Project 2

Biodiversity Register

0685CH02

This project will help you to learn about biodiversity among living things in the world around us (Figure 2.1). You will create a biodiversity register based on your observations and the information you gather.

As part of the project, you will be able to:

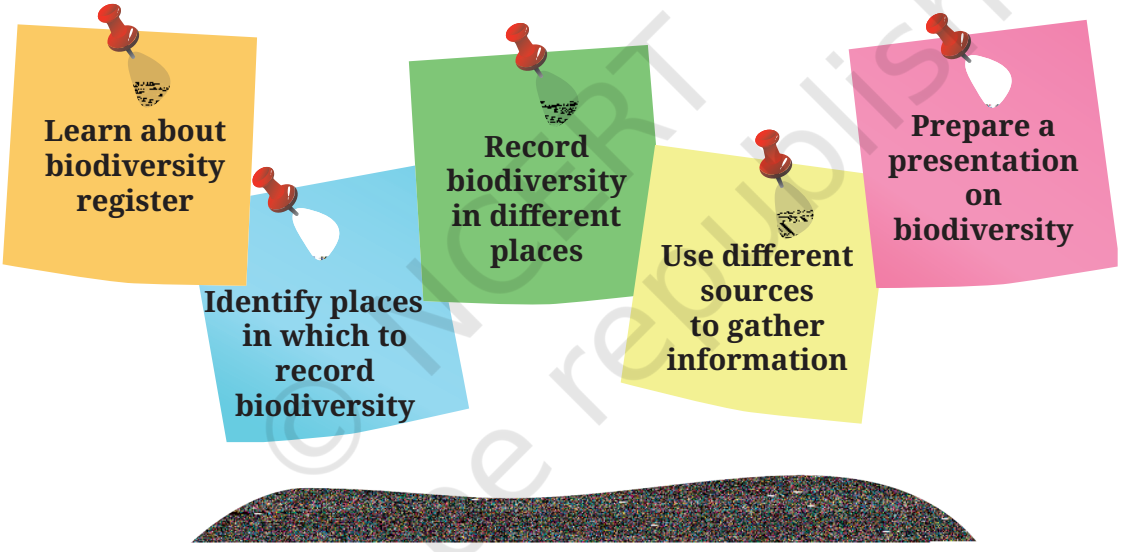

Figure 2.1: *Look around at the diversity of living things in your surroundings*

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The diversity of living things, known as biodiversity, comprises the variety of life forms on earth. It includes plants, animals, birds, fish, insects, and even microorganisms that are found everywhere, including soil (see Figure 2.1).

You have learnt about the diversity of living things around us in Science.

A biodiversity register is used for documenting the diversity of living things in an area. It contains information about habitat, which includes the landscape and types of soil, scientific and local names of living things, what animals eat, living things that may harm others, and other different kinds of information.

Recording biodiversity is crucial because as habitats transform due to factors, such as land clearance for construction or agriculture, or shifts in climate, many species face extinction or become endangered. This interconnectedness means that the loss of any plant or species affects the ecosystems, including humans.

Biodiversity registers also provide people with information that is useful, for example, local knowledge related to crop plants and animals, plants that can be used for their medicinal value, pests that affect plants, when to plant crops, and so on.

You can create your own 'mini' biodiversity register by systematically recording the biodiversity around yourself. In case you come across a plant, insect, bird or animal that you are not familiar with, then you can get information by:

i. Talking to teachers/elders/family members/experts
ii. Looking up for books in the library
iii. Searching for the information with the help of the Internet on the computer
iv. Using applications on mobile phones.

Terms used in the biodiversity register

Scientific name: A name given to living things that is the same across languages. Names differ across languages, but a scientific name ensures that people, especially scientists know that they are referring to the same living thing.

