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# WETLAND ECOSYSTEM AND HABITAT

## *Trainer's Booklet*

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

# WETLAND ECOSYSTEM AND HABITAT

*Trainer's Booklet*

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

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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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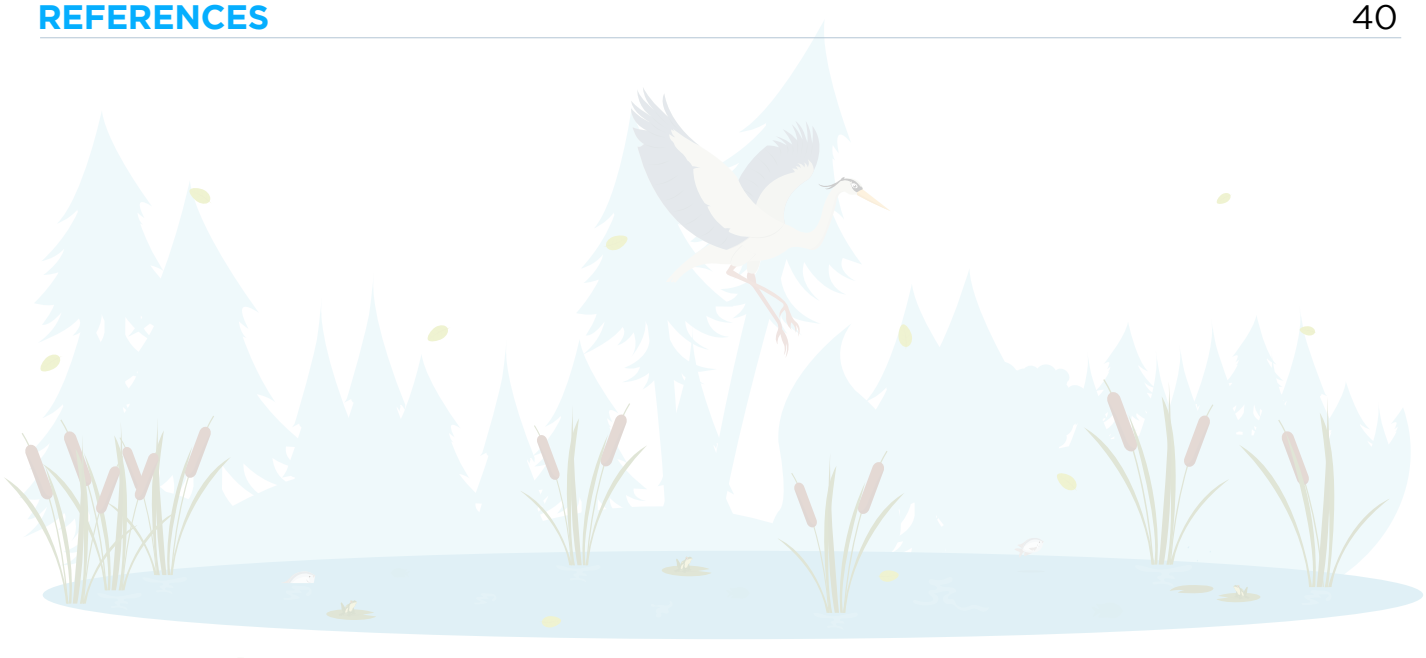
# Contents





# 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 the26-monthsproject 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**

