ÖRAV Kurucu | Garanti BBVA

DOW İş Birliğinde...

Sustainability is not Just Something to be Learned, it is a Lifestyle to be Fully Embraced.

SUSTAINABLE ENVIRONMENT TRAINING ACTIVITY BOOK

Commemorating the 10th Anniversary of DOW & ÖRAV Partnership

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Special thanks to **DOW Türkiye** for their support to environment education towards a sustainable future and this activity book.

Teachers Academy Foundation-2024

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Dear Teachers,

As the Teachers Academy Foundation and DOW, we are aware of our responsibilities in meeting the needs of today's generations without compromising the ability to meet the needs of future generations. With this awareness, we have been collaborating for 10 years and providing professional development programs to empower our teachers so that our outreach and impact towards a sustainable world continues in the minds and hearts of their students.

10 years ago, our paths crossed in the ideals that every child deserves quality education and should learn to protect our planet, ensure that everyone has access to a healthy and quality life, create sustainable cities and communities, to produce and consume responsibly.

This activity book has been prepared for our teachers to honor this long-lasting partnership and efforts paid for a sustainable future in such a long time. We hope you make the most of it and share the outcomes of your students' learning experience with us.

We would like to thank everyone who has contributed and will contribute to the achievement of the purpose of this activity book.

Sincerely,
Teachers Academy Foundation

ABOUT THE ACTIVITY BOOK

- In this activity book, there are 10 activities prepared in accordance with the theme of sustainable environment to commemorate 10 years of our cooperation with DOW.
- The activities were prepared with the Sustainability themes "At Home", "At School" and "In My Neighborhood" respectively.
- There is no prerequisite sequence for the implementation of the activities. Teachers can follow the order below if they wish:

√ Implementation can be done according to the theme order given below.

1. Sustainability at Home

1.1. Environmental Engineers at Work!
1.2. Reducing My Water Footprint!
1.3. Guess Which One First!
1.4. Home Energy Saving Detectives

2. Sustainability in My School

2.1. My Dear Plant, Grow Up and Let Me Eat You
2.2. Journey of Water
2.3. Is it Recyclable?
2.4. Those Who Know the Difference Come Here

3. Sustainability in My Neighborhood

3.1. Water Saving Ambassadors
3.2. Let the Neighbors Know

√ The following topics are covered in connection with the themes. Teachers can implement the activities in a way that takes the topics into account. If this method is preferred, the following sequence should be followed:

Zero Food Waste and Zero Waste with Compost

1.1. Environmental Engineers at Work!
2.1. My Dear Plant, Grow up and Let Me Eat You

Water Savings

1.2. Reducing My Water Footprint!
2.2. Journey of Water
3.1. Water Saving Ambassadors

Recycling and Zero Waste

1.3. Guess Which One First!
2.3. Is it Recyclable?
3.2. Let the Neighbors Know

Sustainable Energy Sources

1.4. Home Energy Saving Detectives
2.4. Those Who Know the Difference Come Here

- Before starting the activities, we recommend that you inform your students about the sustainable development goals by making use of the explanations in the title.
- You can use the **"Glossary of Terms for Children"** to make it easier to understand the terms used in the activities.
- There are of course many special days and weeks for a sustainable environment. In this book you will find a calendar where we have marked one special day for each month. We hope that you will expand your sphere of influence in raising awareness by exhibiting student products on the relevant days.

"We believe in the power of your impact for a sustainable environment!"

SUSTAINABLE DEVELOPMENT GOALS FOR CHILDREN

World Leaders agreed in 2015 to protect our planet by 2030;

- Ending extreme poverty,
- Fighting inequality and injustice,
- To fix climate change,

17 Global Goals have been agreed. For them to be realized, everyone around the world needs to know about them and to act on them. Everyone - governments, businesses, civil society and people like us - must play their part to achieve the goals. Let's look at what each of the goals is.

1.No Poverty

Ending all forms of poverty everywhere.

2. No Hunger

Achieve food security and good nutrition and support sustainable agriculture.

3. Good Health and Well-Being

To ensure that people live a healthy and quality life at every age, with ideal conditions according to where they live and their own culture.

4. Quality Education
Ensure that people have fair and equal access to lifelong learning opportunities, taking into account their gender, race, ethnicity, socioeconomic status, geographical location, health problems and disabilities.

