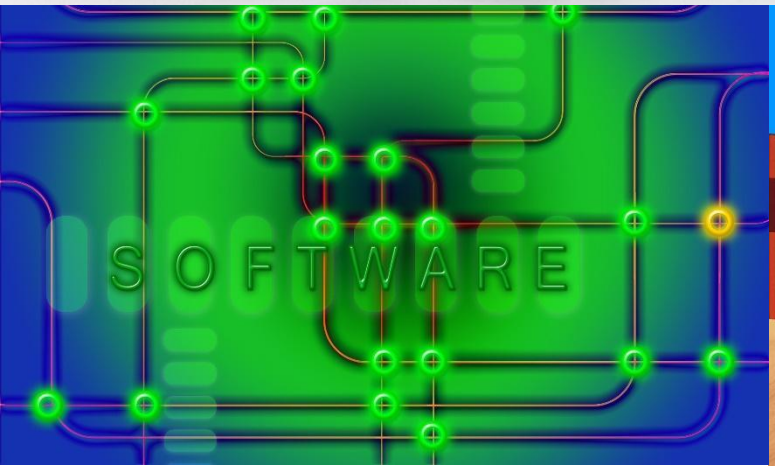
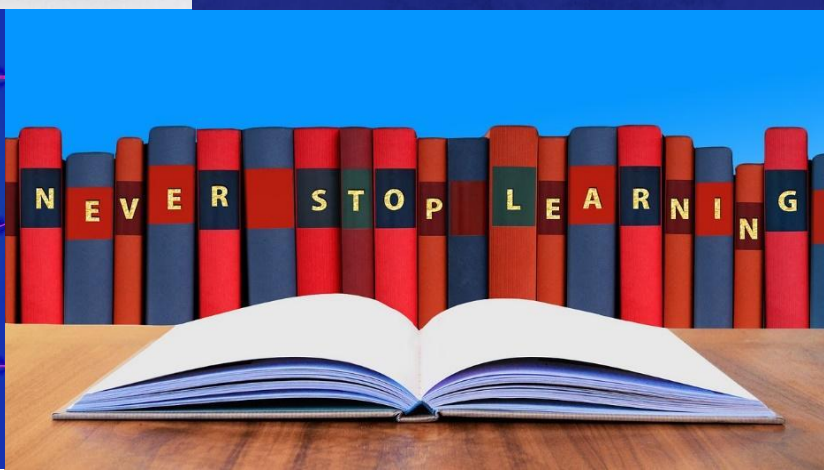




Innovative Environmental Education ECO-COMPASS
MODULE 1

Ecological skills and competences in individual life

Educational material for participants

ECO-COMPASS

Co-funded by
the European Union

Programme: ERASMUS+

KA210-ADU - Small-scale partnership in adult education
Form ID: KA210-ADU-813F065C
Project Number: 2021-2-SK01-KA210-ADU-000048280
Inovatívne budovanie ekologického povedomia a kultúry rozvíjaním environmentálnych zručností a formovaním postojov občanov s mentálnym postihnutím
Innovative building of ecological awareness and culture by developing environmental skills and shaping the attitudes of citizens with mental disabilities

ECO-COMPASS

Innovative Environmental Education ECO-COMPASS – Educational material for participants

This publication has been approved by a consortium of partners within the framework of Erasmus+ KA2 project 2021-2-SK01-KA210-ADU-000048280 “Inovatívne budovanie ekologického povedomia a kultúry rozvíjaním environmentálnych zručností a formovaním postojov občanov s mentálnym postihnutím” (Innovative building of ecological awareness and culture by developing environmental skills and shaping the attitudes of citizens with mental disabilities) – ECO-COMPASS.

The main objective of the project is to support social inclusion and lifelong learning of people with mental disabilities by developing their environmental skills and competencies, shaping their environmental attitudes and responsibilities through education based on international experiences. The project specifically focuses on supporting and developing international cooperation of participating organizations, building, and strengthening partnership networks and professionalization of organizations.

Innovative Environmental Education ECO-COMPASS ensures developing the environmental skills and competences of professionals and people with mental disabilities, shaping their environmental attitudes and environmental responsibility through innovative education based on international experience.

Coordinated by civic association Spoluprácou pre lepšiu budúcnosť - Veľký Meder and edited by ECO-COMPASS consortium
August 2023

2021-2-SK01-KA210-ADU-000048280

Co-funded by the European Union

Contents

1. Introduction

In this module, you can get to know with the living and not living environment. We present the interactions between living organisms and address the importance of biodiversity. We describe in detail the detrimental impact of human activity on the environment. We learn about what environmental protection means and what we can do for a healthy environment.

1. *We are the part of the nature that surrounds us*

In the first topic, we present the main components of living space. Changes of the water, the air and the soil affect the entire living world of our planet.

2. *The relationship between living organisms and the importance of biological diversity*

The second theme deals with the interrelationship between animals, plants and humans. This relationship helps people to survive. The biodiversity of life on Earth contributes to the well-being of mankind.

3. *The impact of human activity on the environment*

The aim of human activity is that we live more comfortably. This often has harmful consequences. The third topic presents the threats of environment pollution and its impacts.

4. *Environmental protection and the importance of ecological behaviour*

The fourth theme deals with environmental protection and the importance of ecological behaviour. We have prepared the Ten Commandments for the environment protection. It summarises the rules for responsible and environmentally responsible behaviour.

2. Ecological skills and competences in individual life

2.1. We are the part of the nature that surrounds us

2.1.1. What is important to know?

Our living environment consists of air, soil, surface and groundwater, plants, animals, landscape and the built environment. Why are water, air and soil important for us?

The water

Water is very important for life. It is required by every living creatures on Earth. It helps plants to produce organic matter. And it provides food for animals and people. For many animals, water is their immediate living environment, which means they are only able to live in water.

