



IA4SE



People of 2050

GREEN SOLUTIONS



# THE GREEN CLASSROOM

-ACTIVITIES

-INNOVATIVE APPROACHES 4

# A SUSTAINABLE ENVIRONMENT

# (IA4SE)



K2220-SCH- Cooperation Partnerships in School Education

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**We're excited to share this teaching material developed collaboratively by three schools from Romania, Turkey, and Austria along with input from three organizations with expertise in environmental and climate issues.**

**Inside, you'll find a collection of practical activities and workshops aimed at helping students (of age 9-16) understand climate change, sustainability, biodiversity and environment. We've tested 23 different activities, ranging from quick exercises to longer workshops, all designed to be easily incorporated into your teaching.**

**Our resource includes a table of contents to help you find the activities that best suit your needs, along with introductory information for each activity to provide context. We hope you find this material helpful for your teaching endeavors. Read the following introduction to get started and inspired.**



# Hello, young green minds!

## Welcome to the

### *Green Classroom!*

Welcome to the fascinating and increasingly important world of climate change and the environment. Today, we're going to embark on a journey to explore the incredible planet we call home and understand the changes happening around us.

Climate change is like a story that our Earth is telling us. It's about how the air, oceans, and land are all connected in a delicate balance. Sometimes, human activities, like using cars and making too much garbage, can upset this balance.

But don't worry! We're here to learn about how we can be superheroes for our planet. By making small changes, like using less plastic and saving energy, we can help keep our Earth healthy and happy.

So, get ready to discover the wonders of our environment and become a superhero for this beautiful planet. Together, we can make a big difference!

## Are you ready for the adventure?

Let's go! 

Lets embark on the adventure - Learning about climate change and environmental studies is super important, especially for someone your age. Here's why:

1. **Your Future Home:** Imagine your favorite places—beaches, mountains, forests. Climate change can affect these places, changing weather patterns and even causing extreme events like hurricanes. Learning about it helps you understand how to protect the places you love.

2. **Your Health:** Climate change can impact air and water quality. By understanding environmental studies, you'll learn about how pollution and changes in the environment can affect your health. It's like knowing how to keep yourself and your friends healthy.

3. **Cool Solutions:** Learning about the environment gives you the power to come up with cool solutions. Whether it's inventing new technology, promoting sustainable habits, or supporting eco-friendly policies, you can be a part of making positive changes.

4. **Biodiversity Rocks:** Ever seen a cool animal or plant and thought, "Wow, that's awesome!"? Climate change can mess with where these creatures' life. When you learn about the environment, you get to be a protector of all the amazing animals and plants on our planet.

5. **Your Voice Matters:** As you grow up, you'll have a say in how things are done. Learning about climate change and the environment helps you speak up for what you believe in. Your voice matters in creating a world that's fair and sustainable.



## **Climate Change:**

Alright, so picture the Earth as this complex system with interconnected parts—oceans, atmosphere, ice caps—all working together. Now, humans are major players, and we've been burning fossil fuels like coal and oil for a while. The result? We're pumping a hefty dose of carbon dioxide and other greenhouse gases into the atmosphere.

These gases are like a heat-trapping blanket around the Earth. It's good to have some insulation, but we've been overdoing it. The consequence is a global temperature rise, causing disruptions in weather patterns, more extreme events, and rising sea levels. It's like we're messing with the Earth's thermostat on a global scale.

So, climate change is essentially the Earth reacting to the excessive amounts of gases we've released. It's a serious issue that demands our attention and some thoughtful solutions to bring things back into balance.

## **Environment:**

Now, when we talk about the environment, we're zooming in on our planetary home and all its ecosystems. We rely on the environment for essential resources like clean air, water, and food. But, our way of living, from industrial activities to deforestation, has consequences.

We're generating a lot of pollution, messing up the air and water quality. Habitat destruction is threatening countless species. The environment is like a complex web, and when we disrupt it, the consequences ripple through the entire system.

Studying the environment involves understanding these interconnected systems, how they function, and how our actions impact them. It's about finding sustainable solutions to ensure a balance between human activities and the health of our planet.

In essence, climate change is the result of our global impact on the Earth's climate system, while environmental studies delve into the complexity of maintaining a healthy balance within our planetary home. It's a call to action for responsible and sustainable living. 🌍🌱

# ENVIRONMENTAL ISSUES

Technology is developing at a very fast pace. However, even though this brings many advantages it also poses the risk of grave environmental consequences. Many things we would not want to miss today are produced at a cost of nature. If we do not want to miss out on the comfort of technology while avoiding natural disasters, we have to adapt our course of action.

Environmental issues include, but are not limited to, deforestation, endangered species, fossil fuels, resource depletion and global warming.

Deforestation, the clearing of forests for farming, settlements or logging, greatly affects climate especially, when rainforests are cleared. Moreover, it decreases the natural habitat of animals and plants.



Animals that either lose their natural habitat or are overhunted easily become endangered and some have unfortunately become extinct. Fewer specimen of a certain species can have an impact on other species leading to a great misbalance in the ecosystem.

Fossil fuels are fuels made from coal, natural gas or oil and are non- renewable, as they take millions of years to form. Burning them leads to massive air pollution in form of carbon dioxide emission. This leads to heat being trapped in the atmosphere and thus to global warming.

Depletion of resources describes the overuse of natural resources. Mineral depletion, overfishing, oil depletion and deforestation are some of the better known examples of this. Consuming resources at a higher rate than it can be replaced or renewed leads to problems that still have to be solved.

Global warming is the long term heating of the Earth due to human activities. Documented since the late 19th century the temperatures of the Earth's surface is constantly rising, leading to huge problems with ecosystems and natural disasters.

In order for the next generations to be able to live on the Earth in a save way, we have to find solutions to this problems. Educating children to live sustainable is a major step in the right direction.





# DEFORESTATION

Global deforestation is one of the most serious environmental challenges of our time and has a major impact on the ecological balance, the climate and biodiversity. Progressive deforestation, mainly caused by human activities such as the creation of agricultural land and the extraction of raw materials, threatens the habitats of numerous plant and animal species in particular. Worldwide, around 350000m<sup>2</sup> of rainforest is chopped down every day, the equivalent of an entire soccer pitch every 2 seconds.

One of the main drivers of deforestation is the expansion of agricultural land, particularly for livestock farming, due to the high meat consumption of humans worldwide, and the cultivation of monocultures such as soy and palm oil. The growing demand for wood products and increasing urbanization also contribute to deforestation, with serious environmental, social and economic consequences.

One of these worrying consequences is the impact on climate change. Forests play a crucial role in storing carbon dioxide (CO<sub>2</sub>), a greenhouse gas that is a major contributor to global warming. Deforestation not only reduces CO<sub>2</sub> uptake, but also releases large amounts of stored carbon, further polluting the atmosphere and contributing significantly to global warming.

In addition, deforestation has a negative impact on many plant and animal species, whose natural habitats are being pushed back further and further or completely destroyed. The loss of forests leads to the destruction of entire ecosystems and can threaten the existence of numerous plants and animals - this also affects some indigenous communities (e.g. in the Amazon rainforest).

It also increases the risk of the emergence of new "zoonosis", infectious diseases caused by viruses, fungi or bacteria that can be transmitted between animals and humans. Tropical rainforests are home to a particularly large variety of rodents whose habitats are being destroyed. They are forced to settle near villages and towns and thus come into contact with humans, making it easier to transmit diseases to which we are not resistant. Such diseases include malaria, dengue and probably also Covid-19.

## What can be done against it?

Urgent and global action is needed to tackle the challenges of global deforestation. This includes, for example, sustainable forest management, the establishment of nature reserves, the reforestation of cleared areas, the promotion of environmentally friendly and renewable energies and sustainable agriculture. It would also count a lot if we all reduced our daily meat consumption.

All of this requires intensive cooperation between governments, companies, and civil society. Only through joint efforts can the negative effects be contained and a sustainable future for our planet be secured.



# Activity 1: Worksheet- That's why we need forests!



## 1. Medicinal plants from the forest

Since \_\_\_\_\_ such as parasites or staphylococci are becoming increasingly resistant to common \_\_\_\_\_, we need to find new medicines. The most productive source for this is the huge reservoir of millions of plants, insects and fungi that are \_\_\_\_\_ for antibiotics, for example.

## 2. Food from the forest

Over 80% of all the world's \_\_\_\_\_ - such as nuts, bananas, tomatoes, potatoes and cocoa - originally come from the forest. Diseases and \_\_\_\_\_ lead to extreme crop losses in monocultures. Only \_\_\_\_\_ with wild varieties can reduce the susceptibility of cultivated varieties.

## 3. Economic goods from the forest

Forests are very productive \_\_\_\_\_, they produce and supply not only wood but also fibers, fruits, dyes, medicinal plants and much more. Unfortunately, however, only a small proportion of all these products are obtained \_\_\_\_\_. We also need the "laboratory" forest: thanks to their \_\_\_\_\_, over 2,000 plant species have such good pest-controlling properties that they can be used as pesticides.

## 4. Water from the forest

All the forests on our planet function like giant sponges that soak up \_\_\_\_\_ and sweat it out again through their leaves. They produce their own clouds and provide vital precipitation even in distant \_\_\_\_\_. However, since half of the forests in Africa, for example, have been destroyed, \_\_\_\_\_ have taken on devastating dimensions as far as the south of the continent.

## 5. Forests as global CO<sup>2</sup> reservoirs

Where forests burn, they further increase global \_\_\_\_\_ emissions - in two ways: firstly, through the \_\_\_\_\_ that is produced during combustion. Secondly, shrinking forests will be able to store less carbon in the future and will no longer be able to keep the \_\_\_\_\_ of our planet within tolerable limits.

Fill in the blanks. The answers on the the reverse side will help you.



# Activity: Worksheet- That's why we need forests!



# ENDANGERED SPECIES



An endangered species is an animal or organism that is in great and imminent threat of extinction. Most common reasons for an animal to become endangered is either loss of habitat, excessive hunting, or loss of genetic variation.

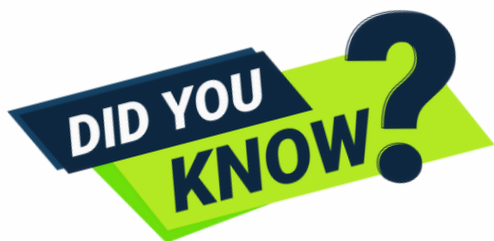
Contributing factors and problems:

Loss of habitat can happen naturally, as for example happened with dinosaurs: A drastic change in climate, probably due to the striking of an asteroid, made it impossible for most of the dinosaurs to inhabit the earth any longer without the means of adapting to the new climate.

However, loss of habitat can and very often does occur as a result of human activity, as is the case with deforestation. Clearing of rainforest for logging, cattle breeding or settlements destroys the natural habitat of many animals and diminishes their food. This mainly affects animals that require a large area or territory as a habitat, such as wolves, tigers, mountain lions and elephants. Development of cities or deforestation can lead to less of those animals, as they cannot tolerate the loss of territory.

Excessive hunting is another threat to wild species. Animals like the Tasmanian Tiger or the West African Black Rhinoceros became extinct because humans hunted on them ruthlessly. Still living species like the Giant Panda or the African Elephant are classified as endangered, because they have been hunted or are still being poached to the verge of extinction.

Loss of genetic variation is also a contributing factor of endangerment. Inbreeding leads to less genetic variation and is the cause of birth defects or inherited diseases. Thus, fewer of those inbred animals survive to maturity. Overhunting reduces the number of breeding pairs, two adult animals of different sex that are not closely related and can thus cause less genetic variation.



*...that the Tasmanian Tiger only got extinct because it was depicted as a bloodthirsty sheep killer, even though most sheep were killed by stray dogs or dingoes?*

*...that gamekeepers remove the horn of rhinos in order to protect them from poachers?*

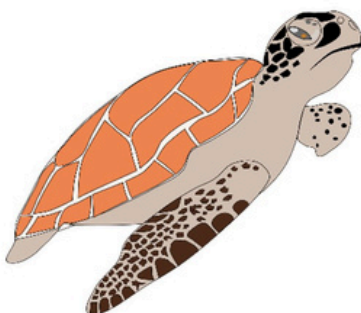
*...that the Amur Leopard is the rarest big cat in the world? There are only about 200 adult specimens of them living in the wild.*



# Activity 2: Endangered animals in my country

**Length:** 1 day of lessons

- Divide the class into five groups. Each group needs a chairperson.
- Each group has to find an endangered animal in their own country. WWF.com (or the national version) provides a good starting point for your research.
- The chairpersons of all groups have to make sure, that each group chooses a different animal.
- The group has to give a little presentation about their animal and provide a quiz with at least five questions about their animal or the reason it is endangered.
- Feedback: is the quiz solvable with the information provided?

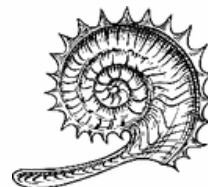


# FOSSIL FUELS

Fossil fuels are found in the Earth's crust and contain carbon and hydrogen, which produce energy when burned. The fuels are plants and animals that decomposed in deep layers of soil. Natural gas, oil and coal are examples of fossil fuels. Fossilized plants are what most of what a coal is made from. Oils is found in a solid form between layers of rocks and must be heated to be liquid. Natural gas can be found between layers of rocks often above oil and consists primarily of methane.

