

LET'S SAVE OUR ENVIRONMENT AND OUR FUTURE

Project number: 2021-1-DE03-KA220-SCH-000023948



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the European Union**



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Aim

Context

Learning environmental activities outdoors

1. Module Air pollution and climate change STEAM Applications and Experiment K

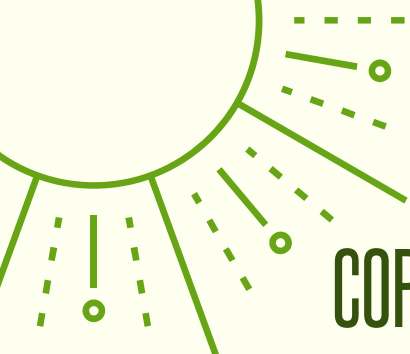
2. Module Climate Change, Water Pollution (Baltic Sea), Natural Disasters

3. Module Soil Pollution and Formation

4. Module Waste Recycling, Renewable Energy Resources and Saving

Closing Final Remarks



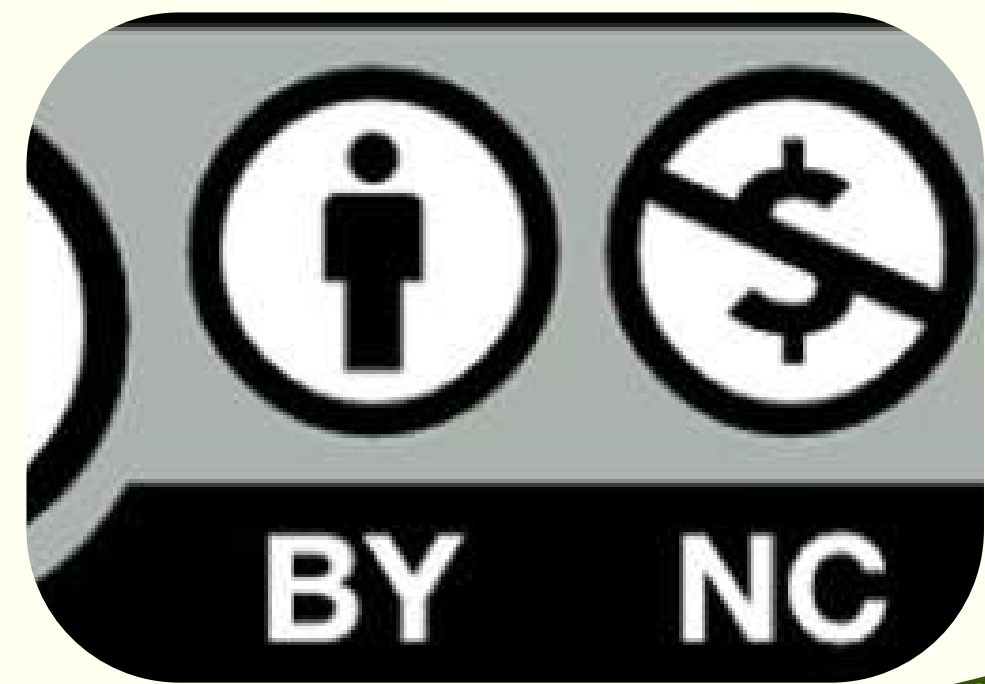


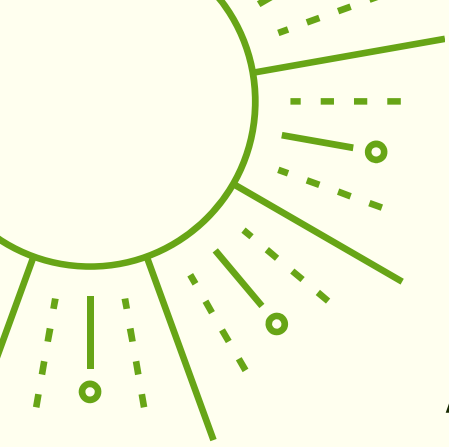
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1. AIM

We aimed for children to be environmentally conscious by receiving environmental education from an early age through the transnational mobilities we carry out thanks to our project and the activities we carry out in school and outdoors. The main goal is to raise awareness of environmental pollution by understanding the relationship between global warming and environmental pollution. To increase contact with nature by gaining environmental skills that give importance to sustainability and recycling from an early age. Thanks to our project, we aim to understand the importance of nature for the human generation through nature-friendly activities and to raise awareness that there is no other world and therefore we should all protect nature.

We aim to transfer our activities and environmentally friendly kit to future generations by establishing environmental awareness. This ebook we have created supports this goal.



1. CONTEXT

In addition, thanks to Erasmus+, we aim to develop the educational activities within our activities, which are also included in the ebook, by increasing the environmental awareness of every audience we can reach, and to encourage them to take part in such projects. In this way, it aims to raise awareness about global problems such as environmental pollution and to pave the way for children to gain knowledge and skills on issues such as renewable energy, recycling, and reducing environmental pollution; and to make positive changes in their behavior that respects the environment and nature from a young age.



Students, who had the opportunity to observe the ever-increasing environmental problems and the importance of recycling through different activities, had the opportunity to connect with the natural world and encounter real examples of the damage caused by climate change. They had the chance to learn by planning experimental hands-on activities. Educational activities can be adapted to wider audiences. It can be a light to many educators.

The test was carried out between the ages of 7-10 and 11-15. All activities were designed to include these two groups.

On the other hand, in the ebook you will also find:

Thanks to Erasmus +, where experiments and simple laboratory studies are carried out and you contribute to the development of basic competencies, you will observe how environmental awareness spreads to large masses with our project.





OBJECTIVES

To be able to make experiment kits to discuss the subject of STEAM, to get to know the scientific method, to monitor some of the relevant environmental parameters. We conducted real STEAM experiments on Arduino or similar technologies and on a small scale.

An interactive presentation was given to all participants by Alessia Tricomi, Director of the Sicilian Center for Nuclear Physics and the Structure of Matter (CSFNSM).

CLIMATE CHANGE

Climate is the variability and average values of atmospheric elements, defined by long-term statistics, such as the average state of all weather conditions experienced or observed over many years in any part of the world, or, in a more systematic approach, the synthesis of weather conditions in a particular region. According to the United Nations Framework Convention on Climate Change, "Climate change" is defined as the change in climate resulting from human activities that directly or indirectly disrupt the composition of the global atmosphere, in addition to natural climate change observed over comparable time periods.



ENVIRONMENTAL POLLUTION

Environmental pollution can be defined as the degradation of natural habitats by human-made and unnatural means, and as a result, the vital activities of living things are negatively affected.

Although environmental pollution is a very general expression, it covers the following pollution areas:

- Air pollution,
- Water pollution,
- soil pollution,
- Noise pollution,
- visual pollution,
- Light pollution,
- electromagnetic pollution,
- radioactive pollution



AIR POLLUTION

Air pollution is the change in the natural composition of the air for various reasons and the presence of solid, liquid and gaseous foreign substances in the air in concentrations and periods that may harm human health, living life, ecological balance and property.



To leave a clean environment to future generations:

We must transition to sustainable energy sources, reduce polluting activities and promote green infrastructure.



AIR POLLUTION

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CAUSES OF AIR POLLUTION



Carbon Monoxide

Carbon monoxide, released as a result of incomplete combustion of fuels used in homes or workplaces, reduces the amount of oxygen in the blood. Additionally, carbon monoxide, also found in cigarette smoke, can cause serious respiratory diseases.



Forest fires

Forest fires are also important factors that cause the release of harmful gases. In addition to causing air pollution, it also causes the destruction of living creatures and the living layer of the forest.



Heating Methods

Coal is used for heating purposes but causes air pollution.

Natural gas is a cleaner fossil fuel in terms of emissions when compared to coal and oil.



Industrial Pollution

Industrial facilities that do not use clean energy sources or do not have filters in factory chimneys are among the most important causes of air pollution.



Pollution from Traffic

It includes pollution from vehicle exhaust fumes. In high-traffic areas, this type of pollution can be particularly high.

All of these factors can harm human health and the environment by affecting air quality. Therefore, air pollution can be reduced and a healthier environment can be maintained by taking measures such as turning to clean energy sources, using filters in industrial facilities, and reducing traffic density.

We Collected Water and Soil Samples.

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We are going for a walk in nature!!

Your task:

Record at least 5 observations

Our planet can be thought of as a single large system (geosystem) consisting of four interacting spheres (hydrosphere, atmosphere, lithosphere or geosphere, biosphere).

Think about this while walking...

What do you see?

What is happening in nature?

Have you noticed any changes?

Even something simple is important!

To remember:

Silence please!

Be respectful of nature and other students



STEAM AND EXPERIMENTAL KITS

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Material We Use: Micro:Bit

This environment expansion card is closely related to natural sciences.