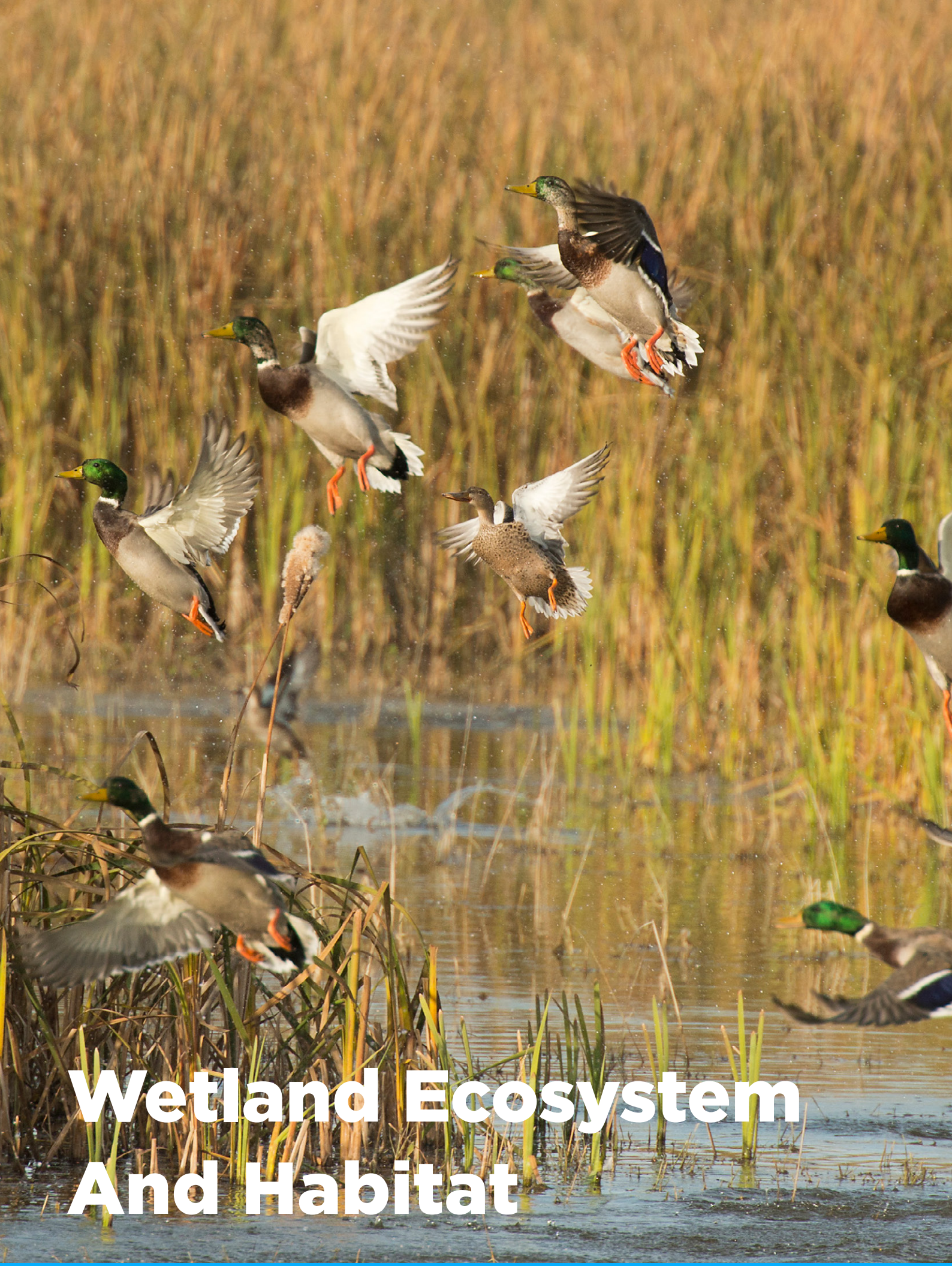
# About The Booklet

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.



# Wetland Ecosystem And Habitat

*Our planet has various ecosystems.*

Wetlands are among the richest ecosystems on our planet with numerous living beings as well as non-living elements such as water and soil.

## Ecosystem

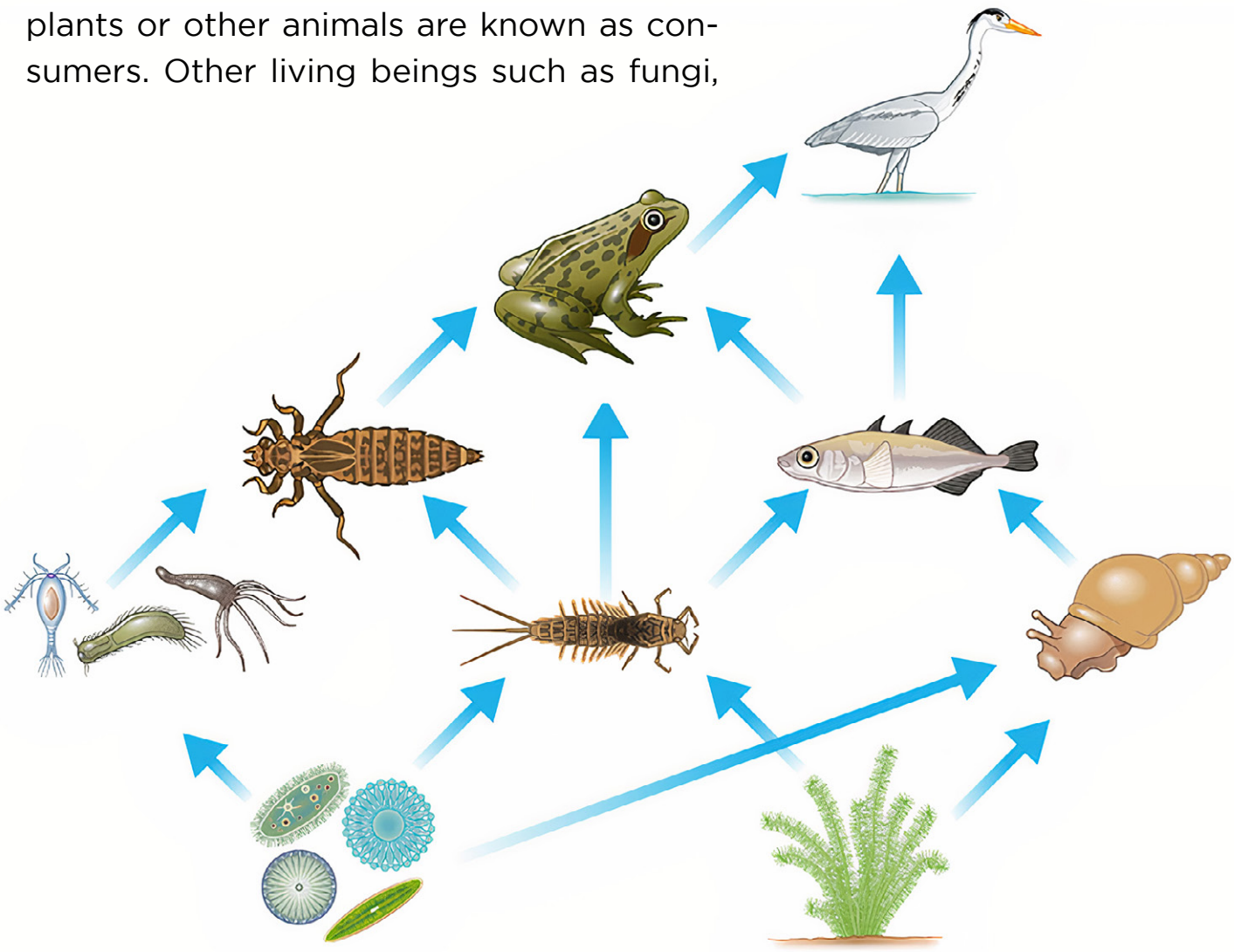
Everything on our planet whether they are living and non-living is interrelated. The flower blooming in the meadow, a bee collecting nectar from flowers, a stream flowing at the slopes of a mountain, a rock rolling inside the river... All of them are part of the ecosystem. The ecosystem concept is used for defining all-natural beings including living and non-living things in nature and the relationships between these beings.