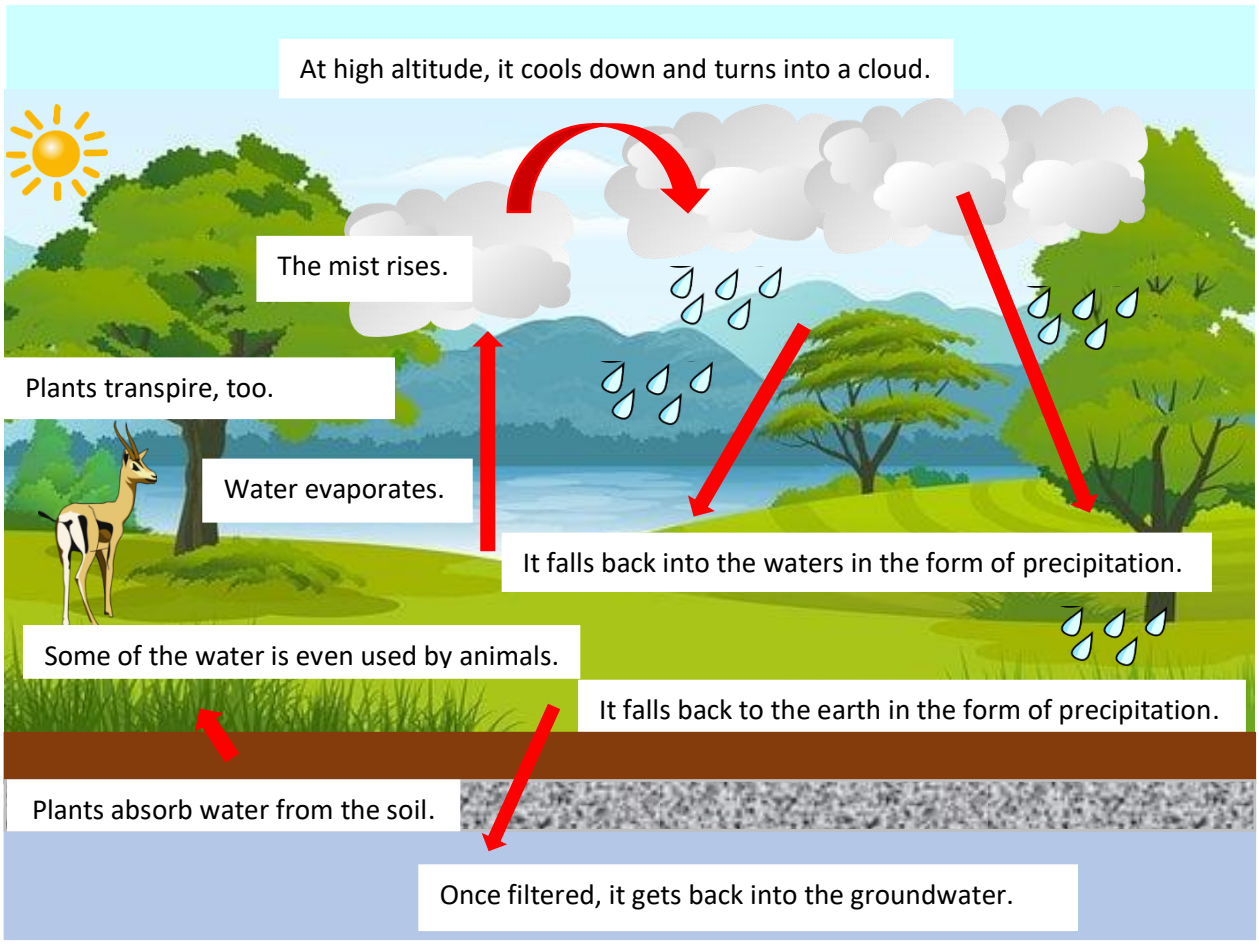
Most of the Earth's surface is covered by water (71%). Land makes up a smaller proportion (29%). Water is found almost everywhere, in oceans, seas, rivers, lakes, rocks and even clouds. It is a very important part of animals, plants and the human body.

Most of the water is saline seawater (97%), with much less freshwater (3%). Some freshwater is found in ice sheets and frozen ground, groundwater (e.g. mineral water, groundwater, medicinal water) and surface water (e.g. rivers, lakes, swamps, precipitation). Only a small proportion of fresh water (0.3%) is consumable, and unfortunately it is becoming increasingly polluted. Freshwater is used for many purposes, such as drinking water, washing, agriculture, food production, industry, etc.

Water is in constant motion between the Earth and the atmosphere, which we call the water cycle. The sun causes water to evaporate from the Earth's surface. It turns into mist and rises into the atmosphere. At high altitude, the mist cools and the water droplets turn into clouds. They then fall back to Earth in the form

of precipitation, rain or snow. Some water is absorbed into the soil, some is used by plants and animals, while some of it evaporates.

The water cycle



We need to save water, because water supplies are constantly diminishing. In many places they still do not have access to enough water.

