

Biodiversity Around Us



Let it live

Activity Booklet

TREE Foundation's Biodiversity Awareness Initiative



Jane Goodall's
Roots & Shoots
India

Whether it hops, crawls, runs, wriggles, slithers, swims, flies, buzzes, grows from the ground or lives in water, man needs nature!

Biodiversity is the variety of life on Earth. It's everything from the tiniest micro organisms to the tallest trees, from creatures that spend their entire lives deep in the ocean, to those that soar high above the earth's surface. The word biodiversity is relatively new. It is short for the term 'biological diversity'.

An ecosystem is a living community of plants and animals and their relationships with the environment around them. Environment includes both the living and the non-living things around us. In any ecosystem, most native plants and animals have evolved over thousands or millions of years, having developed interconnectedness with each other; in other words they have evolved depending on one another and the environment around them, which supplies air, water, food and shelter for their survival. In our own urban ecosystem, we depend on farms, grocery stores and other businesses that supply us the things we need.

Biodiversity is the foundation of a healthy, functioning ecosystem, upon which all life depends. Each species within an ecosystem, including us humans, is part of the web of life. Every plant or living being has its own role to play in an ecosystem; each is dependant on another for its food, shelter and energy sources, for its very survival. Biodiversity is the source of all our food as well as many medicines and industrial products. Biodiversity also ensures clean air, water and fertile soils; it provides opportunities for recreation, tourism, scientific research and education; and it is a source of cultural identity for us. Hence maintaining a diversity of life in an environment is vital to the survival of life, including our own.

We humans need to plan our use of land and other natural resources carefully as we go about our own activities, ensuring the preservation of biodiversity within our own ecosystems. The diversity of life on Earth shapes and nourishes every facet of our existence. But because these connections are seldom obvious, we don't always know how our actions affect the environment. Due to the rapidly growing human population and its impacts on ecosystems, we have chosen biodiversity and its conservation as the theme for *Biodiversity Around Us*, activity booklet.

In referring to schoolyard biodiversity we will be talking about all the different kinds of plants, animals and insects that you might find around your school. This booklet is designed for use with students aged 11-14. The activities in this booklet can be integrated into many subject areas, not just science. The worksheets provide opportunities for educators to draw out every child's natural curiosity and sense of wonder and help bring biodiversity to life in the students' lives. The world around us is full of wonders to appreciate - the intricate dance of a honey bee, the unexpected appearance of a rainbow, the delicate craftsmanship of a birds nest. We hope you will enjoy understanding more about biodiversity and become aware of the fantastic phenomena that routinely take place in the natural world around us, through this booklet.

Only if we understand, can we care. Only if we care, can we help.
Only if we help, we shall be saved- Dr. Jane Goodall

Biodiveristy Around Us –The Team

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TREE Foundation is an NGO, founded by Dr. Supraja Dharini in 2002, inspired and guided by Dr. Jane Goodall DBE, and driven by compassion and care for the welfare of all animals, environment and communities. TREE Foundation pioneered a successful community based conservation program for the endangered Olive Ridley turtles that nest along the southeastern coast of India. The foundation focuses on the conservation of sea turtles through community education and training. Local young fishermen, who previously were turtle egg poachers, are now engaged as Sea Turtle Protection Force (STPF) members. This provides them with an alternative means of livelihood. They are now the key players in monitoring nesting turtles, relocating eggs into hatcheries, providing protection from poachers and predators, and releasing lakhs of baby turtles to the sea. They are also involved in spreading the conservation message to community members. They have gained recognition from the State Forest Department.

TREE Foundation uses the Olive Ridley as a flagship species to address marine conservation issues within the fishing community. TREE Foundation works jointly with the Wildlife Wing of the Forest Department, the Department of Fisheries of Tamil Nadu, Andhra Pradesh and Odisha, and the Indian Coast Guard. The program covers 40 villages along a stretch of 126 km in Chennai; 45 villages in Nellore along a stretch of 77 km; 4 villages in Krishna District along a stretch of 43 km; 12 villages along a stretch of 28 km in Vizianagaram- Andhra Pradesh; and 5 villages along a stretch of 23 km in Ganjam, Odisha.

By conducting education and awareness programs to all stakeholders, TREE Foundation aims to: influence policy makers on larger conservation issues; involve the community in restrictive gear management and seasonal closures at sea; spread awareness of the land/ocean connection; and protect all endangered marine species.

TREE Foundation is expanding its current program to protect turtles at sea and minimize accidental catch of sea turtles during fishing activities, in order to reduce mortality of turtles coming in to nest, in addition to protecting turtle nesting sites and turtle eggs.

TREE Foundation also runs the first of its kind Rescue Rehabilitation Centre for sea turtles in India. When the foundation receives information about a sea turtle that has been stranded or hurt, it rescues and rehabilitates it in the centre with the help of STPF members and volunteers. Once the turtle is nursed back to health, it is released to the ocean.

Our 'Outreach and Education' activities form an important part of our conservation program. It is through these activities that we reach out to students and the general public. Students, who learn about the importance of marine ecosystems and conservation, will someday pass along these learnings to their children and grandchildren.

Our Foundation conducts a variety of environmental education programs that include:

- An annual Teachers Conference to involve teachers in Biodiversity Conservation Awareness
- An annual Flipper Fest - A marine biodiversity awareness festival with competitions for school and college students
- Coastal Cleanups and Eco Bag Designer of the Year contest
- Youth summit for college students
- Turtle Walks for the general public, corporate bodies and students of all ages.
- Endangered Marine Species Workshops for Marine Police, Coast Guard, Forest and Fisheries Department, throughout Tamil Nadu and Andhra Pradesh.