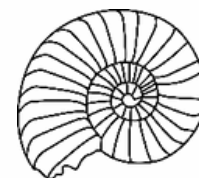
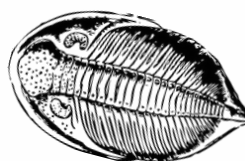
## Why are fossil fuels considered non-renewable?

Fossil fuels need millions of years to form, thus waiting for them to renew themselves is not an option. Once those resources are depleted, they are no more.



## What problems are caused by fossil fuels?

The pollution fossil fuels cause are responsible for almost  $\frac{3}{4}$  of emissions from human activity. The pollution by fossil fuels lead to acid rain and damaged crops and forests. This also leads to higher acidity in the oceans which has a great impact on the ecosystem underwater. Oil spills or fracking fluid cause massive waterpollution and causes fish and other seacreatures to die. The underwater ecosystem can nalso be highly damaged by this kind of water pollution. The harmful emission caused by the burning of fossil fuels contributes drastically to climate change through huge quantities of carbon dioxide. This traps the heat in the atmosphere.



Mecury emissions are caused by coal- fire power plants as well as soot in the air. Air pollution brought on by fossil fuel can cause serious health problems in humans and animals such as cancer and deseases of the lung.

Landscapes are also defined by the extraction of coal, oil or gas as pipelines, wells and access roads are needed in order to transport the fossil fuel to wherever it is processed or sold. In the case of strip mining, entire ecosystems such as forests are removed in order to get to the fuel beneath.

**DID YOU  
KNOW?**

*... that most plastic is made by fossil fuels?*

*... that we use fossil fuels because they are often cheaper than cleaner sources?*

*... that we use fossil fuels that formed before the dinosaurs roamed the Earth?*

# Activity 3: The class challenge



Length: 1 day

- Your class is your team. Each student and teacher of the class tries to avoid the use of fossil fuel as much as possible for one day.
- Before the project you brainstorm where you use fossil fuels. (e.g. car, bus, plastic, order products that come by car, etc...) Try to find ways to reduce the amount of fossil fuels you need for your daily routine.
- Everybody takes notes of their choices in regard to saving fossil fuels. (e.g. I turned the heat down. I took the train. I didn't buy the soda can.) The next day everybody shares their notes. Give each other feedback on your choices.



# Global warming as a common challenge

Our climate is changing faster and faster: weather records show that it has become considerably warmer worldwide since the middle of the 20th century. There are many more extreme weather events – i.e. very hot or very cold days, heatwaves and droughts, heavy rainfall, floods, and storms – than just a few decades ago. In the 2015 Paris Agreement, almost 200 countries agreed to halt the global rise in temperature. To achieve this goal, we need to produce far fewer climate-damaging gases. According to the Intergovernmental Panel on Climate Change (IPCC), a reduction of up to 70% in global CO<sub>2</sub> consumption is needed to achieve the climate targets. The main causes of climate change are industrialized countries in Asia, Europe and North America, but Africa's economical development shows signs that they will at some point also emit the same amount of Green house gasses per capita as countries in the global north. In many African countries, there are extreme weather fluctuations that destroy harvests and cause famine.

## **Causes of global warming: industrialization, greenhouse gases, our lifestyle**

The Earth's climate is never constant because it is influenced by factors such as solar radiation or the gases in the atmosphere. But we humans have accelerated today's climate change through industrialization. Our emissions of exhaust gases are changing the atmosphere. As a result, the solar radiation reflected from the earth's surface does not radiate back into space in the usual way. As a result, it is getting warmer near the ground and other weather conditions are also changing. In less industrialized regions of the world, lifestyles are much more "climate-friendly".

## **Dramatic consequences for our world**

Extreme weather conditions are only the obvious part of climate change. What is less visible, for example, is that rising sea levels are leading to the salinization of groundwater and the loss of agricultural land. Coastal and island states in tropical and subtropical regions are noticing these changes the most. Over 20 million people worldwide are now considered "climate refugees". The lives of many people as well as the survival of animal and plant species would be under massive threat due to global warming of 2 degrees Celsius





# Global warming as a common challenge

## What can we do?

Rapid adaptation to new climatic conditions is hardly conceivable. Agricultural land cannot simply be recreated, coastal cities cannot be rebuilt elsewhere.

**Mitigation** therefore means, on the one hand, massively reducing greenhouse gas emissions. To do this, we must all radically change our entire way of life and economy - energy from renewable sources such as nuclear power instead of oil and coal, low-emission drives instead of combustion engines, regional food and products and many other things. On the other hand, **adaptation**- protective measures for affected regions, must already be paid for now, for example early warning systems for disaster prevention, new irrigation systems in dry regions or a climate-friendly transport infrastructure. And once again it would also count a lot if we all reduce our daily meat consumption.

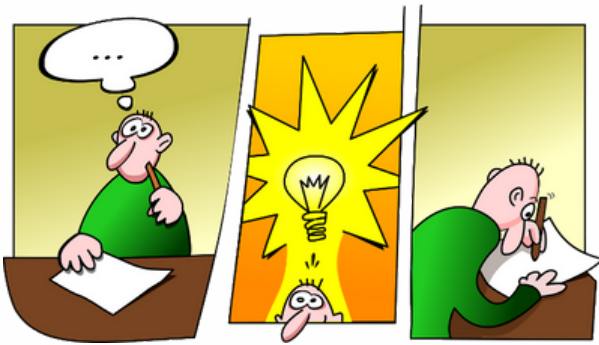


Certain aspects of climate change, such as the melting of Arctic ice, can create feedback loops that exacerbate the problem. For example, melting ice exposes darker surfaces, which absorb more sunlight and heat, leading to further warming.

# Activity 4: What can you do?

Individual or partner work, class discussion, evaluation

**You are challenged:** What can you do to combat climate change? What activities contribute to that the earth is getting warmer and the climate is changing faster and faster? Which activities are not or hardly harmful to the climate?



Examples:

*Riding a bike*

*Drinking tap water*

*Eating local fruits and vegetables*

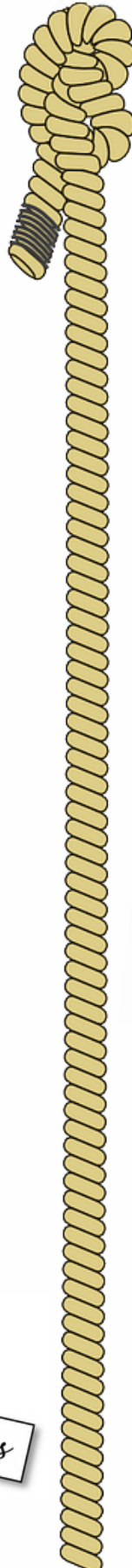
*Take lots of flights*

*Buying new clothes every week*

*Eating at a lot of meat*



Check this QR code and get inspired!



1. Write one activity with little or no impact and only minor effects and one activity with a strong impact on a piece of paper. Your teacher can then collect the slips of paper or ask you later for your ideas.
2. After everyone has finished writing, stand in a row and line up one behind the other. You can also draw a line with chalk (for example in the schoolyard) or lay a rope on the ground. The left side is the space for activities with little or no impact on the climate, the right side is the space for activities with a strong impact.
3. Your teacher now names an activity. You have to decide on which side this activity lies. It is important that you can explain your decision to your classmates.
4. After you have discussed enough activities, talk about what you can do at home or at school for climate protection.

# RESOURCE DEPLETION

This term does not refer to all globally defined resources, but specifically to so-called "natural resources".

## What are our "resources" at all?

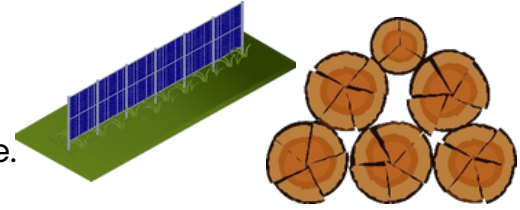
A natural resource is a resource that arises and exists in nature.

**Renewable:** water and renewable raw materials such as wood

**Non-renewable:** mineral raw materials, i.e. ores, salts and rocks as well as fossil raw materials (oil, natural gas and coal)

**Flowing resources:** geothermal, wind and solar energy

Resource depletion also occurs when the quality of a resource, such as drinking water or air, decreases!



## What are the causes of resource depletion?

There are various reasons. This table shows you the most decisive causes of resource depletion:

Reasons	Background
Limited availability of non-renewable resources	<ul style="list-style-type: none"> <li>are formed in geological processes that take several millennia; are regenerated only very slowly</li> <li>the speed at which non-renewable resources are used by humans is many times faster</li> <li>reserves of non-renewable resources are used up over time</li> </ul>
Unequal distribution of resources	<ul style="list-style-type: none"> <li>particularly non-renewable resources are unevenly distributed around the world</li> <li>in resource-poor countries there is a shortage of these resources</li> </ul>
Increasing demand for resources	<ul style="list-style-type: none"> <li>global population growth</li> <li>economic and technical progress in almost all countries</li> <li>increasing consumption</li> </ul>

You may have heard of Earth Overshoot Day. This is the name given to the day of the year on which the Earth's population has used up all the natural resources that can be regenerated on Earth within a year. From this day onwards, humans live at the expense of the planet, so to speak, by depleting local resources and accumulating carbon dioxide in the atmosphere. In 2023, "Earth Overshoot Day" fell on August 2. There are also national Overshoot Days. Try to find out when this takes place in your country

Two most central and possible solutions:

➔ Exploring new resources as an alternative to scarce resources

➔ Using fewer resources and increasing sustainability and efficiency in the use of them

*"A clean, healthy and sustainable environment is a universal human right."*



# Activity 5: Resource memory

The aim is to recognize the connection between the causes and effects that lead to resource depletion. Print and cut out the pictures suggested below. To increase the level of difficulty, more pictures can be added. Of course, only terms can be written on paper or cards.

- 1. Divide the class into groups of 3-4 students.** Do not specify exactly what the task is about so that they do not have too many clues.
- 2. Mix and distribute the pictures.** The students should put them together in groups of two. The aim is to make a connection between cause and effect. For example: Overfishing leads to unemployment among fishermen.
- 3. Recapitulation in plenary.** The students explain their associations. It may be appropriate to stimulate discussion by thinking about possible solutions. Using the example of fishermen: How can you earn a living without jeopardizing your job in the medium term? There are no simple, conclusive answers; the aim of this task is to get students to think about it.
- 4. Finally, return to the importance of conserving resources.** Recognize the link between personal consumption (the more you consume, the more likely you are to use up resources) and our society that encourages us to behave in this way. Also point out that recycling makes it possible to reuse certain resources.



*(Backside of memory cards)*

Alternatively, the matching memory pairs are presented and discussed. Two students leave the room. Meanwhile, the memory pairs are distributed among the remaining students. They hold the cards or objects so that they are face down or hide them at their seat. The two participants standing outside are now invited in and try to find the memory pairs by pairs by taking it in turns to call out two participants who each show their memory object. If the two items do not form a memory pair, they are hidden again. If they match, the two participants leave the playing area with the guessed memory cards and the guessing player receives a point.

The game is over when all pairs have been guessed!

# NATURE POLLUTION



Nature pollution can be defined as the deterioration of the natural environment as a result of human activities and the negative impact on living life as a result. Nature pollution can be examined under five main headings: air, soil, agricultural, noise and radiation pollution. These issues will be explained in detail in the following sections.

Nature pollution poses a serious threat to human health and the environment. Here are some of the ways nature pollution affects our lives; These factors often interact and exacerbate each other's effects:

**Climate change:** Nature pollution is a major cause of climate change. Pollutants known as greenhouse gases are trapped in the atmosphere and cause the Earth to warm. Climate change, on the other hand, refers to long-term shifts in global or regional climate patterns, primarily attributed to human activities such as the burning of fossil fuels, deforestation, and industrial processes. Climate change leads to rising global temperatures, altered precipitation patterns, more frequent extreme weather events, and rising sea levels. The effects of both nature pollution and climate change are interconnected and exacerbate each other

**Health issues:** Air pollution can cause respiratory diseases, cancer, heart disease and other health problems. Noise pollution can cause hearing loss, headaches, stress and insomnia.

**Loss of biodiversity:** Nature pollution causes loss of biodiversity. Pollutants destroy the habitats of plant and animal species and can lead to extinction.

**Aesthetic deterioration:** Nature pollution can cause deterioration of natural beauties. This can make it difficult for people to connect with and appreciate nature.

# AIR POLLUTION



## General Introduction:

Air pollution consists of chemicals or particles in the air that can harm human, animal and plant health. Particles that cause air pollution can be solid, liquid or gas. Some types of air pollution occur naturally, such as smoke from forest fires or ash from volcanoes.

Air pollution causes damage to vegetable and fruit production, decreased productivity, acid rain, and destruction of vegetation. It predisposes living beings to diseases, causing cancer and genetic mutation, respiratory tract infections, central nervous system diseases and even death.