5. Gender Equality
Ensuring that individuals of different genders have equal rights. Ensure equal participation and visibility of both genders in all areas of public and private life.

6. Clean Water and Sanitation
Ensure access to clean water for all and public health conditions related to the adequate treatment and disposal of wastewater and sewage.

7. Affordable and Clean Energy
Ensure that everyone has access to environmentally friendly energy without the use of fossil fuels.

8. Decent Work and Economic Growth
To ensure individuals' rights to work and employment, to improve occupational health and safety conditions, to support social security opportunities and their right to express themselves.

9. Industry, Innovation and Infrastructure
Building resilient infrastructures, supporting inclusive and sustainable industrialization and strengthening innovation.

10. Reducing Inequalities
Reducing inequalities within and between countries.

11. Sustainable Cities and Communities
To create living spaces that meet the needs of today and the future in the most comprehensive and effective way.

12. Responsible Production and Consumption
Minimizing the negative impact on the environment by using energy, products and services as much as we need so that resources can be left to future generations.

13. Climate Action
Take urgent action to combat climate change and its impacts.

14. Life Below Water

Protect and sustainably use oceans, seas and marine resources.

15. Life on Land

Ensure sustainable forest management; combat desertification; halt and reverse land degradation; prevent biodiversity loss.

16. Peace, Justice and Strong Institutions

Building peaceful and inclusive societies for sustainable development, ensuring access to justice for all and building effective, accountable and inclusive institutions at all levels.

17. Partnerships for the Goals

Building functional partnerships between governments, civil society, the private sector, multinational organizations, academic institutions and other stakeholders for sustainable development.

The above text was prepared by using UNDP (2017) "Sustainable Development Goals" on 24.04.2024.

Access link for detailed information

GLOSSARY OF TERMS FOR CHILDREN

Sustainability:
Making sure that a situation or something continues.

Sustainable Development:
Meeting the needs of people living today without compromising the ability to meet the needs of people living in the future.

Sustainable Environment:
The process of recovering and redesigning natural resources and protecting natural areas.

Zero Waste:
Advocates avoiding waste and preventing, reducing, reusing and recycling waste.

Recycling:
Recycling refers to the reuse of materials that we think of as "garbage", such as plastic bottles, paper and cardboard, plastic containers, metal cans, glass, etc., through various processes.

Upcycling:
Producing something new and usable from something old and even unusable.

Sustainable Energy:
Energy from sources that can replenish themselves faster than they are consumed.

Renewable Energy:
Energy production from sources that can be naturally renewed over time.

Biomass Energy:
Renewable in less than 100 years, it is energy that can be obtained from all plants and animals, forest products, waste from cities and the food industry.

Geothermal Energy:
It is obtained by the decay of radioactive materials in the rocks and liquids in the earth's core.

Hydroelectric Energy:
This is a type of energy generated by water. The flowing water turns turbines, which turn a generator to generate electricity and energy.

Compost:
It is a fertilizer obtained as a result of decomposing or grinding animal and vegetable wastes, which contains nutrients that add efficiency to the soil and maintains its balance.

Earth Overshoot Day:
The day that tells us when we have exhausted the resources that the planet has and that we can use during the course of a year.

Carbon Footprint:
All greenhouse gases emitted into the atmosphere by our daily activities and consumption; carbon dioxide (CO_2), water vapor (H_2O), nitrous oxide (N_2O), methane (CH_4) and ozone (O_3) are a measure of the damage caused by human activities to the environment in terms of quantity.

Water Footprint:
The amount of fresh water used to produce a good or service.

SPECIAL DAYS FOR A SUSTAINABLE ENVIRONMENT

JANUARY

01	02	03	04	05	06	07
08	09	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

FEBRUARY

			01	02	03	04
05	06	07	08	09	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29			

MARCH

				01	02	03
04	05	06	07	08	09	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

APRIL

01	02	03	04	05	06	07
08	09	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

MAY

		01	02	03	04	05
06	07	08	09	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

JUNE

					01	02
03	04	05	06	07	08	09
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

JULY

01	02	03	04	05	06	07
08	09	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

AUGUST

		01	02	03	04	
05	06	07	08	09	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