Together we can make a Difference!

Let's be the change we want to see!

Contact us @

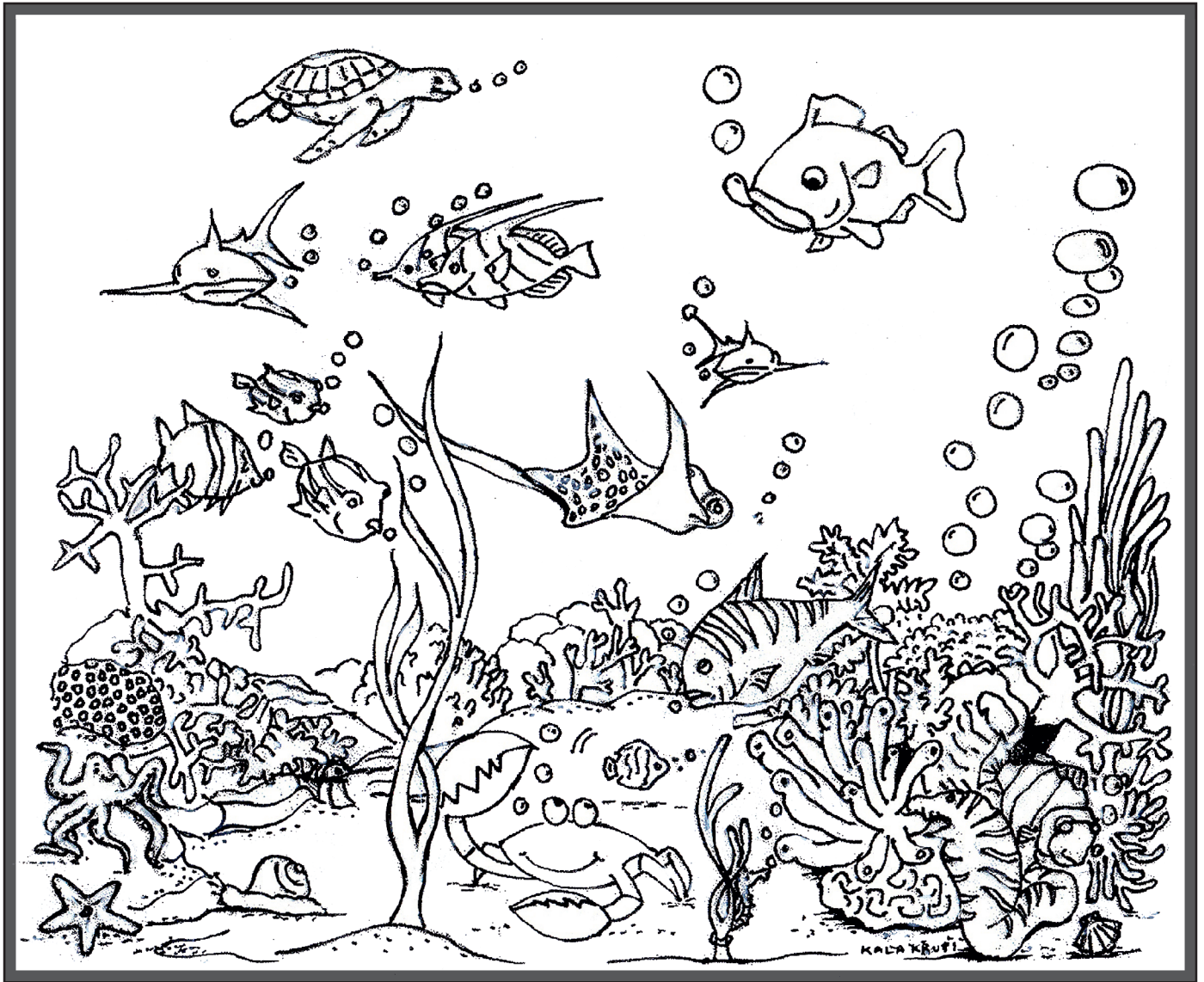
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Roots & Shoots India (A Dr. Jane Goodall Institute International Volunteer Program)**

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Marine biodiversity

TREE Foundation's Biodiversity Awareness Initiative

Supported by:-



Web of Life

Work Sheet 1



1. What is Web of Life?

2. What does 'biodiversity' mean?

3. Why is biodiversity important?

4. Why is the Maintaining of the biodiversity important for various tribes?

5. What are the few basic things we can do to protect our natural environment?

6. Where can we find biodiversity?

7. What kind of food does our biodiversity provide?

8. Name other resources that our biodiversity provides

9. How many species of plants and animals can we find in Tamil Nadu?

10. What are the plants and animals you see around your home / school?

11. Where is the natural habitat of the Olive Ridley Sea Turtle?

12. How many species of sea turtles are found in our coast?

13. What are the most common birds you are likely to find in Chennai?

14. What are the common migratory birds of Chennai?

15. What flower, tree and fruit are the symbols of Tamil Nadu?

16. What is the speciality of the Nilgiri Tahr and the Emerald Dove?

17. Can you find the symbolic flora around your home / school?

18. Why should students visit natural environments?

19. What are the various Do's and Don'ts during a nature trip?

20. How is our natural environment being threatened?

21. Which are the endangered flora and fauna of Tamil Nadu?

22. How can you help biodiversity?



Ecosystem Research: Design Brief

Work Sheet 2



Your task: Design and make a 3D model or a diorama of an ecosystem to be used in an advertisement to tell people about different kinds of biodiversity.

Features: What ecosystem features will you include?