*Each year around 300 000 people in Europe die prematurely due to air pollution.*

<https://www.consilium.europa.eu/en/infographics/air-pollution-in-the-eu/#health>

## DID YOU KNOW?

### Green Energy

**Investments:** Investing in clean and renewable energy sources instead of fossil fuels can help reduce air pollution. Green energy sources such as wind energy, solar energy and hydroelectricity form the basis of this solution.

### Electric Vehicle

**Incentives:** Encouraging the use of electric vehicles can reduce air pollution. Incentives for the purchase of low-emission or no-emission vehicles can improve urban air quality

### Industrial Filtration Technologies:

Improving filtering technologies used in factories and industrial facilities can help reduce harmful emissions..

- **Urban Green Spaces:** Creating more parks, gardens and green areas in cities can reduce air pollution. Vegetation can improve air quality by absorbing harmful particles and pollutants. Smart City Planning: Improvements can be made in areas such as traffic management, energy efficiency and waste management by using smart city technologies. This can reduce air pollution.
- **Air Quality Monitoring Systems:** By establishing sensor networks to monitor air quality, pollution levels can be determined and this data can be shared with the public. Thus, people can act and take precautions based on pollution levels.
- **Education and Awareness Campaigns:** Organizing education and awareness campaigns that raise public awareness about air pollution can make people more sensitive to the environment and reduce pollution.

# Activity 6: Air Pollution Measurement

- **Use public transportation:** encourage people to use private cars less and raise awareness about using public transportation.
- **Residential heating sources :** we can use residential heating sources such as electric heaters, heat pumps, wood burning stoves or fireplaces, solar heating systems and natural gas furnaces .we can also rise awareness about these residential heating sources.

## WORKSHOP

- **Title:** Air Pollution Measurement Paper
- **Group Age:** 10-15 years old
- **Length of the Project:** Short-term
- **Project Purpose:** To reduce air pollution and improve environmental awareness in our school

### Air Pollution Measurement Paper

Now let's explore air pollution, one of the negative conditions for the natural environment and living life, with a product we will make! Isn't the air we breathe important? In fact, it is the same for all living things! So what's in the air? Is the air clean where we live?

### Materials

white cardboard  
Scissors  
Ruler  
Pencil  
20cm rope  
1 teaspoon of vaseline



### Experimental Procedure

- Measure 10 cm with a ruler and draw a 10×10 square on white cardboard.
- Cut the square you drew with the help of scissors.
- Measure 1 cm from the left side of your 10×10 white cardboard and draw a straight line from top to bottom with a pencil.
- Divide the 1 cm column you reserved on the paper with 2 lines horizontally into 3 equal sections.
- Color the bottom part with a pencil.
- Color the section above it very lightly with a pencil.
- Do not paint the top section.
- Open a hole in the upper middle part of the cardboard, pass the rope and tie it.
- Apply a thick layer of Vaseline to the empty part of the cardboard.
- Hang the Air Pollution Measurement Paper you prepared outside the balcony or window and observe it for 1 week.
- At the end of 1 week, compare with the color chart on the left.
- You can check the air quality of your location from the National Air Quality Monitoring Network and compare it with the results in the product you prepared.
- To access the National Air Quality Monitoring: <https://waqi.info/tr/>

# SOIL POLLUTION



## General Introduction:

Soil pollution is when the physical, chemical or biological properties of the soil become harmful to human or environmental health. Pollutants that causes soil pollution come from various sources such as natural sources (volcanic eruptions, forest fires) or human activities, industrial activities, pesticides, fertilizers, waste oils, domestic waste. Harmful chemicals can damage plant roots and reduces soil fertility.

Soil pollution causes health problems for human health by consuming crops produced due to toxic chemicals in the soil. Additionally, contact with contaminated soil can increase people's risk of diseases such as skin diseases, respiratory problems and cancer. Soil pollution negatively affects plant and animal life.



**Bioremediation:** Bioremediation is a method that uses living organisms such as plants and microorganisms to clean contaminated soils. In the Netherlands, willow trees were used to clear the site of a former gas works. The roots of willow trees absorb and clean pollutants from the soil.

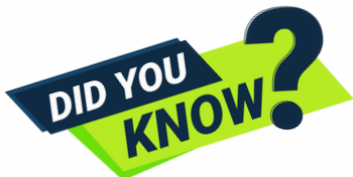
**Mushrooms:** Some types of fungi have the ability to absorb heavy metals and other pollutants from soil. These fungi can be used to clean contaminated soils. In China, the species *Pleurotus ostreatus* (oyster mushroom) was used to clean contaminated soils.

**Vermicompost:** Vermicompost is a fertilizer produced by worms by breaking down organic waste. Vermicompost increases soil fertility and binds pollutants. In India, earthworms have been used to compost sludge from urban wastewater treatment plants. Vermicompost binds pollutants while nourishing the soil.

**Nanotechnology:** Nanotechnology offers new and innovative solutions to clean up soil pollution. Nanoparticles can be used to clean soil by absorbing or breaking down pollutants. In the USA, a method has been developed to remove heavy metals such as lead and arsenic from contaminated soils using nanoparticles.

## To prevent soil pollution:

- Reducing the use of chemical fertilizers and pesticides
- Promoting recycling and composting
- Making legal regulations against activities that cause pollution
- Raising awareness about soil pollution





# Activity 7: Clean Soil, Healthy Future!

- **Title:** *Clean Soil, Healthy Future*
- **Group Age:** 10–15 years old
- **Length of the Project:** Short-term
- **Project Purpose:**

To ensure that students gain awareness about soil pollution and enabling them to acquire environmentally friendly habits by better understanding the environmental impacts of plastic use.

## Project Steps

1. Cleaning the waste from the soil
2. Sort the waste into categories and add it to a pot filled with soil and examine the time it takes for them to disappear.
3. Creating a wall panel about the time it takes for waste to disappear from the soil.

## Materials

- Glove
- Garbage bag
- Waste materials
- Vase
- Soil
- Paper and crayons

## Implementation of the Project

1. Student takes the garbage bag and gloves.
2. It collects waste thrown into the ground in nature.
3. It separates paper, fruit-vegetable, plastic waste and metal waste from these wastes.
4. Chooses one from each of these wastes.
5. He puts soil in the pot.
6. Adds 1 fruit-vegetable, 1 plastic waste, 1 paper waste and 1 metal waste into the soil.
7. Observes weekly.
8. By doing research on waste, prepares a poster about recycling waste and hangs it on the wall board.



Image 2. James Rebertson

# AGRICULTURE



## General Introduction:

Agriculture is an important sector that provides food production along with the use of natural resources. However, the effects of agricultural activities on nature have become an important source of environmental pollution. Agricultural pollution is caused by various factors. The first is the use of pesticides and chemical fertilizers. Additionally, irrigation systems used in agricultural areas can also lead to deterioration of water resources.

## What Problem It Causes:

An other effect of agriculture on nature is the expansion of agricultural areas and deforestation. With the spread of agriculture, agricultural wastes also spread in to the environment. In particular, animal waste and agricultural chemicals pollute soil and water resources and threaten ecosystems.



**DID YOU  
KNOW?**

**Use of Biochar:** Biochar is a carbon-based material obtained as a result of the pyrolysis (oxygen-free combustion under high temperature) process of organic wastes. By increasing soil organic matter content, biochar can increase soil fertility and prevent harmful chemicals from spreading into the soil.

**Phytonutrient:** Phytophore is a method in which plants are used to filter or absorb sources of pollution. It is a widely used method, especially in combating water pollution. Plants can remove pollutants from water by absorbing or breaking them down and reduce pollution in water.

**Underground Irrigation Systems:** Traditionally used underground irrigation systems can reduce agricultural pollution by ensuring effective use of soil and water. These systems ensure that water is delivered directly to the roots, thus reducing the risk of water erosion on the surface and the mixing of pollutants into the water.

**Promotion of Urban Agriculture:** Urban agriculture involves agricultural activities in cities and can increase the consumption of local products. This can help reduce long-distance transportation and therefore reduce the carbon footprint.



# Activity 8: Organic Agriculture Pots



## Organic Agriculture Pots

- **Project Name:** Organic Agriculture in Pots
- **Age Group:** 10-15 years old
- **Length of the Project:** Short-term
- **Purpose of the Project:** Learning good practices in agriculture by experiencing it with a small agricultural garden

### Project Process

- Sustainable Agricultural Practices: Creating a small agricultural garden in the school garden. While doing this study, selecting the most suitable plants, determining the irrigation policy, and planning agricultural activities. Carrying out the necessary research and applications on this subject.
- Creating a composting area and observing changes to raise awareness of natural fertilizer formation at school.

### Project deliverables

Developing a sustainable agricultural garden with a focus on natural fertilization through composting, aimed at promoting awareness and adoption of best agricultural practices.



Did you know that some plants can actually help each other grow better? It's called companion planting! For example, planting marigolds near your vegetables can help keep away pests because marigolds have a strong smell that bugs don't like. Isn't that cool

# NOISE POLLUTION



Noise pollution is the spread of unwanted and loud sounds into the environment resulting from human activities. This situation has many negative effects on both human health and the environment.

Noise pollution has negative effects on people, plants and animals.

It causes deterioration in people's quality of life, hearing loss and stress.

Noise pollution prevents the growth and development of plants. It reduces the food production of plants by negatively affecting the photosynthesis process. It reduces the reproductive capacity of plants by affecting the activities of pollinating insects.

Noise pollution affects the behavior of animals by increasing their stress level. It destroys the habitats of animals, endangering them, causing changes in migration routes and feeding habits, and affecting reproductive behavior.

## DID YOU KNOW?

### Smart Noise Reduction

**Technology:** Many technology companies are developing smart noise reduction technology. This technology detects external noise and reduces the noise by producing sounds of the opposite frequency. This technology can be found in headsets, phones and even in-car systems.

### Noise Map Creation and Analysis:

Cities can determine which areas are noisier by creating noise maps. These maps can be used in policies and planning to reduce noise pollution.

**Rotterdam Sound Wall:** Built in Rotterdam, Netherlands, this sound wall is considered the longest sound wall in Europe and helps protect the city from road noise.

# NOISE POLLUTION

## DID YOU KNOW?

**Green Spaces:** Green spaces such as parks and gardens can help reduce noise pollution by absorbing and reflecting noise.

**Barcelona Sustainable City Movement:** The city of Barcelona has taken a number of measures to reduce noise pollution. reducing traffic speed, using sound insulation materials and expanding green areas

**Noise Direction and Insulation Technologies:** In some buildings or industrial facilities, specially designed directional and insulation technologies can be used to prevent the spread of noise.

**London Noise Action Plan:** The City of London has prepared a plan to prevent noise pollution. This plan aims to identify noise sources, monitor noise levels and reduce noise pollution.



### Use of Noise Absorbing Materials:

Environmental noise can be reduced by the use of noise absorbing materials on building facades or industrial areas, next to high traffic roads.

**Green Walls and Roofs:** Green walls and roofs covered with plants can increase sound absorption and reduce environmental noise.

### Community Participation and Education:

By organizing community participation and training programs on noise pollution, people can be made aware of reducing noise.

# RADIATION POLLUTION

## General Introduction:

Radiation pollution, also known as radioactive contamination, is caused by radioactive substances. These materials emit ionizing radiation that harms living things. Radiation pollution threatens human health and the environment. People receive radiation from natural sources such as cosmic rays from space and the sun, radioisotopes found in the earth's crust, soil and building materials, water and food. We are also exposed to radiation in many areas such as energy production, medicine, industry, research, agriculture and animal husbandry. Rapid developments in technology and radiation generated by electronic devices (medical devices such as TV, radio, computer, x-ray, tomography, etc.) cause electromagnetic pollution. Radiation pollution is examined in two main categories: natural and human-induced. It results from human activities such as nuclear energy production, nuclear weapons testing, and accidents at nuclear facilities. It occurs naturally from sources such as radon gas in the soil and cosmic rays from space.

## What Problem Causes:

Exposure to radiation can cause cancer, genetic mutations, and other health problems. Radiation pollution also affects plant and animal life. The effects of radiation pollution depend on the level of exposure, duration of exposure, and type of radiation. Brief exposure to high levels of radiation is life-threatening. Long-term exposure to low levels of radiation may cause less obvious health problems. Plants and animals exposed to radiation become less productive, become ill, or die. Radiation pollution causes the ecological balance to deteriorate.

**Using cleaner energy sources such as solar or wind energy instead of nuclear energy.**

- **Implementation of safe handling and disposal of radioactive materials.**
  - **Monitoring radiation levels in the environment.**
- **Educating the public about the risks of radiation exposure.**
  - **Prohibition of nuclear weapons tests**
  - **Increasing the security of nuclear power plants,**
- **Reducing the use of radiation in medical applications**



- **Radioactive Waste "Vitrification":** Radioactive waste is combined with a mixture of glass and metal, turning it into a glass-like substance, making it safer for storage.
- **Storage in Space:**
- Some countries are working on sending radioactive waste into space.
- **Bioremediation:**
- Plants and microorganisms can be used to absorb radioactive elements from soil and water.
- **Innovations in Nuclear Energy:**
- New types of nuclear energy, such as molten salt reactors and thorium reactors, produce less radioactive waste than traditional reactors.