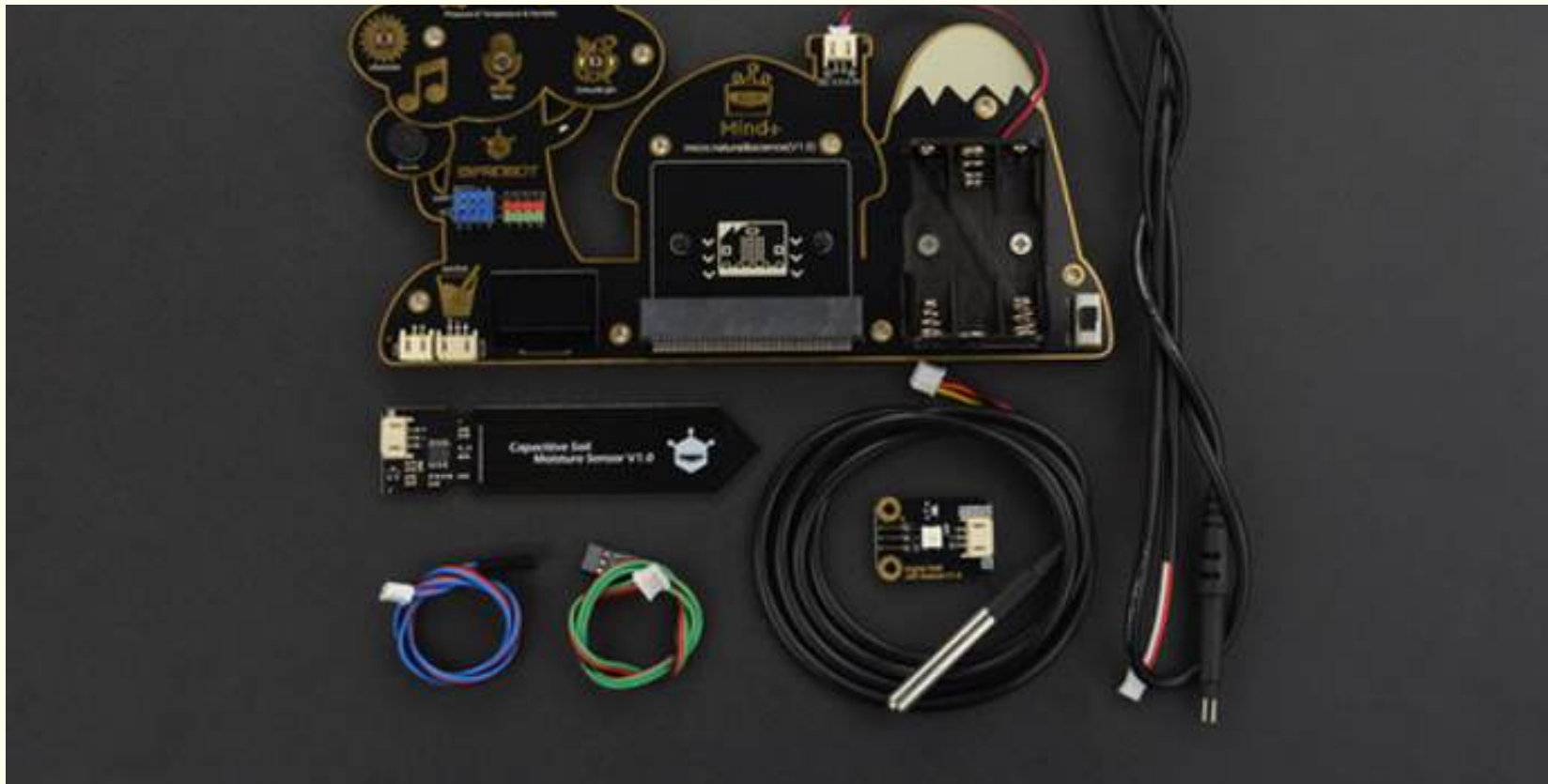
We integrated multiple sensors such as atmospheric pressure, temperature, humidity, UV rays, light, color, sound, water quality, water temperature, soil moisture into this expansion board. Thanks to these sensors, measurements can be made to cover all fundamental aspects of natural sciences and daily life.

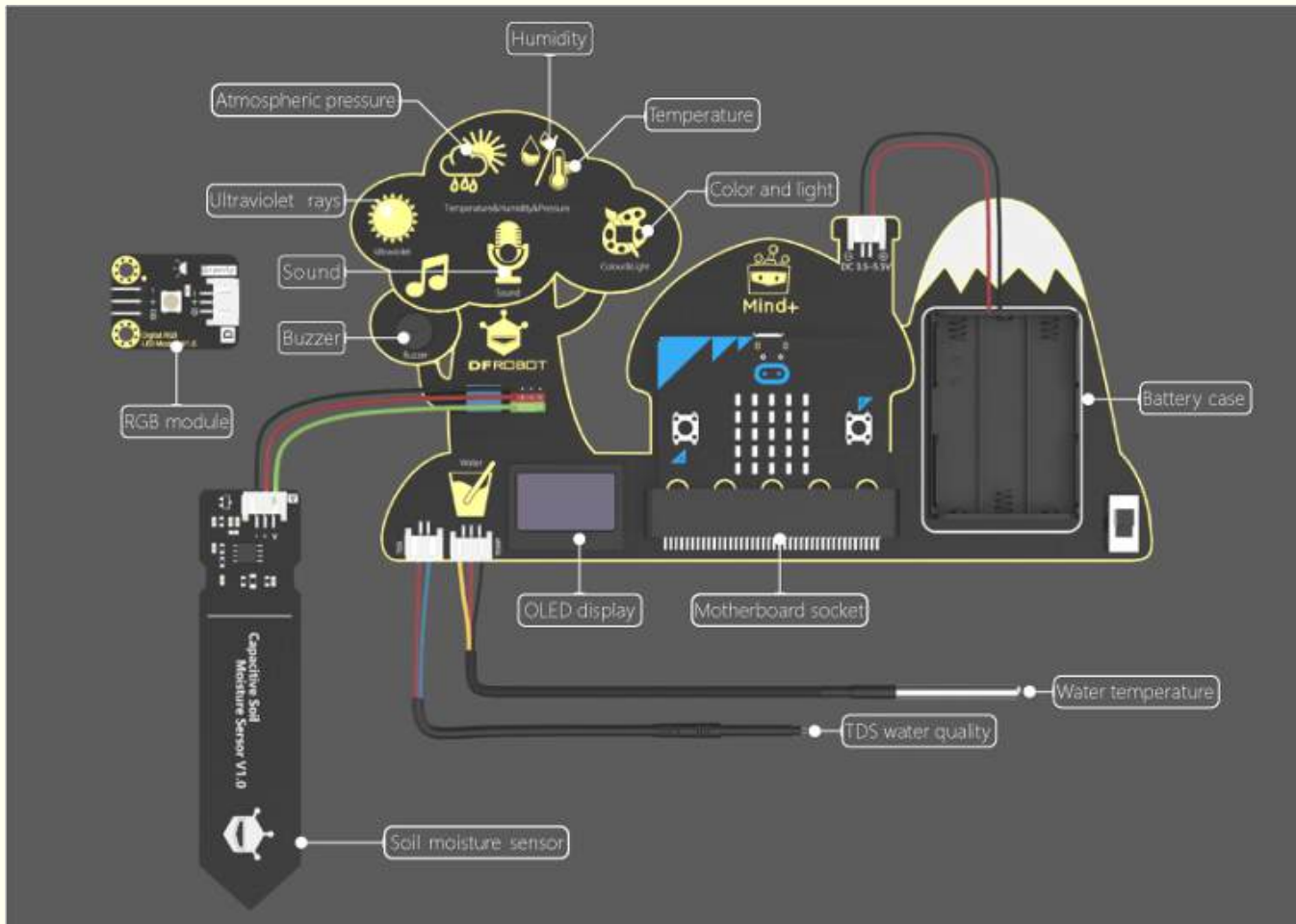
During the learning process, students learn the measurement principles of various natural data and can analyze these data by programming their own graphic programs. This card allows students to explore science and make practical applications, while also monitoring environmental factors using technology.

Experiment #1 TEMPERATURE

To test the temperature, go to <https://makecode.microbit.org> and download this file or do the programming on the next page:

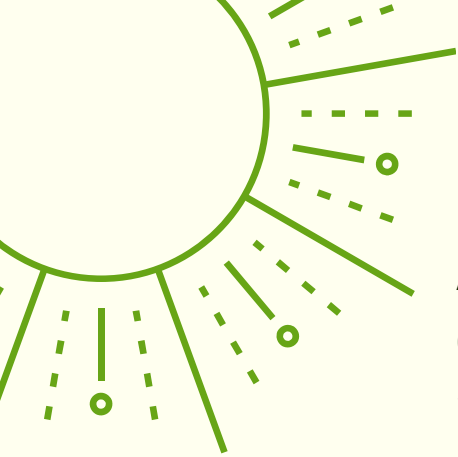
Let's do some coding and testing with Micro Bit





```

no arranque
para index de 0 a 4
fazer
  clear OLED row index + 1
para sempre
  request data
  OLED from column 1 to 16 in row 1 display string juntar "T:" temperature(°C)
  serial escrever valor x = converter para número temperature(°C)
  pausa (ms) 2000
  
```

MAJOR HEALTH EFFECTS

Asthma, Allergy, Chronic obstructive pulmonary disease (COPD) and Cancer Air pollution is an important health risk factor in Europe and around the world.

A recent global study on diseases found that air pollution is one of the top ten health risk factors worldwide.



1. Approximately 7 million people worldwide die prematurely due to air pollution; 400,000 people in the European Union (EU) suffer premature death.
2. The Organization for Economic Co-operation and Development (OECD) predicts that outdoor air pollution will be the first cause of deaths due to environmental conditions worldwide in 2050. Pollution has been classified as one of the most important environmental factors causing cancer.

SIMPLE EXPERIMENTS



Measuring the drinkability (Ph) of water with litmus paper and separating water from foreign substances

Were observed in a STEAM-based laboratory environment experiment, the measurement of the drinkability (Ph) of water with litmus paper.



MODULE 2

Ecology, Water Pollution (Baltic Sea),

Water pollution is the negative change in the quality of water.