For example, a forest where a rabbit runs, birds build nests with small rivers and worms under the soil represents an ecosystem. The forests are an ecosystem not because they are full of trees but they consist

of all living organisms and non-living compounds. Similarly, a wetland full of marshes stretching across the land and an otter looking for food among the reeds and waterfowls flying above the marshes form a complete ecosystem on its own.

## Food Chain and Food Web

All living and non-living beings in an ecosystem undertake certain tasks. Green plants, that is, producers produce food with a method called photosynthesis. The living beings that live by eating these green plants or other animals are known as consumers. Other living beings such as fungi,

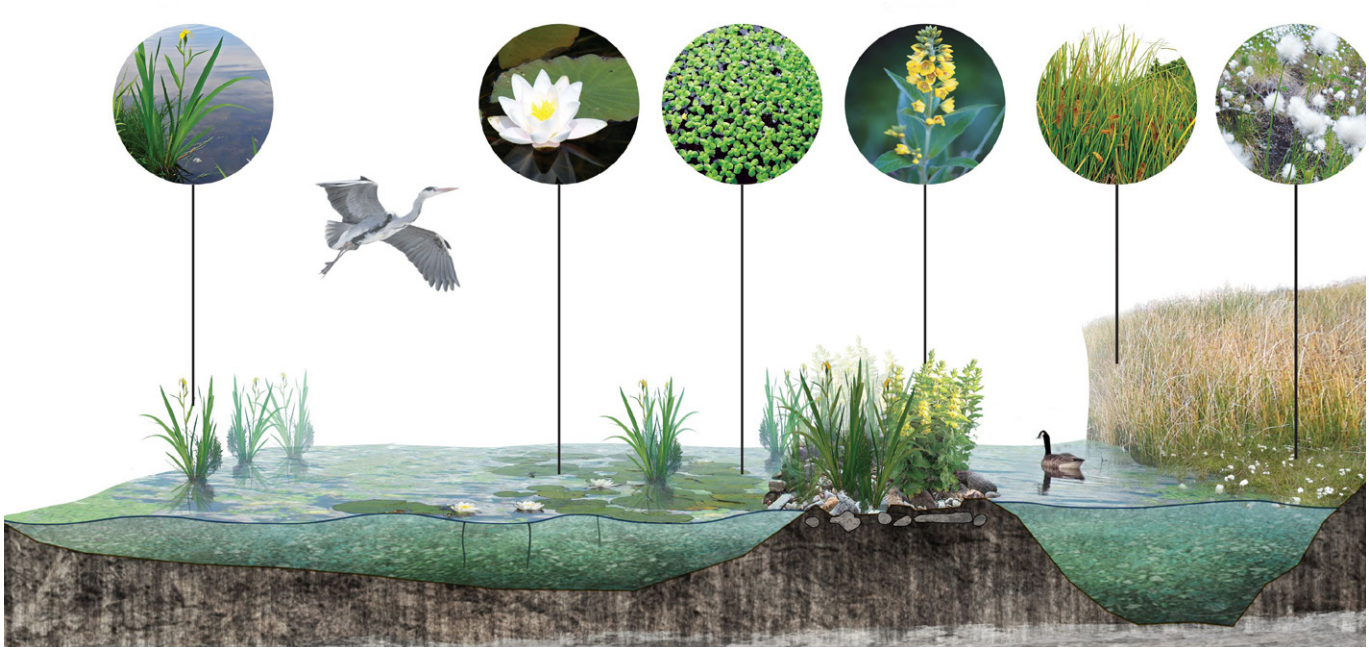


*The food network contains various food chains.*

The flower blooming in the meadow, a bee collecting nectar from flowers, a stream flowing at the slopes of a mountain, a rock rolling inside the river... All of them are part of the ecosystem.

bacteria and worms other than producers and consumers are classified as decomposers. The entire cycle that contains living being groups undertaking different tasks is called the **food chain**.

Food chains are indispensable elements for the entire ecosystem! But this chain can be in various forms and living beings in this chain can also be in other chains. For example, butterflies not only collect food from flowers but also collect nectar from different plant types. Similarly, buzzards not only eat mice but also eat lizards and hedgehogs. **Food web** term is used for defining this complex food relationship and multiple food chains.



*Wetlands create a unique ecosystem with their soil structure, plant species and other living beings.*

## How Does the Wetland Ecosystem Work?

Although wetlands only form 6% of the Earth's surface, they are important ecosystems with numerous tasks. In addition to the rich biodiversity they host, the properties provided by their physical structure have important benefits for humans.

First of all, wetlands are the ecosystem that protects water as the source of life. This ecosystem acts like a giant sponge and a filter! It can store a tremendous amount of water after intense rainfalls. Thus, it can control floods and high-water. This stored water mass also feeds the underground water sources due to their special soil structure. On the other hand, this giant filter can clean the water in it. The plants, fungi and

