gently swaying in the wind. ‘Plants like Rateesh are called annuals. They grow quickly from seed and produce flowers and seeds of their own, all within a year. Even though they have short life spans, they make sure they produce enough seeds for new sets of plants to come up after them!’

‘So next year, I’ll meet junior Rateesh! Gosh, I’ll feel like an uncle then!’ said Satish.

‘But you too look different, Malti!’ said Priya. ‘You just had a few leaves on you when we last met you. But now you are covered in leaves and flowers. How beautiful!’

‘Ohh..thanks, my child,’ said Malti. ‘You see, many of us plants change a lot with the seasons. Vishala too, sheds his leaves during this time of the year. In fact, because Vishala doesn’t have

so many leaves on him, more sunlight reaches the ground beneath him. And that means all the plants around Vishala get a chance to use the sunlight and they get, to grow bigger! It’s called a natural cycle, and when nobody disturbs it, all plants adjust themselves and grow according to it.’



‘That’s very interesting! But where is Mani, my favourite mushroom? He seems to have disappeared completely!’ said Satish in dismay.

‘Hey Satish, I’m down here!’ said a muffled voice that seemed to come from under the earth.

‘Mani! Is that you? Where are you hiding? I can’t see you!’

‘I’m right here, under the earth,’ said the voice. Most of my body is in fact under the earth, composed of millions of fine threads called filaments. Whenever the conditions are right, like in the rainy season, my filaments will create a set of mushrooms that will pop out of the ground. Each mushroom contains hundreds of small seed like structures called spores. As the spores disperse in the wind, they will take root in other places.’

‘Wow! You’re so much cooler than I thought!’ said Satish.

‘So kids!’ said Vishala. ‘Why don’t you go around and make notes about the new things you see today? Say hello to your old friends too!’

Exercise 7: What grows around your tree during this season?

The seasons have changed and the air is drier and cooler. Your tree is behaving differently too, is it not? Has it shed any leaves? If not your tree, the plants around your tree have definitely changed, haven’t they? The smaller plants that you observed growing around your tree seem to be drying off. It is a good time to repeat what you did in Exercise 2 – to observe what grows around your tree – to observe how changing season affects all plants. You remember what to do, don’t you? If not, here’s a reminder.



Week 1: You need to first make a circle around your tree, with the help of a friend. Follow these instructions to make the circle-



a. Measure and cut a rope/string 5m in length.



b. Ask your friend to hold one end of the rope and stand at your tree.



c. Now hold the other end of the rope and walk in a circle around your tree, marking a circle around it. If you have some coloured ribbons, you could make flags and put them along the circle boundary. You need to do this so that you can find your circle again the next time round.



e. Now imagine that the circle is cut into 4 equal parts or quadrants and mark the lines within the circle.

Week 2-4: Once the circle is made, all you need to do is to observe and record (by taking samples, photographs or drawing) all the plants, ferns and mushrooms that grow within the circle. You can record details from one of the four parts at a time, and one part every week. How many different plants grow on and around your tree? Is it different from a tree that one of your friends is monitoring? How is it different in the kind and number of plants that grow under each tree?





‘Surprise!!!’ said a chorus of voices as the kids walked by. Vishala and all his plant, animal, insect and bird friends had gathered together and were creating a huge noise.

‘Wha..what happened?’ said Satish hesitantly.

‘Don’t you know what day it is, kids?’ said Vishala. He had put out some sweet fruit that he was handing around to all the birds and insects to eat. Malti the creeper looked even more beautiful than before. She and Gul the flowering bush, had festooned the area with branches filled with fragrant flowers. Saleena the spider had spun some beautiful webs around the branches, giving the entire area a festive appearance.

‘It’s been a whole year since we all met, children!’ said Malti. ‘And it’s time to celebrate!’

‘Oh! Yes it has, hasn’t it!’ said Priya happily. ‘We’ve had so much fun meeting and playing with all of you that we just didn’t realise that a year had passed by so quickly!’

Suddenly, there was a flapping of wings. Two young crows and a koel landed on a branch nearby. ‘Do you recognize them?’ said Kaagey the crow. Those are my children- Kalia, Shyamala and Kokila. You saw them when they were just little eggs in my nest. Now look at them – so beautiful,’ said Kaagey with a tear in her eye.

‘Oh my! You’ve grown so quickly,’ said Priya, looking in wonder at them.

‘And where’s my friend Manga?’ said Satish. ‘Here I am,’ said Manga, tossing down a twig at Satish. ‘Ouch! You’ll never change, will you, Manga?’ said Satish, as he rubbed the spot on his head where the twig had landed.

‘Come on, join the party, kids,’ said Vishala, handing them some fruit. Girija, the grass patch asked the kids if they’d like to sit on her carpet. Madhu the bee brought them small drops of nectar to drink. Anil the squirrel, ran up and down the tree bringing them little tit-bits that he had gathered from everywhere, just for the party. Mani the mushroom had emerged from the ground again, beaming radiantly at the children, while Nandu the herb and Francis the fern chattered excitedly with them.

‘This is the best party I have ever been to!’ said Priya happily. ‘Oh yes it definitely is!’ said Satish, who was busy playing ‘catch the twig’ with Anil and Manga.

‘And you both deserve it!’ said Vishala. ‘We are all so happy to have made friends with you. We should throw a party like this every month!’

‘Yay!’ said the kids, dancing about in glee. ‘We are the luckiest kids in the world!’



Exercise 8: Draw and write about your tree friend

For almost a year now you have been drawing sketches and taking photographs of your tree. You are an old friend to the tree now! It is great fun writing testimonials for old friends! Why don't you do one for your tree? Do you like stories? Songs and poems? Well, here is an opportunity for you to write some. Tell us about your tree, what you think and feel about it. Verse or prose, it doesn't matter. What does matter is for you to have fun! So get carried away and make things up! If you do not like writing, then tell a tale about your tree in any other form – a poem, a story, a skit or play, a 3D model of your tree and its denizens, a time-lapse photo story, a collage, a painting. Anything! You could team up with a friend or do it by yourself.



How to go about it

Be creative! You can either write about your tree (a story, poem or play) or make an artistic depiction (make a comic, sketch, painting, collage, 3D model) or use a camera to get pictures or videos of all the exciting this happening on and around your tree.