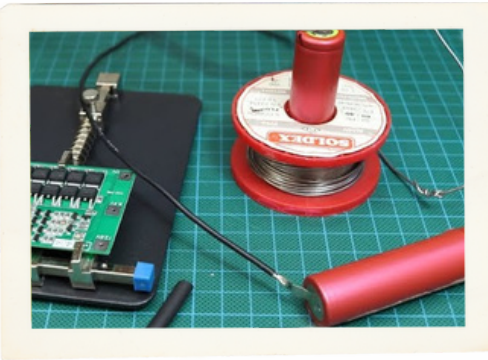
# Activity 9: Making a radiation detector



- **Title:** Making a radiation detector
- **Group Age:** 10-15 years old
- **Length of the Project:** Short-term
- **Project Purpose:** Making a radiation detector

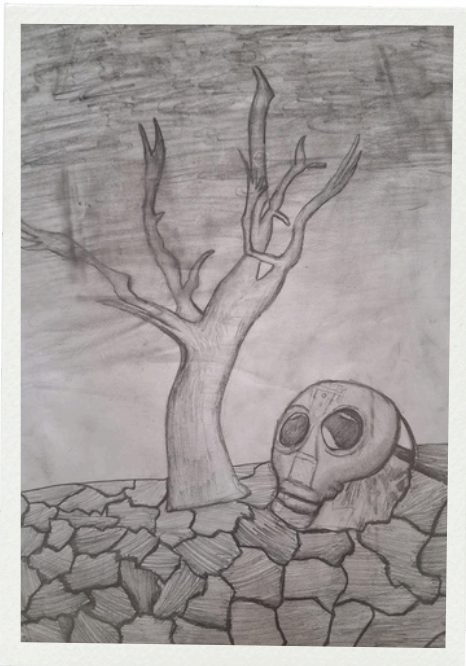
## Materials:

A cardboard or plastic box (for example, a small gift box)  
Aluminum foil or aluminum foil tape  
A thin metal wire  
LED light (powered by a small battery) Battery (for example, AAA battery) Tape or adhesive



**Preparation:** Cover the inside of the box with aluminum foil. Place the aluminum foil inside the box and secure it to the edges. Open a small window on one side of the box, connected to the aluminum foil.

**Preparation of the Diode:** Create a ring by bending one end of the metal wire. Connect the other end of the ring to one end of the LED light. Connect the other end of the LED light to the end of the other metal wire that you will connect to the battery.

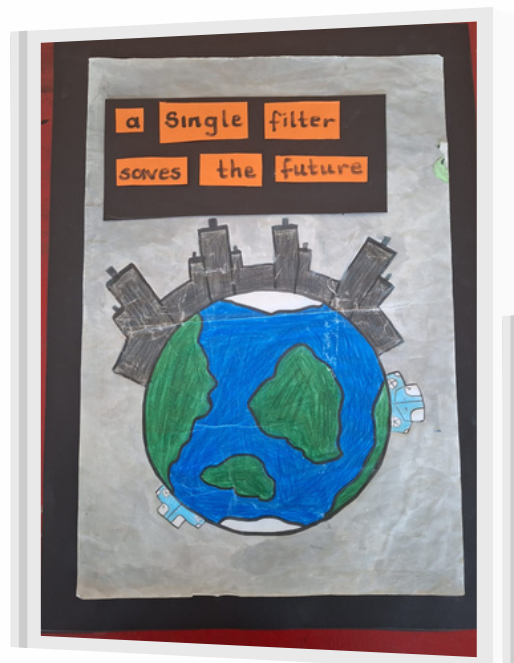


**Assembly:** Connect one end of the metal wire to the aluminum foil placed inside the box. Take the other end of the metal wire outside the box and connect it to one end of the battery. Connect the other end of the LED light to the other end of the battery.

**Testing:** Move the detector close to a radiation source to test it. For example, you can test it by bringing it near a battery. If the metal wire contacts the aluminum foil, the LED light will turn on, which means radiation is detected.

# Nature pollution: Conclusion

- As a result, pollution of the natural environment or "nature pollution" includes various types of pollution that occur as a result of human activities. Elements such as air, agriculture, soil, noise and radiation pollution can harm ecosystems, biodiversity and human health. Therefore, environmental protection efforts are of great importance for sustainable development and preserving the natural balance.
- The results also show that societies, industries and individuals should adopt environmentally friendly lifestyles, reduce waste, encourage recycling, and develop awareness of protecting nature for sustainable environment. These efforts can contribute to the goal of leaving a clean, healthy and sustainable world to future generations by protecting the natural environment. Environmental policies and regulations at local, national and international levels can help protect the natural environment. It is also important for everyone to take responsibility in this regard and adopt sustainable lifestyles.





# ACTIVITY 10: NATURAL POLLUTION – THINK AND ANSWER

What kind of precautions should factories take to prevent obstruction of nature?

What technological solutions can be developed to prevent air pollution?

Air pollution is a global problem. What international cooperation is needed to solve this problem?

Where do you dispose of used batteries and electronic devices? What is the impact of these wastes on the environment?

What steps can you take in your daily life to prevent soil pollution?

What incentives and sanctions can be applied to prevent soil pollution?

What legal regulations do you think should be made to prevent agricultural pollution?

Do you know the sources of radiation at home and at work? What can you do to protect yourself from these sources?

How can noise pollution be prevented in urban planning?

How can noise control be achieved in construction and industrial activities?

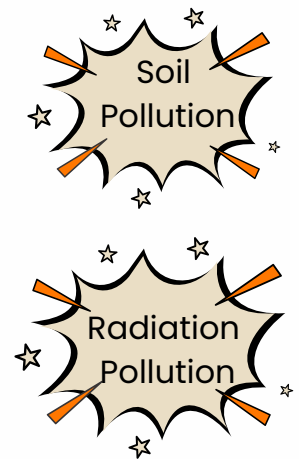
# Activity 11 : Natural pollution fill in the blanks

.....  
is when the physical, chemical or biological properties of the soil become harmful to human or environmental health

.....  
is unwanted and disturbing sound that disrupts human hearing health and comfort, prevents or negatively affects the hearing of natural sounds.



.....  
occurs naturally from sources such as radon gas in the soil and cosmic rays from space.



.....  
is caused by various factors such as the use of pesticides and chemical fertilizers.



.....  
causes damage to vegetable and fruit production, decreased productivity, acid rain, and destruction of vegetation

# ENERGY RESOURCES

## General Introduction:

Energy resources are the essential ingredients that power our world, fueling everything from the devices in our hands to the lights that brighten our homes and to generate electricity, run machinery, and meet the myriad demands of our daily lives. These resources are the lifeblood of modern civilization, allowing us to accomplish tasks, innovate, and thrive.

Energy exists in various forms. These forms can be harnessed, transformed, and utilized to perform work, create heat, or generate electricity. The exploration of energy resources involves tapping into these diverse forms to meet our ever-growing energy needs.

-What do you use energy for in the classroom?

-What do you use energy for at home?

## 1. Solar Power:

**How It Works:** Solar power harnesses energy from the sun using photovoltaic (PV) cells. These cells convert sunlight into electricity.

**Environmental Impact:** Solar power is a clean and renewable energy source. It produces electricity without emitting greenhouse gases. The manufacturing process and disposal of solar panels have environmental considerations, but advancements are being made to address these issues.



## 2. Wind Power:

**How It Works:** Wind turbines capture kinetic energy from the wind, converting it into electricity through the rotation of turbine blades connected to a generator.

**Environmental Impact:** Wind power is considered environmentally friendly as it produces electricity without direct emissions. Wind farms may have visual and noise impacts, and their construction can disrupt local ecosystems, but these impacts are generally less than those associated with fossil fuels.



## 3. Hydropower:

**How It Works:** Hydropower generates electricity by harnessing the energy of flowing water. Dams or turbines are used to capture the kinetic energy of rivers or falling water.

**Environmental Impact:** While hydropower is a renewable energy source, the construction of dams can have significant environmental consequences, including altered river ecosystems, habitat disruption, and displacement of communities. Run-of-river projects have fewer environmental impacts compared to large dams.



# ENERGY RESOURCES



## 4. Geothermal Energy:

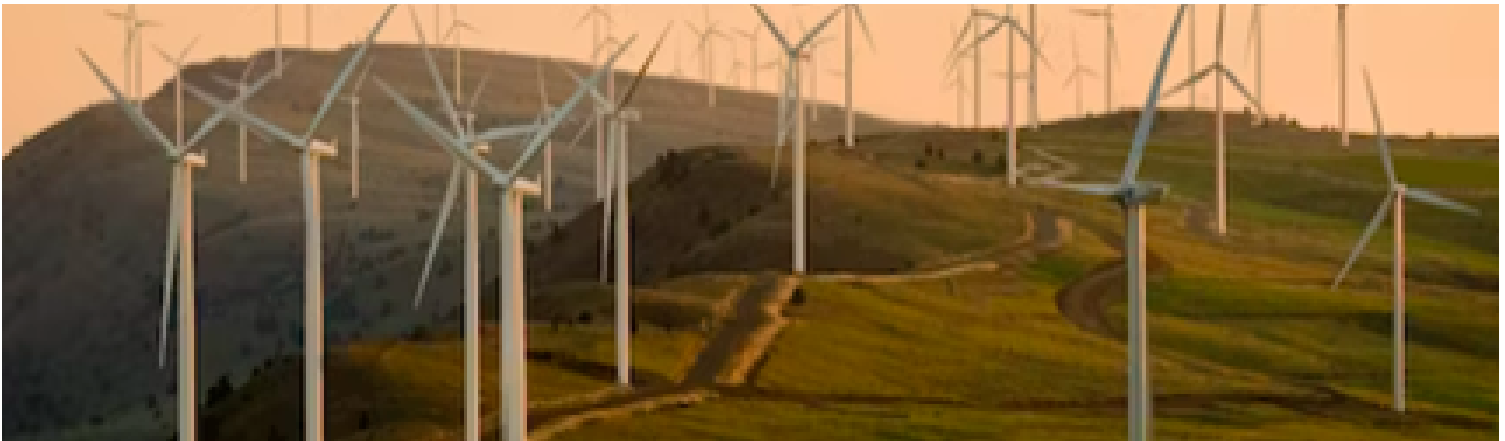
**How It Works:** Geothermal power taps into the Earth's internal heat by utilizing steam or hot water from underground reservoirs to generate electricity.

**Environmental Impact:** Geothermal energy has a low environmental impact during operation, emitting fewer greenhouse gases than fossil fuels. However, there are some concerns about the release of trace gases and the sustainability of reservoirs over the long term.

## 5. Biomass Energy:

**How It Works:** Biomass energy is produced by burning organic materials, such as wood, crop residues, or waste, to generate heat or electricity.

**Environmental Impact:** Biomass is considered carbon-neutral if managed sustainably, as the carbon dioxide released during combustion is roughly equal to what the plants absorbed during growth. However, improper management lead to deforestation, habitat loss, and increased emissions. Furthermore it uses alot of land.



## 6. Nuclear Power:

**How It Works:** Nuclear power generates electricity through nuclear reactions, usually involving the splitting of uranium atoms (nuclear fission).

**Environmental Impact:** Nuclear power produces electricity with low greenhouse gas emissions but raises concerns about nuclear accidents, radioactive waste disposal, and the potential for nuclear proliferation. Advances in technology aim to address safety and waste management challenges.



## 7. Coal

**How It Works:** Coal is extracted through mining, which can have significant environmental and social impacts, including habitat destruction, water pollution, and health hazards for miners. Coal-fired power plants burn coal to produce steam, which drives turbines to generate electricity.

**Environmental Impact:** Greenhouse Gas Emissions: Coal is a major contributor to CO<sub>2</sub> emissions and is considered one of the most carbon-intensive fossil fuels. Burning coal also releases other pollutants such as sulfur dioxide (SO<sub>2</sub>) and nitrogen oxides, which contribute to respiratory diseases and water contamination.



## 8. Oil:

**How It Works:** Oil is extracted through drilling wells, both onshore and offshore. This process can have significant environmental impacts, including habitat disruption, water pollution, and potential oil spills. Once extracted, oil is refined into various petroleum products such as gasoline, diesel, and jet fuel.

**Environmental Impact:** Greenhouse Gas Emissions: Burning oil products releases CO<sub>2</sub> into the atmosphere, contributing to climate change. Additionally, oil extraction and refining processes emit pollutants such as volatile organic compounds (VOCs) and particulate matter, which can harm air quality and human health. Oil spills pose a severe threat to marine ecosystems, causing long-term damage to aquatic life and coastal environments.



## 9. Gas: How It Works:

Natural gas is extracted through drilling wells, often using hydraulic fracturing (fracking) techniques. Fracking can have significant environmental consequences, including water contamination and habitat disruption. Once extracted, natural gas is processed and transported via pipelines for various uses, including electricity generation and heating.

**Environmental Impact:** Greenhouse Gas Emissions: While natural gas combustion produces fewer CO<sub>2</sub> emissions compared to coal and oil, it still contributes to climate change. Methane, the primary component of natural gas, is a potent greenhouse gas with a much higher warming potential than CO<sub>2</sub> over a shorter timeframe. Additionally, methane leaks during extraction, transportation, and storage can offset the climate benefits of using natural gas. Fracking operations also release other pollutants into the air and water, posing risks to human health and ecosystems.