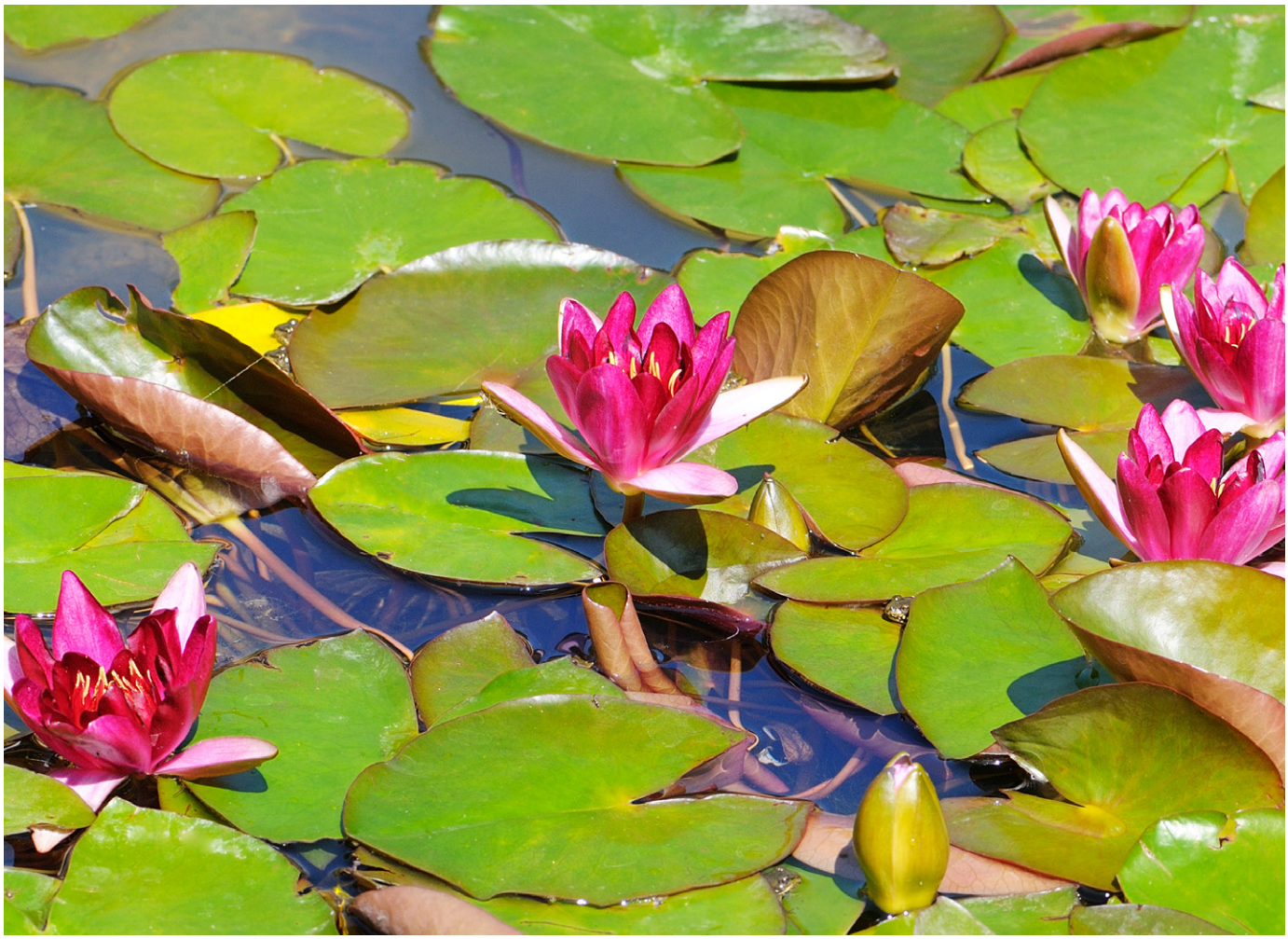
### Did You Know?

**Wetlands absorb carbon 10-20 times faster than other terrestrial carbon sinks such as forests and meadows. Approximately 40% of the terrestrially-absorbed carbon is stored in wetlands.**

40% of all known living creatures on Earth live in wetlands. Because wetlands act as a safe home where these species live and thrive.

mosses inside the wetland can filter the water and purify it from dangerous chemicals and foreign materials. These filtered materials are safely stored in the sand and soil layer at the bottom of the wetlands.

At the same time, wetlands protect the beaches and coastline. The marshes and swamps on the coastline protect the valuable soil and sand that might wash away with strong hurricanes and waves. Thus, our beaches can be as beautiful as they are even though they are subjected to giant waves!



The benefits provided by the wetland are not limited to these. 40% of all known living creatures on Earth live in wetlands. Because wetlands act as a safe home where these species live and thrive. Most importantly, wetlands are our greatest supporters to decrease the effects of climate change which is one of the most important problems of our planet. They can capture the greenhouse gases and especially carbon dioxide that leads to climate change.

Wetlands are our greatest supporters to decrease the effects of climate change which is one of the most important problems of our planet.

Other than all of this, humans can benefit from the unique beauties of wetlands in different ways. The close relationships of humans with wetlands throughout history have led these areas to be included in cul-

*Visitors can visit different zones with walking paths in wetlands.*

tural, economic and social life. For example, humans have been using fish species as a food source and reeds as structural materials especially in some local communities. Today, wetlands are mostly used for tourism activities and these areas can turn into places where people can visit with ecological tourism methods.

## Wetland Ecosystem Elements

Like all other ecosystems, wetlands contain numerous living and non-living components. Wetlands are among the richest ecosystems in the world thanks to the relationships and interactions between these elements.

*Wetlands contain numerous living and non-living components.*

The key non-living component that forms the wetland is water. Although water, which is indispensable for all wetland areas is defined as a non-living thing, it enables all other living beings to emerge. In addition to water, various soil layers and landforms inside the wetland play a role in preserving water in wetlands, water cleaning and enriching processes.

What makes a wetland unique is the living beings in that wetland. Millions of living beings live in wetlands including simple water moss to complex animals like birds, fish and mammals.

## Did You Know?

**Although plants love water, excessive water might cause them to die. But the plants in wetlands have evolved to survive and produce when they are exposed to excessive water.**

The most fundamental living beings in the wetlands are plants. The flora that changes based on wetland soil structure, climate conditions or the amount of water can consist of reeds, mosses, grass and weeds or trees and bushes. While some of these plants grow to the surface of the water and are visible, others live underwater. In addition to plants, numerous fungi can be found in wetlands.

This perfect habitat has a rich biodiversity in terms of birds and fish as well as numerous other animals. The fish, crabs, frogs, turtles living in water; herons and grebes nesting among the marshes; flies flying around; waterfowls and waders feeding on the water surface; otters hunting fish and many others enjoy the rich habitat provided by the wetland.