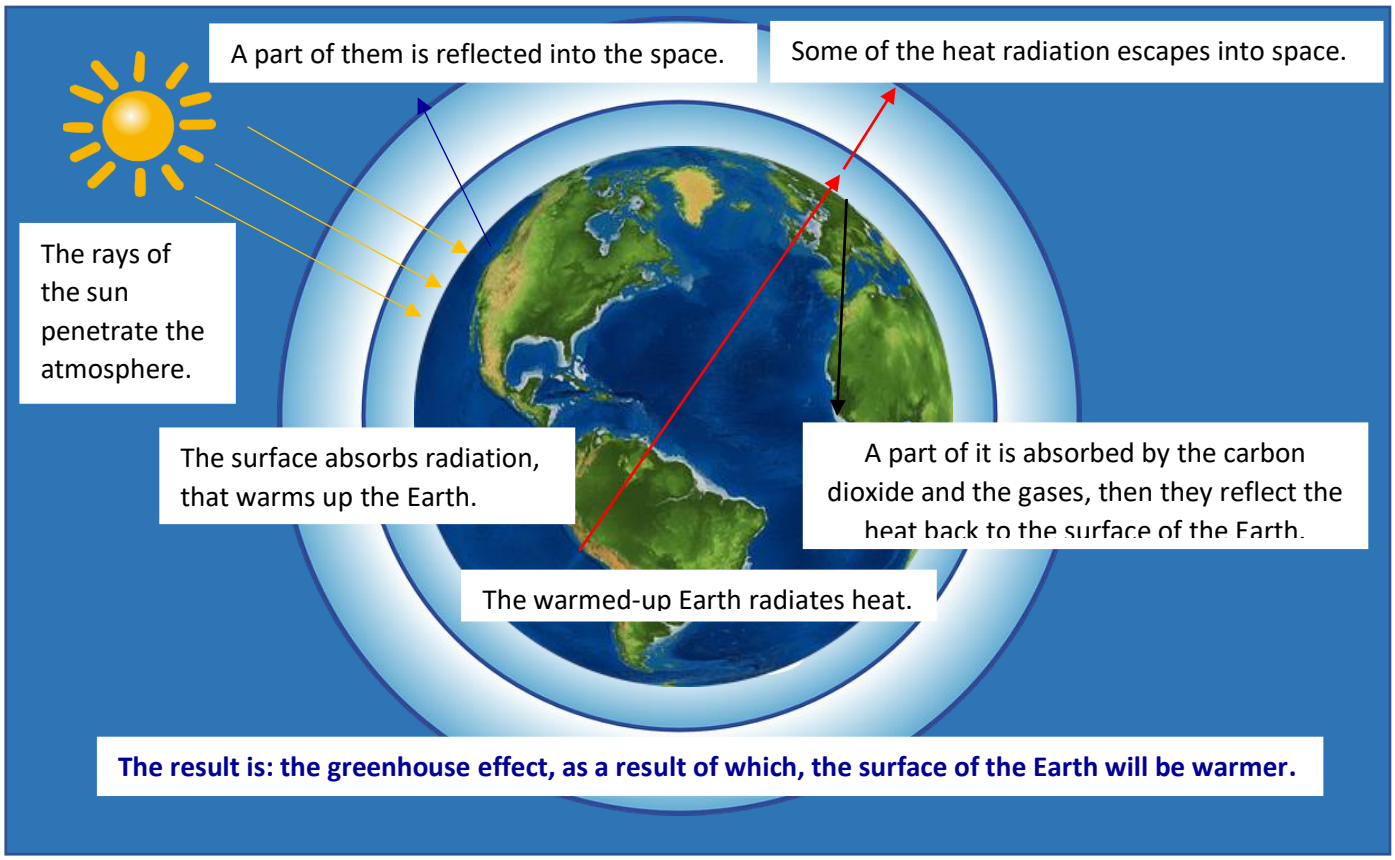
The air

Air is a colourless and odourless gas mixture. Its main components are nitrogen (4/5) and oxygen (1/5). It also contains gases and small particles such as dust and soot, but also pollutants. The lower layers of air are the most important for us. This is where water is found, where clouds and precipitation are formed, and where winds and storms are developed. The ozone layer is at an altitude of 20-30 km. The ozone layer absorbs the part of ultraviolet radiation that is harmful to living organisms.

We could not live without air. Air contains oxygen, which is important for breathing, but without it, we could not even start petrol engines, either. We can also use oxygen to light our campfires. Oxygen helps to break down fallen leaves, a fallen tree and rubbish. The atmosphere is important for plants because it provides carbon dioxide. Green plants turn carbon dioxide into organic substances using solar energy and water. This is called photosynthesis.

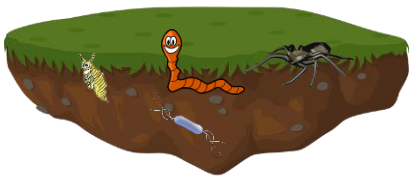
Greenhouse effect is a natural process. It is important because without it, the Earth's average temperature would be about 34°C colder. This could cause the extinction of many organisms. As a result of the greenhouse effect, some of the sunlight reaching our Earth is absorbed by the surface of the earth. Sunlight is converted into heat energy, but it cannot fully escape from the atmosphere because greenhouse gases (e.g., carbon dioxide, water vapour, methane, ozone) prevent it. They form a shell around the Earth from which heat is reflected, thereby warming the atmosphere. The use and combustion of fuels such as coal, petroleum and wood increase the amount of carbon dioxide in the air, causing climate change.

The greenhouse effect



The air is a habitat for birds, bats, arthropods. Even the wind can blow smaller organisms – viruses, bacteria, fungal spores, aphids. The wind also carries small organisms - viruses, bacteria, fungal spores, aphids, small spiders. The atmosphere is also important because it is where planes fly.

The soil



The soil is the uppermost, loose, fertile part of the earth's surface. Its most important task is to provide nutrients and water to the plants growing on it and to provide a habitat for the organisms that live in the soil. There is a variety of organisms living in the soil, such as bacteria, fungi, mites, spiders, worms, earthworms and insects. A very important part of the soil is humus, which is formed from the remains of decaying plants and animals. The humus mixes with the debris from decomposing rocks and over time this forms the soil. Soil fertility is the ability of the soil to supply water and nutrients to the vegetation living on it. The higher the humus content of the soil, the darker the colour, the more fertile it is.

Without soil, life would be unimaginable for human beings. In a soil with good fertility, we can grow crops for food or to produce other industrial products.

The soil is very sensitive. If the vegetation is eradicated from the soil surface, rains and strong winds can carry away the top fertile parts of the slopes of hills and mountains. This process is called soil degradation. Soil degradation can be prevented by planting forests, because the roots of plants retain the soil.

The fertility of soil can be damaged by the use of pesticides and pollutants (e.g., oil, waste). They can also enter the human body through the food we eat.

The soil has many other important tasks as well: for example, it provides habitat for millions of living organisms other than plants. Thus, contributing to the preservation of biodiversity. The soil also has a natural filtering and detoxifying impact. Thus, providing us with healthy drinking water.