Each energy type has its advantages and challenges. Achieving a balance between meeting our energy demands and minimizing the impact on our planet is a complex puzzle. Looking forward, the future of energy is marked by a transition toward more sustainable practices. This involves a mix of renewable sources, technological advancements, and a collective commitment to responsible energy consumption. In essence, energy resources form the cornerstone of our ability to progress and innovate. Understanding their complexities and exploring ways to harness them responsibly is key to ensuring a sustainable and resilient future for generations to come. 🌍⚡

# Activity 12: Paper Windmill Craft

- **Title: Paper windmill craft**
- **Group Age: 10–15 years old**
- **Length of the Project: Short-term**
- **Project Purpose: An understanding of wind energy and wind**

## Materials Needed:

1. Square piece of paper (15x15 cm or larger works well)
2. Pencil with eraser
3. Ruler
4. Scissors
5. Push pin or small tack
6. Wooden skewer or straw
7. Glue or tape (optional)

## Instructions:

1. *Start with a square paper:*
  - Get a square piece of paper, around 15x15 cm. If it's not square, trim it with the help of a ruler.
2. *Fold the paper:*
  - Fold the square paper in half diagonally to make a big triangle.
  - Unfold it, and then fold it diagonally in the other direction, creating a cheerful X-shaped crease.
3. *Cut along the folds:*
  - With the paper still folded, use scissors to cut along the creases from the corners towards the center, stopping about 2.5 cm from the center point.
4. *Create the windmill blades:*
  - Fold each cut corner towards the center, securing it in place. You can use glue or tape for extra sticking power.
  - Watch as your paper transforms into a colorful windmill with four blades!
5. *Add some positivity:*
  - Before poking a hole in the center, have your pupils draw or write something positive or happy on each blade. It could be simple drawings, smiley faces, or uplifting messages.
6. *Poke a hole in the center:*
  - Now, use a pencil or the eraser end of a pencil to carefully poke a hole through the center of the folded paper.

# Activity 12: Paper Windmill Craft

## 7. Attach the windmill to a stick:

- Insert a push pin or small tack through the hole in the center of the windmill.
- Attach the windmill to a wooden skewer or straw. Push the pin into the eraser of the pencil or directly into the skewer/straw, allowing the windmill to spin freely.

## 8. Test your windmill:

- Take your happy windmill outside, catch the wind, or blow on it to watch the energy and the positive vibes spin around!



Encourage children to express their creativity by using colorful paper and adding their own cheerful touches to the windmill. This simple craft not only brings joy but also helps children learn about shapes and wind energy in a playful way, maybe encourage the children to figure out their own design.

See which windmill catches the wind the best.



# Activity 13: Solar-Powered Iced Tea Adventure

- **Title:** Solar-Powered Iced Tea Adventure
- **Group Age:** 10–15 years old
- **Length of the Project:** Short-term
- **Project Purpose:** An understanding about the use of solar energy

## Materials:

- Tea bags of your choice
- A large, transparent jar with a lid
- Water
- Ice cubes

## Brewing Your Solar-Powered Iced Tea:

### 1. Set the Stage:

- Gather your tea bags, a big, clear jar, and some water. It's time to create magic using the power of the sun!

### 2. Tea Bag Dive:

- Take your tea bags and toss them into the empty jar. Imagine it's like giving your tea a cozy home for its flavor to unfold.

### 3. Fill 'Er Up:

- Pour water into the jar until the tea bags are fully submerged. Put the lid on top, giving your tea a little space to work its magic.

### 4. Sunbathing Time:

- Find a sunny spot, preferably around noon when the sun is at its brightest. Place your jar there and let it bask in the sunlight for a few hours.

### 5. Let the Steeping Begin:

- The sun's heat will kickstart the "steeping" process. It's like the tea leaves are waking up and spreading their flavor throughout the water. The longer they soak up the sun, the tastier your tea will be!

### 6. Patience, Young Tea Brewer:

- Let your tea brew for at least two to four hours. The amount of time depends on how much sunlight and warmth your tea gets.

### 7. Chill and Enjoy:

- Once your tea has soaked up all that solar goodness, take out the tea bags, give it a stir, add some sugar and add some ice. Congratulations, you've just brewed your very own solar-powered iced tea!



Feel free to experiment with different tea flavors, and maybe even add a slice of lemon or a sprig of mint for an extra twist. Enjoy your refreshing creation and marvel at the wonders of using sunlight to make your very own delicious iced tea! ☀️🍵



This hands-on experiment not only demonstrates solar energy utilization but also introduces concepts like brewing time, temperature, and the natural process of flavor extraction. It's a tasty and funny way for students to explore science and sustainability while enjoying a delicious outcome.



# Activity 14: Plant a tree

## Plant and take responsibly for a tree.



- **Title:** Plant and take responsibly for a tree
- **Group Age:** 10-15 years old
- **Length of the Project:** Short-term / Long term
- **Project Purpose:** Understanding and taking care of nature.

Trees are nature's champions. They absorb the greenhouse gas carbon dioxide, releasing oxygen through photosynthesis. By planting trees, we become environmental superheroes, contributing to a healthier planet. – How does a tree grow? Talk about photosynthesis. Acting as natural air filters, trees remove pollutants, purifying the air we breathe. Their presence is a vital ally in combating pollution and promoting cleaner, fresher air.

Erosion Prevention Engineers:

With their intricate root systems, trees play a crucial role in preventing soil erosion. They act as stabilizers, ensuring the integrity of landscapes and protecting against the forces of nature.

**Get planting.**

Select a tree species compatible with your local climate and soil conditions. Tailor your choice to the specific benefits you hope to achieve, whether it be enhanced biodiversity, energy efficiency, or aesthetic appeal.

**Site Selection and Preparation:**

Choose a suitable location, ensuring ample space for the tree to flourish. Adequate sunlight and proper soil preparation are key considerations for optimal growth. Talk with the school janitor about where this could be.

**Planting and Nurturing:**

Plant the tree with care, paying attention to the depth and alignment. Adequate watering and the application of mulch contribute to the successful establishment and growth of the tree.

**Stewardship Commitment:**

Like any meaningful endeavor, planting a tree requires ongoing care. Commit to regular maintenance, ensuring your tree thrives and continues to contribute to the well-being of the environment.

Through the collective effort of tree planting, we become active participants in the preservation and enhancement of our natural world. It is an investment in the health and vitality of our communities, and a step toward a more sustainable and harmonious future.

The idea about this activity is for the students to understand how trees play a vital role related to our climate and environment, also for the students to take responsibility and care for a tree.



# Activity 15: TRAGEDY OF THE COMMON GAMES

- **Group Age:** 10-15 years old
- **Length of the Project:** Short-term

**The goal:** to learn about a very common cause for depletion of natural resources called *tragedy of the commons*. If natural resources are not governed properly, a situation often arises where it is better for the individual to overuse that resource, although it would be better for all if everyone worked together and kept the total use to a level that can sustain itself.

## **Materials:**

- Shoes (or something else)
- Black/whiteboard/paper

## **Game:**

Each student puts 2 shoes in a pile and form a circle around it (It does not have to be shoes).

- Imagine that the students are fishers, that the shoes are fish, and the pile is a big lake.

Each round (year), the students in turn go fishing – One by one they go into the middle and take either 0, 1 or 2 shoes back to their home (2 is the maximum their boat can carry).

- The teacher writes their names on the board and how many shoes they take.

When everyone has had their turn, the fish population is renewed:

- First all shoes that has been taken from the pile is collected, so they can be used again.

Important: don't put them back in the middle pile (lake) yet.

- For every shoe left in the middle pile, one more is added to the next round i.e. the fish population doubles every round.

Important: there can maximum be 2 shoes for each student in the pile. (That is the maximum population that the lake can sustain).

Now next round starts. This time starting with the fisher who where last in the last round and going in the other direction. If there are no more fish, the game ends.

- When the game ends, the teacher adds up how many fish were caught in total, and who got the most.

Try again, and see if you can do better.

**Extra:** After playing a few games: Try adding a governor, that can choose to penalize fishers after their turn by taking back up to 2 fish from the fisherman.



## Example:

**Setup:** 20 students, 40 fish from start.

**Round 1:** student #1, takes 1 fish, student #2 takes 2 etc. In total they catch 30 fish, leaving 10.

**Round 2:** First the population of 10 fish doubles to 20. Then student #20 takes 2 fish, student #19 takes 1 etc. The fishers in total catch all 20 fish.

There are now no more fish in the lake and the game ends.

The teacher adds it up on the board. They caught 50 fish in total.

**Tip:** If they could have agreed to collectively only catch 20 per round, the population could sustain itself indefinitely.

## Before the game:

- Explain the rules of the game.
- Don't give them too many hints on how to play it.
- Help them after a few games, if they don't figure it out.

## Things to discuss afterwards:

- Why did we overfish?
- What did we do better in the next game?
- Did adding the governor help?
- Where in the real world could this be relevant?

## Learnings:

Students should understand the mechanism behind tragedy of the commons:

- Every fisher would get more if they worked together and only takes what can be regenerated.
- But each individual fisher has incentive to take more if the lake is not regulated.

Understand real-world cases where tragedy of the common takes place:

- Fishing: Fishers catch more fish than can be regenerated.
- Grazing of pastures: Cow herders graze their cattle so much that the grass cannot regenerate.
- Deforestation: Cutting down more trees than can regrow.
- Pollution, for example greenhouse gasses: So far we only looked at taking a something good out (fish, grass or trees), but it can also be putting something bad in. This is the case with GHG. It would be better for everyone if we limited GHG emissions, but for the individual country it is often cheaper to keep burning fossil fuel.



# WASTE AND ENVIRONMENTAL IMPACT

The emergence of humans and the development of society have triggered the greatest transformations and degradations of the environment. More and more components of the environment have been transformed into resources. The explosive growth of the global population, industrialization, urbanization, and increasing standards of living have heightened the demand for food, water, energy, and raw materials. Humanity has become the largest consumer of resources without considering the ecological imbalances produced. In addition to the risk of depleting resources, there has been a growing and diversified form of pollution from year to year. The consuming human has become the wasteful human, whether consciously or unconsciously, leading to the generation of waste. Waste refers to those residues that are discarded after the use of finished products. The waste category has expanded to include both used finished products, their residues, and the disposal of related elements used in the technological processes of obtaining finished products.

## Issues caused by waste

The vast variety of waste produced by society and the quantities in which they accumulate exceed the possibilities of recycling. Waste storage spaces or, as the case may be, discharges into aquatic environments contribute to pollution and trigger ecological imbalances. Non-degradable plastic waste, textile waste, various chemical pollutants affect the quality of air and water, decrease soil fertility, and harm plants and animals. Anthropogenic pollution, in addition to the imbalances caused in the surrounding environment, also has harmful effects on human health.

By raising awareness of the magnitude of pollution processes and the severity of harmful effects, mentalities regarding the generation and disposal of waste must be changed, promoting selective waste storage. In this context, the project focuses on practical educational activities aimed at optimal utilization of waste-resources. Generated waste can be recovered and reused or transformed to create new products. Reusing processes through recycling materials intended to become waste increase the lifespan of depletable resources and become solutions for environmental protection.



**MORE INFO**

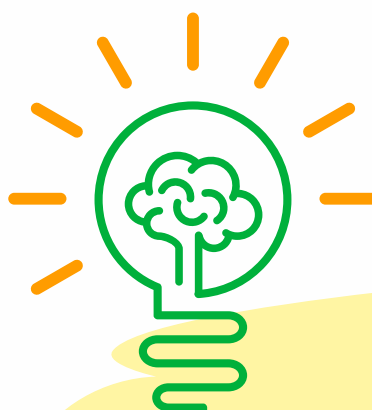


# WASTE AND ENVIRONMENTAL IMPACT

## Important Resources

Web page links:

- Reuse and Recycle  
[https://climate.ec.europa.eu/citizens/climate-tips/reuse-and-recycle\\_ro](https://climate.ec.europa.eu/citizens/climate-tips/reuse-and-recycle_ro)
- Waste Management  
<https://www.mmediu.ro/categorie/gestionarea-deseurilor/22>
- How can the waste we dispose of in nature affect us?  
<https://www.eco-romania.ro/noutati-blog/cum-ne-pot-afecta-deseurile-pe-care-le-lasam-aruncate-in-natura/>
- Let's Do It, Romania! & Green Point: What Happens to Recyclable Waste?  
[https://www.youtube.com/watch?app=desktop&v=\\_IsI2CMYRqk](https://www.youtube.com/watch?app=desktop&v=_IsI2CMYRqk)



**DID YOU  
KNOW?**

reducing food waste by just 25% could feed all the malnourished people in the world?