SEPTEMBER

						01
02	03	04	05	06	07	08
09	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

OCTOBER

	01	02	03	04	05	06
07	08	09	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

NOVEMBER

				01	02	03
04	05	06	07	08	09	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

DECEMBER

						01
02	03	04	05	06	07	08
09	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

2nd week of January – ***Energy Saving Week***

February 2 – ***World Wetlands Day***

March 22 – ***World Water Day***

April 22 – ***Earth Day***

May 20 – ***World Bee Day***

June 5th – ***World Environment Day***

July 28 – ***World Nature Conservation Day***

August 2 (date changes every year)
2023 World Overdraft Day

September 22 – ***World Car Free Day***

October 4 – ***World Animal Day***

End of November (date changes every year)
No Purchase Day

December 10 – ***Mother Earth Day***

ACTIVITIES

1. Sustainability at Home

1.1. Environmental Engineers at Work!

Aim: To realize that food waste is not garbage for a sustainable environment and to protect the soil by composting.

Duration: 40 minutes

Preliminary Preparation:

- Students are asked to bring compostable fruits such as apples, bananas, pears, tangerines, etc. to school as a snack.
- Tea pulp and coffee grounds are collected from the school canteen or tea house. Leaves and grass are collected from the garden. A few pieces of newspaper are brought.
- Prepare a 5-liter plastic bottle by cutting the mouth part. Put the ingredients listed above into it.
- Twigs and sticks are collected for composting.

Instruction:

This is Not Garbage, No No No!

Students are encouraged to eat the fruits brought by the students for snack. They are told not to throw away the peel, core or stem of the fruit and to keep it in their hands. If there is enough space in the classroom, students stay in the classroom, if not, they are taken to the corridor or the school garden. Students are asked to stand in a circle with the leftover fruit in their hands. The teacher is in the center of the circle. The previously prepared 5-liter plastic bottle is held up in the air. "There are tea pulps, coffee grounds, leaves, grass, newspaper papers in this bottle. So, are these garbage?" is asked. After receiving responses from 3-4 students, "Children, contrary to popular belief, these are not garbage. Are you surprised? Now we will play a game. I will ask a question and you will walk towards me, that is, towards the center of the circle, saying "these are not garbage! no-no-no-no" with a rhythm in unison. When everyone is close to the center, you will go back to the circle and a new question will come and you will walk towards me with the same rhythm and say "these are not garbage! no-no-no-no"." It is said. The following questions are asked in order and the activity is carried out.

- Are tea pulp and coffee grounds garbage? Students are expected to come to the center and say "these are not garbage! no-no-no-no" to the rhythm they make up. After all students meet in the center, they return to the circle.

- Are pieces of newspaper, leaves, grass garbage? Students are expected to come to the center and say "these are not garbage! No-no-no-no" to the rhythm they make up. After all students meet in the center, they return to the circle.

- The students are asked to remove the fruit scraps from their hands. The teacher asks again, "Are these garbage?" and the students come to the center of the circle, saying "These are not garbage! No-no-no-no" in unison. The fruit scraps in the students' hands are placed in a 5-liter bottle. "These are not garbage! Noooooo!" and returns to the center of the circle and the game is completed.

What is Compost?

"Well, children, now we know that these are not garbage. What can we do with them?" question is asked. Answers are received from 3-4 students. The word **"COMPOST"** is written on the board in capital letters. The importance of compost and the stages of composting are explained in the teacher's own words using the text below.

"Composting is the process of turning waste, such as food scraps and garden waste, into soil. This process provides many benefits for the environment:

- **Garbage Reduction:** Most of the garbage in our homes consists of food scraps and plant waste. We can utilize these wastes by composting them instead of throwing them away. Thus, our garbage bins will be less full and less garbage will pollute our environment.
- **Strengthening the Soil:** Compost is a type of natural fertilizer that nourishes and strengthens the soil. When we add compost to the soil, plants grow healthier.
- **Water Saving:** Composted soil retains water better. This means we need to water our gardens less. By saving water, we reduce our water bills and help the environment.
- **No Chemicals Needed:** Compost is a natural fertilizer that we can use instead of artificial fertilizers. Thus, we do not need to use chemicals in our garden and this is healthier for plants.
- **Learning about Nature:** Composting is a great way to learn how nature works. We can see how decaying plants and food waste turn into soil. This process shows us how waste can be recycled and how nature regenerates itself.

Let's Compost

Compost is made together with the students using the composting steps below. After preparing the compost together at school, all students are asked to prepare the same compost individually at home. The 5-liter plastic bottle prepared in the play activity is used for this activity.