GOALS

To realize the benefits of production and consumption and green skills for a sustainable environment, we experienced measuring water pollution with our environmentally friendly kits. This was learning by doing and experiencing. To be a part of nature with permanent learning about the future, to have the awareness of protecting it, and to understand the necessity of recycling and sustainable energy resources. Starting to integrate green skills into our daily lives.





Water pollution

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An interactive presentation was made, prepared by key people and science teachers, by our Estonian partner on water pollution and its prevention and promotion of green skills.

Water pollution is a major environmental problem that causes pollution of seas, oceans, lakes and rivers around the world. Marine pollution occurs as a result of various factors such as human waste disposal, industrial activities, use of pesticides and plastic. Wastewater from industrial facilities can cause harmful chemicals to enter the seas and oceans and disrupt the balance of aquatic ecosystems. Fertilizers and pesticides leaching from agricultural fields also contribute to water pollution, as these chemicals enter water bodies and affect aquatic life.



EXPERIMENT

Equipment;

- 4 glasses of dirty water
- 1 Empty glass Filter funnel
- paper filter
- Sawdust
- chalk powder
- Wooden sticks.

Since oil pollution is the most dangerous for water, we conducted experiments on how to purify water from oil. Our students witnessed the pollution in the seas with this experiment. We raised awareness to prevent this pollution.





GREEN ENTREPRENEURSHIP

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Realist is an online marketplace where a manufacturing company can sell excess materials and products to save money, reduce waste going to landfill, and develop new business opportunities.

Green entrepreneurship is productive activity that involves brightly developed entrepreneurship to address and solve relationships and social issues and problems.

TRANSITION TO GREEN

Greenshift is a ridesharing app for commuters. The service makes it easy to plan trips and share costs.



GreenShift



Sustainable development in Estonia Fair and Sustainable Fashion

Do you know that clothes can be not only beautiful, but also respectful of the environment, natural resources, workers and consumers' health? Discover fair and sustainable fashion. Sustainable Materials Cotton, linen, hemp, wool as well as innovative materials such as Tencel® or fabrics made from orange and pineapple fibres: discover organic and sustainable materials that are beautiful and safe to wear.



Sustainable Materials

I AM NOT
A COAT





Sustainable Development in Estonia Fair and Sustainable Fashion

sustainable fashion

Reed Aus is a qualified fashion designer and environmental activist, a rebel who founded REET AUS COLLECTION® and THE UPSHIRT. He is a pioneer in the field of industrial upcycling for fashion and developed the UPMADÉ® certification to transfer his knowledge to brands and factories.



It's a cruel industry

A soft and warm fur coat... You'd better leave it to the owner. The fur industry often kills animals in cruel ways and pollutes the air and water.

I AM NOT
A COAT





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GREEN ENTREPRENEURSHIP

Estonia is among the best countries in the world in terms of sustainable development indicators, which take into account the harmonious development of social, economic and environmental spheres. Estonia ranked 10th globally according to the Sustainable Development Report 2021. These t-shirts are made using pieces of fabric called 'waste', which are routinely discarded during production, normally dumped on the factory floor and thrown away. Cleverly designed by ethical fashion pioneer and upcycler Reet Aus, perfectly fine little pieces of high-quality cotton jersey have been transformed into extremely cool and wonderful little t-shirts. These red/pink t-shirts are made from GOTS (Global Organic Textile Standard) certified organic cotton. This product is UPMADÉ® certified. Made using surplus materials, it meets international labor standards and avoids restricted hazardous chemicals. Each product saves 91% water and 92% energy. August is an ethical clothing brand that combines natural, organic materials with innovative design. The harmony between comfort, practicality and style is the main concept behind the design process. August is characterized by simplicity, minimalism and functionality. The structure of clean forms, refined lines and quiet expression embody these collections, which are suitable for anyone who appreciates elegant clothes as well as sustainability in clothing design. August was founded by Estonian designer Äli Kargoja (Studio Bercot, Paris), who returned to his native Estonia to further his vision of clothing design after gaining experience in the ateliers of Nicolas Andreas Taralis and Maison Martin Margiela. ClimateLaunchpad is the world's largest green business ideas competition. It has been held in Estonia since 2015. Ekotekt produces quality houses at affordable prices. Reduces construction time by up to 70% with large-scale 3D construction printers. Ekotekt houses are more sustainable thanks to the waste materials used in the concrete walls. Our strategic goal is to have a living environment that takes into account citizens' needs, quality requirements and security by 2035. Estonia has joined the EU Green Deal, which stipulates that climate change and environmental changes are an existential risk for all of Europe and the world. GetElectric follows the business model of AirBnB and Uber. They crowdsource their Electric Car Charging Service. GetElectric provides extra income to venues and households and encourages the adoption of Electric Cars.

AWARDS

According to the Northern Europe Business Report (2017)
One of the Top 20 Responsible Leaders in Northern Europe

White Star N glory, class V (2016) Nordic Business Report (2015)
One of the Top 20 Women in Business

Second Place in the I:COLLECT Award (2015) Second Place in the European Environmental Business Awards (2014) Woman of the Year (Estonian Business and Professional Women's Association 2014) Notable Young Estonian (Junior Chamber International Estonia 2014) Environmentally Friendly Company (Ministry of Environment 2013) Civil Society Entrepreneur of the Year (Estonian Network of Non-Profit Organizations 2013)

The company Reet Aus helps create a circular economy for fashion. By keeping your design needs first, they create new eco-friendly clothing from materials left over during production. The circular economy, by design, produces zero waste and pollution. It is an ideal that the UPMADE® method supports in reality and practice. An average of 18% textile waste occurs in traditional clothing manufacturing.





POLLUTION IN THE SEAS

Baltic Sea



The Baltic Sea is one of the most polluted areas in the world and has a shallow structure, with an average depth of approximately 60 meters. The Baltic Sea is an almost closed sea and is connected to the oceans only through the narrow Danish straits. This sea is one of the world's busiest trade routes, hosting between 1800 and 2000 ships at any given time. Historically, the Baltic Sea was a large freshwater lake and merged with the ocean about 8000 years ago. One of the main environmental problems of the Baltic Sea is the mixing of large amounts of nitrogen and phosphorus into the water due to wastewater from agricultural areas, cities and waste from some industrial enterprises. This causes organic matter in the sea to fail to break down fully and oxygen levels to drop, leading to the release of hydrogen sulfide, which is harmful to marine life. The second biggest problem in the Baltic Sea is oil-related water pollution. Every year, thousands of tons of oil enter the sea through various wastewaters. Many of our daily activities can have negative impacts on the Baltic Sea. Therefore, it is important to take various measures to protect and improve the marine ecosystem.

IDEAS FOR GAINING GREEN SKILLS



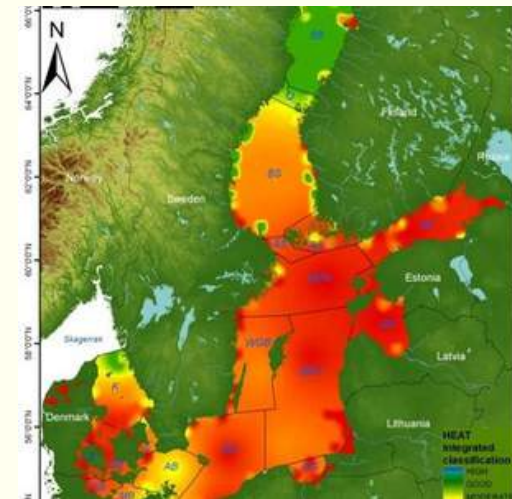
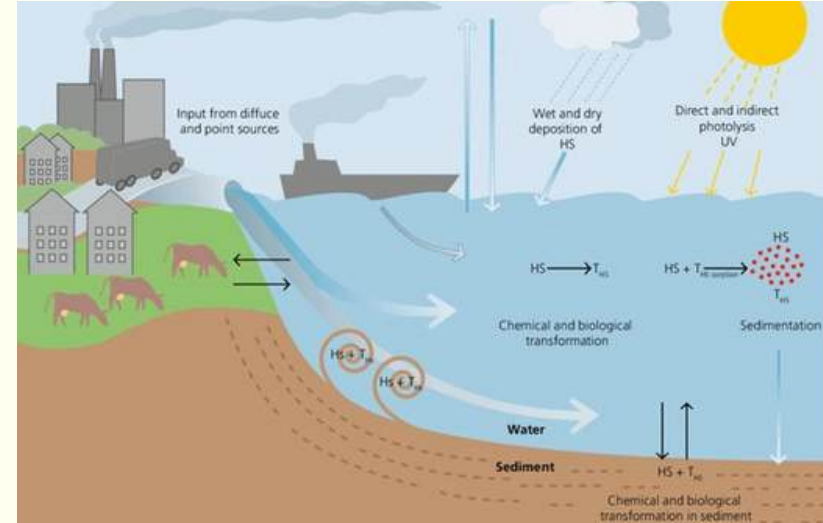
If you have a choice, choose products made from recycled materials. If possible, buy second-hand and quality products (clothes, consumer goods); Choose used, not new, and find opportunities for items you no longer need (furniture, clothes, children's toys, etc.) to live a "second life."

Be careful to separate garbage according to their characteristics and reduce waste, do not pollute water and resources, be careful about saving water, pay attention to energy consumption and turn to renewable energy sources.