Creatures: What plants and animals will you include?

Materials: List the materials and equipment that you will use in your model.

Natural materials

Non-natural materials

Equipment

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Using your model: Describe how your model will be used in an advertisement to promote biodiversity.

Drawing : Take an A4 size paper and sketch your design on it. The maximum size of the base of your model is the size of this sheet of paper (A4 size).

Students can be instructed to make models to be displayed in TREE Foundation's Flipper Fest

Reptiles around Us

WorkSheet 3



Bengal Monitor (*Varanus bengalensis*)

Trees and walls I love to climb,
I'm born with dark colours but lose them over time



Oriental Garden Lizard (*Calotes versicolor*)

In your house or the yard I could be found,
I change orange or dark yellow when I see a female around



Brahminy Skink (*Eutropis carinata*)

I may look like a lizard but my neck and legs are small,
I'm found anywhere from your garden to the mall



Indian black turtle (*Melanochelys trijuga*)

I'm active mornings and evenings and bask all day long,
I don't think eating dead animals would be wrong



Indian Star Tortoise (*Geochelone elegans*)

I'm slow and steady using my shell as a shade,
Humans say I'm quite popular for exotic pets trade



Indian Flapshell Turtle (*Lissemys punctata*)

I'm an aquatic turtle but I can walk long distances on land,
My head and feet retract inside my shell if things go out of hand



Indian Chameleon (*Chamaeleo zeylanicus*)

I use my sticky long tongue to catch insects to eat,
I camouflage so well I could be right under your feet!



Checkered Keelback (*Xenochrophis piscator*)

You can see me in fresh water lakes or rivers that are
near, But I'm not venomous so never fear !



Rat snake (*Ptyas mucosa Linnaeus*)

I'm a constrictor so I swallow my prey whole,
I'm a farmer's friend as I eat a rat or a mole.



Common Green Vine Snake (*Ahaetulla nasuta*)

I hide in the trees all day and sleep at night,
Please don't hurt me or I may give you a nasty bite



Spectacled Cobra (*Naja naja*)

Snake charmers should not keep me anymore,
I am the biggest of the poisonous 'big four'



Blind Snake (*Ramphotyphlops braminus*)

I look like an earthworm but segments you cannot find,
A layer of translucent scales make me almost blind

Mammals around Us



Indian Palm Squirrel (*Funambulus palmarum*)

Quick and nimble and as fast as can be,
On my back you'll usually find stripes of three



Bonnet Macaque (*Macaca Radiata*)

I'm closely related to everyone, (of you)
I love to be curious and always have fun



Indian Grey Mongoose (*Herpestes edwardsii*)

I'm shy so under dry wood or branches I hide,
I come out in the night to feed the family by my side



Indian Flying Fox (*Pteropus giganteus*)

I may have wings but birds are not my kind,
Not with echolocation but with my eyes my food I find



Indian Hare (*Lepus nigricollis*)

Don't think I'm a rabbit for I'm larger and faster,
I'm always alert and ready for any disaster

Amphibians around Us



Indian Bullfrog (*Hoplobatrachus tigerinus*)

I can be up to 15 centimetres big,
My dramatic colours get the females to do a jig



Indian Green Frog (*Euphlyctis hexadactylus*)

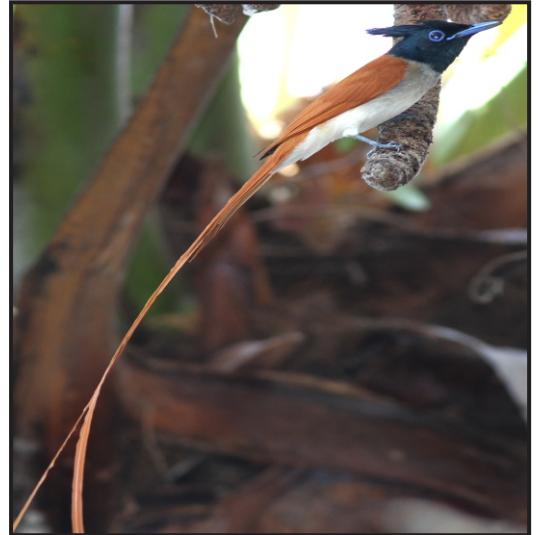
My first finger is longer than or equal to the second one,
I come out in the monsoons and have lots of fun

Birds around Us



- ◀ **Asian Koel (*Eudynamys scolopaceus*)**
I wake everyone at dawn with my calls so loud,
I pirate crow's nests and of my ability I am proud

- Asian Paradise Flycatcher (*Terpsiphone paradisi*)** ▶
If brown dominates my feathers then I could be a girl,
But I could also be a boy so look at my long tail curl



- ◀ **Black Drongo (*Dicrurus macrocercus*)**
I'm an aggressive bird and protect what's mine,
I can even mimic other bird calls just fine

- Coppersmith Barbet (*Megalaima haemacephala*)** ▶
Look at the number of colours on me,
I love to eat berries and figs from the tree



- ◀ **Indian Golden Oriole (*Oriolus kundoo*)**
I look like a superhero with a black eye mask different from the rest,
But sometimes stay near a Black Drongo for protection of my nest



- ◀ **Little Green Bee Eater (*Merops orientalis*)**
 I do aerial sorties that no fighter plane can match,
 I toss my prey in the air before with my beak I catch

▶ **Purple Rumped Sunbird (*Leptocoma zeylonica*)**

I indulge in nectar piracy where I steal nectar without pollinating,
 My nests are filled with cobweb for lining



- ◀ **Purple Sunbird (*Cinnyris asiaticus*)**
 Look at your index finger for I am that small,
 I am completely purple with iridescence and all

▶ **Red-vented Bulbul (*Pycnonotus cafer*)**

I'm very common and you see me all the time,
 I sing pleasant songs and hunt for insects and berries on the trees I climb



- ◀ **Red-whiskered Bulbul (*Pycnonotus jocosus*)**
 It looks like I'm always blushing,
 My hair gets teenager like spikes without brushing



- ← **Rufous Treepie (*Dendrocitta vagabunda*)**
 Rufous is a kind of brown colour if you didn't know,
 Can you believe such a beautiful bird like me is related to a crow?