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Variety refers to differences in a similar kind of plant, e.g., there are different varieties of mangoes, like *Alphonso, Kesar, Ratnagiri, Totapuri, Chaunsa, Dasheri, Langra, Banganpalli, Anwar Ratol* and *Pairi*.
Cropping season: It is the season in which a particular crop is grown.
Season of fruiting: This refers to the season when fruit trees produce fruits.
Source of seeds/plants: This refers to how new plants grow, whether from seeds, seedlings, bulbs, stem cuttings or any other method.
Affected crop: Crop that had been damaged by pests, e.g., diseases that affect plants, insects that eat the leaves or fruits, or any other reason.
Host: It is a plant or animal on which other plants or animals live. For example, dogs are hosts for fleas, who suck their blood, and some plants are hosts for caterpillars, who grow by eating leaves and fruits.
Pests: These are insects, birds or animals that are harmful to plants.
Pesticide: Pesticides are used to prevent or control harm to hosts by pests. They can be in the form of liquid, solid or gases.
Weedicide: Weedicides are used to prevent or control harm to plants by weeds.
GI tag: A Geographical Indication (GI) tag is given by the government and recognised all over the world. For plants, it means that the plant is grown in a specific geography and all the produce from that area is of a high standard. For example, we have many varieties of rice in our country – some with GI tags are *Navara* rice from Kerala, *Basmati* from Uttarakhand, and *Gobind Bhog* rice from West Bengal. Another example is of *Jalgaon* bananas from Maharashtra.

What will I be able to do?

At the end of the project, you will be able to:

1. Systematically record the biodiversity that you observe around yourself;
2. Use different methods to collect information related to biodiversity; and
3. Analyse information to present your understanding of the biodiversity around yourself.

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What will I need?

To carry out this project, you will need the following materials:

- A notebook, pen, eraser, measuring scale, and sharpener.
- You can use a handheld magnifying glass or lens in case you want to observe details of plants or insects.
- A camera or a smartphone (borrowed from your teacher or parents/guardians) can be used for taking photographs, and making video and audio recordings. However, you must make sketches of whatever you include in your biodiversity register.
- You can also use a smartphone for identification of living things.

How do I keep myself and others safe?

Discuss the precautions you need to take. For example:

- Wear shoes for the field visits.
- Cover your arms and legs to prevent mosquito bites.
- Be careful while observing wild plants, insects, birds and animals.
- Do not disturb any animal, bird or insect.
- Do not damage any plant.
- Do not leave any garbage behind. It is harmful for living things.

Internet safety: Ask your teacher for help while using the Internet. Be careful and do not upload or download anything without checking for safety, and do not share personal information anywhere.

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What do I need to know before I start?

Activity 1: What is around us?

Look around and observe the living things you can spot. You will find that each one of the plants supports a tiny cosmos full of insects, spiders, squirrels, birds, and other creatures that feed on it and seek shelter amongst its leaves and branches (Figure 2.2). You will record some of your observations and related information in your biodiversity register.

Figure 2.2: *Recording observations of living things around us*

Before you begin writing on your biodiversity register, complete table 2.1. This will help you in remembering the living organisms you often observe and where you see them (e.g., near a water body, in a farmland, or in a park). You can make a sketch or paste a photograph, if you want. This information will be useful when you plan surveys to fill your biodiversity register.

Table 2.1: Identifying locations where you can observe a variety of living things

Living things or living organisms	Names (Try and find the names in as many languages as you can)	Places (Where do you find them?)
Insects		
Birds		
Animals		
Worms		

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Activity 2: Meet an expert

You can invite different experts to come and speak to you about biodiversity. For example, a forest officer or a farmer. A conservationist, who works for the protection of plants and animals can also be invited to speak about biodiversity. Another person you could invite is an expert in Ayurvedic medicine, a *Vaid* or *Vaidya*. The person is a practitioner of traditional tribal medicine, since they use medicinal herbs and other related plants.

You must prepare questions to ask the experts. Some examples are as follows:

1. Where can we find different kinds of plants in our locality?
2. How do we know whether the plants growing in the locality have been there for a long time or were brought from other places?
3. Are there plants that are no longer found in the locality?
4. Which kind of plants should we be growing more to support biodiversity?
5. Is there any plant that we should not grow, as it harms biodiversity?
6. Do you have any tips for us, as we start documenting our biodiversity register?

What do I have to do?

You are now ready to start creating your biodiversity register. The first step is identification of the places to visit (you need to visit them more than once). You will also need to make a plan for your visits. On the basis of this plan, you have to fill the biodiversity register and then make a presentation based on your observations.

Activity 3: Identify places to survey

Decide which places you will visit to record biodiversity. For example, the area (i) around school, (ii) around water bodies, (iii) near your home, (iv) around farms/parks/gardens/nursery, (v) near a religious place, and (vi) near a market (Figure 2.3).

