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# BIODIVERSITY

## *Trainer's Booklet*







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EUROPEAN UNION



**BIOLEARN-BSB142  
ECO-CONSCIOUS MINDS TO STOP POLLUTION  
IN THE VALUABLE WETLANDS OF BLACK SEA BASIN**

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# **BIODIVERSITY**

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## *Trainer's Booklet*

**Target Audience: 8-14 years old**



**CROSS BORDER  
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Joint Operational Programme Black Sea Basin 2014-2020 is co-financed by the European Union through the European Neighbourhood Instrument and by the participating countries: Armenia, Bulgaria, Georgia, Greece, Republic of Moldova, Romania, Turkey and Ukraine.

This publication was produced with the financial support of the European Union. Its contents are the sole responsibility of Enez District Governorship and do not necessarily reflect the views of the European Union.

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 [www.bio-learn.org](http://www.bio-learn.org)

# Contents

<b>ABOUT THE PROJECT</b>	6
<b>ABOUT THE BOOKLET</b>	9
<b>BIODIVERSITY</b>	10
What Is Biodiversity?	11
Why Is Biodiversity Important?	15
How Can We Determine Biodiversity Richness?	19
Biodiversity Loss	22
<b>ACTIVITIES</b>	25
Activity 1. What Am I?	26
Activity 2. Different Types Of Birds	29
Activity 3. Plant Diversity	38
<b>NOTES</b>	44
<b>REFERENCES</b>	46



# About The Project

BIOLEARN (Eco-Conscious Minds to Stop Pollution in the Valuable Wetlands of Black Sea Basin - BSB142), which was initiated on 01.01.2020 within the scope of the first call for proposals of “Joint Operational Programme Black Sea Basin 2014-2020” where the Directorate for EU Affairs is the national authority, is led by District Government of Enez.

Representatives of the following partners are as follows:

1. District Government of Enez-Turkey
2. Division Directorate of Edirne under First Regional Directorate under General Directorate of Nature Protection and Nature Parks of Ministry of Agriculture and Forestry - Turkey
3. Foundation Caucasus Environment - Georgia
4. Agricola NGO - Ukraine
5. Green Balkans / Stara Zagora NGO - Bulgaria
6. Management Body of Evros Delta and Samothraki Protected Areas - Greece

The overall objective of the project is to provide information, experience transfer and capacity building training between partners and develop a common environmental protection and education approach, methodology and organizing campaigns that will raise awareness in the society to reduce pollution in important wetlands in the Black Sea Basin.

**The main activities to be carried out within the scope of the 26-month project are as follows:**

1. Establishment of a total of 4 environmental protection and training centres, one of which is on the shores of Gala Lake, and providing environmental protection training to visitors and especially to students. By providing equipment for the other 6 existing centres, there will be a network of 10 activity and training centres.
2. Workshops to be held in Bulgaria and Greece, focusing on discussions about examples of

successful training and awareness-raising campaigns for the protection of wetlands, sharing experiences and preparing the materials to be used in training which will be applied in all centres. Capacity building training for trainers.

3. Organizing massive and synchronized cleaning campaigns to reduce pollution in wetlands.
4. Award-winning photo contest and exhibition focused on wetland protection.
5. Organizing a wetland pollution-based painting contest and exhibition in primary and secondary schools.

### **Outputs of the Project:**

1. “Stop Pollution” and “Save Nature” environmental education and activity centres, one of which is mobile, will be established in 5 countries and will sustainably carry out training and awareness-raising activities.
2. A report will be prepared on the nature and rate of pollutants in 5 wetlands in the Black Sea Basin.
3. A guide with examples of good practices consisting of training and campaigns focused on protecting wetlands will be prepared.
4. A wetland protection training set consisting of 12 sections will be prepared especially for students. Training sets will also be shared on the internet.
5. After 10 people from 2 each partner country received trainer’s training, they will train 25 people in each region (totally 125 people) and the sustainability of training activities will be ensured in the established centres.
6. A painting competition on environmental protection will be held in at least 15 primary and secondary schools and paintings selected by the jury will be exhibited.
7. Pictures taken in 5 regions with the participation of professional photographers will be exhibited. With the mobile ‘Stop Pollution’ vehicle, the exhibition will travel to 5 countries.
8. An environmental cleaning campaign will be held simultaneously with the participation of 1500 people in 5 regions.
9. With the international conference to be held in Georgia, the outputs of the project and future action plans will be shared with the public.

**For more information, you can visit the project website: [www.bio-learn.org](http://www.bio-learn.org)**



# About The Booklet

This training booklet is a part of the training set prepared under the “BIOLEARN-BSB142 / Eco-Conscious Minds to Stop Pollution in the Valuable Wetlands of Black Sea Basin” project. The booklet is prepared to attract the attention of the countries in the Black Sea basin to the importance of wetlands, to prevent pollution in wetlands and to develop ecological literacy of the participants accordingly.

This training material targets groups age 8-14 and consists of two parts which are the educator booklet and participant booklet. The trainer booklet has detailed activity application instructions, necessary information on the subject, assessment questions and recommendations to enrich the activity.

## Application Notes

 Before starting the activity, it is recommended to view the entire booklet and to get ready for the topic by using the information in the booklet.

 At the beginning of the activity, necessary materials and worksheets should be distributed to the participants.