- Rose ringed Parakeet (*Psittacula krameri*)** ➔
 I love to be free and roam the yards,
 But sometimes get captured and am forced to read magic cards



- ← **Shikra (*Accipiter badius*)**
 Little Banded Goshawk is my other name,
 Insects to small birds, rodents and lizards are my game



- Brahminy Kite (*Haliastur Indus*)** ➔
 I scour the coastal line looking without creating a racket,
 I have a beautiful white neck with a brown feather jacket



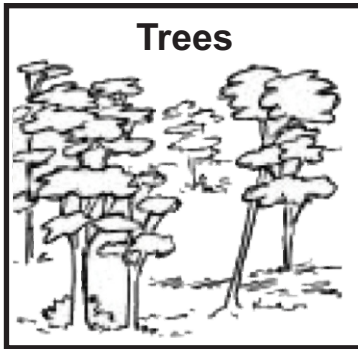
- ← **Spotted Owl (*Strix occidentalis*)**
 I'm a small owl and it's hard to find me,
 Can't spot me? I'm covered in spots ironically

Healthy Habitats

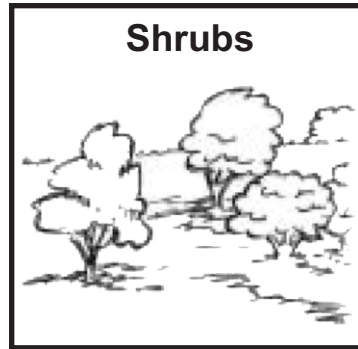
Work Sheet 4

A healthy habitat provides all the things that plants and animals need.
Tick the boxes that describe the area you are looking at.