2.1.2. Questions

We are the part of the nature that surrounds us

1. Why is water important for us?

2. Where do we use fresh water in our everyday life?

3. What does the water cycle mean?

4. Why could life not exist without air?

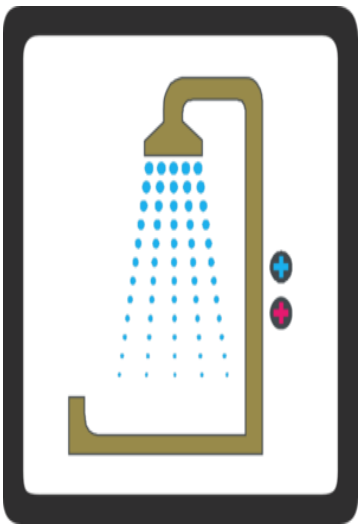
5. What does soil contain?

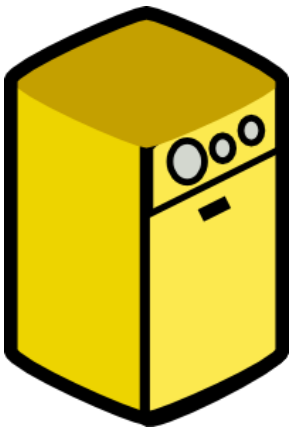
2.1.3. Practical tasks - worksheets

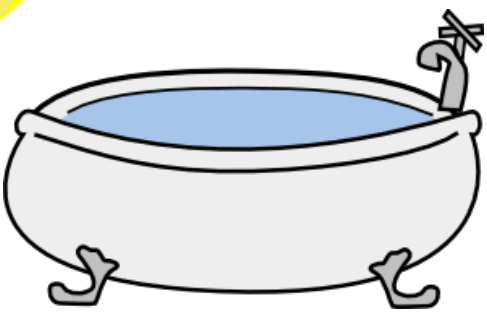
We are the part of the nature that surrounds us

Worksheet 1 – From the following pictures, choose those that illustrate economic water consumption:

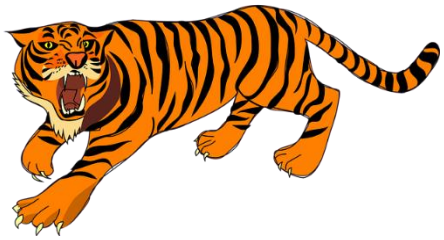


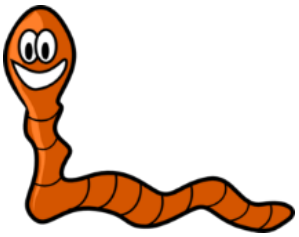



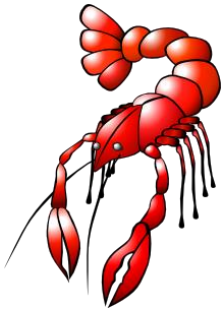


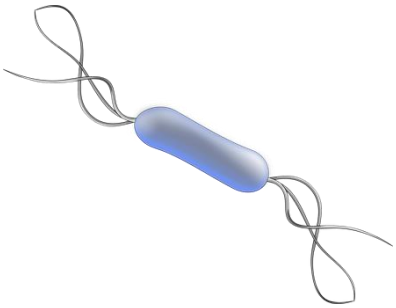


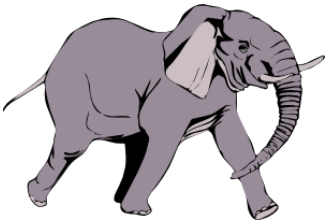

Worksheet 2 - Choose which of the living organisms in the pictures, lives in the soil!