 When activities are applied, it is important to undertake a facilitator/guide role and to ensure the active participation of the participants.

 The activities in this booklet are planned to be completed in a short time. All of these activities can be applied consecutively or one or two of the activities can be applied in desired order depending on the development stages and interest levels of the participants.

 Presenting the activities with a natural narrative rather than reading the information text in the instructions and keeping the interest of the participants with questions and answers would present positive benefits.

 The activity instructions can be followed exactly or adapted based on participants' ages, development stages and interest levels without diverging from the activity purposes.



# Biodiversity

## What Is Biodiversity?

Our world is home to living beings in numerous ecosystems from the deepest points of the oceans to the highest peaks of the mountains. The diversity created by all these living beings is called **biological diversity (biodiversity)**. While the biodiversity in the equator regions with more moderate climate conditions is richer, the cold climate around the poles causes poorer biodiversity. For example, there are more species in the Amazon rainforests compared to the harsh conditions in Antarctica.



 Biodiversity varies under different climate conditions and geographies.

Our world is home  
to living beings in  
numerous ecosystems  
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mountains.

Scientists and conservationists use the concept of biodiversity to understand whether nature is working healthily and whether the living beings in nature are under any threats. Thus, they try to prevent the extinction of species. While doing that, they consider biodiversity in 3 different ways.

First, they investigate **the diversity of the species**. For example, living beings in the Black Sea are considered one by one as fish such as Horse Mackerel, Anchovy, Bonito; mammals such as Common Dolphin, Bottlenose Dolphin and Eurasian Otter; birds such as Shag, Yellow-legged Gull and Yelkouan Shearwater. They also try to identify the microorganisms, mushroom and plant species in this region. In this way, they reveal the diversity of the species in the Black Sea.





Second, they investigate **genetic diversity**. Let's take a look at ourselves to understand genetic diversity. For example, what colour are your eyes? Is your hair wavy or straight? Which shape do your nose and lips have? Is your look exactly the same as people around you? Although all humans around the world belong to the same species called *Homo sapiens*, everyone has different body structure and no one is exactly the same as others, right? This is because we all have different genetics... Scientists investigate this diversity in other living creatures in the ecosystem just like the diversity we have as humans.



Scientists and conservationists use the concept of biodiversity to understand whether nature is working healthily and whether the living beings in nature are under any threats.

Lastly, they consider **the diversity of the ecosystems**. In general terms, we can define an ecosystem as a relationship between the living being and non-living things such as air, water, soil and temperature. The living beings living in a healthy ecosystem can meet their necessary needs to grow and reproduce. Different ecosystems enable different species to meet their needs. For example, the wetland ecosystem, forest ecosystems or shore ecosystem in the Black Sea enrich the ecosystem diversity in the Black Sea. Because different groups of living beings can live in each ecosystem. The birds in the wetlands, the mammals in the forests or the fish in the sea can live in different ecosystems but exist around the same sea.

As a result, the diversity in species, genetics and ecosystems create biodiversity as a whole.



odiversity and correct functioning of the ecosystem. The extinction of biodiversity will cause disturbing these relationships and therefore, leading humans and various other living beings to experience serious problems.

Biodiversity is extremely important for the continuation of life. The air that we breathe, the water that we drink, the food that we eat all depend on biodiversity. The clean air exists with the existence of trees. Various fruits, vegetables and plants exist with the





## Did you know?

Our body is full of microorganisms. More than 10 thousand bacteria species live in the human body. Their total number might exceed 100 trillion! They form approximately 1.5 kg of our body weight. This diversity and the number of beneficial bacteria are crucial for our health.

existence of bees and bugs. Biodiversity ensures the safety of our food. Our richness of food with various plant-based and animal-based food types forms the basis for us to eat well and stay healthy. Our immune system functions healthily thanks to thousands of different microorganisms living in our body. On the other hand, scientists benefit from biodiversity in medication production. We use various plants, mushrooms and microorganisms in medication production to treat our diseases. Other than food, biodiversity helps us to meet our basic needs such as sheltering and clothing. Additionally, it provides spaces with natural beauties that are good for our soul. Moreover, all of these valuable services from biodiversity are freely offered by nature...



 *The high-speed train designed in Japan was inspired by the beak of a bird called kingfisher. In this way, it is possible to move forward with less friction and energy loss.*

Apart from all these, we owe to the rich biodiversity for our artistic and technological development. Various artists are inspired by this biodiversity in their paintings, composed songs or written texts. In addition to artists, engineers, designers and scientists are influenced by this biodiversity. Various technological developments have marks from biological elements. Moreover, this has a special name. Finding solutions and developing new methods by being inspired by nature is called **biomimicry**.

Biodiversity is extremely important for the continuation of life. The air that we breathe, the water that we drink, the food that we eat all depend on biodiversity.

## How Can We Determine Biodiversity Richness?

Scientists use different methods to define and measure biodiversity richness. The most common method is to determine the number of species and individuals in a certain area. For example, while 312 different bird species live in the Danube Delta, approximately 100 bird species live in the Sakarya River Delta. In a global sense, this difference could be larger. For example, the number of plant and animal species living in the rain forests is 20 times more than the species living in the North Pole region. A similar situation is valid for the number of individuals or the abundance of living things. For example, the number of Brown bears in Turkey and Georgia is significantly higher than Brown bears in Bulgaria.