My area is : _____



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none	some	lots



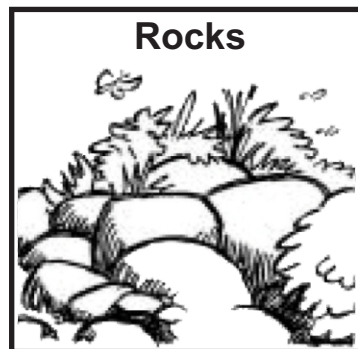
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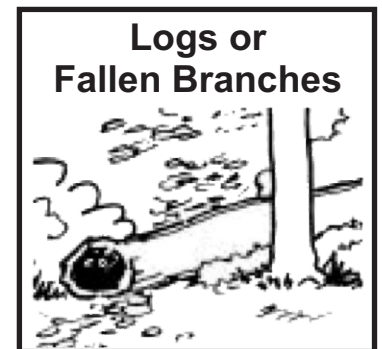
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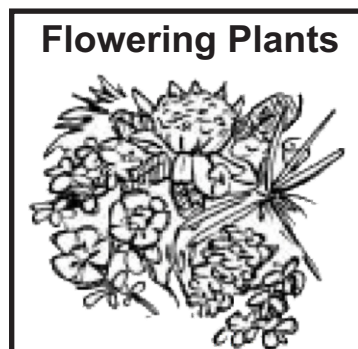
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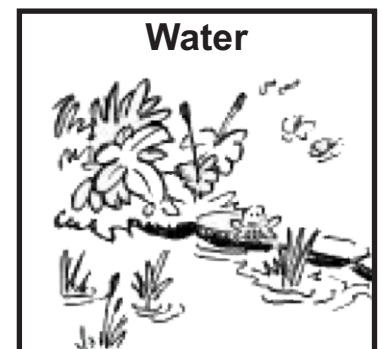
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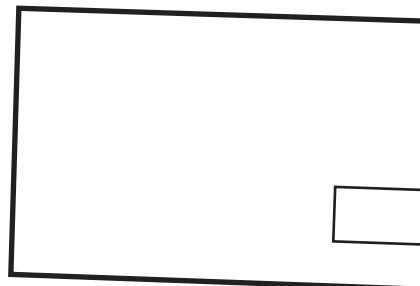
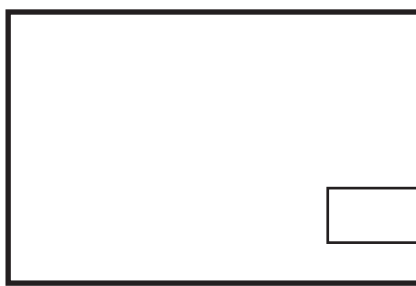
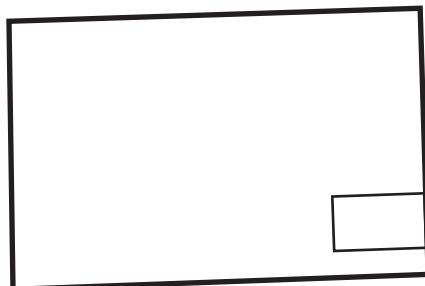
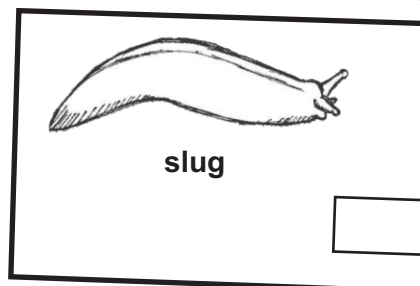
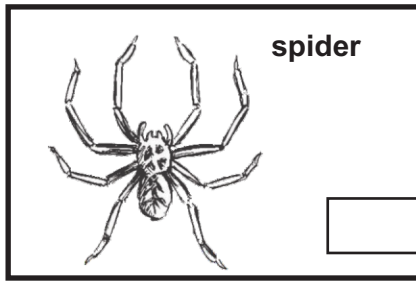
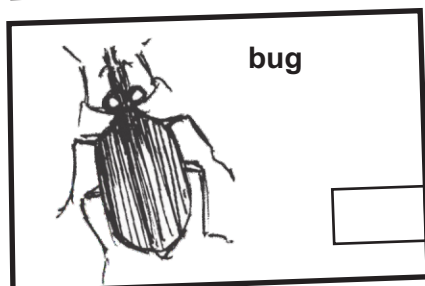
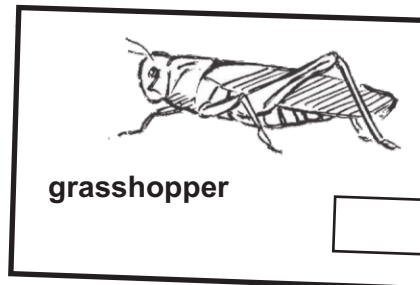
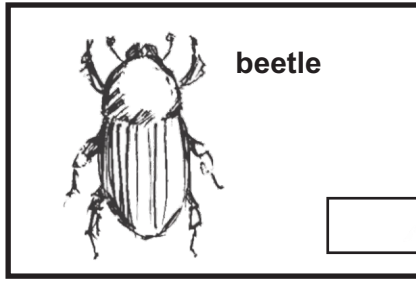
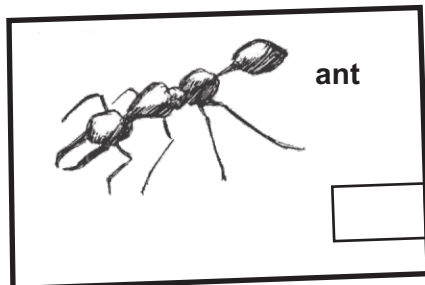
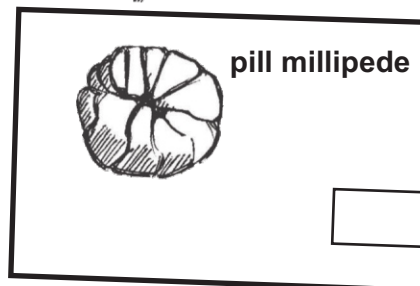
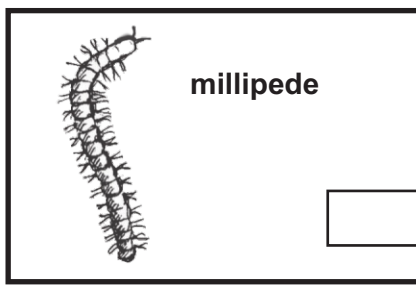
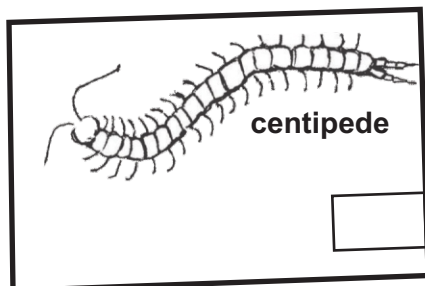
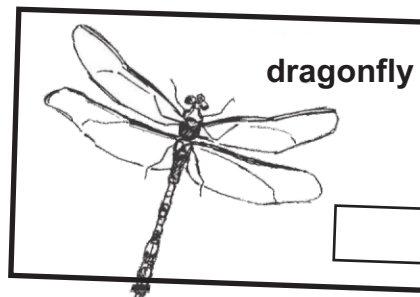
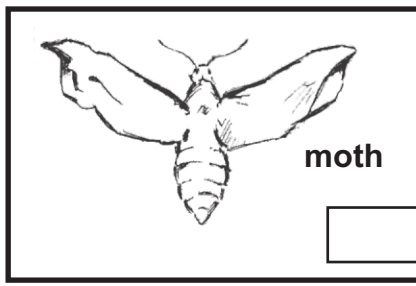
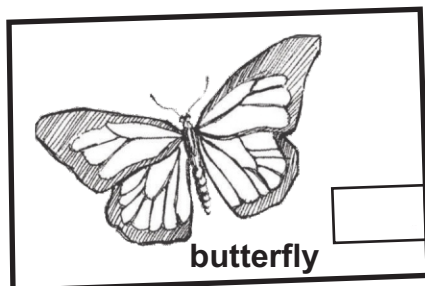


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none	some	lots

Invertebrate Survey

Work Sheet 5

Record the number of each invertebrate you find.
There is extra space for you to add creatures that
are not shown here.



Butterflies Survey

Work Sheet 6

Given below are some of the common butterflies found in Chennai.
Look around you, use this list to identify them and record the number.
There is extra space for you to add butterflies that are not shown here.