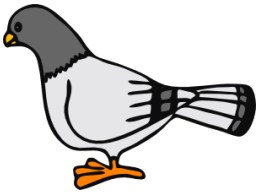


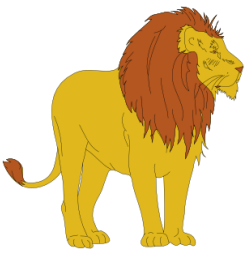


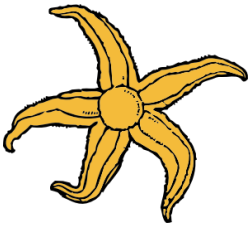


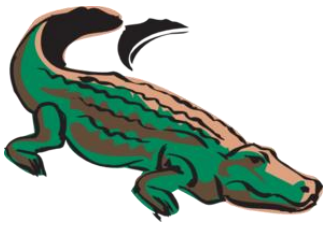










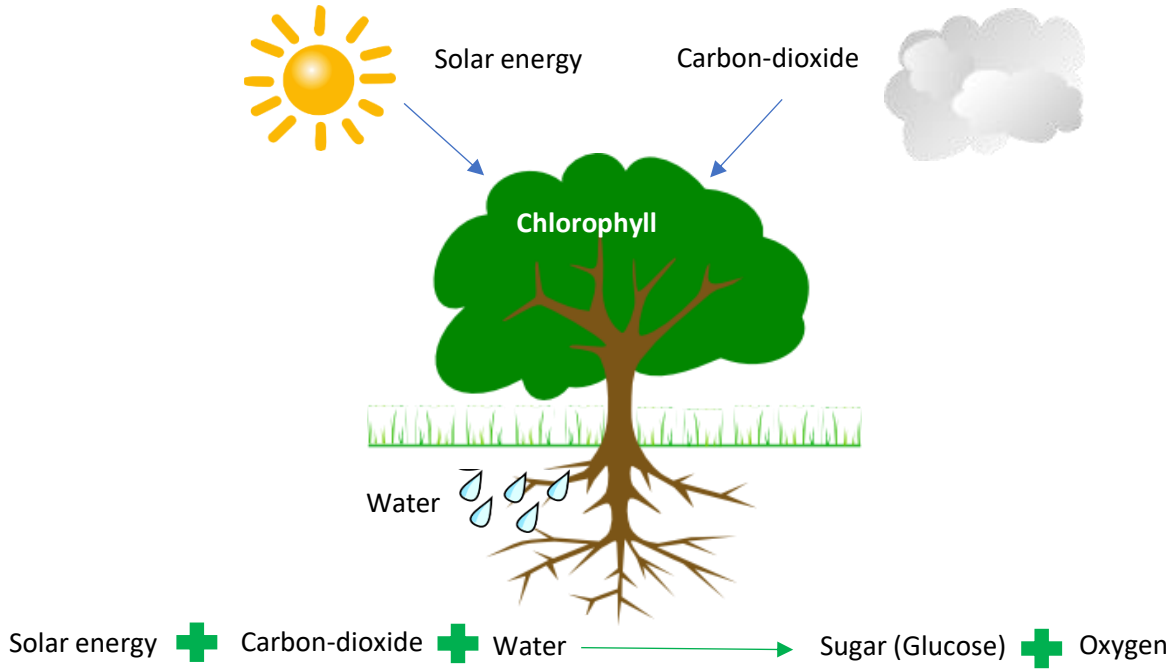


2.2. The relationship between living organisms and the importance of biological diversity

2.2.1. What is important to know?

All living organisms need organic matter, food. Green plants use the energy of sunlight to produce organic matter from water and carbon dioxide in the air. This is called photosynthesis. Animals and humans are not able to do this. Only plants can produce organic matter, which is the food for many, many organisms.

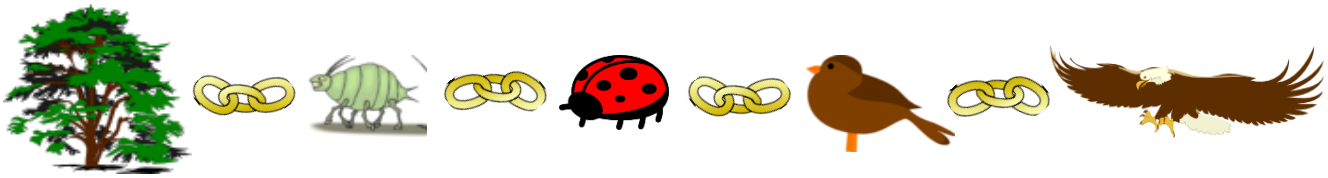
PHOTOSYNTHESIS



Animals, plants and humans are interconnected. Of these, the nutritional relationship is very important.

A food chain is an interconnected chain in which organisms feed on each other in succession. Living organisms can generally be divided into the following groups: producers (e.g., plants), consumers (e.g., animals), predators (e.g., carnivores). The food chain works as follows: producers (e.g., plants) produce plant organic matter through photosynthesis. Producers are fed by consumers (e.g., animals) and thus absorb herbal organic matter. Consumers (e.g., animals) are fed by predators (e.g., carnivores). The last member of the food chain is the top predator, which has no natural enemies.

For example, in our oak forests, oak leaves are sucked by the aphid, which in turn is a favourite food for the seven-spotted ladybird. The seven-spotted ladybird is eaten by the tree sparrow, while the sparrow is hunted by the sparrowhawk. This shows that organisms form food chains. There are many different food chains in nature.



Dead living organisms in soil and water are broken down by bacteria and fungi. They convert them into mineral nutrients, water and carbon dioxide, which are reabsorbed by plants.

The living world is made up of different organisms. The land beneath our feet is not just rock, soil and sediment. A small patch of soil is home to a wide variety of organisms. Biodiversity means that there are many different kinds of organisms in a given area and that their habitats are diverse and varied. Maintaining diversity is very important for sustaining life on Earth, because the presence of one animal or plant can affect the life of another. Biodiversity is being adversely affected by deforestation, drainage of wetlands, urban growth, hunting and fishing, climate change, pollution and the introduction of alien animal and plant species. Many new alien animals and plants are brought to us through trade and

travel, and they can proliferate. Some of them can be harmful to us. For example, ragweed, which causes allergies.

Biodiversity is very important because it provides our food, our heating, the fertility of the land, as well as the water and carbon supplies. As the number of people continues to grow, more and more food and industrial products are needed. We are exploiting the Earth more and more. As a result, biodiversity is decreasing. Human activity is threatening the wildlife and can cause the extinction of animals and plants. For example, if the forest is destroyed, the animals and plants living there will be dead. Pollutants entering the habitat can be toxic. Some animals and plants may become extinct, leaving their consumers without food. Insecticides used in agriculture can get into the organisms of insectivorous birds and apex predators, to which they have harmful impacts. For example, the number of peregrine falcons has declined, because the chemicals have damaged the shells of their eggs. Many plant and animal species are threatened by human activity.

1 million out of the 8 million species are threatened by extinction!

More than half of the indigenous trees, for example the chestnut tree, the beech, the oak are in danger!

Among the animals, snails, mussels and fish are most at risk. Around half of the mammals - the lynx, brown bear, Mediterranean monk seal, brown dolphin, grey wolf, European mink, Mediterranean fur seal, Arctic fox, polar bear - have become endangered. Some of the birds are also endangered species. For example, peregrine falcons, ospreys, bald ibis, and the imperial eagle.



The number of bees and other pollinating species is also greatly reduced. One out of ten bees and butterflies are threatened by extinction, despite their importance to the European environment and economy.

2.2.2. Questions

The relationship between living organisms and the importance of biological diversity

1. What is the relationship between living organisms?

2. Why is photosynthesis important?

3. What does biodiversity mean?

4. What is damaging biodiversity? Give some examples!

5. Which animals and plants belong to the endangered species in Europe?

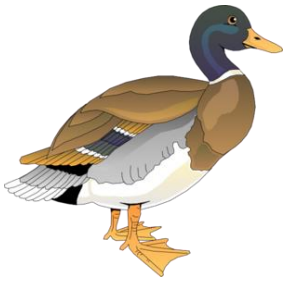
List some animals and plants!