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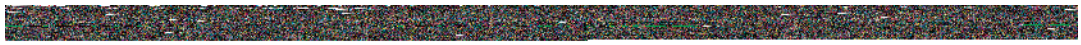

Figure 2.3 (a): *Pond* **Figure 2.3 (b):** *Forest*

Figure 2.3 (c): *Farm* **Figure 2.3 (d):** *Park*

Figure 2.3: *Places for observing biodiversity: ponds, forests, farms, parks (clockwise)*

You should be able to reach the areas quickly, so that you can easily go back in case you want to check your observations or the information you gathered.

The following questions will help you in conducting your survey systematically.

1. What types of habitats exist in your surroundings (e.g., forests, wetlands, grasslands, urban areas)?

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2. Have you noticed any area(s) where more plants grow, compared to other areas? Yes/No
3. What type of birds, mammals, insects, etc. have you observed in your surroundings?

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4. Are there any specific effort being made to protect plants and animals in certain areas? For example, conservation of some species or permission to enter the area.

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   .....

5. Now, which places do you plan to visit? Please write them below:
   1. .....
   2. .....
   3. .....
   4. .....
   5. .....

Activity 4: Scheduling visits for observing biodiversity

- Consult local experts, biologists, conservationists and the like.
- Divide yourself into groups, with a maximum of 5 students in each group.
- Plan to visit the identified areas at different times of the school year so that you can observe if there are any changes during different seasons.

Make a schedule for visits and note it in table 2.2:

Table 2.2: Schedule for visits to fill biodiversity register

1.	4. .....
2.	5. .....
3.	6. .....

- Visit and explore the identified places, observing plants, insects, birds, and other living things along with necessary equipment and materials, such as binoculars magnifying lens, cameras, field guides, notebooks, etc.

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Activity 5: Filling in the biodiversity register

Write your responses based on observations and discussions in tables 2.3 to 2.7 for each of the places you visit. There are many rows and columns in a biodiversity register (tables 2.3. to 2.7). Try to fill up as many as possible. You can also add more rows related to other kinds of information in discussion with your teacher and peers. You can also make new tables related to living things that are around you. For example, if you live in a big city, look for flowering and fruit trees in the colony garden, and so on (Figure 2.4 and 2.5).

Figure 2.4: *Observing with the naked eye and a magnifying lens*

While noting your observations, you should:

1. Remember to share your observations with each other. Maybe you missed something the first time you visited a place, but your friend did not. You can always go back again to check.
2. Fill in any new information each time you visit a place.
3. Take care to sketch or take photos of insects, worms, birds, plants, and animals that are new to you. This will help you identify them later by showing them to others or using an AI tool for identification.

Figure 2.5: *Recording observations*

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If you still feel you cannot find any information for a specific part of a table, speak to your teacher before deciding to leave it blank. You are now ready to create your biodiversity register.

I. Observation of biodiversity in crop plants

1. Date of observation:
2. Location:
3. Habitat type:
4. Weather condition:
5. Observations:

Table 2.3: Description of Crops

S.No.	Description	1 (example)	2	3	4	5
1.	Crop name	Onion				
2.	Local name	*Kanda* in Marathi, *Vengayam* in Tamil, *Pyaaz* in Hindi				
3.	Scientific name	*Allium cepa*				
4.	Variety name	Pachaganga				
5.	Planting method	Direct seeding/ bulbs/ transplants				
6.	Special features, like cropping and harvesting season	Onion can be planted and harvested in different seasons				
7.	Uses	Eaten raw or after cooking				
8.	Sketch/ photograph					

II. Observation of biodiversity in fruit plants

1. Date of observation:
2. Location:
3. Habitat type:
4. Weather condition:
5. Observations:

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Table 2.4: Description of fruit plants

S.No.	Description	1 (example)	2	3	4	5
1.	Plant name	Mango				
2.	Local name	Mango (Amba)				
3.	Scientific name	*Mangifera indica*				
4.	Variety name	Alphonso				
5.	Planting method	Grafting or seeding				
6.	Special features, like fruiting season and aroma	Fruiting season-summer. Distinct intense and pleasant aroma.				
7.	Uses	Eaten raw or after making fruit pulp or juice.				
8.	Sketch/ photograph					

Note: *Alphonso mangoes have been awarded the Geographical Indication (GI) tag which authenticates their origin from specific regions in Maharashtra, particularly Ratnagiri and Sindhudurg mangoes.*