Common Crow

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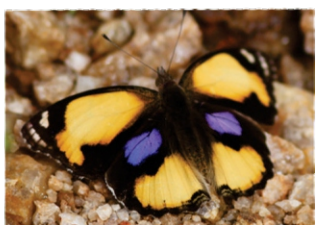

Common Sailor

☐


Lemon Pansy

☐


Southern Birdwing

☐


Yellow Pansy

☐


Blue Tiger

☐


Chocolate Pansy

☐


Common Mormon

☐


Lime Butterfly

☐


Chocolate Pansy

☐


Common Gull

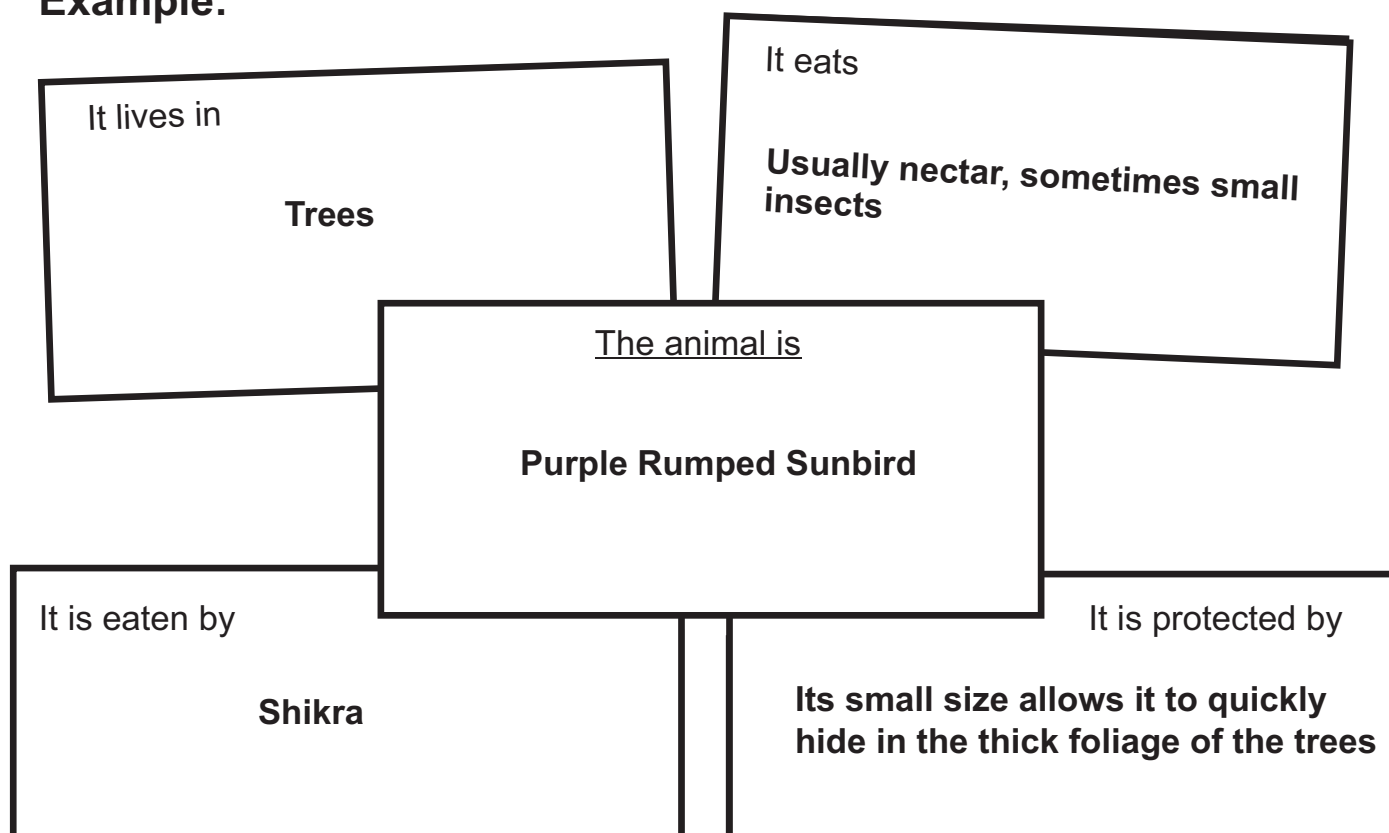
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Peacock Pansy