BALTIC SEA ECOLOGY



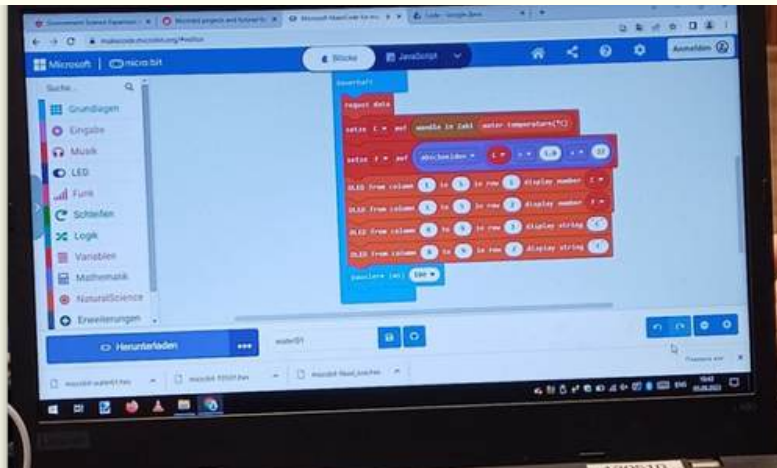


BALTIC SEA ECOLOGY

The Baltic Sea is home to the world's largest amber reserves. The Baltic Sea reserves were formed 44 million years ago, when the region was covered by temperate forests. Today, amber is used in decorative objects and alternative medicine. Marine species such as the grey seal (*Halichoerus grypus*) and the harbour porpoise (*Phocoena phocoena*) have seen their populations drastically reduced in the region due to chemical pollution, hunting and noise pollution. According to marine biology experts, the main risk that pollution poses to the Baltic Sea is the eutrophication of the water. The accumulation of nitrates and phosphates from pesticides and agrochemicals is responsible for the process, which removes oxygen from the water, putting marine life at risk.



WE MEASURED THE PH AND TEMPERATURE OF THE WATER BY TAKING SAMPLES FROM THE WATER IN THE BALTIC SEA WITH ENVIRONMENTAL KITS.



Experiment #2 Water Type To test water type [https:// makecode.microbit Go to org/](https://makecode.microbit-go.org/) and download this file or do the programming in the image.

PRODUCT LIFECYCLE ASSESSMENT



▶ 1. EXTRACTION OF RAW MATERIALS

- fossil extinction
- Pollution of surface and groundwater
- Energy consumption - solar, wind.

▶ 2. PRODUCT MANUFACTURING

- Energy, Water consumption
- air emissions
- Pollution of surface and groundwater
- soil pollution

▶ 3. PACKAGE

- Use of packaging materials

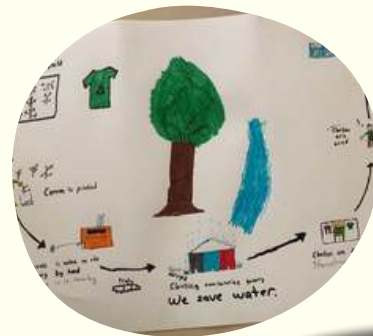
▶ 4. PRODUCT USE



▶ 5. DESTROY



THE PROCESS FROM RAW MATERIAL TO OUR HOME



TRADITIONAL ESTONIAN DOLLS FROM RECYCLED MATERIALS

The materials are old fabrics, bulgur, rice, etc.



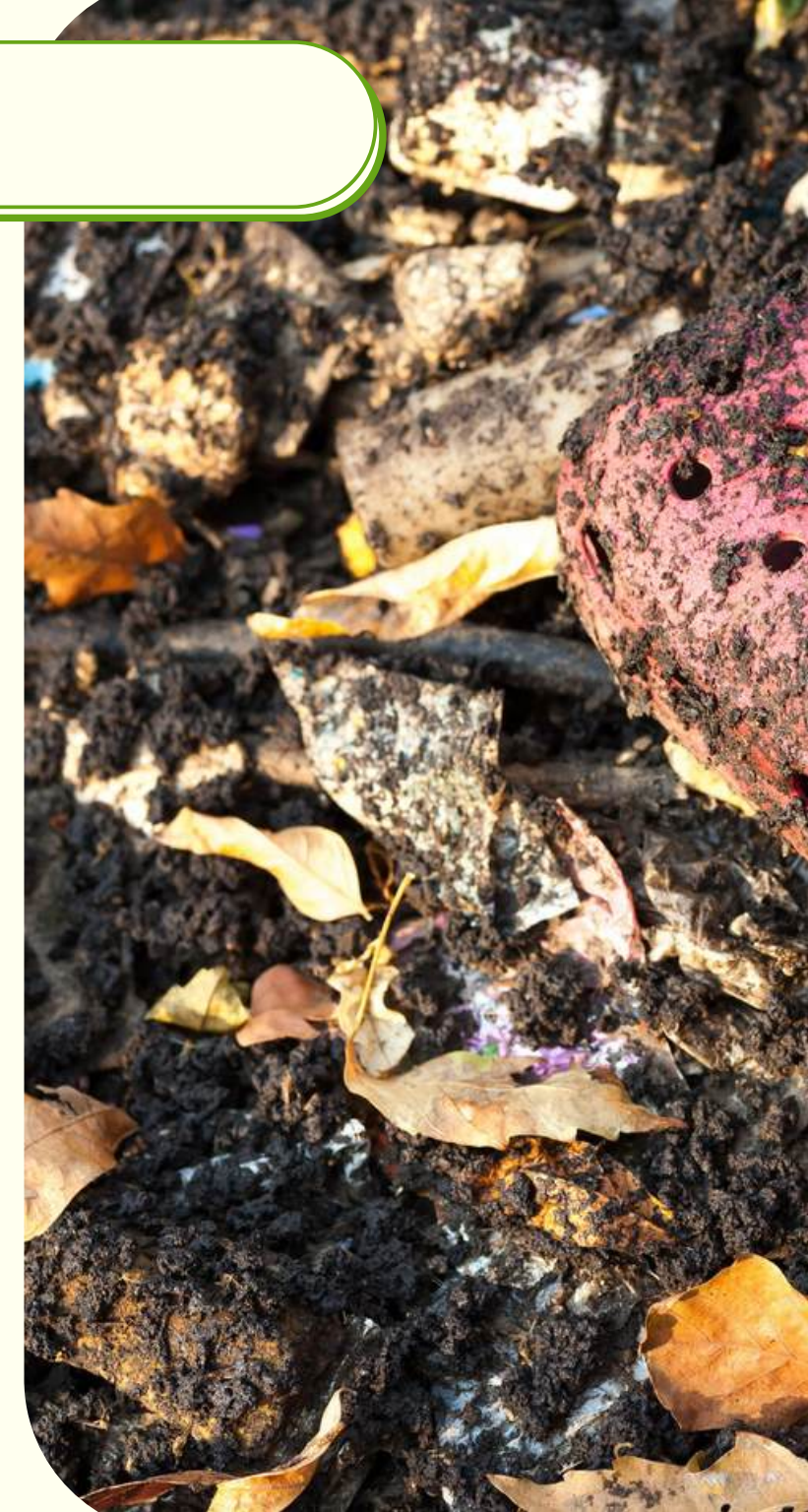


GOALS

All participants reflected on the causes and consequences of environmental and soil pollution. They participated in STEAM-based activities and the IBSE (Inquiry-Based Science Education) approach to encourage children to think in a laboratory environment.

We have obtained the following information.

What is soil pollution? Things that harm our land. How our waste causes damage when spread on the soil. This waste can be solid, but also chemical, which damages our soil. Soil is our source of life. How can we reduce soil pollution?



What is Noise Pollution?

Noise pollution, also known as sound pollution, is any human, animal or machine-generated sound formation that negatively affects human or animal life and disrupts its balance. The source of outdoor noise worldwide is mainly from machinery, transport and transportation systems.



Noise pollution is harmful to human health!

What is Soil Pollution?

Soil pollution is the degradation of the physical and chemical properties of the soil by solid, liquid and radioactive residues and pollutants. “Just as humans cannot live without air and water, it is also not possible to live without soil and the nutrients it provides.



Without our land, we would starve.

SOIL POLLUTION AND SOIL ANALYSIS

Dr. Livio Caruso presented an interactive presentation about causes and consequences of soil pollution. This presentation was made by Dr. Alessia Tricomi, Director of the Sicilian Center for Nuclear Physics and the Structure of Matter (CSFNSM).

This work focused on the measurement of soil parameters/properties through STEAM applications.



TESTS WITH OUR ECO-FRIENDLY KITS

Teacher Vanda Franco also showed the Soil Moisture experiment to track the soil moisture of plants!

To do that she used these materials:

1 micro:bit with battery pack and batteries

2 long nails or silver

2 crocodile clips

Here's what you connect your soil moisture sensor:

Connect a nail to the 3V pin with a croc clip and insert it into the soil.

Connect the other nail to the Po pin with a croc clip and insert it into the soil.

The soil itself has some electrical resistance which depends on the amount of water and nutrients in it. It acts like a variable resistor in an electronic circuit.

The water is not conductive but the nutrient content is. The combination of water and soil nutrients makes the soil have some conductivity. So, the more water there is, combined with the nutrients, the less the soil will have electrical resistance.