III. Observation of biodiversity in fodder plants

1. Date of observation:
2. Location:
3. Habitat type:
4. Weather condition:
5. Observations:

Table 2.5: Description of fodder plants

S.No.	Description	1 (example)	2	3	4	5
1.	Plant name	Napier grass/ Elephant grass				
2.	Local name	*Hatti govat* (in Marathi)				
3.	Scientific name	*Pennisetum purpureum*				

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4.	Variety name	Pusa giant				
5	Planting method	Cuttings of stem or splits				
6	Special features, like sowing time	Sowing time- February to March				
7	Uses	Used as forage for livestock. Habitat and shelter for wildlife				
8	Sketch/photograph					

IV. Observation of biodiversity in weed plants

1. Date of observation:
2. Location:
3. Habitat type:
4. Weather condition:
5. Observations:

Table 2.6: Description of weed plants

S.No.	Description	1 (example)	2	3	4	5
1.	Plant name	Bermuda grass				
2.	Local name	*Haral* (in Marathi)				
3.	Scientific name	*Cynodon dactylon*				
4.	Variety name	Pusa giant				
5.	Found in crops as a weed	Example- sugarcane, cotton, grassland, and fruit tree orchards.				
6.	Special features, if any	Highly tolerant to heat and drought. It provides habitat and food for various insects and wildlife species.				
7.	Uses	Used in playgrounds, sports fields, and high-traffic areas.				
8.	Sketch/photograph					

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V. Observation of biodiversity in pests

1. Date of observation:
2. Location:
3. Habitat type:
4. Weather condition:
5. Observations:

Table 2.7: Description of pests

S.No.	Description	1 (example)	2	3	4	5
1.	Plant name	Potato				
2.	Local name	*Aloo* (in Hindi)				
3.	Scientific name	*Solanum tuberosum*				
4.	Pest name	Aphid (insect)				
5.	Scientific name of pest	*Myzus persicae* (green peach aphid) *Aphis gossypii* (cotton aphid)				
6.	Habitat	Aphids are commonly found on the undersides of leaves, as well as on tender shoots and buds of plants.				
7.	Special features, if any	Can be found as winged and wingless forms.				
8.	Time/Season of attack	After winter, as the temperature starts rising				
9.	Sketch/ photograph					

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Did you know?

- You can visit the website of 'Season Watch' to register a tree in your neighbourhood and upload photographs every week. You can also track trees in other areas.
- Can you find any tree similar to those in your neighbourhood in Season Watch?
- Did you get additional information about them?

Activity 6: Identifying 'unknown'

If there is any missing information or any additional information you may need to complete the tables from 2.3 to 2.7. You can ask an expert or a knowledgeable person in the community. You can use an AI tool or school library for getting information (Figure 2.6).

Figure 2.6: *Use multiple sources of information to find the information you need*

Using AI tools to collect more information about plants/crops/weeds/pests

Google Lens is an image recognition technology that uses something called machine learning and OCR (Optical Character Recognition) to analyse and provide information about objects, text, landmarks, and so on captured by a device's camera. It can identify objects, read text, translate languages, scan barcodes and Quick Response (QR) codes, and integrate with various Google services. You can access Google Lens through the Google Photos

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app or as a standalone app, and pointing the camera at objects, you can get relevant information or even perform tasks like translation and web searches.

Google Lens analyses any image and provides information. You can use Google Lens to identify scientific names, diseases, and other useful information about plants/crops/weeds insects, and pests using photos. If you have not taken the photos, you can capture them using Google Lens itself.

1. Download and open the Google Lens app on the smartphone.
2. Locate the Google Lens icon in the search bar and tap on it. This activates Google Lens.
3. Point your camera at the plant/insect/image you want to identify and tap the shutter button to search.

You can now add the missing information to the biodiversity register.

Activity 7: Presentation of biodiversity register

Make a presentation on the biodiversity in each of the places you visited by using the information you have gathered. You can create charts, diagrams, models or whatever else you think of.

Remember, the presentation will be based only on your observations and the information you have gathered. Highlight that there can be many variations in places and among living things. That is what biodiversity is all about.

Your presentation can be in two parts:

Part 1: Prepare a summary of the information you have gathered

Right now, the information you have gathered from visits made at different times, is in different tables. Imagine you have to explain the biodiversity around yourself to a visitor. Combine the information from all the tables to create a summary for this visitor.