Geography and climate conditions play an important role as the reason for these differences. Living beings can develop differ-



ent adaptations over the long years for the conditions of that region to be able to live in that region. For example, mammals living in cold climate conditions have thicker fur, higher body fat and more suitable colours to snow than the animals living in hot climates. These adaptation differences cause a change in the number of living beings in different regions.

1.5 million different species except bacteria have been discovered and scientifically named.

Although this method of measurement is functional, it is not sufficient to fully identify the biodiversity of our planet. The studies show that we are still unable to determine the exact number of creatures on our planet. Currently, 1.5 million different species except bacteria have been discovered and scientifically named. But scientists think that this number is more than 8.7 million!



 Arctic foxes wear white fur to have camouflage in their surroundings during winter. Red foxes have colours suitable for milder geographic conditions.



When the estimated number of species is this high, scientists are in relentless research to discover new species. New living beings can only be discovered by visiting new places. The depths of oceans and seas are among the most ideal places for this job! As a result of the studies, scientists recently discovered more than 200 new species on our planet. These species are so unique in genetic terms that most of them do not have close relatives.

## Biodiversity Loss

Our world can be more durable against the problems it has been facing thanks to this rich biodiversity. Because the greater the biodiversity, the more likely it is to withstand harsh conditions such as drought, disease, and climate change. However, some species are going extinct and disappear forever. This extinction might occur as a result of a natural process in some cases. For example, while dinosaurs that lived in the prehistoric period were extinct due to natural events, the most important responsible part of the extinction of today is humans.

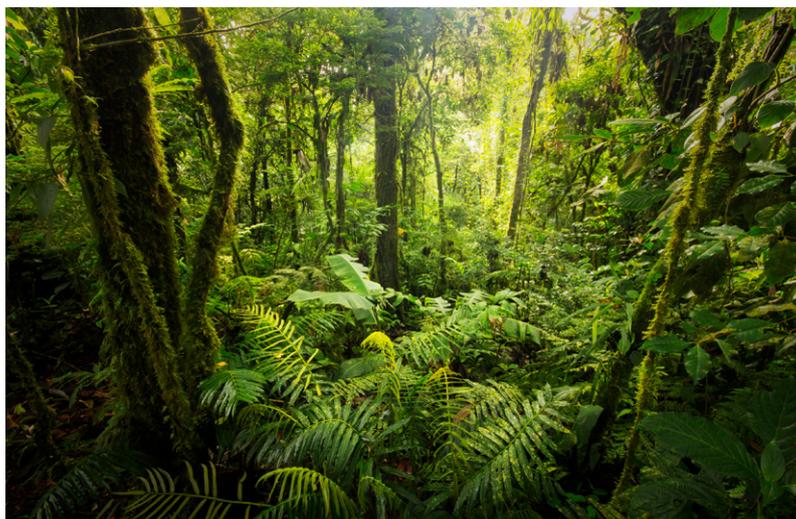
In the last 100 years, human expansion to every corner of the world and human damage to nature has caused and is still causing hundreds of living beings to go extinct.



 It is known that Mediterranean Monk Seal which is under threat at a global scale used to live in the Black Sea. Today, it is estimated that there are only 700 individuals left mostly in the Aegean Sea.

## Did you know?

Thousands of living species on Earth are facing the threat of extinction. According to studies, more than 450 species went extinct in the last 10 years.



The studies show that in the last 100 years, human expansion to every corner of the world and human damage to nature has caused and is still causing hundreds of living beings to go extinct. One of the main reasons for this extinction is damaged or destroyed natural habitats. For example, destroying a forest to form an agricultural field or fragmentation of the habitats dividing into pieces for roads threaten the future of these living beings in this forest. Additionally, pollution, excessive hunting, climate change and dozens of other problems threaten the existence of living beings.