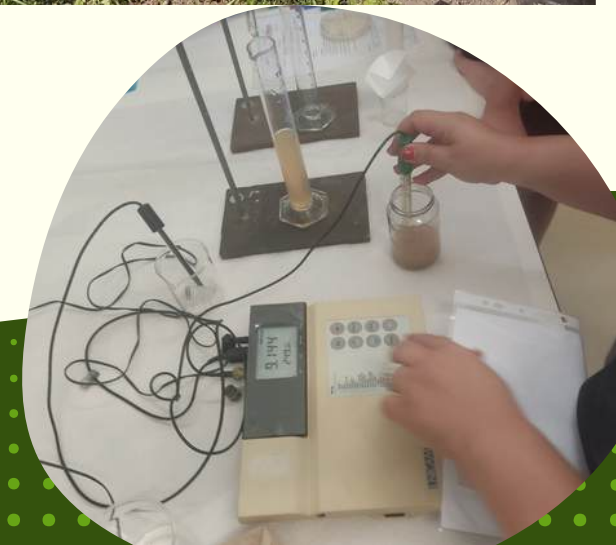
To make this experiment go to Código (microbit.org) and follow instructions.



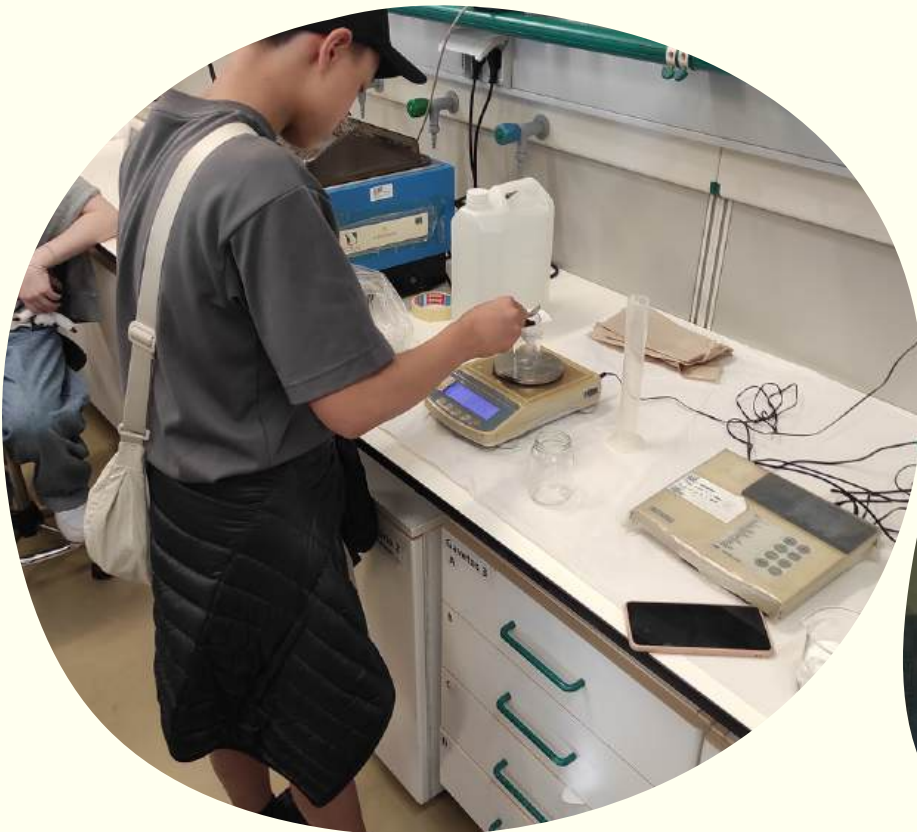


Visit to Isoplexis at the University of Madeira

During the visit to Isoplexis, a group of researchers, Cristina Oliveira, Sofia Valente and Gregório Freitas, in a very friendly and enthusiastic way, made known the experimental field and the laboratory where, among other contents, we learned about three techniques for monetizing the soil: Mulching or stuffing, application of Biochar in the Soil and Green Manure. We also had the opportunity to carry out some experiments in the ISOPlaxis laboratory. To know more about visit [ISOPlaxis \(uma.pt\)](http://uma.pt)



Orography and soil of the island of Madeira During this Erasmus+ exchange we had the opportunity to get to know the orography of the island of Madeira



MADEIRA ISLAND



Madeira Island is one of the most beautiful travel destinations in Europe, to which thousands of tourists return every year; because not only does it offer wonderful fauna and flora as well as a summer climate all year round, it is also virtually crime-free and one of the best in the world. Also, our island is a very safe holiday destination. Our guests learned that on the island of Madeira, the relief is rather uneven, dominated by rocky mountains intersected by deep valleys with steep slopes.



The island of Madeira, with an area of 741 km², is an oasis in the Atlantic where a great natural and cultural richness is preserved among forests, cities, beaches and mountains. Madeira Islands are a Portuguese archipelago of volcanic origin in the North Atlantic Ocean. Funchal, the capital of the region, is located on Madeira Island. Agriculture has long been the dominant activity of the islands of Madeira and Porto Santo. Crops historically grown on the islands include sweet potatoes, various types of gourds, vegetables, cereals, sugar cane, and a variety of fruits such as oranges, lemons, guavas, mangoes, loquats, custard apples, figs, pineapples and bananas. Banana plantations and vineyards now predominate, and bananas and the Madeira wine of the same name are among the most important exports. Other economic activities include sugar processing, fishing and crafts such as woodworking, wickerwork and embroidery; the last of these was introduced to Madeira in the 1850s by Elizabeth Phelps, the daughter of a British wine shipper.

Land and Plant Analysis Center, located at the Agricultural Quality Laboratory in Camacha.

The visit was directed by Dr. José Brito, who, in a very enthusiastic and friendly way, explained and exemplified all the procedures that are carried out, from the reception of the soil sample, to the procedures carried out for its testing.

In this laboratory they analyze soil samples to perform analytical determinations of total nitrogen, phosphorus, potassium, sodium, calcium, magnesium, iron, copper, zinc, manganese and boron. Soil and substrate analyses consist of chemically analysing soils and substrates and also analysing soils in their physical properties.

We were also able to observe, granulometrically, the clay, silt and sand contents (essential parameters for the classification of soil texture).

To know more about visit [As análises de solos e de plantas \(madeira.gov.pt\)](http://madeira.gov.pt)



While doing this, we observed the separation of molecules in the laboratory environment.

ORGANIC FERTILIZER (COMPOST) AND ANIMAL WELFARE

Dr. Cláudia Costa Barreto, from the Madeira Zootechnical Station, developed the composting of organic materials and gave us the opportunity to build a "homemade" composter with reused materials.

5 Freedoms of Animal Welfare

- Free from hunger and thirst
- Free from discomfort
- Free from pain, injury and illness
- Free to express your normal behavior
- Free from fear and anguish



HOW TO MAKE COMPOST?

1. Cut brown and green waste into small pieces
2. Randomly place thick branches at the bottom of the composter (promoting ventilation and preventing compaction).
3. Add a coat of Brown.
4. Add no more than a handful of soil or ready-made compost. This amount will contain enough microorganisms to start the composting process.
5. Add a layer of Green.
6. Add another layer of Browns on top.
7. Water each layer to maintain adequate moisture content.
8. Repeat this process until the compote is full.
9. The final layer to be added should always be Brown to reduce odor problems and the proliferation of insects and other unwanted animals.

References:

<https://gardeningscan.com/>

WHY IS ORGANIC FERTILIZER (COMPOST) GOOD?

Why Is Composting Good for the Environment?

Composting is one of many methods to reduce your ecological footprint. There are many benefits to composting, from saving water to benefiting the environment.

1. Composting helps reduce the amount of waste going to landfills.
2. Composting helps improve the environment by reducing greenhouse gas emissions.
3. Composting is good for the soil because it helps improve the quality of the soil.
4. Composting is good for the animals living in the environment because it helps reduce their waste output.
5. Composting is good for your health because it helps improve your respiratory system and overall health.



FIGHTING SOIL POLLUTION

The use of agricultural areas for other purposes (as areas where settlements and industrial facilities are established) should be prevented. Our forests, which are an important shield against CO₂ gas that pollutes the air by causing a greenhouse effect, should be legally protected, and an inventory and biotope maps of our areas rich in tree and animal species should be made.

To prevent soil erosion, areas where forests have been destroyed should be covered with grasslands (steppe and savannah). Artificial fertilizers containing macro and micro nutrients used in agriculture should be applied when needed after determining the amount, method and application location, taking into account the soil - plant type, chemical properties of the soil and the fertilizer.



To leave a clean environment to future generations

It is important to preserve clean lands for future generations. Soil pollution can be reduced with solutions such as recycling, organic farming practices and waste management. In this way, a healthy and productive environment can be passed on to future generations.