# Problem of Plastic – UpCycling Activities

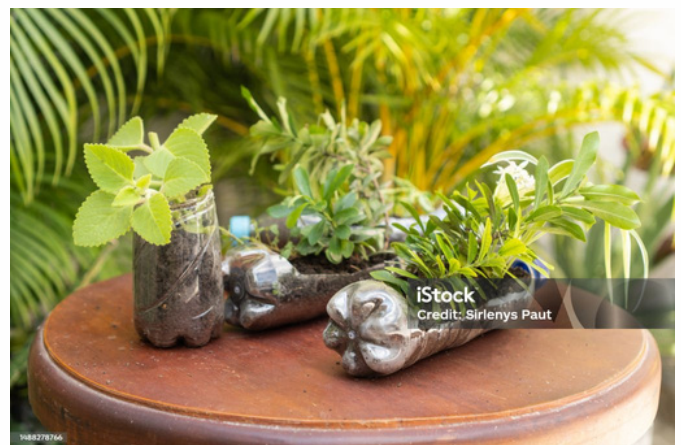
Plastic represents a global issue with a particularly harmful impact on the environment. Unfortunately, plastic has become a ubiquitous part of our everyday landscape, visible everywhere, even in less accessible places where we wouldn't expect to find it: on mountain tops, in caves, in the vast oceans, wherever it has been left behind. One explanation for the ubiquity of this material is its high environmental persistence, with decomposition ranging from 10 to 400 years for certain types of plastic. The majority of plastic found in our oceans originates from activities on land: around 70% to 80% of it is carried into the sea through rivers or coastlines. The remaining 20% to 30% stems from marine sources like discarded fishing gear such as nets, lines, ropes, and abandoned vessels.

## What problem it causes:

When plastic waste enters water or soil, it releases numerous toxins that pollute these environmental components, affecting flora and fauna. Animals may mistakenly consume plastic or become trapped inside it. Humans are also not exempt from the effects of plastic, as it enters their bodies through the food chain. Another way humans ingest plastic is through foods and beverages packaged in plastic. Although we ingest plastic through various routes, the health effects are not fully understood. Additionally, there is aesthetic pollution, creating real visual discomfort.



*Currently, the production of plastic is so extensive that existing recycling and waste management facilities are unable to handle the entirety of the quantity generated. Presently, it is estimated that plastic waste constitutes approximately 10% of the total municipal waste worldwide, with 80% of all plastic in the world's oceans originating from rivers and sewage systems.*





# Activity 16: Recycle Plastic Creatively

- **Title:** *Recycle Plastic Creatively!*
- **Group Age:** 10–15 years old
- **Length of the Project:** Short-term
- **Description:** The activity will involve observing the volume and type of plastic produced in a class of students for one week. The quantity of plastic produced each day will be quantified, and the type of plastic produced will be classified. Then, the students will explore creative ways to transform the plastic

## 1. Research and learn:

Students will be encouraged to read information about how plastic affects nature and quality of life, types of plastic and their recycling, ideas for reusing plastic creatively. They will also propose alternatives to the use of plastic or reducing the volume of this waste. To accomplish this, students will read articles on the proposed subject, consult blogs of waste management NGOs, educational films about recycling activities, documentaries regarding plastic waste persistence and effects.

## 2. Implement the Activity

*Materials needed: plastic bags and containers (cups, bottles), scissors, colors, glue, string.*

Students will use plastic materials to create useful objects: bags, pencil holders, storage boxes, flower pots. They will observe that certain seemingly useless materials can be transformed into useful objects with minimal cost, extending the life of the respective product. As a result of the activity, they will notice a reduction in waste volume, contributing to a more sustainable environment. They also have the chance to practice their practical skills, creativity, and exchange ideas.



about 9% of all plastic ever produced has been recycled?

# Activity 16: Recycle Plastic Creatively

## 3. Promote Further:

The products obtained from this activity will help students better understand what recycling means and will serve as an incentive to continue this process. The results will be shared with classmates from other classes, family, and close friends. Students will have the opportunity to promote their products through an exhibition at the school, where they can add information about the manufacturing process, its usefulness, and the benefits for the planet (for example, by recycling product x, we saved x liters of water, saved x kw of energy, planted x number of plants that will produce oxygen). Photos from the activity and with the products obtained will be posted on the school's website as examples of good practice.

## 4. Evaluate and ask for Feedback:

The enthusiasm and level of involvement of the students provide an overview of the conducted activity. Additionally, the number, quality, and usefulness of the obtained objects offer valuable insights into how students perceive the concept of plastic recycling and the need to continue this process in different contexts. By analyzing their own behavior regarding plastic waste management, students will become aware of what they need to change or improve, as well as the importance of reducing plastic volume and recycling.



# UpCycling and Reuse of Clothes (Fast Fashion)

*"Fashion condemns us to many follies, but the greatest of them is that it turns us into its slaves." - Napoleon Bonaparte*

## General description

One of the most polluting industries is the textile industry. The main places where textile waste originates are knitwear factories, clothing factories, textile footwear, and tailoring workshops. The tendency to buy more and more clothes, to match them, to stand out through the worn outfit, has led to an explosion in the fashion industry. Well-known brands come to launch new clothing collections every two weeks, giving rise to a new concept - fast fashion.

## What problem it causes:

The effects of textile waste on the environment are multiple and affect both air, water, and soil. It is estimated that the textile industry produces approximately 10% of the total global annual carbon emissions, and the forecast for greenhouse gas emissions generated by the fashion industry will be over 50% by 2030. The textile and fashion industry is a major consumer of water, but also a major polluter of this resource through the chemical substances used in dyeing fabrics and the microplastics originating from synthetic textile fibers. Scientists estimate that clothes are the largest source of microplastic pollution in the world's oceans, as approximately 60% of them are made of plastic.

**DID YOU  
KNOW?**

- *It is estimated that 10-20% of total fashion industry textiles are wasted.*
- *Only 15% of all textile materials are recycled.*
- *The process of dyeing textile fibers is considered to be the second-largest source of water pollution in the world.*



# Activity 17: RESPONSIBLE FASHION

- **Title:** *Responsible Fashion*
- **Group Age:** 10-15 years old
- **Length of the Project:** Short-term
- **Description:** The activity begins with reading an article on the pollution caused by the fashion industry. Discussions about the environmental disadvantages generated by this industry are held. Subsequently, students will be divided into three groups, and each team will compile a list of local clothing stores that have environmentally friendly practices. In the end, each team presents its activity product, and it is concluded that everyone can reduce pollution with these types of waste by purchasing clothes from such stores.

## 1. Research and learn:

To realize the impact of the fashion industry on the environment, students will be guided to read various articles regarding the concept of fast fashion, persuasive marketing techniques, the consumption of resources needed for clothing production, the amount of waste generated, air and water pollution generated by this industry, and solutions for reducing the volume of textile waste. They can also learn about certain legislative regulations regarding textile production, recycling, and ethical aspects regarding industry employees.

## 2. Implement the Activity

*Materials needed: computers with internet connection, projection screen, paper sheets, markers.*

The activity begins with reading an article on the impact of the fashion industry on the environment by accessing the link <https://www.greennews.ro/article/fast-fashion-industria-modei-impact-asupra-mediului>. Discussions are held based on the article, and then students will be divided into three teams. Each team will have to search for information about local eco-friendly stores for 15 minutes: 1. Stores with clothing made from recyclable materials; 2. Thrift stores selling quality textile products; 3. Local clothing brands that adopt sustainable practices. At the end, each team presents its results, and it is concluded that we can adopt "responsible fashion."



# Activity 17: RESPONSIBLE FASHION

## 3. Promote on the school's website/social media pages:

Students can write an article to be published on the school's magazine/website or in a local newspaper promoting local clothing stores/brands that adopt sustainable practices. Also, those who are customers of these stores can create a school or city outfit that is "in fashion," and later promote it among classmates or friends



## 4. Evaluate and ask for Feedback:

The openness of students to consider other types of stores when purchasing clothes or to adjust their consumption behavior by reviewing their wardrobe and reducing the number of purchased items provides information on the success of this activity. It will be emphasized that by adopting sustainable behavior, we will contribute to a cleaner environment and also make savings in our own budget.



# Activity 18: WATER, A PRECIOUS RESOURCE

- **Title:** *Water, a precious resource*
- **Group Age:** 10–15 years old
- **Length of the Project:** Short term/ 2–3 weeks
- **Description:** March 22 is World Water Day globally. Students can become aware of the importance of protecting water resources by creating thematic products that can be presented in an exhibition. Students can make posters, drawings, poems, essays, presentations that follow the following aspects: identifying the sources of water pollution in the area where they live and their impact on the environment, identifying solutions to reduce water pollution in the area where they live, awareness of resource protection of water, identifying individual solutions to reduce water consumption and water pollution. The students' learning experience can be completed with a visit to a wastewater treatment plant.

## 1. Research and learn:

The students will choose together with the teacher the type of product they want to make and its theme. Students will have 1–2 weeks to document and create the chosen product. Students can work individually or in teams of two to four students.

- <https://letsact.education/>,
- <https://www.who.int/news-room/fact-sheets/detail/drinking-water>

## 2. Implement the Activity

The students will present their products in an exhibition organized at class level: posters, drawings, poems, essays, presentations. The exhibition ends with students participating in a thematic contest through the Kahoot platform. The students' learning experience is completed by visiting a water treatment plant in the next period.



## 3. Promote on the school's website/social media pages:

The products made by the students can be exhibited at the school level to sensitize all the students of the school on the importance of protecting water resources. The project can also be promoted on the school page by making a photo album of the project.

## 4. Evaluate and ask for Feedback:

Together with the coordinating teacher, the strengths and aspects that need improvement will be identified for each product displayed in the exhibition. At the end of the project, the participants will present their impressions of the project in a free discussion.

# RECYCLING RULES



## General description

The recycling process refers to the reuse of old materials and products to create new ones, without resorting to new raw materials. In this way, the energy consumption required for the extraction of raw materials, respectively the destruction of waste, is reduced.

Recycling helps reduce greenhouse gas emissions and has a positive effect on the economy as well: it creates jobs, lowers costs for companies, the recycling effort is covered by the savings made, etc. Sources of recyclable materials are both private households and industries. They include glass, paper, aluminum, iron, textiles, plastic, electrical equipment, vegetable food waste, used vegetable oil, tires. To increase the efficiency of the recycling process, these materials must be sorted and separated by product type.

## What problem it causes:

The earth has a finite amount of resources that we can use. The day the planet Earth ran out of resources, formerly known as the Ecological Debt Day (EDD), is a calculation of the illustrative calendar date when humanity has used all of the planet's resources for that year. For the rest of the year, the resources consumed will be those of the following year. It is an illustration of the aggressive use of resources far beyond the Earth's ability to regenerate those resources in that year. This calculation highlights the need to use resources more constructively, reuse them and give the planet time to regenerate.

The storage of waste in landfills causes over time numerous problems of environmental pollution affecting the health of those who live near them, a situation frequently encountered in developing countries but not only in their case. Incineration of waste as a method of disposal leads to the release of a large amount of greenhouse gases into the atmosphere.



*The paper can be recycled a maximum of 6 times, because after the sixth recycling the fibers become too weak and no longer hold. An aluminum can can be recycled indefinitely without losing its qualities. An aluminum can naturally disappears in 100 years, while banana peels disappear in 2 years. Plastic bags disappear in almost 30 years. Making steel from recycled materials saves 75% of the energy used in making steel from raw materials. Every year 15 million hectares of forest are cut or burned. That's the equivalent of 75,000 football fields every day.*

# Activity 19: WHAT DOESN'T BELONG HERE?

- **Title:** *What doesn't belong here?*
- **Group Age:** 10-15 years old
- **Length of the Project:** 2 -3 hours

## 1. Research and learn:

The activity is recommended to take place in an area with rich vegetation. Before the activity, choose 4 routes that all start from the same point and hide objects on each route. Objects can be hidden on the ground, in grass, in trees, in clearings, in bushes, under a cut tree trunk, etc. The same number of objects (20-30) will have to be left on each route, some more visible, others more hidden.

## 2. Description and implement the Activity

Materials needed: garbage bags, protective gloves, small and medium-sized items, laptop, copies of a newspaper article (Computer recycling West Africa style - Click - BBC Newsvideo [https://youtu.be/JXDrIvShZKU?si=fYTqxA6\\_Z4gl2Mcu](https://youtu.be/JXDrIvShZKU?si=fYTqxA6_Z4gl2Mcu) ; newspaper article <https://www.smithsonianmag.com/science-nature/burning-truth-behind-e-waste-dump-africa-180957597/> )

Divide the group into 4 teams and explain that for 30 minutes they will have to investigate the designated route and find as many objects that do not belong in the place. Finally, after the time is up, each team presents the found objects. The team that found the more objects can be rewarded.

Discuss what effect it would have had on the environment if the objects had not been recovered? How much time do they decompose? How would it have affected the vegetation? What about the fauna? Before you leave the location where you held the activity, make sure that all originally hidden objects have been retrieved.



In the second part of the activity gather the group in a circle around a round fabric. Hold up the material with the whole group and the facilitator says one of the given statements. Everyone who agrees must run under the fabric and switch places with another person before they are caught by the group pulling the fabric down.



Statements:

- I have a mobile phone
- I have had more than one mobile phone so far
- I like to get a new phone as soon as I can.
- I still have an old phone at home.
- I sold or donated an old phone.
- I threw away an old phone.
- I never thought about what happens to old mobile phones.



# Activity 19: WHAT DOESN'T BELONG HERE?

Show participants the video or article. What issues are highlighted? What surprised them? What do you think is the impact of sending e-waste to Africa?