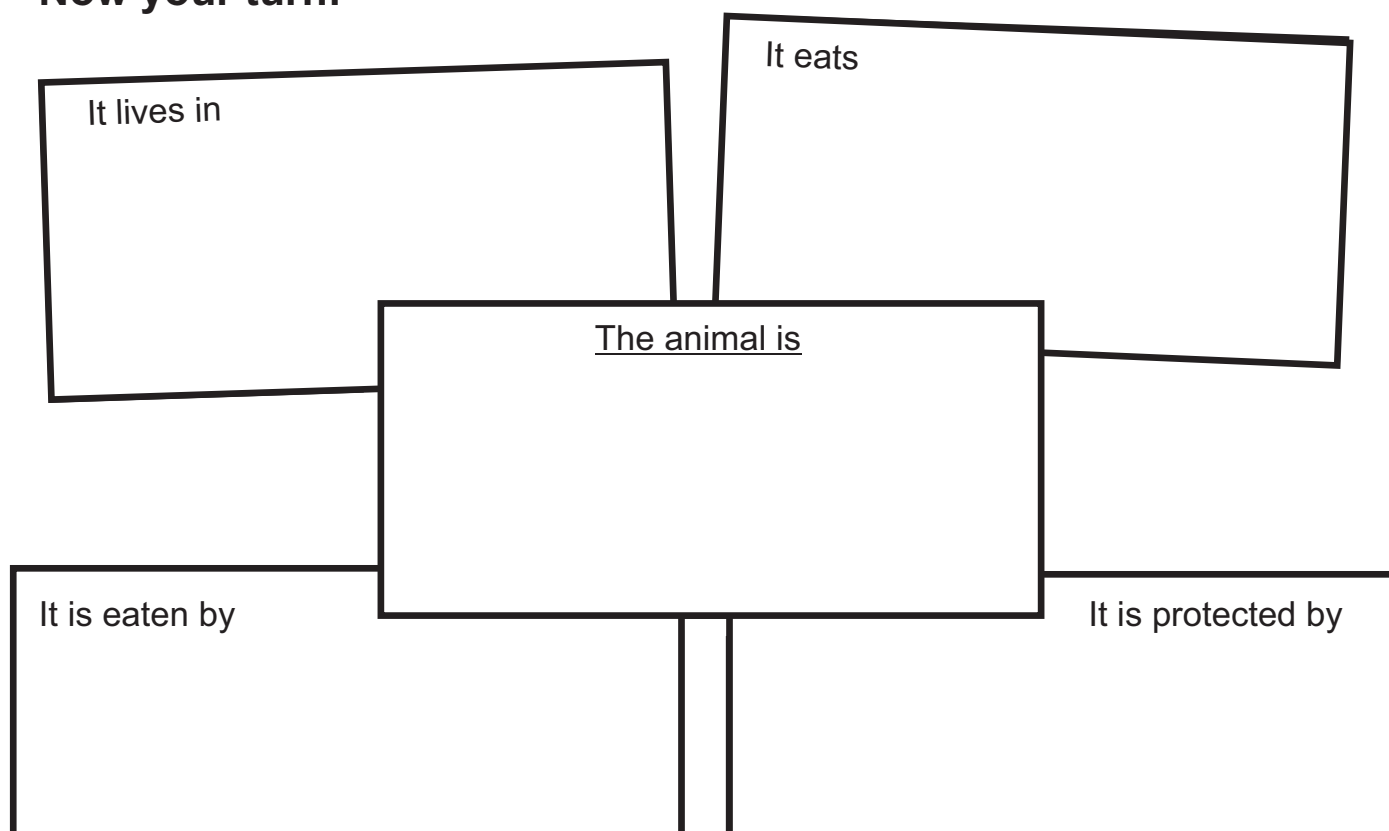
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Food Chains and Webs

Example:



Now your turn:



My Biodiversity, My Asset

A 'treasure trove' is an amount of something which is of great value, which has been in existence for a long time but was hidden in places. There are many places in the world where there are many different species of plants and animals which we consider as nature's treasure troves. Sometimes the people who live there are poor and so they use these treasure troves to make money.

What do I think?

Treasure troves could be home to many resources which could be beneficial to human beings but its expensive to get them. If there was cooperation on a global scale, it would be beneficial to everyone but that doesnt happen very often. Unfortunately, very often treasure troves are destroyed before anyone has a chance to research

What do my parents think?

What would a scientist think?

People cut forests or burn them down because they need the money by selling the valuable wood, or as they need fertile land for growing food. This is much quicker than waiting to find something in the area that might be useful in a few years time. Sadly, money can be earned like that only once. If there was a way to earn money over long periods of time and yet manage to keep the forest for many years to come, it would solve a lot of problems.

What might a farmer think?

Then again, it's not just about saving things that earn us money. Animals and plants and nature as a whole also have a value that we cannot put a price on. We would want our children and their children to be able to enjoy the beauty of nature. What's more, we don't know today what plants and animals might be of great benefit sometime in the future.

There are many reasons why we should protect our environment – economic, social/cultural or even aesthetic reasons. Given above are a few people who are directly or indirectly affected by biodiversity, can you write down what the reasons each of them may have to protect our natural resources?

Action Plan



What?

What are you going to do?

When?

Time Frame.

Where?

Area in school.

How?

Steps involved.

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Who?

Class, parent helpers, council?

Why?

What is the purpose?

Evaluation

How did it go? What can be improved?

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Answers to Web of Life

1. An ecosystem is made up of all the living animals and plants and the non-living matter in a particular place, like a forest or lake. All the living things in an ecosystem depend on all the other things - living and non-living for continued survival - for food supplies and other needs. In some ways, the actions and reactions that take place within an ecosystem are like a spider web - when one strand is broken, the web starts to unravel. What affects one part of an ecosystem, affects the whole in some way. The idea that everything is interconnected and dependant on each other is the Web of Life.

(<http://urbanext.illinois.edu/ecosystems/teacherguide6.cfm>)

2. Biodiversity refers to the variety of life. It is seen in the number of species in an ecosystem or on the entire Earth.

(<http://simple.wikipedia.org/wiki/Biodiversity>)

3. Of course, preserving a rich, genetically diverse and wide range of species alive is important for our future generations. Besides that, maintaining a healthy biodiversity means maintaining balance in nature, killing all the snakes would mean pests like rats would thrive. We base our diets on food crops and the animals that eat them. We clothe ourselves using material derived from plant and animal fibers. We take advantage of single-celled organisms, from bacteria to yeast, to drive important industrial and manufacturing processes. And then there's medicine. Almost 40 percent of all prescription drugs sold worldwide contain natural compounds found in different plant, animal and fungal species. The biggest benefit of biodiversity isn't what compounds an individual species carries in its cells, but how that species fits together and interacts with other species in its ecosystem and how that ecosystem works with others across the world.

(<http://science.howstuffworks.com/environmental/conservation/issues/biodiversity-important1.htm>)

4. The livelihoods of the tribes who live along areas of rich biodiversity are heavily dependent on the area. They rely on nature for food, clothing, shelter, remuneration, etc. They need the biodiversity around them to thrive as they have no other alternative that could suit their needs and be sustainable.