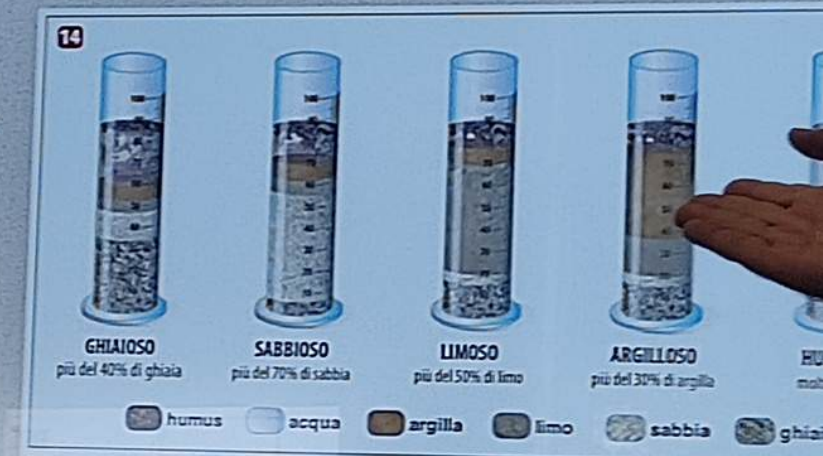


FIGHTING SOIL POLLUTION

Additionally, the use of biological fertilizers that do not pollute the soil and are economical should be encouraged. When using pesticides that pollute soil and groundwater, their half-lives should be taken into account or biological control should be carried out in a way that does not adversely affect soil creatures and humans. Livestock should not be given water, feed or hay containing biocide residues. Industrial and nuclear facilities should be built in areas far from agricultural and residential areas. All kinds of waste that creates pollution should be collected in a planned manner, classified according to their types, and should not be discharged into the ground without treatment. Importance should be given to the construction of recycling and treatment facilities required for the use of waste materials. Necessary laws and regulations should be enacted before too much damage is caused to the environment, and necessary sanctions should be applied to those who do not comply. Award ceremonies should be organized to ensure that others pay attention to this issue, and the media should also support this. Renewable (solar, hydroelectric, wind, biomass and geothermal) energy alternatives should be used instead of fossil fuel consumption, which causes the greenhouse effect, ozone layer depletion and acid rain, and whose reserves are depleted.

Soil weaving

It is the texture, or grain, which indicates which type of granule it contains, it may happen that a soil is made up of a large quantity of humus and little gravel and so on. If a soil contains a lot of silt, clay and humus there are in a soil, it is necessary to mix them at the bottom of the container so that the various components do not sediment. The percentage distribution of the various components is classified as: gravelly, sandy, silty, clayey, humous.



Promethean

Plastic Recovery and recycling targets and annual action plan to combat plastic waste management

GOALS

The aim is to gain insight into how waste pollutes our environment and how energy can be used.

How can we use nature in the most efficient way, how can we prevent waste, how can we use the waste we produce in creative and beneficial ways.

Doing experimental STEAM applications, Learning recycling waste management, Being aware of how waste pollutes our environment, how energy can be used in the most efficient way, how we can reduce waste and how we can use the waste we produce creatively and beneficially, Understanding the importance of waste prevention and recycling.



VISIT TO LOCAL RECYCLING FACTORY

With the visit to the local garbage recycling factory, our participants attended the interactive presentation on recycling prepared by the experienced employees of the factory. They had an idea about how these studies were formed and continued.

They had the opportunity to see the process through the recycling stages on site. In this way, they witnessed this process that was explained theoretically.





**MAKING RHYTHM INSTRUMENTS FROM RECYCLING MATERIALS.
THIS IS A MINI CONCERT WITH ALL PARTICIPANTS WITH THE INSTRUMENTS WE MADE.**



WE VISITED THE KLIMAHAUSS BREMERHAVEN SCIENCE CENTER

We have crossed five continents and nine regions. We sweated, we froze, most of all, we talked about the daily lives of people from all over the world and witnessed how the climate affects them.

A BREATHTAKING JOURNEY WE EXPLORE 9 REGIONS OF THE WORLD THROUGH CLIMATE



Klimahaus Bremerhaven is a mixture of a science center and theme park. It showcases the unique world of weather, climate and climate change knowledge and experience, also making it a climate museum. We traveled around the world across eight longitudes, experiencing the world's exciting and spectacular climate zones up close.

<https://www.3-n.info/wissen-und-service/klimacenter-werlte/bildungsangebot-biooekonomie-rallye.html>



VISIT A LOCAL LANDFILL



**IN OUR LOCAL WASTE SITE VISIT;
AUTHORIZED PERSONS WE HAD THE
CHANCE TO OBSERVE THE STAGES
FROM THE FIRST STAGE OF WASTE
TO THE LAST STAGE WHEN IT IS
RECYCLED.
WE REMEMBERED THE IMPORTANCE
OF RECYCLING ONCE AGAIN.**



Visit to the “Haus im Moor” in Goldenstedt (This is a swamp.) We take a trip around the swamp on a small train, did some science activities.

As we went deeper, we observed the differences in soil profiles.

<https://www.niz-goldenstedt.de/>
We are mining soil.



EXPERIMENTS

Science experiments (Germany, C4) – Recycling and Waste Management

The 2030 Agenda, adopted by all United Nations members, established 17 world Sustainable Development Goals (SDGs).



SUSTAINABLE DEVELOPMENT GOALS



Air Quality - Preparation

01

Hardware Connection Connect the Microbit single-board computer with a USB cable.



02

Software Installation: You can access the software by visiting the website. <https://makecode.microbit.org/>

03

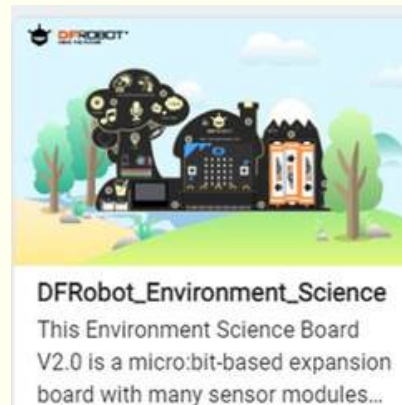
Start a new project:



Click on the "Extensions" button.



Select:



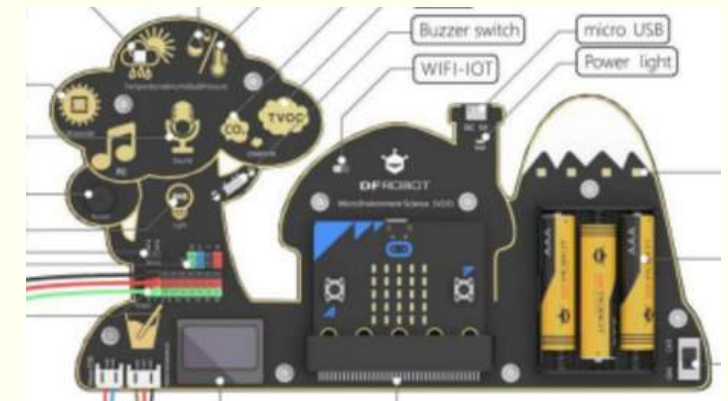
04

Program this by putting blocks together.



05

Connection with "Environment Card". Insert the single-board calculator called "Micro:bit" into the "Peripheral Card". Insert three AAA (micro) batteries. Open the "Peripheral Card" with the switch in the lower right corner.



Station 1b Air Quality - Air quality



13 CLIMATE ACTION



One of the goals of the United Nations is to take immediate action to combat climate change and its effects.

Through the media we often encounter the fact that the CO₂ content in the atmosphere is increasing dramatically. So, what are the reasons for this and why exactly is the rapid increase in CO₂ content in the atmosphere so problematic? There are experiments that will help you understand this topic better.

Station 1b Air Quality - Air quality

Note the observations and changes in CO₂ for the following experiments.

01 Measuring CO₂ content in air.
Material: Environmental Board Pe
Opens the Environment Card.
Measures CO₂ value in open wind...

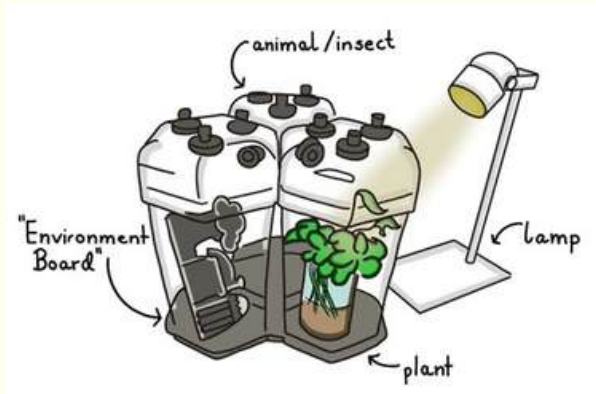


04 Measurement of CO₂ content in a container filled with a candle
Material: Environment Card, Tealight (small candle), Glass Bowl,
Wooden Handle

- Light the candle.
- Place the measuring device (with the help of a popsicle stick, if available) next to the tealight at some distance.
- Place the clear glass jar over both objects. It measures value.

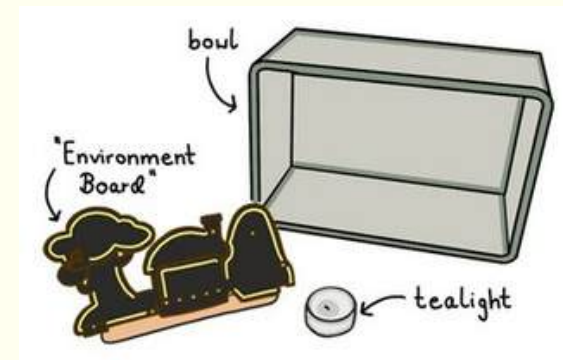
02 Measurement of CO₂ content in inspired air Material:
Environmental Card Hold the device in front of your
face.
Blow on the card.
It measures value.

03 Measuring the CO₂ content in
a container filled with plants
The container represents a
biotope filled with plants and
animals. First, make a
prediction about whether the
CO₂ content in the biotope
will differ from the CO₂
content in the room. Then,
measure the value in the
container.



Place the device in the container filled with plants. o Measures value.

Material: Environment Card, a container filled with plants and animals (biotope)



Candle wax contains largely carbon, as does crude oil or natural gas. What are the consequences of this? How has the combustion of natural gas and crude oil affected the CO₂ content in the air? Exchange ideas within the group and write down the result.