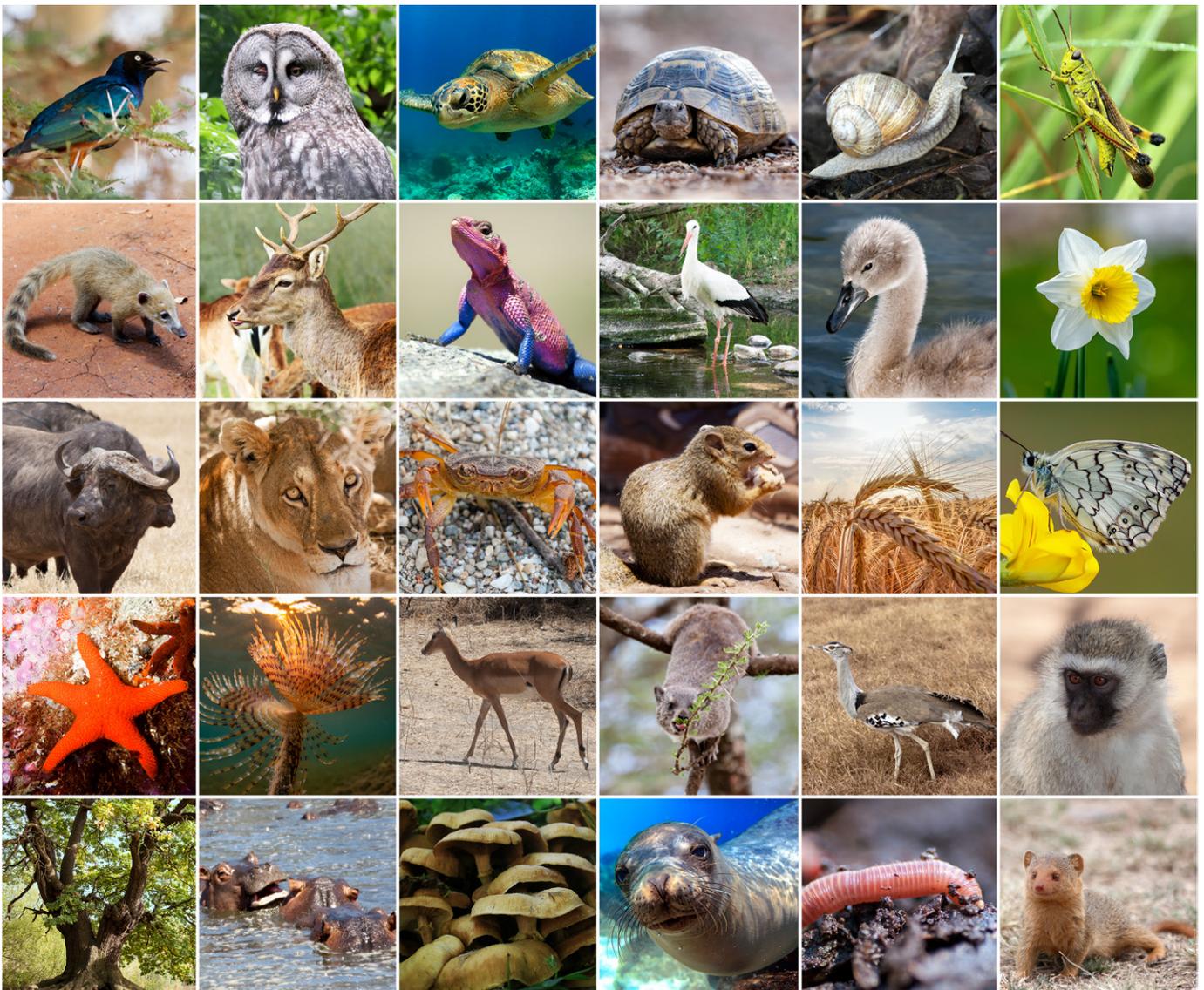
Still, it is possible to eliminate all these threats and to make our planet a safer place for all living things. By adjusting our individual lives in a nature-friendly way and changing our habits that damage nature, we can start shaping a beautiful future where all living beings live in harmony.

## What did we learn?

 The entire living beings and the ecosystem in our world are called biological diversity or biodiversity.

 The healthy existence of biodiversity is vital for all living beings, especially for humans.

 Various threats including human activities cause biodiversity to be damaged and destroyed.





# Activities



# What Am I?



## Objective

To attract attention to the diversity of living beings in nature.



## Target Audience

8-14 years old



## Learning Outcomes

- ✎ S/he will ask the right questions to conclude.
- ✎ S/he will realize the diversity of living beings in nature.



## Materials

Pencil, sticky papers



## Duration

20 min



## Method

Question - answer, game

## Application

1. Create a circle with the children. Write down different words about biodiversity on the sticky paper as much as the number of children. Attach these papers to the forehead or the back of each child. Make sure that no one sees their own words. Warn the children not to tell each other about their words.
2. You can use the following words: Fish, bird, tree, butterfly, fly, mole, ant, flower, seed, deer, leaf, human, wolf, frog, apple, spinach, tomato...
3. Explain to the children how to play the game. Tell everyone to randomly walk around the designated area and ask each other 20 “yes-no” questions. Tell them that they will be guessing which living being they are depending on their answers. Warn the children not to ask open-ended questions like where do I live, what do I eat.
4. The children can ask the following questions to each other and try to guess what they are:

- Am I an animal?
  - Am I a plant?
  - Do I live in the forest?
  - Do I live in the sea?
  - Am I big?
  - Am I small?
  - Am I green?
5. At the end of approximately 10 minutes, ask the children to create a circle. Take everyone's guesses about what they are. Give some clues to those who guessed incorrectly or didn't make any guess to help them guess what they are.
6. At the end of the activity, tell children that different living beings live together on our planet. Talk about what other beings can exist in the ecosystem and draw attention to biodiversity.





## Assessment Questions

You can ask the following questions to the children at the end of the activity.

- ▶ Did you struggle to guess which living being you were? Why?
- ▶ Have you ever heard of the biodiversity concept?
- ▶ What does it mean to have lots of species on our planet and these creatures living together?

## Extension

- ▶ You can play the game above in two different ways.
  - 1.** Choose a volunteer among the children and ask him/her to come to the board. Write a biodiversity-related word on the board without showing it to the volunteer child. Then, ask the volunteer child to only ask “yes-no” questions to his/her friends and guess the word written on the board. Continue the game with different children.
  - 2.** Write these words on sticky paper and attach them to the children’s foreheads. Create a circle with the children. Make sure that everyone asks questions to get “yes-no” answers. The child can keep on asking questions as long as s/he gets a yes answer. When s/he gets no answer, the next child will take the turn.

# Different Types Of Birds



## Objective

To perceive biodiversity and to discover the differences between the birds.