5. Most common answers could be – cut down on electricity, conserve water, buy energy efficient and eco friendly products, reduce - reuse- recycle, drive less and carpool, support environment protection initiatives, plant trees and reduce deforestation, most importantly – encourage others to do the same.

6. When most people think of biodiversity, they think of verdant Amazonian Rainforests or Vibrant Coral reefs in tropical seas. But even a typical house in the suburbs is with an amazing diversity of life. Spiders, insects and other arthropods crawl in nooks and crannies. Molds, algae and fungi bloom on our foods and in our showers. Grasses and weeds grow in the front yard and birds and mammals camp out in our homes.

(<http://science.howstuffworks.com/environmental/conservation/issues/biodiversity-important.htm>)

7. Food grains are one of the most important, besides that, animals grown for consumption also rely on biodiversity for food. Various bacteria and insects are a boon to farmers and indirectly are a part of the food process.

8. Most common answers could be – clothing, shelter, power generation, etc.

9. The Angiosperm diversity of India includes 17,672 species, nearly 1/3rd of total flora of India. The faunal diversity of Tamil Nadu includes 165 species of fresh water pisces, 76 species of Amphibians, 177 species of reptiles, 454 species of birds and 187 species of mammals. The Gulf of Mannar region in the Indian coast between Rameswaram to Kanyakumari is among world's richest region from marine biodiversity perspective. (http://tnenviis.nic.in/tnenviis_old/bio diversity.htm)

10. Students answer

11. An Olive Ridley Sea turtle can travel thousands of kilometers to come back to the beach where it emerged as a baby to lay her eggs. Generally, the Olive Ridley lives in the tropical and subtropical waters of the Pacific, Indian and Atlantic Oceans.

12. There are five main species – Olive Ridley, Green turtles, leatherback turtles, hawksbill turtles and loggerheads Sea turtle.

13. Asian Koel, Asian Paradise Flycatcher, Black Drong, Copper Smith Barbet, Golden Oriole, Little Green Bee Eater, Shikra, Purple Rumped Sunbird, Purple Sunbird, Red Vented Bulbul, Red Whiskered Bulbul, Rufous Treepie.

14. Common migratory birds of Chennai

a. Local migration – From North to South India – Wetland birds – Lesser and Greater Flamingo, Grey/Spotted Pelican, Little Grebe

b. Local Migration – Terrestrial Birds - indian Pitta, Pied Crested Cuckoo, Chestnut Winge Cuckoo, Forest Wagtails, Orange Headed Ground Thrush, Common Hawk Cuckoo / Brain Fever Bird, Blue Tailed Bee Eater

c. International Migration - Gargany Teals, Osprey, Amur Falcon, Short Eared Owl, Northern Teal, Common Kestral, Fulvous Whistling Teal, Great Knots, Terns.

Northern Pintails, Pacific Golden Plover, Lesser Sand Plover, Eurasian Curlew, Common Green Shank, Sandpipers, etc

15. Gloriosa Lilly, Palm Tree and Jack fruit. (http://en.wikipedia.org/wiki/Symbols_of_Tamil_Nadu)

16. They are the animal and bird known as the symbols of Tamil Nadu. (http://en.wikipedia.org/wiki/Symbols_of_Tamil_Nadu)

17. Students answer

18. Most common answers could be – for better understanding, to empathize with nature, enjoy the environment and what is given to them, etc.

19. (<http://www.blackbuck.org.in/dodont.php>)

Do's

1. Wear sober/neutral coloured clothes (preferably dull greens, browns, khakis, greys), that are comfortable
2. Ensure that there are no loose flapping pieces of clothing that are likely to get caught in the bushes and undergrowth.
3. Wear comfortable shoes appropriate for the trip (walking/trekking)
4. Bring a water bottle and cap
5. Bring medicines (if prescribed by your doctor)
6. Bring Binoculars (recommended) & cameras (if needed)
7. Bring your own mugs and spoons in order to avoid creating unnecessary trash in the places we visit.
8. Carry a plastic bag for non-biodegradable litter.
9. Keep your mobile phones on silent/vibration mode if you must bring it along (best to leave it at home)
10. Travel light.

Don'ts

1. Avoid expensive jewellery / things that might cause anxiety during the trips.
2. Avoid soaps with a strong scent during trips into forests.
3. Avoid wearing strong perfumes or deodorants during the trip.
4. Don't go off trail, or separate from the main group especially in high altitude areas - it might cause soil erosion and damage to sensitive vegetation as well as cause unnecessary tension for fellow members.
5. Don't give treats to local children; it encourages begging.
6. Don't play loud music or indulge in loud talk.
7. Don't leave any trash behind. Carry it all back to the nearest big town for disposal.

20. Threat to atmosphere and water cycle: climate change, sea level rise, atmospheric pollution. Threats to land and soil: chemical dumping, exploitation, soil erosion, invasive species. Threats to the sea: exploitation, soil erosion, habitat loss, nutrient discharge. (<http://www.seafriends.org.nz/issues/threats.htm>) Deforestation, pollution, loss of biodiversity, rising sea level, oceanic dead zones, rise in human population, etc. (<http://inhabitat.com/7-biggest-threats-to-the-environment-why-we-still-need-earth-day/>)

21. Plants - Sandal Wood, Cinchona Trees. Animals – Nilgiri Tahr, Lion Tailed Macaque, Nilgiri Laughing Thrush and Asiatic Elephant.

22. Students answer

Notes :-

Notes :-

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Create a Colourful Biodiversity