Station 2

- Magnetism



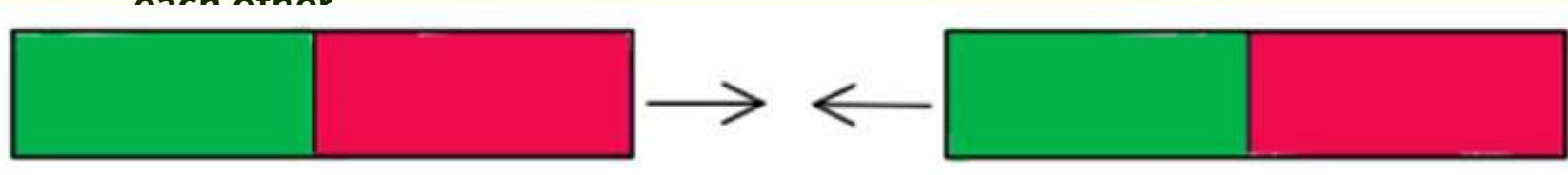
One of the goals of the United Nations is to build resilient infrastructure, promote inclusive and sustainable industrialization, and support innovation. Electricity and magnetism play an important role in this regard. For example, you can consider power plants or WiFi. To get an impression of this, here magnetic fields will be detected by smartphones.

Same poles attract each other. Different poles cancel each other.

If you put two magnets together, you can observe that they repel each other when you put the positive and positive terminals or the negative and negative terminals together.

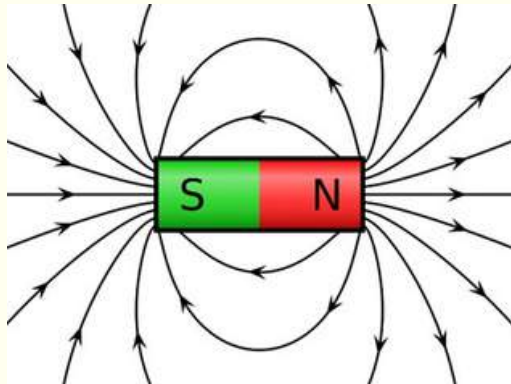


If you bring the negative and positive terminals together, they will attract each other.



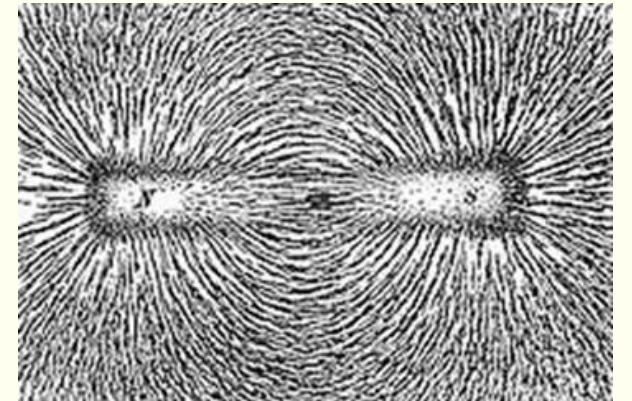
Magnets have magnetic fields. So-called field lines extend from one pole to the other.

File: "VFPTcylindricalmagnetthumb", https://commons.wikimedia.org/wiki/File:VFPT_cylindrical_magnet_thumb.svg, licensed under the "Creative Commons Attribution-ShareAlike License". You can find the license terms here: <https://creativecommons.org/licenses/by-sa/3.0/legalcode>



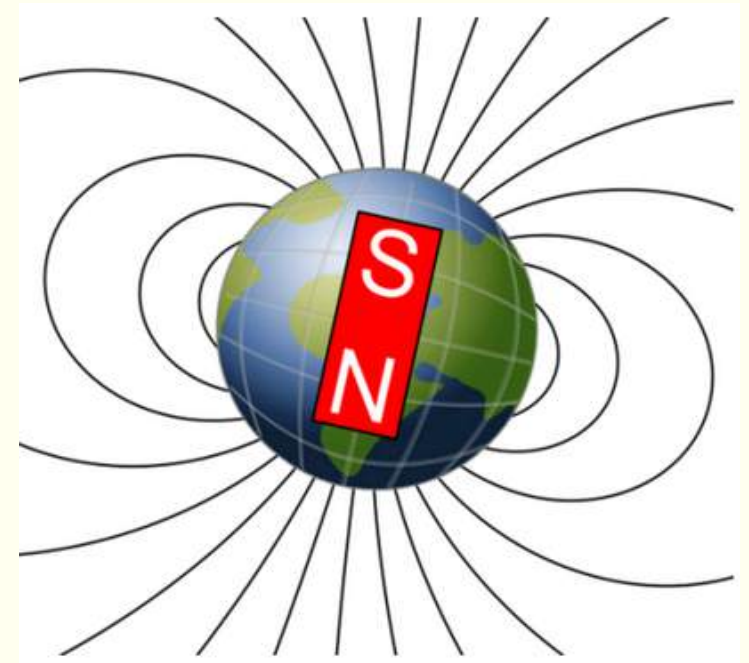
The magnetic field creates the magnetic effect we are familiar with.

File: "Magneto873", <https://commons.wikimedia.org/wiki/File:Magneto873.jpg>, licensed under the "Creative Commons Attribution-Share Alike License". You can find the license terms here: <https://creativecommons.org/licenses/by-sa/3.0/legalcode>



Our Earth also has a magnetic field that we can measure and see, for example, with a compass. This aligns with the Earth's magnetic field so we can navigate. The Earth's magnetic field protects us from the solar wind, a stream of charged particles from the Sun, namely dirt and dust from the Sun.

Magnetic fields also occur when current passes through a conductor because electric current consists of negative charge. This is called electromagnetism. Tasks: Think about where the magnetic field is located in your daily life or current environment. 1. Install the "phyphox" app on your smartphone. Measure the magnetic field in different places and near different objects. 2. Open the app, go to "Magnetic Field" and then go to "Amount". Here you can read the value for the strength of the magnetic field.





3. Prove the existence of electrosmog. To do this, ask yourself these questions: Where is the value particularly high? Where is it lower? What do magnetic fields actually have to do with the environment?

Electrosmog is produced by electrical devices powered by electricity. In other words, they create electromagnetic fields like Wi-Fi or Bluetooth. Many electrical devices or other magnetic and electrical objects result in many electrical and magnetic fields in one place. This is called electrosmog. Electrosmog can be measured. Tasks: 4. Think together about whether electrosmog can affect your health. Can electrosmog be harmful to nature? Develop ideas on how you can protect the environment in this regard.



Station 3 - Waste Separation



One of the goals of the United Nations is to ensure sustainable consumption and production patterns.

More and more waste is produced in the world. This causes serious problems.



Plastic waste is a big problem in the oceans, washing up on many beaches. Illegal waste disposal is also a problem and causes a lot of loss of money. Waste prevention and waste recycling are therefore important goals of environmental protection. In Germany, plastic, metal, etc. Yellow boxes are used for empty packaging made of materials. Plastic packaging such as plastic cups, beverage cartons, etc. that should be placed in the yellow box. Packaging made of glass, paper and cardboard is not placed in the yellow bin, but is collected and recycled separately.



WASTE SEPARATION WITH SCREEN, MAGNET AND HAIR DRYER

What happens to the contents of the yellow box at the waste separation plant?

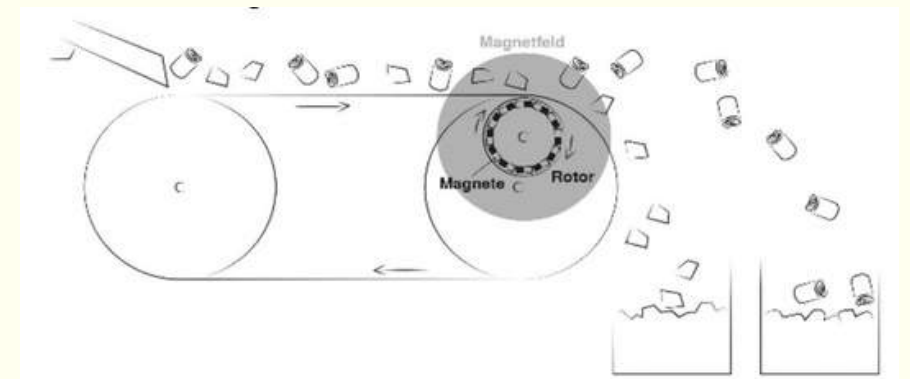
Screen Various machines separate the waste. Each sorting machine works differently and uses a specific sorting process. It all starts with giant sieves. These are either rotating cylinders or screen sheets that swing back and forth. Anything small enough through the holes falls through the bottom of the holes and is separated from the rest.

Pickups With pickups suspended above the conveyor belt, you sort through anything magnetic, such as entire cans. All material passes under the conveyor belt. The boxes magnetically ascend and are then carried away by a second conveyor belt.