- Coarse materials such as twigs or sticks are placed in the bottom of the bottle to ensure air flow.

- Ingredients are layered. For this, brown and green ingredients are added in layers. As a general rule, the brown ingredients should outnumber the green ingredients (in a ratio of about 3:1).

- After adding each layer, the pile is slightly moistened. The aim is for the compost pile to have the consistency of a wet sponge.

- The compost needs to be aerated regularly. For this, it is aerated once a week with the help of a stick. This ensures that the materials decompose faster.

- It is regularly checked for humidity, odors and temperature. If odors are present, it indicates excess moisture or not enough ventilation.

- Maturation your compost can take several months to mature. When it is ready, there will be a dark, earthy and fragrant material under the top layer.

Students who prepare their compost are asked to mix it with the soil in their home gardens or pots and plant and grow a seed of their choice.

Controlled experiment: Students are asked to follow the growth of a plant grown with compost and a plant grown without compost. Students write their observations day by day and share their diaries with the class. A digital presentation is prepared by taking photos of the plants they grow using compost. The presentation is shared with other classes and the school.

Additional Information

Non-Compostable Products

- Meat and Fish Products: Meat, fish, poultry and their processed products (especially cooked ones) are not suitable for composting. This is because they can cause bad odors and attract harmful bacteria, rodents and other unwanted animals.
- Fats and Fatty Foods: Cooking oils, margarine, mayonnaise and other fatty foods are not suitable for compost. Fats prevent the compost from breathing and slow down the decomposition process.
- Dairy Products: Cheese, yogurt, cream and other dairy products are not recommended for compost. These products can also cause bad odors and attract unwanted pests.
- Diseased or Pesticide Treated Plants: Diseased plant waste or pesticide/drug treated plants should not be added to the compost pile. Such materials can spread diseases and chemicals through the compost.
- Cat and Dog Feces: This type of waste can contain parasites, bacteria and viruses, so it is not safe for composting.
- Inedible Plants: Poisonous plants or inedible plant parts (e.g. poison ivy) are not suitable for compost.
- Treated Wood and Coal Ash: Painted, varnished or treated wood and materials such as coal ash may contain heavy metals or other harmful chemicals and are not suitable for composting.
- Synthetic and Non-Biological Materials: Non-biodegradable materials such as plastic, metal, glass should not be used in composting.

Products **Suitable for Composting**:

- Carbon (Brown Materials): Materials such as leaves, twigs, napkins, cardboard, newsprint. These materials are sources of "brown" carbon for your compost.
- Nitrogen (Green Materials): Organic waste such as kitchen waste, tea bags, coffee grounds, grass cuttings. These materials provide nitrogen to the compost.
- Water: The compost heap needs to remain moist, but not too wet.
- Oxygen: Regularly adding air to the compost pile allows the materials to decompose.

1.2.Reducing My Water Footprint!

Aim:

- To provide an understanding of the relationship between the disappearance of fresh water resources in nature and ecological balance.
- Recognize the importance of individual effort in reducing the water footprint.

Duration: 40 minutes

Preliminary Preparation:

- The attached "Water Saving Questionnaire" and "Water Saving Commitment Cards" are reproduced as many as the number of students.
- Students are asked to keep the last water bill they received at home.

Instruction:

Grouping

Students are named with the words in the question "water", "foot", "trace", "what is it?" from right to left respectively. Four different groups are formed: one group with the name "water", one group with the name "foot", one group with the name "footprint", one group with the name "trace" and one group with the name "what is". After the students settle in their groups, the question "What is the water footprint?" is asked. Answers are received from 3-4 students. The following questions are used as clues to get students to think about the concept:

- What happens to the water used in the production of the clothes we wear?
- What happens to the water we use in processes such as growing and cooking food?
- Where does the water go after it rains?

"A water footprint is the total amount of fresh water that a person, community, company or country uses to produce services. There are three different water footprint concepts in total: Blue water footprint: The surface and underground freshwater resources needed to produce a good, i.e. the water resource that comes to mind when we think of freshwater. The blue water footprint is usually increased by agricultural activities.

- Green water footprint: It refers to the percentage of water consumed in any product purchased or any daily habit that is sourced from rainwater.
- Gray water footprint: Water polluted by the production of goods and services."