***Let's think about living and non-living things in wetlands. Write the word to the table below based on the number of letters in the word.***

| 3-letter word | 4-letter word | 5-letter word | 6-letter or more word |
|---|---|---|---|
| | | | |

## Wetland Habitat

As we have mentioned, the ecosystem is a large concept including various elements. When we limit this large concept, we call an environment where a species lives, feeds, finds shelter to protect itself or its young as the habitat of that living being. For example, for a bittern living in the wetland, this wetland is its habitat, that is, its living space. It can hunt fish in the wetland and feed itself, hide among the marshes to be protected from birds of prey or build the nest here to raise its chicks. In other words, an ecosystem contains the habitats of hundreds of different creatures.

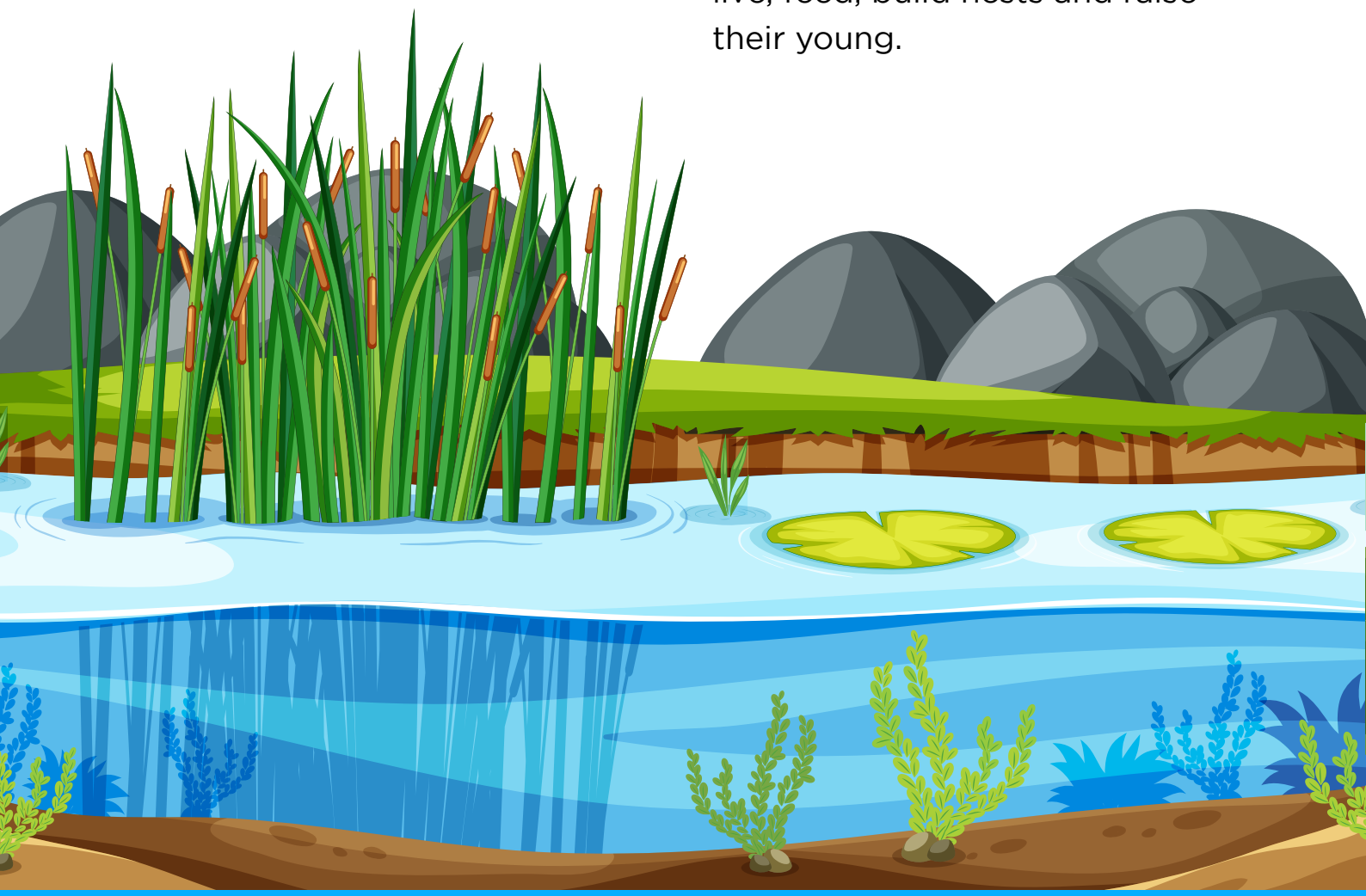
Wetlands are the safe habitats for living beings where they can live, feed, build nests and raise their young.

*Birds called bitterns are hidden inside these marshes both to be protected from the hunters and to secretly approach their prey.*

However, the habitats of living beings can face various threats. These creatures that mostly struggle with the problems caused by humans lose their habitats day by day. Dams built on rivers that feed the wetlands, drying the wetlands for agricultural fields or building new structures, water pollution with pollutants such as plastic, chemical waste and oil, burning marshes in the wetlands, cutting down trees and numerous threats destroy the habitat of living beings in the wetlands. Both to ensure healthy living for these creatures and for humanity to have a healthy future, we need to protect the natural habitats and do our best to eliminate these threats.

## What Did We Learn?

- The relationship between living organisms and non-living components in nature is defined as the ecosystem.
- Producers, consumers and decomposers are included in the food chain.
- Living beings in different food chains form a food web.
- Wetlands are among the richest ecosystems on our planet with numerous living beings as well as non-living elements such as water and soil.
- Plants, fungi, insects, amphibians, fish, reptiles, birds and mammals are among the creatures living in wetlands.
- Wetlands are the safe habitats for living beings where they can live, feed, build nests and raise their young.



# Activities

# The Web Of Life in The Ecosystem

**Objective**

To understand the food web in the ecosystem and the relationship between the living and non-living things.

**Learning Outcomes**

- S/he will relate the living and non-living things in the ecosystem.
- S/he will realize the importance of the ecosystem.
- S/he will predict the consequences of changes in the food chain.