## Learning Outcomes

- ✎ S/he will form a piece-whole relationship.
- ✎ S/he will perceive the connection between different ecosystems and biodiversity.
- ✎ S/he will explain the differences between bird species.



## Target Audience

8-14 years old



## Duration

50 min



## Method

Question - answer, discussion, application

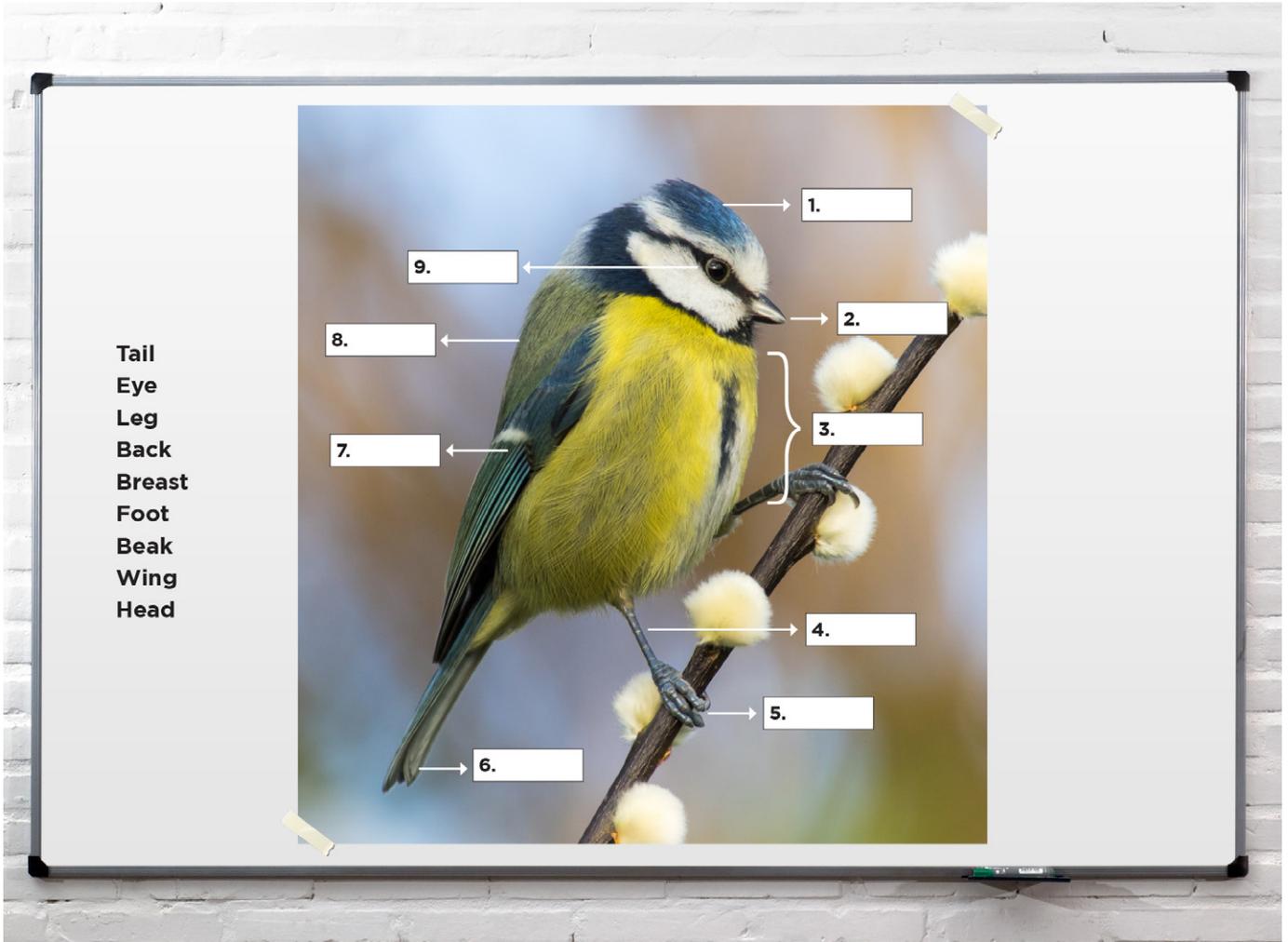


## Materials

Bird Diagram, Bird Beak and Leg Worksheet, pencil, a projector

## Application

1. Ask children which living beings do they see in the parks near their home, school or garden. Try to get answers from everyone. There will be different answers like trees, flowers, birds, bugs, humans, cats, dogs and hedgehogs. Note how many different species are seen.
2. According to the answers, tell the children how many different species are there in a small park or garden. Then, give brief information about biodiversity.
3. Ask the following questions to the children after making the explanation:
  - Do you know the biodiversity around you? Have you ever tried to count?
  - How many different mammals, fish or tree species do you know? How many different bird species have you seen?
  - How do you distinguish these species? What makes them different from each other? (appearance, sound, behaviours...)



4. Then, tell them that today you will get to know birds closer and discover the differences between species. You can make the explanation below.