Water Footprint Detective Game

"Now I am going to show you some visuals. You will discuss with your group how many liters of water the food or clothing in the visuals consumes from the producer to the consumer and make an estimate. You should write down your collective estimate as a group on a piece of paper." It is said and the "Water Footprint Cards" in the appendix.

Visuals are projected on the smart board. 1 minute time is started. At the end of the time, the spokespersons of the groups raise their predictions at the same time. The group with the most correct guess gets 10 points. After all the guesses about all the visuals are taken in turn, the group that collects the most points is declared the "Water Footprint Detectives Champion of the Class".

Correct answers :

- 2,400 liters of water is used for 1 150 g hamburger.
- It takes 200 liters of water to produce 1 glass (200 ml) of milk.
- Approximately 11,000 liters of water are used to produce a pair of jeans.
- It takes 40 liters of water for 1 slice of 30 g wheat bread.
- It takes 2,700 liters of water to make a single t-shirt

Water Footprint Calculation

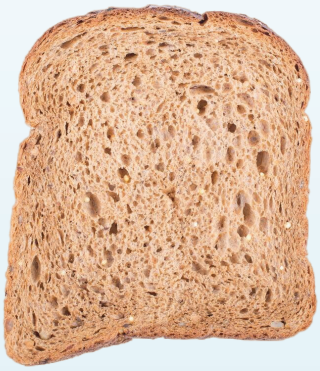
"Were you surprised by any information in the game we just played? Did you know that 140 liters of water is used to produce a cup of coffee and 2400 liters of water is used to produce a hamburger?" With these questions, important points such as that we should be more careful when buying items such as t-shirts and trousers even though we do not need them just because they are fashionable, or when we buy more food than we can eat and waste it are mentioned. Then the water footprint calculation is done as a class. (A water footprint calculation site can be used.) If there is a computer that all students can access, they are made to calculate the water footprint individually. Otherwise, the teacher opens the water footprint questionnaire on the board, takes a vote, answers the answers of the class on average in line with the common decision and calculates the water footprint of the class. At this point, measures that can be taken to reduce the water footprint are discussed. For example, keeping the water off while brushing teeth, taking shorter showers, leaving the faucets completely closed, washing food in a container full of water instead of in running water, washing dishes in the dishwasher instead of washing them by hand are mentioned.

Exit Ticket My Family at Work

As a water detective, students are asked to have a family member at home fill out the attached "Water Detective Questionnaire" about water use in a day. The students are asked to fill in the attached "Water Conservation Commitment Card" both by a family member and by the student himself/herself. A water saving commitment board is prepared in the school, the cards are hung there and students present their commitments to each other.

The students are asked to compare the next month's water bill that arrives at their homes with the water bill they saved before the activity. They talk about the difference. The feeling of achievement will be good.

APPENDIX: WATER FOOTPRINT CARDS

1 hamburger 	1 slice of wheat bread 
1 cup of milk 	1 coot pants 
1 t-shirt 	

APPENDIX: WATER DETECTIVE SURVEY

Make sure that every member of your family completes the questionnaire.
Name:.....
Date: .....

Thank you for taking part in this survey as a water detective.

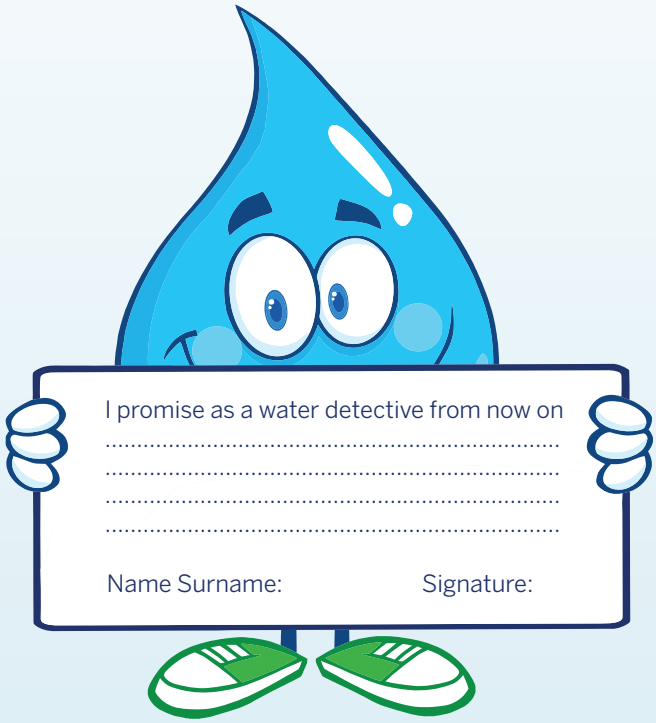
The information you provide will help us reduce our water footprint by raising awareness and enabling us to take action.