**Target Audience**

8-14 years old

**Duration**

40 min.

**Method**

Question - answer, game

**Materials**

The Web of Life Cards, ball of wool

**Preparation**

Cut and prepare The Web of Life Cards before the activity.

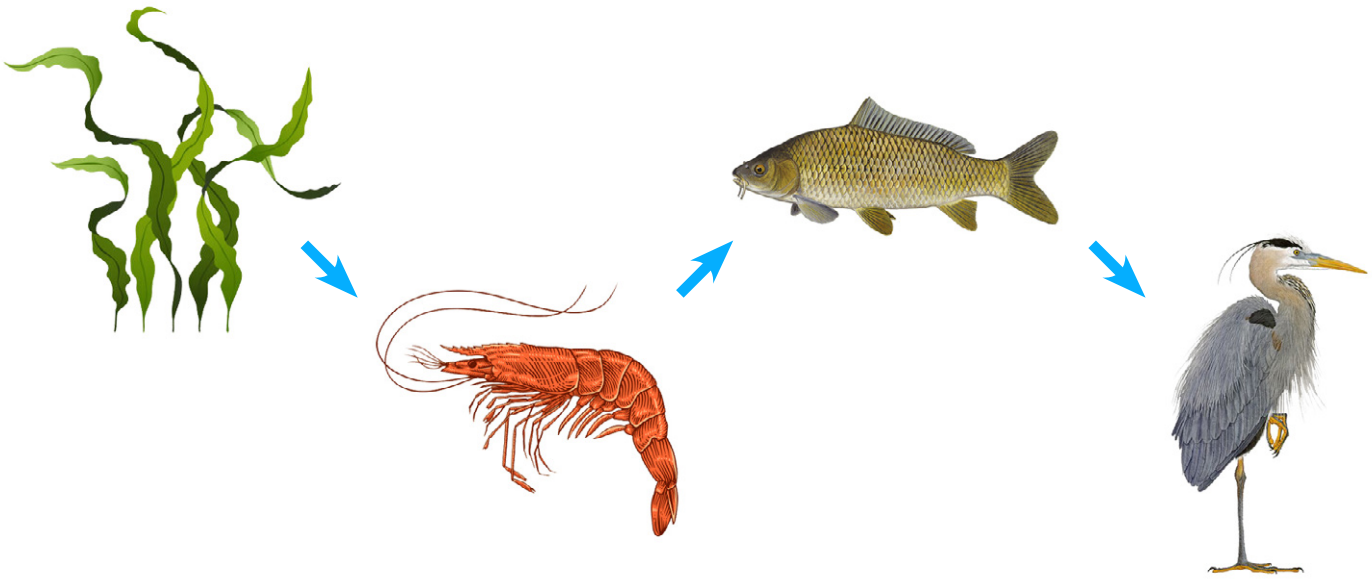
## Application

1. Hand out the cards only representing living creatures randomly to the children.
2. Ask every child to say their opinions about the card they draw. At this stage, you can ask the following questions:
   - Which card did you draw? Are you a plant or an animal?
   - Have you seen this living being before?
   - Where does it live?
   - What does it feed on?
3. Then, ask the children to sit in a circle. Show the ball of wool in your hand and tell everyone to throw this ball of wool to the species that can eat him/her. For

this purpose, the child should throw the ball of wool holding on to the free end; in this way, the chain at the end will be visible to everyone.

4. You can create the following food chains:
- Grass-cow-human
- Flower-bug-nightingale-fox
- Worm-blackbird-cat
- Grass-grasshopper-frog-snake-eagle
- Acorn-squirrel-owl
- Moss-shrimp-carp-grey heron
- Tree-deer-wolf

5. Show the game with a few simple food chains. For example, you can use the grass, cow and human food chain. Give the ball of wool to the child holding the grass card; ask “who is eating the grass?” question and guide the child holding the ball of wool to throw it to the child with the cow card. Ask “who is eating the cow?” and guide the child holding the ball of wool to throw it to the child with the human card. After remarking this food chain for the children, play the game for a few rounds with other food chain examples to help the children better understand the activity. Give the following information when you are playing and ask questions to the children to make them think about the food chain:



*All living beings in nature need energy. To meet this energy need, all living and non-living things depend on each other. Let's think about a forest ecosystem. Plants use the sun's rays and water to photosynthesize and produce their own food. These are called producers. Herbivorous animals eat plants to get energy. Carnivorous animals eat these animals that are feeding with plants. These are called consumers. The ecosystem has a food chain that follows these rules and this chain always starts with a producer like a green plant and continues with a consumer. At the same time, there are decomposers in nature that decompose the plants or animals when they die and turn them back to the soil.*

- What could happen if one of these living beings is missing? (For example, the number of deer will increase if the number of wolves decreases. Deer will eat more trees in the forest and this will decrease the number of trees in the forest. This will lead the animals living on the trees to be homeless and living beings that feed on the trees to run out of food.)
- What could happen if there is a sudden increase in the number of one of the living beings?
- What could affect the increase or decrease of these living beings?

6. Then, collect back the cards you have given to the children. Randomly distribute the cards again by adding non-living thing cards (sun, soil, water, air). Say that they have seen some of the food

chain examples in the ecosystem with this game. Then, say that you will all create a more complex web in the ecosystem. Make the following brief information about the web of life.