*Birds are animals with feathers and wings. Some have good sound; some do not sing much and some have loud singing. There are different bird types. They can have different shapes, sizes, colours or lengths. For example, let's compare storks and sparrows. They are different, aren't they?*

5. Then, ask the children to open the Bird Diagram and fill in the blanks. If necessary, you can reflect this page on the board with the projector. Make the following explanations about the bird diagram:

*If we know the body parts of the birds well, we can distinguish the birds from each other. The head, beak, body, leg, feet, wing, tail and eye of the birds gives us clues about the bird species. The shape, size and colour of them will help us to*

*understand which species the bird belongs to. Of course, the colour of their feathers is very important. We can understand which bird it is by looking at its colour.*

At this stage, you can ask the following questions depending on the age level:

- *The birds have feet. But do they have hands? (They are light enough to carry their bodies on their two legs.)*
- *Birds have beaks. Well, do they have teeth? (Birds have an organ called a gizzard between their stomachs and intestines. Birds eat sand or small stones on purpose. The sand or small stones stored in the gizzard acts as a mill. The food comes from the stomach to the gizzard and the gizzard crushes the food.)*

### **Bird Diagram Answer Key:**

- 1.** Head **2.** Beak **3.** Breast  
**4.** Leg **5.** Foot **6.** Tail  
**7.** Wing **8.** Back **9.** Eye

6. Then, ask them to open Bird Beak and Feet Worksheet and give them 5 minutes to answer the questions here. If necessary, you can reflect this page on the

board with the projector. By using the description text below related to the images, talk with the children about the differences of bird species and the reasons for these differences.

*Now, let's closely look at the differences between different bird species... Let's consider the feather colours and analyse the beak and feet structures. Where do you think these differences come from?*

*- It is because of different living spaces (habitats) and diets.*

*All birds have beaks. They don't have lips and teeth like humans. Birds use their beaks to catch food and eat it. Different birds have different beak shapes to help to eat different foods.*

*All birds have two legs and two feet. Some birds have long legs and others have short legs. Their feet' shape can be different. Why don't all birds have the same feet shape or same leg length?*

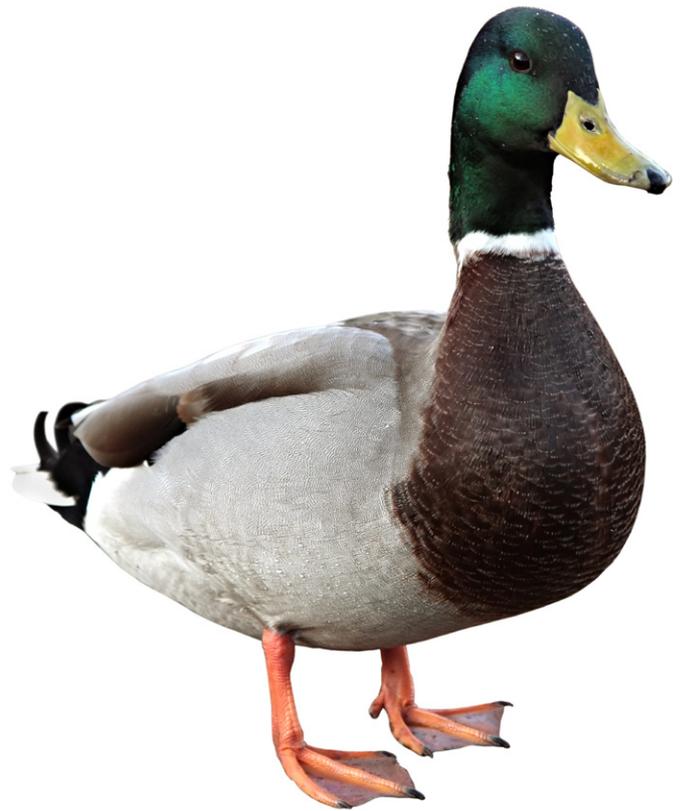
*- Legs and feet help birds to walk, perch, swim, rest, catch food and even scratch their body. Some birds live in the forests, others live in the seas and some live near the lakes. These feet' shapes help birds to live in different surroundings and catch food. Since the birds' bodies are*

*covered with feathers, the feathers on the belly hide the leg length. They mostly have longer legs than it seems but we can only see them when we raise their feathers.*



### Eagle

- *Eagle beak is strong, sharp and hooked. This beak shape helps it to catch the escaping animals and to separate and eat the large and strong animals it catches. It eats creatures like mice, snakes, rabbits, birds and animal carcasses.*
- *Eagle feet have sharp, large and strong claws. In this way, it can easily hunt living beings like snakes, mice and small birds. Its legs are strong enough to catch and carry its prey. It can even easily catch large animals.*



### Duck

- *Duckbill is long, flat and broad. The bill is not sharp; it has soft lines and there are comb-like structures along the edge of the beak. This is why they cannot cut the foods into parts. They swallow them as a whole. The comb-like structure helps them to filter the food from water, sand or mud. They can eat bugs, molluscs, frogs, weeds and seeds living in the water.*
- *The duck feet are webbed. The webbed feet give them the ability to swim in the water by pushing the water like a shovel.*



### Finch

- Finch beak is small and sharp. It helps them to find and eat small seeds.
- Finch feet are thin and have long nails. In this way, it can easily hold the tree branches and perch there for a long time.

### Stork:

- Stork beak is long and pointed. Since storks mainly feed in wetlands, their beaks evolved to feed in these regions. In this way, they can easily find food among the weeds in the water. They feed mainly on creatures such as fish, worms, molluscs, snakes, lizards, frogs in wetlands.
- Storks have long legs and toes. Their feet are not webbed like

*ducks because they do not swim. They mainly roam around the muddy areas near wetlands. The long toes prevent them from sticking inside the mud. The long leg helps them to walk easily without getting wet while looking for food near water.*

7. After completing this activity, discuss the similar structures in bird species with the children and encourage them to give examples.