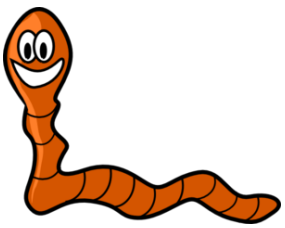
2.2.3. Practical tasks – worksheets

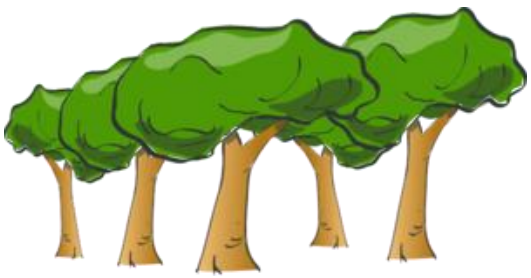
The relationship between living organisms and the importance of biological diversity

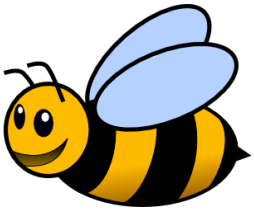
Worksheet 1 - Use arrows to highlight the food chain!

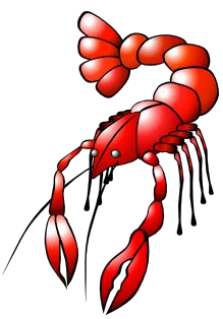
Worksheet 2 – Tie them together! Where does each animal live?











2.3. The impact of human activities on the environment

2.3.1. What is important to know?

The majority of organisms adapted to their environment. Many animals hide in caves or burrows, to protect themselves. Some animals significantly transform their environment. For example, beavers build beaver lodges and can block rivers

It is man who has the greatest impact on the environment, and it is man who transforms their environment to the greatest extent. People have already tried in ancient times to change their environment and exploit natural resources such as water, forests, minerals, oil, gas and wind energy. Resources are used to the greatest extent, for example, in food production, industry, energy production, construction materials and tourism. It is important that this use should be sustainable.

The number of Earth inhabitants http://population.city/

1804	→	**was 1 billion**
1960	→	**was 3 billion**
2011	→	**was 7 billion**
2050	→	**will be 10 billion**

Currently, there are around 8 billion people living on Earth. Population is more and more growing, while the consumption is more and more increasing, People are using and producing more and more products, which requires a lot of energy.

In the meantime, a lot of waste is produced and a lot of pollutants are released into the air, water and soil. And additional energy is needed to treat the waste.

Human activity is causing serious damages to the natural environment. Nowadays, this has already become a major threat. These impacts are often irreversible, even for human beings. Human activity most frequently causes the following harmful impacts:

Greenhouse effect – If the amount of greenhouse gases (e.g., carbon dioxide, water vapour, methane) in the atmosphere increases, the surface of the Earth will become warmer. More and more greenhouse gases are being released into the air. There are multiple reasons for this: for example, the burning of fossil fuels (coal, oil, gas), the destruction of rainforests, agricultural production, livestock farming and the production of chemicals. Due to the warming of the Earth, climate and weather are also changing. There are more frequent major droughts, fires, windstorms, floods and melting ice causing sea levels to rise.

Air pollution - Industrial and agricultural production, transport, waste management and households emit various pollutants into the air. The main causes of air pollution are exhaust fumes from cars and smoke from chimneys. Burning coal releases gases into the air that cause acid rain. Exhaust fumes and soot are also harmful to the human body. In larger cities, smoke haze can form, which damages the respiratory tract. The sick, the elderly and children are asked not to go outside and to keep their windows closed. Air pollution is an environmental problem affecting humanity and the whole planet.

Water pollution – The main causes of water pollution are industrial and agricultural production and deforestation. More and more pollutants are also entering our waters because of the growing population. Polluted river water, waste, sludge from sewage treatment plants, radioactive waste and oil tankers are all damaging the water of the oceans and seas. Many aquatic organisms are endangered because of this. For example, oil floating on the surface of the water contaminates the feathers of birds. It is also common for aquatic animals to

become entangled in litter floating in their living water. Agricultural and municipal waste helps pathogens to grow in water, which can make people sick. If harmful substances get into living organisms, they can cause serious health problems, such as tumours.

Contamination and degradation of soil – The soil quality deteriorates because

water and wind carry away and blow away the fertile part. With urban sprawl, arable land is becoming scarcer, which can cause problems for food supply. The construction of new roads and railways can threaten the amount of arable land and have a negative impact on biodiversity. In addition, deforestation, cultivation, heavy use of chemicals, livestock grazing of animals and soil pollution can also cause soil fertility loss. Many harmful and polluting substances are emitted into the soil from industrial and agricultural production and transport. Hazardous substances of landfills and dumps, as well as poisons and heavy metals seep into the soil. The soil is also polluted by pesticide sprays and fertilizers. Plants absorb these from the soil. The plants are eaten by animals and by us, which then makes our organism sick.

Deforestation and acid rains – Forests face a serious threat. Cutting down trees

has a harmful impact on forest wildlife. Acid rain from industrial production, power plants, transport and heating also damages forest vegetation. Pine trees are very sensitive to acid rain. Acid rains decline the quality of water and soil and reduce its fertility. Acid rain can cause toxic substances to build up in the soil, which can enter rivers and lakes. They can enter the food chain and endanger people's health. Acid rains destroy the built environment too. They dissolve objects and structures made of limestone and metal. They also cause serious damages to historic buildings and public sculptures.

Waste production - Waste is generated by human activity and can no longer be

used at the point of generation, but can be recovered elsewhere for use. Waste will become trash if it cannot be recycled any further. Most of the waste is generated by industry and agriculture, while a smaller proportion is

household waste. A special category of waste is hazardous waste. Hazardous waste is any material that could have a harmful impact on human health, wildlife or the environment. Hazardous waste is also generated in our homes. Examples include batteries, cell phone parts, mercury thermometers, expired medicines, used cooking oil, paints, varnishes and glues. We are living more and more on the planet, consuming more and more, and therefore producing more and more waste. We will cover zero waste management in more detail in Module 4.

The ecological footprint

The ecological footprint expresses the extent to which we use or overuse our planet's resources. It shows how much land, water, air and other resources we need to survive. This includes industrial products, food production and waste management. The ecological footprint measures the impact of human activity on the environment in six areas (footprints of forests for absorbing carbon dioxide, arable land, pasture, commercial forest land, water areas and built-up areas).