*We saw the food chains and food flow in nature. We now know these: for example, grass will produce its food from the sun. The rabbit eats the grass. The fox eats the rabbit. When the fox dies, the bacteria decompose the body and turn it back to the soil to supply food for the grass. But other animals eat grass in nature other than the rabbit, right? Or rabbits eat different plants than grass. Foxes can eat various animals and plants. Each of these living beings can be a part of multiple food chains. In this way, a food web created by multiple interconnected food chains emerges in an ecosystem. Non-living things such as sun, water, air and soil are included in these complex food webs and create a web of life that ensures continuity of life. At the same time, we can call this an ecosystem. Everything on our planet whether they are living and non-living is interrelated. Wetland is an example of an ecosystem. The wetland consisting of the water, marshes, flies in the reeds, otters looking for food inside the reeds and duck flocks flying above the water and soil forms a rich ecosystem with a complex web of life.*

7. After informing the children, start the game with any of these elements. Make sure that the child throws the ball of wool to the second being related to the first being and continue this game until everyone is connected. The child must mention the form of a relationship when throwing the ball of wool. The relationship here could be eating each other to survive like in the food chain or needing other beings to survive. For example, the sun will throw the ball of wool to the grass (grass needs the sun to produce food), the grass will throw to the rabbit (rabbit eats the grass), the rabbit will throw to the water (rabbit needs water to live), the water will throw to the tree (tree needs water to live), the tree will throw to the soil (tree needs soil to live), the soil will throw to the worm (soil is the home for the worm; also, the worm decomposes the dead beings in nature and mix them into the soil), the worm will throw to the blackbird (blackbird eats worm), the blackbird will throw to the eagle (eagle eats blackbird) and the eagle will throw to the water (eagle drinks water to live).
8. The game will continue until everyone has a few connections with others. As the network moves forward, discuss each connection or relationship.
9. After everyone is connected with the wool, make sure everyone observes this web of life. Then, take one of the beings out of the web and ask the child to let the wool go. Ask who is directly connected to this wool and whether they felt any shaking after the child let the wool go. Learn how a missing being will affect them. Ask the relationship and what will happen now. Then, ask them to let the wool go and talk about how other connected beings are affected and disintegrate the entire web step by step. Make sure that children understand that the ecosystem elements are interconnected and the balance is necessary to keep the ecosystem healthy.

## Assessment Questions

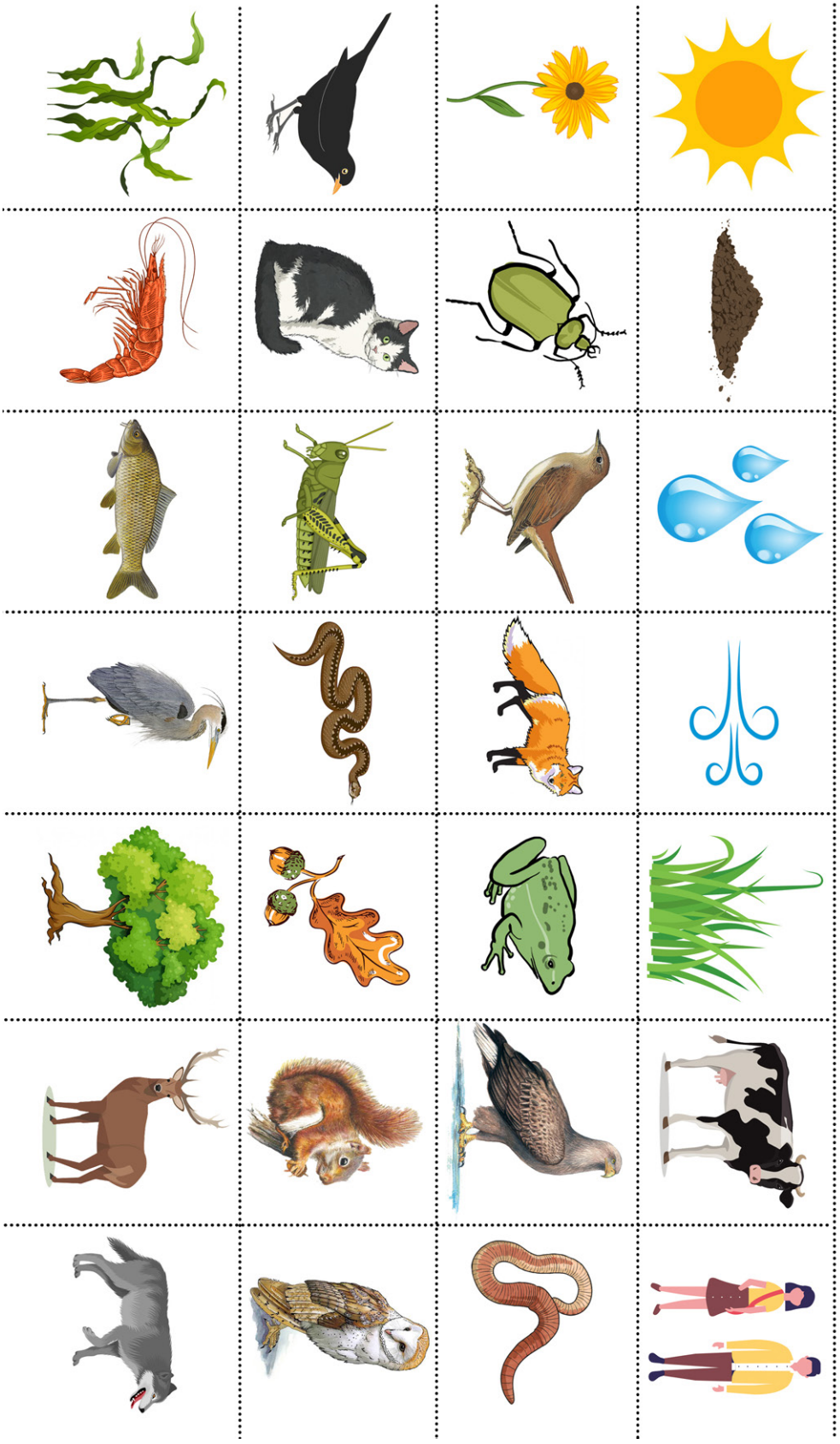
You can ask the following questions to the children at the end of the activity. Depending on the readiness level of the children, you can talk about pollination, cycles in nature, no waste in nature thanks to decomposers.