## Assessment Questions

You can ask the following questions to the children at the end of the activity. Depending on the readiness of the children, you can talk about adaptation in detail.

- ▶ Which differences did you observe between the birds? What were the reasons for these differences?
- ▶ Have you ever seen these birds before? Where have you seen them?
- ▶ Do the other animals have similar differences other than the birds? What are they?

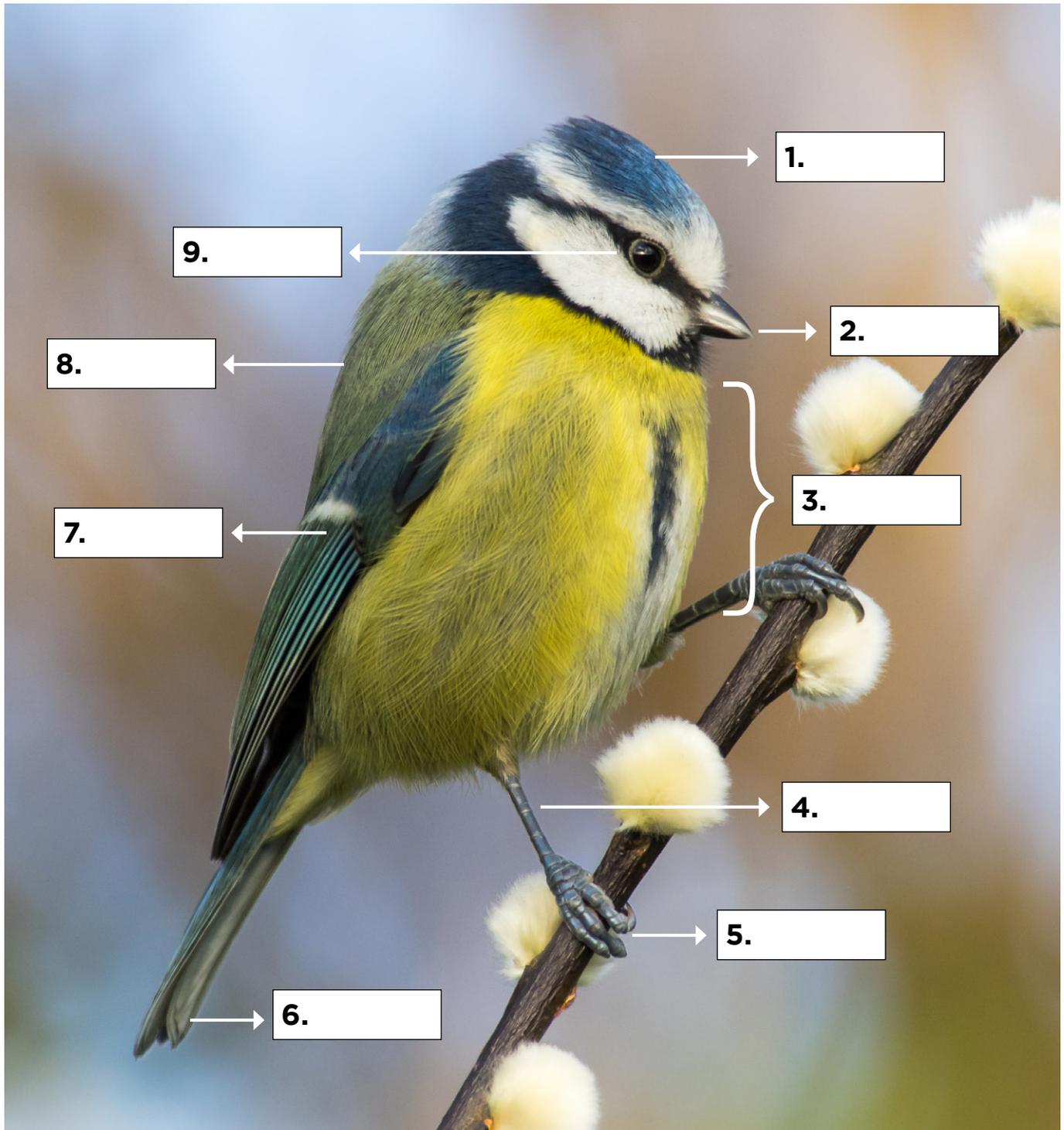
## Extensions

- ▶ Go to an area where children can see different bird species together and do bird watching. During bird watching, use the Bird Diagram to attract attention to different structures of the bird and help children to use binoculars.

## BIRD DIAGRAM

Place the words given below correctly to the boxes in the image and complete the bird diagram.

**Tail - Eye - Leg - Back - Breast - Foot - Beak - Wing - Head**



## BIRD BEAK AND FEET WORKSHEET

By looking at the beak type, guess what the bird eats and write here.



*The birds' beaks can give an idea about what they eat; their feet can give an idea about where they live or for what they use their feet. Look at the birds below closely and guess!*

**Guess the function of the feet types and write it here.**



# Plant Diversity



## Objective

To get to know biodiversity in the region; to distinguish the difference between plant species by observing.