The human ecological footprint has many components. The most important of these are household energy consumption, the use of electricity, natural gas and other fuels, transport and holiday habits, and eating habits. This includes how much waste someone generates, how much packaging they use, what items they buy.

The ecological footprint is measured in global hectares (gha), which is equivalent to one hectare of biologically fertile land on Earth. Much of the Earth's surface is inaccessible to human beings. It is covered by the world ocean, deserts, rocks or ice. There are only 11.9 billion global hectares of biologically productive land available for us worldwide. This area provides us with all the resources and services we need.

In 2019, the size of the ecological footprint of the world was 1,75 global hectares. This means that the Earth's population lives as if it had 1.75 Earths at its disposal. So, at the current rate of consumption, we would need almost two planets to sustain our life.

Reducing the ecological footprint is an important task. This means changing our consumption habits. It is the responsibility of society as a whole and of smaller communities, but also of each individual.

You can assess your own ecological footprint here:
https://www.footprintcalculator.org/home/en

2.3.2. Questions

The impact of human activities on the environment

1. Approximately how many people do currently live on Earth?

2. Why did man shape the natural environment?

3. What does greenhouse effect mean?

4. What are the harmful impacts of human activity on the environment? List some examples!

5. What does ecological footprint mean?

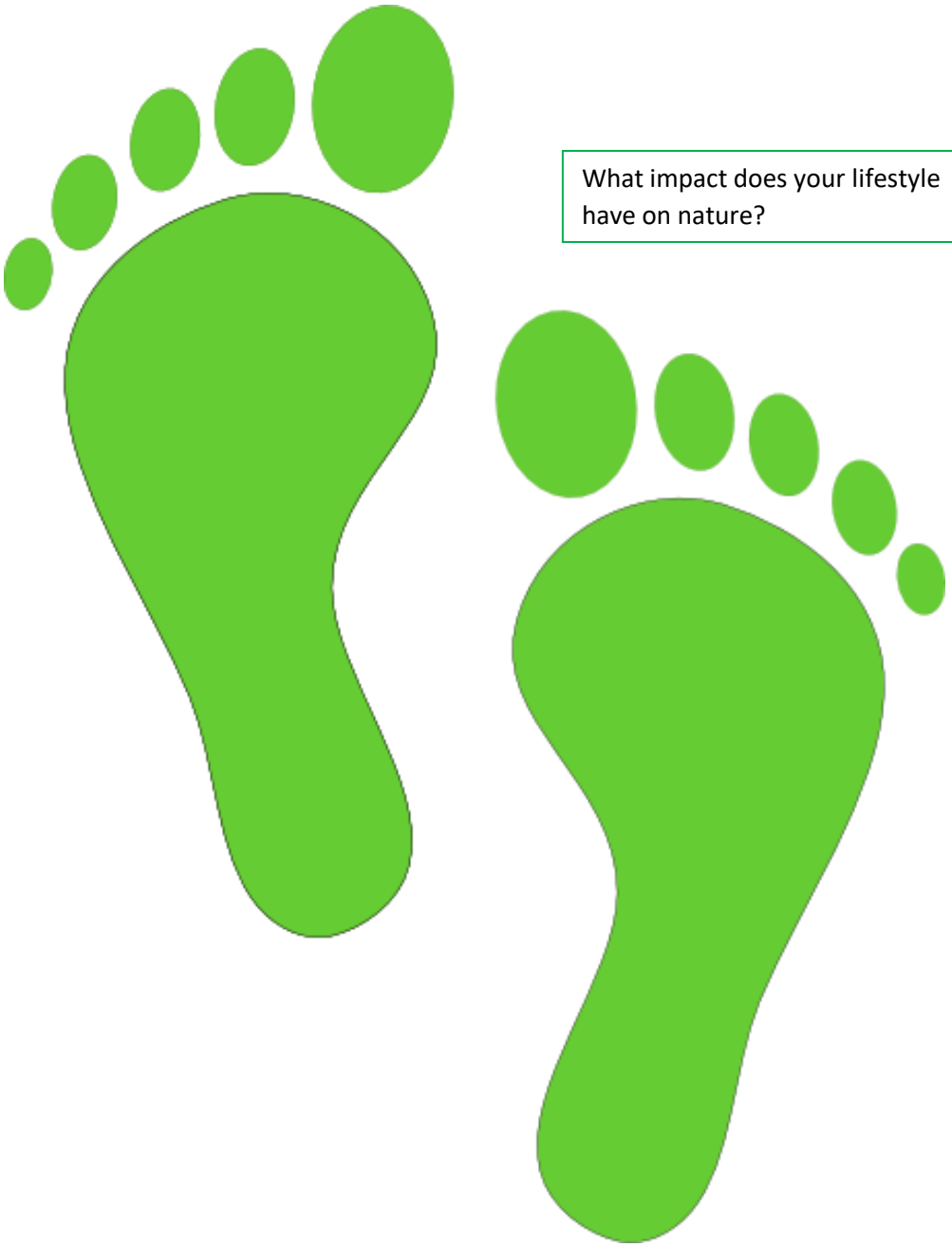
2.3.3. Practical tasks – worksheets

The impact of human activities on the environment

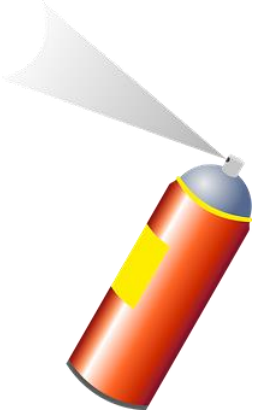
Worksheet 1 – Write or draw your answers to the questions in the footprints!

How does your life depend on natural resources?

What impact does your lifestyle have on nature?



Worksheet 2 – Indicate which tool or activity does not harm the environment.



2.4. Environmental protection and the importance of ecological behaviour

2.4.1. What is important to know?

People seek to shape their environment according to their needs, which often has harmful consequences. Nowadays, we face the following problems:

- increasing energy demand;
- increasing population;
- atmospheric problems;
- soil problems;
- limited natural resources;
- water problems;
- recognition of environmental issues, environmental pollution;
- deforestation and its consequences;
- waste management.