Some guiding questions are given below. Please think of other questions and different ways to summarise your observations. You may include examples to support your reply to the questions:

1. What are the different plants that grow in the areas around you?

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2. Which plants grow in all seasons and which are seasonal?
3. Can all crops and fruits be harvested in the same season?
4. Do all plants flower in the same season?
5. Are the plants useful for us? If yes, how?
6. Is the same fodder available throughout the year or only during some seasons?
7. Are all plants affected by weeds?
8. Are some weeds useful? Please name some weeds and describe their use.
9. Are all plants affected by some sort of pests?
10. Are plants affected by some pests more in some seasons than others?
11. What information did you gather from people in the community (e.g., use of plants as medicine, as fodder, sacred plants, etc.)?

In this way, you can provide a full picture to the visitor.

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Figure 2.7: *Making a presentation on biodiversity register*

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Part 2: Go beyond the information you have gathered

Now think of the ways in which you can present the information you have gathered for a deeper understanding about the biodiversity around yourself.

Your presentation will be a mix of diagrams and some explanations. Think of interesting ways to prepare it (Figure 2.7).

Some guiding questions are given below, but try and think of others.

1. Did you observe more living things in one place as compared to other?
2. How many varieties of plants and pests did you see in the places you visited?
3. Did you see the same kind of insects, pests, or worms in more than one of the places you visited?
4. Did you use any AI tool for this activity? If yes, which ones and how?
5. Did you use any other source to gather information?

Include any conclusion or reflection that you would like to share through your presentation.

What did I learn from others?

Interaction with experts

You discussed with experts all the measures that can be taken to preserve biodiversity in the area. What do you think will work?

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Interaction with members of the community

You might have spoken to a farmer in a rural area, a nursery worker or a gardener in the city or a community member in the rural or urban area.
Write about how the biodiversity changed over the years in the area, let us say in the last 10 or 20 years.

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What did I do and how long did it take?

It is important to understand how much time is required for an activity to be completed.

Calculate the approximate number of periods you spent on each activity. Mark them on the timeline below. If you did more than the activities suggested in the book, please add the number and time taken.

You might have gone to the same place more than once as per your schedule. It is also possible that you went back multiple times to gather information, try and calculate the total number of periods spent on each activity.

Activity	*1*	*2*	*3*	*4*	*5*	*6*	*7*
Time taken (Periods)	---	---	---	---	---	---	---

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Did you know?

India is home to several Biodiversity Heritage Sites (BHS), which are areas recognised for their unique biodiversity. The purpose of these sites is to protect biodiversity in the area and recognise their importance in ensuring traditional cultural practices related to the natural environment.

The following are some notable Biodiversity Heritage Sites in India:

- The Nallur Tamarind Grove in Karnataka has tamarind trees that are over 400 years old.
- Gogabeel in Bihar is a paradise for bird lovers with over 90 species of birds, including many that travel from faraway places like Central Asia.
- Tonglu in West Bengal has plants that you would not find anywhere else in the world.
- Ameenpur Lake in Hyderabad is home to over 200 bird species, even though it is in the middle of a busy city.
- Majuli in Assam is the biggest river island on the planet and has monasteries called '*Satras*'.
- The Myristica swamps in Kerala are home to ancient nutmeg (*Jayafala*) trees, which is a spice we use in cooking.
- The Kali Tiger Reserve in Karnataka is a safe heaven for Bengal tigers and other big animals like elephants.
- The Chilkigarh Kanak Durga Sacred Grove in West Bengal has special plants used in traditional medicine. This grove is protected by the local people.
- In Ziro Valley, Arunachal Pradesh, people grow rice and fish together in a unique way.
- The Mawphlang Sacred Grove in Meghalaya is protected by local tribes and is full of rare plants and medicinal herbs.

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What else can I do?

You can continue your observations of biodiversity at your home and other places you visited. Document your observations and create a nature journal or digital scrapbook.

Please note that you can observe birds, like kites, and animals, like mongoose in the city as well. Some scientists have started referring to these animals as 'urban wildlife'.

Observe the birds that visit your home. Note down how they look and how they behave. Find out their local name and scientific name, and as much as you can discover about the birds.

Ask family members and elders in the community about the birds and animals that they could see when they were young.

Think and Answer

1. What did you enjoy doing?
2. What were the challenges you faced?
3. What will you do differently next time?
4. What according to you is the importance of the biodiversity register?
5. What other jobs are related to the project? Look around, speak to people and write your answer. A few examples of jobs related to the activity that you did; are forest officer, scientist, and conservationist.

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TAKE CARE OF YOUR ENVIRONMENT AND PLANET EARTH

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