- What is the relationship between living and non-living beings? Do you think this relationship is complex?
- What is the duty of soil in this ecosystem?
- What is the duty of animals and plants in this ecosystem?

## Extensions

- At the end of the activity, you may ask the children to do a painting by thinking about the living beings in the food chain and the relationships between them.
- At the end of the activity, you may organize a nature field trip and ask for the children to guess the relationships between the living beings they have observed.

# THE WEB OF LIFE CARDS



# Habitat Discovery

**Objective**
Discovering suitable habitat for animals.

**Duration**
40 min.

**Method**
Field trip-observation

**Learning Outcomes**
- S/he will realize the importance of the natural environment for living beings.
- S/he will observe and discover the surrounding and natural assets.
- S/he will relate the living and non-living things in the ecosystem.
- S/he will distinguish the natural and human elements in the surrounding.

**Materials**
Habitat Discovery Worksheet, pencil

**Target Audience**
8-14 years old

## Application

1. Ask the children to close their eyes and imagine being a bird. Ask “what are you doing, where are you living, what do you see”. Focus on the living space (habitat) with your questions. You can make the children think about the answers to the following questions.

- Which bird are you? Are you a big or small bird? Do you live in the water like a duck? Or next to water like a grey heron? Or in the bushes like a European robin? Do you spend time more in the air or on the roof of the houses like a swift?

- What do you eat? Where do you find your food?
- Do you drink water? Where do you find water?
- Where do you sleep?
- Where did you lay your eggs?
- A foreigner is coming... Where would you hide?
- There is heavy rain... Where would you shelter?

2. After collecting the answers of everyone, do the following explanations about the habitat to the children.

*Habitat means the home or living space of a living being. Let's think about our habitat as humans. Our home, our school... What do we do here? Where do we eat, where do we sleep, where do we rest if the weather is cold, where do we spend time? Our homes offer us our vital needs like eating, drinking, resting, sheltering, right? In other words, our homes are our basic habitat...*

*Other living beings like humans need habitats with similar properties to sustain their lives. These habitats should have 4 essential elements: food, water, cover and*

*space. All living things need a sufficient amount of food and water to grow, thrive and sustain their lives. The cover could be the nesting space or a space to sleep, rest, hide, run away, shelter and feed. Space is the fourth necessary element for a habitat. Living beings require spaces of certain sizes to walk around, look for food, raise their young and migrate. The space for every species could be different. For example, the size of space needed by a squirrel or a brown bear or a migratory bird might be different.*

3. After making this explanation, tell the children that you will discover a habitat and you will use the Habitat Discover Worksheet for this purpose. Tell the children that if they find the necessary elements for 4 different categories on the worksheet, this might be a good habitat for the bird they have selected. Children can draw the elements they find or write their names on the worksheet.
4. Gather at the end of the field trip and discuss the results.

## Assessment Questions

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

- Which element was the easiest to find? Which element was the hardest to find? Why?
- Do the habitats of animals and our habitat look similar? What are the similarities and differences?
- Which other animals could be living in this habitat? Why?
- Why are some habitats not suitable for some animals?
- How will the living beings in the habitat be affected if these habitats are damaged?

## Extensions

- If you have time, you can play the Tag Your Habitat Game with the children.

# TAG YOUR HABITAT

First, find a safe area for the game. An open field with an even surface will be good for the game. If you select a small area, the game will end in a short time.

Then, make the following explanation to the children: "The birds are trying to survive in this habitat. They have 5 minutes to find all their needs in the habitat which are food, water, cover and space."

There are five different roles in the game: Bird and four different habitat elements: food, water, cover and space. Give one of these roles to each child. If there are less than 10 children, choose 2 as birds, if there are children between 10-20, choose 3 as birds and if there are more than 20 children, choose 4 birds. Assign the remaining children with food, water, cover and space roles.

The birds will try to tag others. They will try to catch the habitat elements. The habitat element children will do certain moves while running so that the birds can understand which element they are.

- **Food:** These children will imitate eating by bringing their hands to their mouths.
- **Water:** These children will do wave movement with their arms.
- **Cover:** These children will hold their arms above their heads.
- **Space:** These children will keep their arms open.

The purpose of the game is that the bird will collect four different habitat elements by tagging them. When the child that is bird catches the habitat element, s/he will connect their arms and continue to follow other elements together.

When a group collects all four elements, this group must sit outside the playing field.

At the end of the first round, the birds that can collect all four elements will survive. If you want to make the game longer, you can add the following details:

- The bird that collects four habitat elements will start reproducing. One of the four habitat elements will go back

to the game as a bird and this child will try to catch the habitat elements like other children. Since the competition will increase as the number of children increases, not all the birds can catch all habitat elements. You can assess the reasons for that with the children at the end of the game.

- Or you can tell short stories to the children while playing the game and add or remove some habitat elements. You can use different scenarios like the ones below:
  - » "People started to gather food or raise cattle in a forest." Remove 1 space and 2 covers from the game.
  - » "This was a dry year and the water in the river is low." Remove 1 water.
  - » "The wildlife is being protected and additional space is allocated." Add 1 food, 1 water, 1 cover and 1 space.

You can add new scenarios to the activity and change the habitat elements in every round to apply the game for as much as you want. A bird that cannot obtain all the elements that it needs cannot survive throughout the round. You can assess the effects of these scenarios with the children at the end of the game.

# HABITAT DISCOVERY WORKSHEET

## FOOD

*(Do you search by considering what the selected bird eats. Seeds, bugs, worms, fish, fruit, etc.)*

## WATER

*(What are the water sources around you? Lake, stream, river, puddle, etc.)*

## COVER

*(Which area could be the most suitable option for the bird you have selected to find cover? Trees, reeds, bushes, nests, buildings, etc.)*

## SPACE

*(Which space are you in? Is the space suitable for the selected bird? Forest, garden, sea etc. Or is it a migration route? What is the size?)*

# Notes

# Notes

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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.