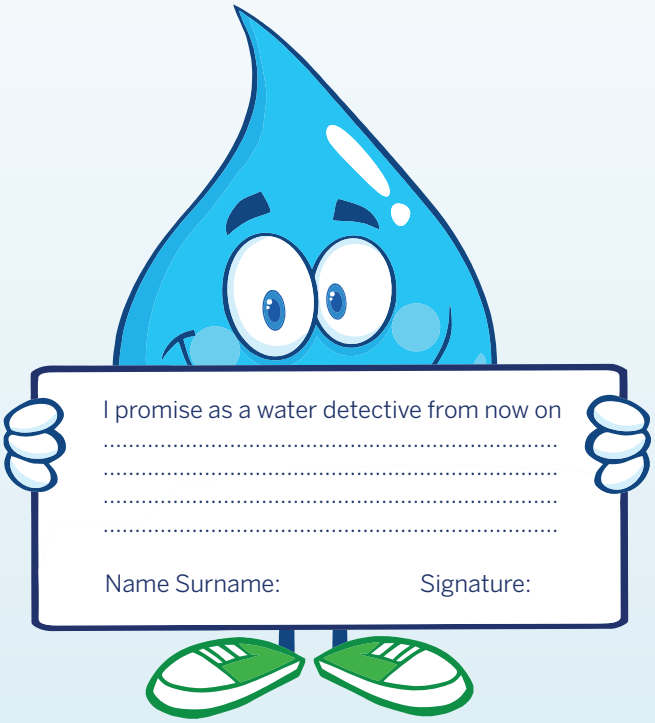
Please fill in the table below thinking about your water use for one day.

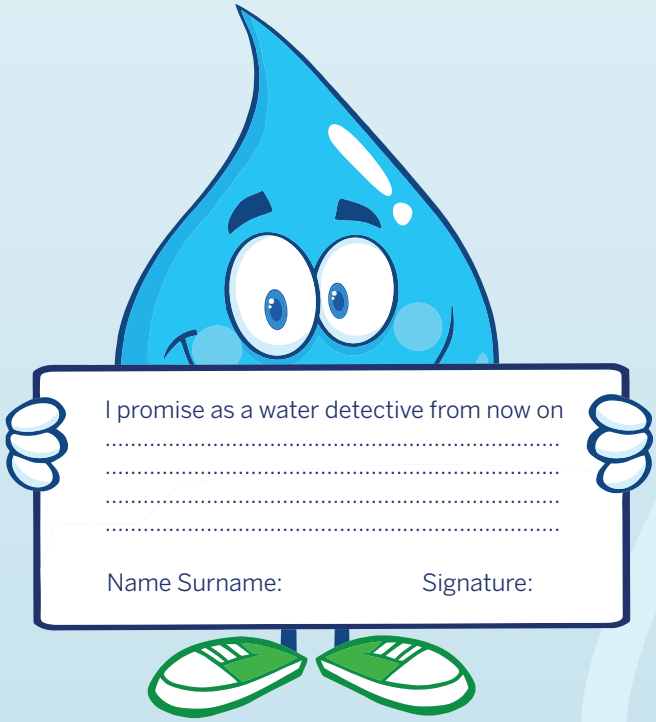
Time of Day	Activity	Duration	Notes	Leavae this section blank so that your child can write down any water saving ideas.
For example 07.00	Shower	10 minutes	I turned off the water while shampooing my hair.	Reducing the duration of the shower