## Target Audience

8-14 years old



## Learning Outcomes

- ✎ S/he will observe the plants.
- ✎ S/he will distinguish the differences between plants.
- ✎ S/he will notice the plant diversity around him/her.



## Materials

Plant Observation Worksheet



## Duration

40 min.



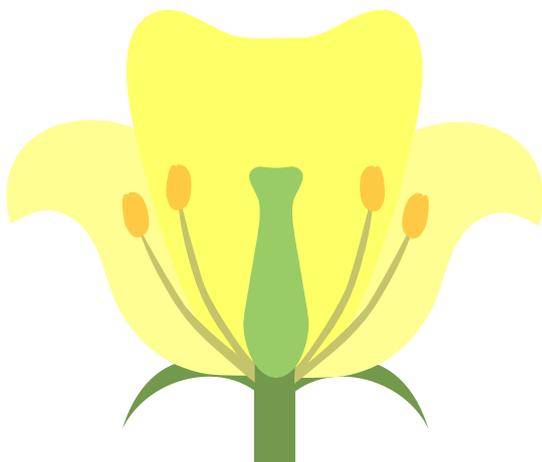
## Method

Trip-observation, question-answer

## Application

1. Go to an area where you observe different plant species with children. Talk about the plants. Ask them what they think about when you say plant and what plants are. You can make the explanation below.

*Plants are the general name of living beings such as mosses, weeds, bushes, trees which can generate their own food with the energy from the sun. Plants have structures like roots, stems, leaves, fruits and flowers. They get water and minerals from the soil with their roots. The stem carries the water and minerals from the root to the other parts of the*



*plant. This part enables the plant to stand upright. Leaves generate food and oxygen by using the sun and the mineral and water from the root and stem. The flower is the reproductive organ of the plants. The flower pollinates through bees, insects and wind. Then, the fruit is formed. The fruit has the seed that enables plants to reproduce again.*

2. Then, tell the children to open the Plant Observation Worksheet. Explain to them the worksheet. Tell them that you will be doing plant observation in a designated area for 30 minutes and they should record their observations to the worksheet.
3. At the end of the observation, create a circle with the children. Guide everyone to share their observation notes and to what

they encountered during the observation.

4. Emphasise the importance of biodiversity and plant diversity and end the activity. You can use the following explanation.

*Humans and other living things provide many benefits thanks to the diversity of plants. Plants are the important oxygen source of the planet and clean the air we breathe. They are a food source for humans and animals. We use wood as fuel. We use wood in furniture or construction. We use them to produce paper. They make a shadow. They hold the soil with their roots and prevent erosion. They regulate the temperature and climate. They are home to animals. They provide beautiful places for humans to live, rest and have fun. We can't think of this world without plants...*





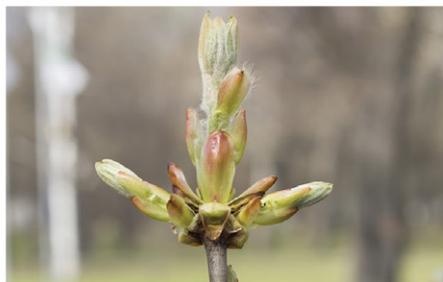
## Assessment Questions

You can ask the following questions to the children at the end of the activity.

- ▶ How was it to closely look into the plants? Was it enjoyable or difficult?
- ▶ Have you noticed that there were this much different plant species when you looked from far away?
- ▶ What was the most interesting species you have seen?
- ▶ How can this high number of plant species benefit the ecosystem?

## Extensions

- ▶ You can mention that 22 March is World Biodiversity Day and you can recommend the children to celebrate that day at home and school.
- ▶ When you apply this activity, you can identify the plant species by using free mobile apps such as **PlantNet** or **PlantSnap** to help you identify the plants.
- ▶ You can invite an expert to this activity and get support to introduce the species in the field.



# PLANT OBSERVATION WORKSHEET

Date \_\_\_\_\_

Start and End Time: \_\_\_\_\_

Location \_\_\_\_\_

Observer \_\_\_\_\_

**How many different leaf types did you see? Try to draw them.**

Leaf 1	Leaf 2	Leaf 3	Leaf 4

**How many different tree stem types did you see? Put this page on the tree stem and colour it with a pencil. Apply the tree stem pattern here.**

Tree Stem 1	Tree Stem 2	Tree Stem 3	Tree Stem 4

**How many different seeds did you see? Learn their names or try to draw them.**

Seed 1	Seed 2	Seed 3	Seed 4

**How many different fruits did you see? How is the size, shape, colour?  
Write them here.**

Fruit 1	Fruit 2	Fruit 3	Fruit 4

**How many different flowers did you see? How is the colour?  
Try to draw them and write the colours.**

Flower 1	Flower 2	Flower 3	Flower 4





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**The Title of the Programme**  
Joint Operational Programme Black Sea Basin 2014-2020

**The Editor of the Material**  
District Government of Enez

Joint Operational Programme Black Sea Basin 2014-2020 is co-financed by the European Union through the European Neighbourhood Instrument and by the participating countries: Armenia, Bulgaria, Georgia, Greece, Republic of Moldova, Romania, Turkey and Ukraine.

This publication was produced with the financial support of the European Union. Its contents are the sole responsibility of Enez District Governorship and do not necessarily reflect the views of the European Union.