Repeat the game from the beginning with these statements:

- I am surprised that so many phones end up in Africa.
- People in Africa are using our old phones properly.
- I want to know more about what I can do with my old phone.

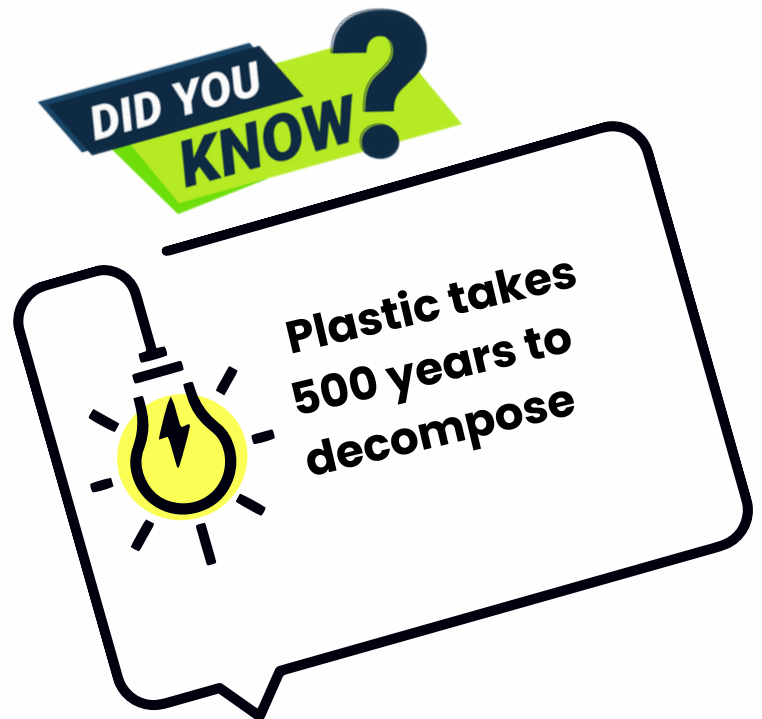
### 3. Promote on the school's website/social media pages:

The project can also be promoted on the school page by making a photo album of the project.

### 4. Evaluate and ask for Feedback:

In a free discussion students are asked to answer the following questions:

- Was it easy to identify objects that did not belong in the environment?
- Did you find any objects other than those placed on purpose?
- Did you collect those too?



# Activity 20: THE GARBAGE BAGS CHALLENGE

- **Title:** *The garbage bags challenge*
- **Group Age:** 10-15 years old
- **Length of the Project:** Short term/ 2-3 weeks

## 1. Research and learn:

Ask students, the week before this activity, select from home, into a garbage bag, the non-perishable items they would normally throw away during that week. Different categories of waste can enter here (juice cans, bottles, clothes, batteries, electronics, packaging, anything but food scraps).

## 2. Description and implement the Activity

At the beginning of the activity, the teacher starts a discussion about waste, what we usually throw in the garbage and how the garbage is processed. Find out what knowledge they have about how rubbish is processed in the area where they live, what happens to it, where does it go?

Before launching the challenge, make sure students are familiar with the 5 R's

**Refuse** – unnecessary packaging, flyers, promotional magazines, plastic bags, juice straws

**Repairs** – clothes, appliances

**Reduce** – choose products that need as little packaging as possible

**Reuse** – buy second-hand products, donate items you no longer use, buy products you use more than once

**Recycle** – paper, plastic, metal

**use**

**pairs**

**use**

**cycle**

**duce**

**RE**

For a better understanding of recycling concepts and recycling rules, a presentation or short thematic films can be used (<https://olivaverde.ro/>). The students are divided into groups of 3, each team receiving an equal amount of waste from the ones brought from home by each. Give them 15 minutes to sort through all the objects in an attempt to make the trash bag as small as possible at the end. After everyone has finished sorting, they have to explain to the others what they decided to do with the items they took out of the trash bag. Which they recycle, which they use for something else, etc.

In the second part of the activity, students are encouraged to make various decorative objects using the waste brought from home.

## 3. Evaluate and ask for Feedback:

Through a free discussion, find out from the students if they have the habit of sorting garbage, recycling, reusing or any other behavior in this direction. What about their parents and grandparents? Ask students to answer the question: What do they propose to change in the way they deal with this problem we face?

# WATER POLLUTION

## General Introduction:

As civilization marches forward, the consequences of our collective actions reverberate through the delicate balance of aquatic ecosystems. In this exploration, we confront the pressing issue of water pollution, a global problem that not only threatens the web of life in our water bodies but also resonates with profound implications for human health and prosperity. Water pollution, a byproduct of industrial discharge, improper waste disposal, unchecked human activities, and notably, agricultural practices, has reached a critical juncture. Agriculture, a cornerstone of human civilization, has inadvertently become one of the largest sources of water pollution. Runoff from agricultural fields carries excess fertilizers, pesticides, and other chemicals into water bodies, leading to nutrient enrichment, harmful algal blooms, and the degradation of water quality. Our rivers and oceans, once pristine sources of life, now bear the burden of contamination from an array of pollutants—from toxic chemicals to non-biodegradable plastics. The gravity of this environmental crisis extends beyond the visible realms, disrupting ecosystems, threatening biodiversity, and posing a significant challenge to the availability of potable water.

## The Problem Unveiled

More than 80% of the world's wastewater is released into the environment without adequate treatment, perpetuating a cycle of contamination that transcends geographic boundaries. Plastics, an emblematic product of modern convenience, contribute a staggering 8 million tons annually to the burgeoning marine debris,



ensnaring marine life and irreversibly altering aquatic habitats. Moreover, water pollution stands as a principal driver behind the decline of numerous aquatic species, from fish stocks to marine mammals. The intricate balance that sustains life beneath the water's surface is under siege, demanding immediate attention and concerted efforts to mitigate further damage.

# WATER POLLUTION

## Causes of Water Pollution

Water pollution happens when harmful substances get into our water sources. This can come from different places, like factories, farms, and even our homes. Chemicals, oils, and trash can end up in rivers, lakes, and oceans, making the water unsafe for plants, animals, and us.

## Effects of Water Pollution

When water is polluted, it can have serious effects. Fish and other aquatic animals can get sick or die. Plants that depend on clean water may not grow properly. Even humans can get sick if we drink or use polluted water. So, it's essential to keep our water clean for a healthy environment.

## Prevention and Solutions

The good news is, we can do things to prevent water pollution! Simple actions like properly disposing of trash, recycling, and using fewer chemicals can make a big difference. Supporting organizations that work to protect water and spreading awareness in our communities are also helpful steps.



**DID YOU  
KNOW?**

### MICROPLASTICS

Imagine this: if you could shrink down to the size of a grain of rice, you'd be swimming with microplastics even in the deepest parts of the ocean! These tiny particles are like microscopic travelers, making their way into the most unexpected places. It's like a plastic adventure, but not the kind we want!

### STORMWATER SYMPHONY

Rainy days are like nature's symphony, but when rainwater mixes with pollutants on the streets, it becomes a stormwater orchestra of chemicals. Let's keep our streets clean to avoid this pollution melody!

### FISH WITH SUPERPOWERS

Some fish can detect pollution with their super-senses. It's like they have a pollution radar to help them navigate through clean waters

# Activity 21: Art for Clean Waters

- **Title:** *Educational Expressions: Art for Clean Waters*
- **Group Age:** 10–15 years old
- **Length of the Project:** 1 hour
- **Objective:** To engage students aged 10–15 in a one-hour artistic workshop that combines creative expression with learning about water pollution and its impact.
- **Materials Needed:**
  1. Watercolor paper or sketchpads
  2. Watercolor paint sets
  3. Paintbrushes
  4. Water containers
  5. Printed cards with simple water pollution scenarios

## Workshop Outline:

- 1. Introduction: "Connecting Art and Knowledge" (10 minutes):**
  - Briefly discuss the importance of clean water.
  - Introduce the concept of expressing thoughts and emotions about water pollution through art.
  - Hand out educational materials briefly explaining the impact of water pollution.
- 2. Educational Segment: "Learning About Water Pollution" (10 minutes):**
  - Provide a brief overview of water pollution, its causes, and its effects using the educational handouts or infographics.
  - Highlight key points that students can incorporate into their artwork.
- 3. Watercolor Exploration: "Painting Pollution" (25 minutes):**
  - Distribute watercolor paper or sketchpads to each student.
  - Provide watercolor paint sets and brushes.
  - Use printed cards with water pollution scenarios as prompts for their paintings.
  - Encourage students to incorporate what they've learned into their artistic expressions.
- 4. Collaborative Art Display: "Gallery Walk and Learning Reflection" (10 minutes):**
  - Set up a space to display the watercolor paintings.
  - Invite students to take a gallery walk, appreciating each other's artworks.
  - Encourage a brief reflection on how their art represents what they've learned about water pollution.
- 5. Closing Activity: "Artistic Water Pledge and Quiz" (5 minutes):**
  - Ask students to create a small symbolic representation of a pledge to protect water.
  - Conduct a short discussion to reinforce the key points about water pollution covered during the educational segment.
  - Display their pledges in a designated area.

# Activity 21: Art for Clean Waters

## Scenario cards

### **Scenario: Plastic-filled Ocean**

**Effect:** The ocean is filled with floating plastic, posing a threat to sea creatures and the overall marine environment.

**Solution:** Illustrate a scene where children build a giant net to collect and remove plastic from the ocean, protecting marine life

### **Scenario: Trashy Beach**

**Effect:** The beautiful beach is covered in litter, harming marine life and making it unpleasant for visitors.

**Solution:** Use watercolors to illustrate a beach cleanup, with children picking up trash and creating a cleaner environment..

### **Scenario: Riverbank Erosion**

**Effect:** Erosion along a riverbank is depositing soil into the water, threatening the habitats of aquatic animals.

**Solution:** Illustrate a scene where kids plant trees along the riverbank to prevent erosion and improve water quality..

### **Scenario: Algae Bloom in a Lake**

**Effect:** Excessive nutrients in a lake have caused an algae bloom, depleting oxygen and harming aquatic life.

**Solution:** Use watercolors to show children planting buffer zones around the lake to absorb nutrients and prevent algae blooms.

### **Scenario: Abandoned Factory Pollution**

**Effect:** Pollution from an abandoned factory is seeping into a nearby river, threatening aquatic life.

**Solution:** Create a watercolor scene where children work to repurpose the factory and restore the health of the river.

### **Scenario: Colorless Coral Reef**

**Effect:** The vibrant coral reef has lost its colors due to pollution, impacting the marine life that depends on its vibrant ecosystem.

**Solution:** Paint a scene where creative children, equipped with eco-friendly tools, work to restore the colors and vitality of the coral reef.



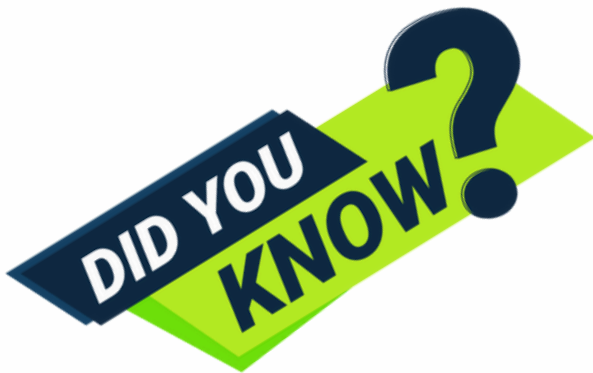
# CARBON EMISSIONS

## General description

Carbon emissions, primarily in the form of carbon dioxide (CO<sub>2</sub>), are released into the atmosphere through human activities such as burning fossil fuels for energy, industrial processes, deforestation, and agricultural practices. These emissions contribute significantly to the greenhouse effect, trapping heat in the Earth's atmosphere and leading to global warming and climate change.

## What problem it causes:

The consequences of excessive carbon emissions are multifaceted and severe. Firstly, they exacerbate global warming, resulting in rising temperatures across the planet. This, in turn, leads to melting ice caps and glaciers, rising sea levels, and more frequent and intense extreme weather events such as hurricanes, droughts, and heatwaves. Additionally, carbon emissions contribute to ocean acidification, disrupting marine ecosystems and threatening marine life. Furthermore, air pollution caused by carbon emissions contributes to respiratory illnesses and other health problems in humans and animals alike. Lastly, carbon emissions also accelerate biodiversity loss by disrupting ecosystems and habitats.



The transportation sector is a major source of carbon emissions, with cars, trucks, airplanes, and ships collectively contributing a significant portion of global CO<sub>2</sub> emissions.

The burning of fossil fuels accounts for approximately 75% of global carbon dioxide emissions.

Carbon dioxide levels in the Earth's atmosphere are the highest they've been in over 800,000 years, primarily due to human activities.

Deforestation is a significant contributor to carbon emissions, as trees act as carbon sinks, absorbing CO<sub>2</sub> from the atmosphere.

# Activity 22: Carbon Footprint Challenge

- **Title:** *Carbon Footprint Challenge Workshop Group*
- **Age:** 10–15 years old
- **Length of the Project:** 1 day
- **Description:** The workshop empowers students to tackle carbon emissions through research, project planning, and community engagement. Participants explore transportation, energy use, waste management, and dietary habits, fostering environmental stewardship and sustainable action.