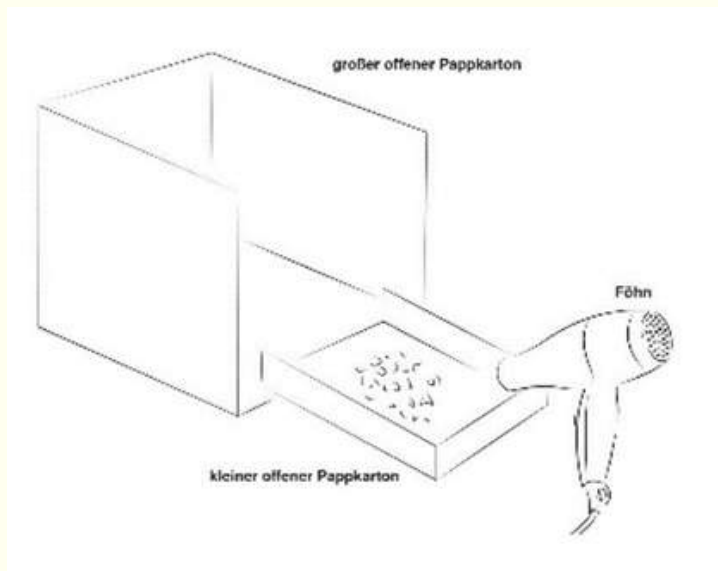


WASTE SEPARATION WITH SCREEN, MAGNET AND HAIR DRYER

Air separators Air separators work like a great vacuum cleaner, just like your home vacuum cleaner, and you can precisely adjust the vacuum power. In this regard, you know about the vacuum cleaner at home. At the lowest level, the vacuum can pull small and light objects/materials like feathers, but not heavy things like stones or iron screws. The air separator is adjusted to ensure that plastic films are still vacuumed, but not plastic bottles or metal cans. For an experiment, you can also use a hair dryer instead of a vacuum cleaner.



TASK 1: TRY SEPARATING THE "WASTE MIXTURE"



Here's what you can do. You can also move the small cardboard box or hit it from underneath.

Task 1: Do you understand the waste separation procedures, you can use the app to check this. Or you can use the template and the cards on the table. **Link:** Waste separation process separation facility (learningapps.org)

Can you tell the different fabrics apart? What fabric specifications did you use?

resources; Vberger (https://commons.wikimedia.org/wiki/File:Beach_in_Sharm_el-Nagao3.jpg), "Beach03 in Sharm el-Naga", marked as public domain, details on Wikimedia Commons: https://commons.wikimedia.org/wiki/File:Hromada_odpadkũ.jpg, "Waste Heap", <https://creativecommons.org/licenses/by/3.0/legalcode> Sorting system Task 1 // Card table. What happens in the waste separation facility? - PDF Free Download (docplayer.org)

Station 4 - Photovoltaic

What is photovoltaics?

Photovoltaics is the conversion of light energy, especially sunlight, into electrical energy. In this experiment, we will investigate how light energy can illuminate an LED lamp.

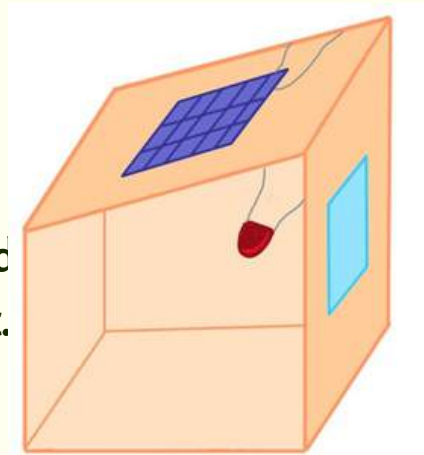
Experiment: Photovoltaic Material:

Cardboard house with solar panel and LED lamp

•What can you observe with mobile phone flash LED lamp?

Tasks:

Consider where photovoltaic systems can be used
photovoltaic systems are important for the environment.



uss why

Sources: Pujanak (https://commons.wikimedia.org/wiki/File:Solar_panels_...), marked as public domain, details at Wikimedia Commons:<https://commons.wikimedia.org/wiki/Template:PD-self>



One of the goals of the United Nations is to ensure access to affordable, reliable, sustainable and modern energy for all. Use solar energy!





PREPARATION OF ENVIRONMENTAL POLLUTION THEMED POSTERS AND PREPARATION OF PLASTIC WASTE ACTION PLAN AND CERTIFICATE CEREMONY

Action Plan to Combat Plastic Waste Purpose: To raise awareness among students and school staff about combating plastic, thus raising environmental awareness. **Target Audience:** students and teachers of our school **Authorized personnel:** Project management team and science teachers **Date of completion:** 12 months **Required resources:** materials within the school and getting support from the local government in the fight against plastic

Action 1: Pay attention to reducing the use of single-use plastics in the school.

Action 2: Gradually reduce the use of plastic bags in school and prefer paper bags.

Action 3: Each classroom teacher should make an informative presentation to students about the harms of plastic use during a class period on June 5, World Environment Day, and raise their awareness.

Action 4: There are mobile garbage bins on each floor that enable the separation of plastic and other recyclable waste.

Action 5: Local authorities support plastic waste reduction efforts in the province.

Action 6: Organizing regular plastic waste collection events at school and raising awareness on this issue.

Action 7: To visit the plastic recycling facilities in the province once a year.



PREPARATION OF ENVIRONMENTAL POLLUTION THEMED POSTERS AND PREPARATION OF PLASTIC WASTE ACTION PLAN AND CERTIFICATE CEREMONY

The main success of the project is to raise awareness of our students about climate change and environmental pollution and to provide them with STEAM skills.

We came together in collaboration with our partners to access the knowledge and tools necessary to contribute to the Sustainable Development Goals for future generations.

We have acquired methods and techniques at local, regional, national and European levels to contribute to real solutions to climate change and STEAM studies. The activities we carried out during the project can be divided into several categories:

- 1. We organized outdoor activities for extracurricular activities during school hours to draw attention to environmental pollution and climate change.**
- 2. Focused on the environmental problems of our age. All activities were planned outdoors, in a laboratory environment, with in-class and out-of-class environment-based activities, learning by doing and student-targeted research and nature discoveries, such as experiments, measurements, surveys.**
- 3. through LTT activities to partner institutions;**

We participated in activities to see environmental problems and the damage caused by humans to nature. During these visits, all our participants had the chance to experience and gain knowledge about the types and dimensions of environmental pollution through experiments, observations, measurements and tests to see the effects of environmental pollution on our world and people.

- 3. Cooperation was made with local governments and universities in cleanliness and environment to make changes and get help to raise awareness about the climate. These sessions with our 4 partners were planned as follows:**

Innovative approaches to meeting the needs of teachers and students, environmental and outdoor training, experiments and observations were planned

- 5. Dissemination activities: Web page, Facebook and Instagram page., News in the partner's schools, websites,...**
- 6. During the study and publication of the project results, we will help other schools in their environmental awareness processes through the documents you need to use, eco shops, STEAM workshops, teacher and student seminars.**
- 7. Final evaluations were made by coordinating the schools with transnational meetings, online meetings throughout the process and the last closing meeting.**

Our Poster Designs

HOW TO STOP WASTE At home:

1. Use reusable grocery bags
2. Purchase wisely & recycle
3. Use a reusable bottle/cup
4. Compost food leftovers
5. Limit use of...
6. Buy in bulk to reduce packaging
7. Buy second hand things

TÜRKİYE

- 1) Plastik şişeler kullanılmadan önce mutlaka yıkanmalıdır.
- 2) Bazı ürünleri kullanırken plastik ambalajlarını geri dönüştürme kutularına atarak geri dönüştürün.
- 3) Bazı ürünleri kullanırken suyu tam olarak kullanın ve kalan suyu çamaşır suyu için kullanın.
- 4) Günümüzde bir çok ürünün geri dönüşümü yapılabilmektedir.
- 5) Kullanılmayan ürünleri geri dönüşüm kutularına atarak geri dönüştürün.
- 6) Kullanılmayan ürünleri geri dönüştürme kutularına atarak geri dönüştürün.

HANİFE SULTAN SEVİM

Recycle

Waste

CANSU EKER

PREVENT WASTE At HOME

BUY reusable products

TURN OFF THE TAP IN THE SHOWER AND WHILE WE BRUSH OUR TEETH

TAKE A SHOWER INSTEAD OF A BATH

COMPOST ORGANIC WASTE

TURN OFF THE LIGHT WHEN WE LEAVE THE ROOMS

USE THE ECOLOGICAL MODE IN WASHING MACHINES AND DISHWASHERS

REUSE CLOTHING TO MAKE CLEANING CLOTHS

GIVE NEW USE TO GLASS JARS

HANİFE SULTAN SEVİM

WAYS TO REDUCE WASTE

Recycle

Use Containers

Newspapers

Bottles

Glasses

Plastics

Enhance and set up more recycling bins

HANİFE SULTAN SEVİM

- Bulaşık temizlerken kum taneleri, tanelerini çöpü atarak geri dönüştürün.
- Kase, tencere başlarında çamaşır yaparken su çöplüğü atarak geri dönüştürün.
- Bir çok şeyi yeniden kullanın. Çamaşır makinesi, bulaşık makinesi, su çöplüğü atarak geri dönüştürün.
- Çamaşır makinesinden sonra, tencere başlarında çamaşır yaparken su çöplüğü atarak geri dönüştürün.
- Kaldırılabilir çamaşır makinesinden sonra, çamaşır makinesinden su çöplüğü atarak geri dönüştürün.
- Kullanılmayan ürünleri geri dönüştürme kutularına atarak geri dönüştürün.

ADANA 01

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Let's Save Our Environment and Our Future!!



Co-funded by
the European Union

The schools in the project:
Coordinator School: Kolleg St. Thomas



KOLLEG ST. THOMAS
der Dominikaner

Partner Schools:
Narva Soldino Gümnaasium, Narva, Estonia
Newmark School Malta
Centro Siciliano di Fisica Nucleare e di Struttura della Catania Italy
EB1/PE das Figueirinhas Madeira Portugal
Atakent IMKB Vocational and Anatolian High School Adana Turkey
Inönü Secondary School Mersin Turkey