Environmental protection is a social activity that prevents or mitigates these harmful impacts. It aims to protect the natural environment, such as rocks and soils, water, air and wildlife, and man-made structures, such as monuments, from harmful impacts.

The task of environmental protection is:

Protection of air purity

Protection of the soil

Protection of waters

Protection against noise and vibration

Protection against hazardous substances

Protection against radiation

Waste management

Nature and landscape protection

Climate change has been triggered by human activity; therefore, we can control it as well. Harmful activities must be replaced by activities that protect the Earth from further damaging impacts. Therefore, in the future we need to pay more attention to sustainable farming and protecting our environment.

Ten Commandments for the Environment

If you learn to put the **"Ten Commandments for the Environment"** into practice, you can do a lot to protect the environment:

1. Reduce unnecessary consumption!

Don't buy food and other products unnecessarily! Don't use water and energy unnecessarily! Be aware, because if you reduce your consumption, you can even save money.

2. Don’t use single-use products!

Nowadays, there are many options to replace disposable packaging and shopping bags with reusable ones. This way you can reduce a lot of the waste that accumulates in your home.

3. Don’t throw away your unnecessary items!

Find new owners for your used and redundant items, for example on social networking sites. Find new owners for your used and redundant items, for example on social networking sites. You can upload your items, clothes, technical devices, etc. for free. You can also transform and repurpose your old objects.

4. Buy quality, repairable, products that can be used several times!

Buy better quality, reusable items (such as technical goods). If they break down, they can be repaired and you don't have to buy new ones.

5. When shopping, look at the packaging, strive for a zero-waste life!

Before you buy anything, check its label to make sure the packaging is recyclable! This will prevent packaging materials from going to landfill.

6. Make your household eco-friendly!

Do not prepare more food than what you can eat. Sort waste in your home, use eco-friendly cleaning products. Choose household appliances that use less water and energy.

7. Produce at home in an eco-friendly way!

You can also grow fruit and vegetables in the garden of your house, but also on the balcony, for example. For example, you can make your own compost from food waste. And for irrigation, use rainwater instead of tap water.

8. Think about the protection of animals and plants!

Buy domestic flowers or grow them yourself! They can not only be the decoration of the garden, but they will attract bees and butterflies! Eat locally grown fruits and vegetables that are in season!

9.Travel eco-friendly!

For smaller distances, instead of using the car, go by bicycle or on foot! If you have to cover a larger distance, then use public transport!

10.Keep your eyes open and look for green opportunities!

Revise your daily life and habits, live in an environmentally responsible way. It's much easier to make new habits a natural part of your life if you gradually build them into your daily routine.

2.4.2. Questions

Environmental protection and the importance of ecological behaviour

1. What environmental problems do you know about?

2. What is the task of the environment protection?

3. Could you list some examples for eco-aware lifestyle?

4. What could you use organic waste for?

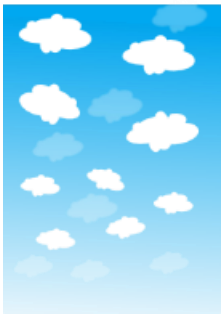
5. What can we do in an eco-aware way with our redundant items?

2.4.3. Practical tasks – worksheets

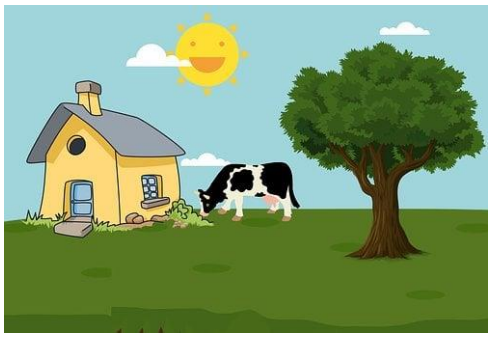
Environmental protection and the importance of ecological behaviour

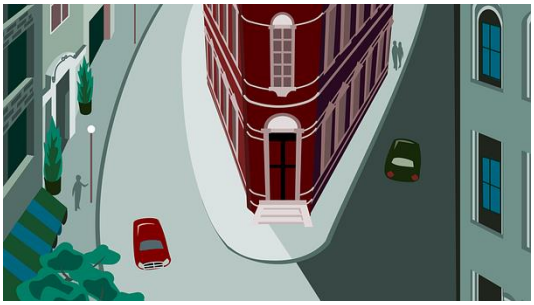
Worksheet 1– Based on the pictures, tell us what the task of environmental protection is!

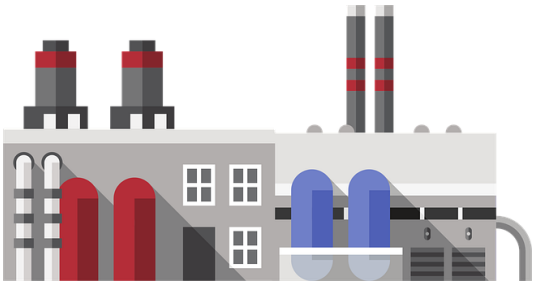
The task of environmental protection is:



Worksheet 2 – What can you see in the pictures? How do you think the built-in area affects the size of the ecological footprint?







3. Quiz

1. Where can you find freshwater?

a) in rivers

b) in seas

c) in oceans

d) in salt-water lakes

2. Which species are threatened in Europe?

a) mouse

b) hare

c) brown bear

d) pig

3. What is one of the most important part of soil?

a) plastic bottle

b) humus

c) brick

d) household waste

4. What is NOT damaged by acid rain?

a) trees

b) room furniture

c) buildings

d) iron structures

5. Which of the following activities is NOT the task of environmental protection?

a) the protection of air purity

b) waste management

c) photosynthesis

d) the protection of waters

Correct answers:

1. a), 2. c), 3. b), 4. b), 5. c)

Sources of photos:

https://pixabay.com/

www.clker.com

Coordinator

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