## Research and Learn:

- The workshop begins with an engaging presentation or discussion about carbon emissions and their detrimental effects on the environment. Through multimedia resources, participants grasp the significance of carbon footprints and the urgency of addressing them.

## Calculate your carbon footprint!

<https://footprintcalculator.org/home/en>



## Implement Your Workshop/Project:

- Participants are divided into small groups, each tasked with focusing on a specific aspect contributing to carbon emissions
- Groups brainstorm innovative projects to mitigate carbon footprints:



### Transportation

Initiating a campaign to promote eco-friendly commuting alternatives like walking, biking, or carpooling to school.



### Energy consumption

Crafting strategies to reduce energy wastage within classrooms by advocating for responsible usage of lights, electronics, and heating/cooling systems.



### Waste management

Designing a waste reduction challenge or implementing a recycling program within the school premises.



### Food choices

Investigating the carbon footprint of different dietary options and proposing ways to integrate more sustainable food choices into school meals.

## Promote Further:

- Visually appealing posters, impactful social media campaigns, engaging presentations, or informative videos.

## Evaluate and Ask for Feedback:

- As the workshop concludes, all groups convene to share their project proposals and receive constructive feedback from peers and facilitators.



# CARBON CALCULATION

## General Description

Carbon calculation is the process of determining the amount of carbon dioxide (CO<sub>2</sub>) emissions generated by various activities, products, or entities. It plays a pivotal role in understanding and addressing climate change by providing insights into the sources and magnitudes of greenhouse gas emissions. The process involves identifying emission sources, measuring emissions using various methods, converting them into carbon dioxide equivalent (CO<sub>2</sub>e), and aggregating the data to calculate the total carbon footprint. Carbon calculation enables individuals, organizations, and governments to quantify their contribution to climate change and develop strategies to reduce emissions, fostering a transition to a more sustainable and low-carbon economy.



that scientists have a clever way to measure how much carbon we're sending into the air? It's called a carbon footprint! Just like how footprints show where we've walked, a carbon footprint shows how much carbon we produce from things like driving cars, eating food, and using electricity. By knowing our carbon footprint, we can make smarter choices to reduce it, like biking instead of driving, using energy-saving light bulbs, or eating more veggies and less meat.

When we drive cars, fly in planes, or even use electricity at home, we release carbon dioxide into the air? It's like blowing bubbles, but instead of bubbles, we're sending out invisible gases that can make our planet warmer. Luckily, there's something called carbon offsetting! This is like a superhero move where we balance out our carbon emissions by supporting projects that help take carbon out of the air, like planting trees, building wind farms, or capturing carbon underground.

that there are special rules and guidelines for counting carbon emissions? These rules, called carbon accounting standards, help make sure that when we measure carbon emissions, we're all using the same playbook. This way, businesses, governments, and organizations can track their emissions accurately and work together to fight climate change. So, when you hear about things like the Greenhouse Gas Protocol, think of it as the rulebook for saving our planet!

# Activity 23: Fill in the gaps!

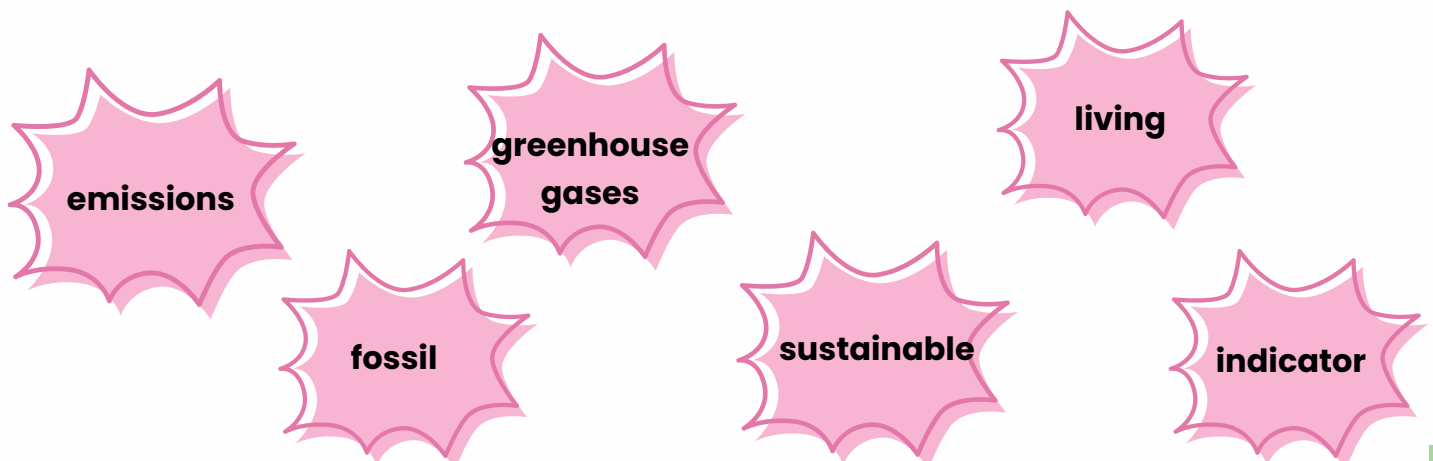
*Instructions: Read the following text about carbon footprint and fill in the gaps with the appropriate words or phrases.*

Carbon footprint is a measure of the total amount of \_\_\_\_\_ emitted directly or indirectly by human activities. These activities include burning fossil fuels for energy, deforestation, and manufacturing processes, among others. It is an important \_\_\_\_\_ of the environmental impact of individual actions and can help raise awareness about the need for sustainability and emission reduction efforts.

To calculate your carbon footprint, you need to consider various aspects of your lifestyle, including transportation, energy consumption, food choices, and waste generation. For example, driving a car produces emissions from burning gasoline, while using electricity at home generates emissions from \_\_\_\_\_ fuels like coal or natural gas. Eating meat also contributes to your carbon footprint, as livestock farming produces methane, a potent greenhouse gas.

Carbon calculation involves assessing the \_\_\_\_\_ associated with each aspect of your lifestyle and quantifying them into equivalent units of carbon dioxide, usually measured in kilograms or metric tons. There are online calculators and tools available to help individuals estimate their carbon footprint based on their activities and consumption patterns.

One way to reduce your carbon footprint is to make \_\_\_\_\_ choices in your daily life. This could involve using public transportation or biking instead of driving, turning off lights and appliances when not in use, and choosing energy-efficient products. Additionally, reducing meat consumption and opting for plant-based foods can significantly lower your carbon footprint. By \_\_\_\_\_ more sustainably and consciously, individuals can play a crucial role in mitigating climate change and preserving the environment for future generations.



# CIRCULAR ECONOMY

## General Description

The concept of a circular economy presents a fundamental shift in the way we produce and consume goods. Unlike the traditional linear model of take-make-consume-throw away, the circular economy emphasizes sharing, leasing, reusing, repairing, refurbishing, and recycling existing materials and products to extend their life cycle. By minimizing waste and keeping materials within the economy through recycling, the circular economy aims to create further value and reduce environmental impact. This approach addresses the problem of resource depletion and environmental degradation caused by the linear model, which relies on large quantities of cheap materials and energy, leading to excessive waste generation and greenhouse gas emissions. Furthermore, the circular economy challenges practices like planned obsolescence, where products are intentionally designed with a limited lifespan to encourage frequent replacement, advocating for more durable and sustainable products.

Transitioning to a circular economy offers a range of benefits that address pressing environmental and economic challenges. Firstly, it helps protect the environment by reducing the consumption of natural resources, minimizing landscape and habitat disruption, and mitigating biodiversity loss. By reusing and recycling products, the circular economy also contributes to a significant reduction in annual greenhouse gas emissions, thereby combating climate change. Additionally, by designing more efficient and sustainable products from the outset, energy and resource consumption can be reduced, with estimates suggesting that over 80% of a product's environmental impact is determined during the design phase.



Moreover, embracing a circular economy model reduces dependence on raw materials, especially critical ones needed for essential technologies, thus mitigating risks associated with supply chain disruptions and price volatility. Finally, transitioning to a circular economy fosters innovation, creates jobs, and saves consumers money in the long term by providing them with more durable and innovative products that enhance quality of life while reducing costs.

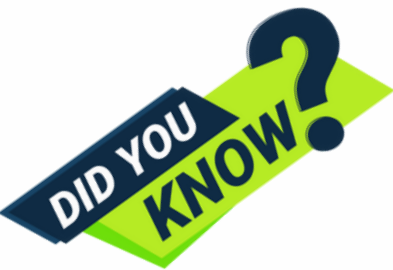
# CIRCULAR ECONOMY

## Problems Addressed

The linear economy, which follows a take-make-dispose model, contributes to resource depletion, environmental degradation, and pollution. It leads to the generation of vast amounts of waste, including single-use plastics, electronic waste, and textiles, which end up in landfills or incinerators, harming ecosystems and human health. Additionally, the linear economy relies heavily on finite resources, leading to supply chain vulnerabilities and economic instability. The circular economy aims to mitigate these problems by promoting resource efficiency, reducing waste generation, and fostering sustainable production and consumption patterns.

that in a circular economy, the goal isn't just to recycle, but to rethink the way we use resources altogether? It's like hitting refresh on our approach to stuff. Instead of tossing things out after one use, we're all about finding new ways to keep things in use for as long as possible. It's all about being smart and sustainable with what we've got!

that the circular economy isn't just good for the planet, but it's also great for the economy? Yep, that's right! By reusing, repairing, and recycling products and materials, we're not only reducing waste but also creating new opportunities for businesses and innovation. It's like a win-win situation where we get to save the Earth and boost the economy at the same time.



that some companies are already embracing the circular economy and coming up with some seriously cool ideas? From fashion brands turning old clothes into new threads to tech companies designing products that are easy to repair and upgrade, there's a whole world of circular innovation out there. It's inspiring to see how creativity and sustainability can go hand in hand to make a positive impact on the world!

# Activity 24: Upcycled T-Shirt Tote Bags

**Objective:** To teach kids about upcycling and the concept of giving old items new life through creative reuse.



## Materials Needed:

- Old T-shirts (one per participant)
- Scissors
- Fabric markers or paint (optional)
- Decorative embellishments (e.g., buttons, ribbons, patches - optional)

## Instructions:

- **Introduction (5 minutes):** Begin by explaining to the kids what upcycling is and why it's important for reducing waste. Show them examples of upcycled products, such as tote bags made from old T-shirts, and discuss the environmental benefits of repurposing items instead of throwing them away.
- **Preparation (5 minutes):** Have each participant choose an old T-shirt they would like to upcycle into a tote bag. Encourage them to select shirts with interesting designs or colors that they enjoy.
- **Cutting (15 minutes):** Instruct the kids to lay their T-shirts flat on a table and use scissors to cut off the sleeves and neckline of the shirt. Then, guide them to cut along the bottom hem of the shirt, creating fringe or strips about 1 inch wide.
- **Tying (10 minutes):** Demonstrate how to tie the strips of fabric together to close the bottom of the bag. Encourage the kids to tie double knots to ensure the bag is secure. This step transforms the bottom of the T-shirt into the bottom of the tote bag.
- **Decoration (10 minutes - optional):** Provide fabric markers, paint, or other decorative embellishments, and allow the kids to personalize their tote bags. They can draw designs, write messages, or add decorative elements to make their bags unique and expressive.
- **Reflection (5 minutes):** Once the tote bags are completed, gather the kids together for a brief reflection session. Discuss the process of upcycling and how they feel about giving their old T-shirts new life as functional tote bags. Encourage them to reflect on the environmental impact of their actions and the importance of waste reduction and creative reuse.
- **Use and Enjoyment:** Encourage the kids to use their upcycled tote bags for carrying books, snacks, or other items. This not only reinforces the concept of repurposing but also promotes sustainability in their everyday lives.



## Final Thoughts

As we reach the conclusion of this enriching journey through sustainability, environment, and climate change, let us reflect on the profound impact and limitless potential that lies within the hearts and minds of children and students. Here are some key insights to carry forward:

- 1. Igniting Action:** Through exploration and engagement, children are inspired to take meaningful action towards a more sustainable future. Their enthusiasm and determination serve as a beacon of hope for positive change.
- 2. Seeding Hope:** Amidst the challenges we face, each interaction with these crucial topics is planting seeds of hope for a brighter tomorrow. It is through nurturing these seeds with care and dedication that we cultivate a sustainable world for generations to come.
- 3. Urgency of Now:** The urgency of addressing climate change and environmental degradation cannot be overstated. It is imperative that we act swiftly and decisively to safeguard our planet and its inhabitants. The time for action is now.

## Results and Impact

Beyond the pages of this learning material, its true impact resonates in the hearts and minds of young learners. Armed with knowledge, empathy, and a sense of responsibility, they are poised to be leaders of change in their communities and beyond.

As we look to the horizon, let us draw strength from the collective resolve to create a future where sustainability is not just a goal, but a way of life. Together, we can chart a course towards a world defined by resilience, sustainability, and hope.

Thank you for embarking on this journey with us. The future is ours to shape, and with determination and collaboration, we can create a world that thrives for all.

Thank you!



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Co-funded by the  
Erasmus+ Programme  
of the European Union