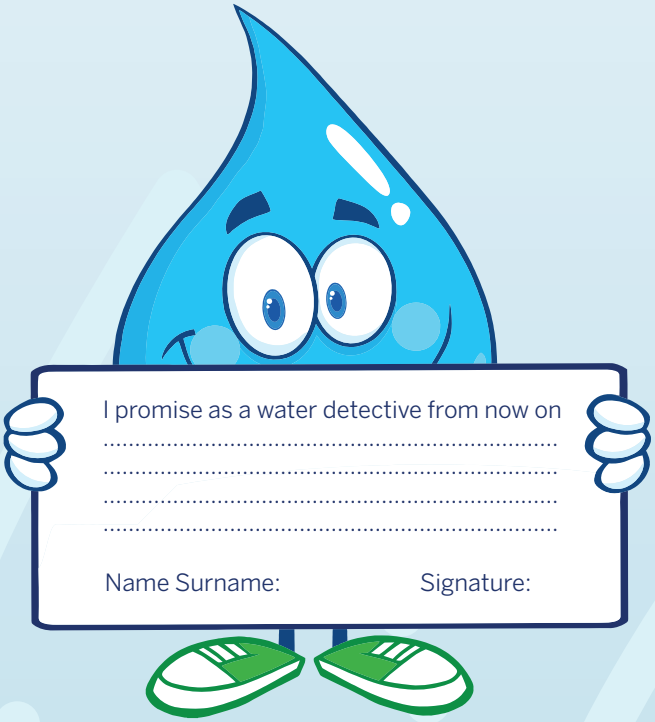
**This activity example was inspired by the website https://www.sukasifi.org/download-resources.*

APPENDIX: WATER SAVING COMMITMENT CARDS









1.3. Guess Which One First!

Aim: To understand that the order of priority for a sustainable environment is zero waste, upcycling and recycling, and to realize what can be done individually in daily life.
Duration: 40 minutes

Yönerge:

Pogo Stick Game

Students are taken to the garden or corridor. Two circles are formed inside each other. The students in the inner circle and the students in the outer circle are facing each other. The teacher is in the center of the circle. The game is played with the following steps:

- "If I say zero waste, everyone will make their hand in the shape of ok 👍 and jump in place once with their arm up." A trial is conducted.
- "If I say upcycling, everyone will creatively sculpt where they are and stand still for 3 seconds." An experiment is made.
- "If I say recycling, you will switch places with the friend you are standing opposite. The inner circle will move outwards and the outer circle will move inwards. Let's try it." An experiment is made

The above instruction is given several times in mixed form and played with as much enthusiasm and joy as possible. Return to the classroom.

Guess Which One?

"Let's remember which concepts I used in the game we just played." Answers are received from a few students. The question "Does anyone know what these concepts mean?" is asked. After receiving answers from 2-3 students, the concepts of zero waste, upcycling and recycling are explained using the explanations in the glossary at the beginning of the book. The following examples are given and students are asked to guess which one they are related to:

- Example 1: When we are thirsty outside, instead of buying water in a plastic bottle, we carry a drinker with us. (Zero waste)
- Example 2: Making a cloth bag from a piece of clothing we don't use (Upcycling)
- Example 3: Sorting and collecting waste paper, glass, plastics according to their characteristics and taking them to the municipal collection bins (Recycling)
- Example 4: Using the cloth bag we bring from home instead of buying plastic bags when we shop at the market. (Zero waste)

So Which One First?

Grouping Students are divided into groups using the following method:
Children are given the numbers 1, 2, 3, 4 in turn. Four groups are formed so that 1s come together and 2s come together. One student from each group is asked to be chosen as a representative.

"Which should be the priority for a sustainable environment?" Ask the question, wait for a while for the group to discuss and get answers from the representatives of 2-3 groups. "Yes, children, our priority should be not to produce waste as much as possible. So zero waste. So why, in the process of producing and using the materials we use in daily life, a carbon footprint is created. Carbon footprint is the amount of greenhouse gases that harm the environment during human activities, measured in terms of carbon dioxide equivalent, is more than it should be. As a result, zero waste reduces our carbon footprint. For example, composting... If we can't do this, what can be our second priority?" The question is asked, the group is given some time to discuss and a response is received from the representative of 2-3 groups. "The second priority should be upcycling. So what can we do if upcycling is not possible and we can't reuse it by repairing it?" The question is asked, a period of time is waited for the group to discuss and answers are received from 2-3 representatives of the group. "Our last option should be recycling. Because in order to recycle materials, products need to be collected from recycling bins, transported to centers, and undergo washing, shredding and chemical processes for recycling. These processes also mean energy consumption. And energy consumption means an increase in our carbon footprint."

Exit Ticket

In today's activity, they are asked to write down 3 things they have just learned, 2 things they find interesting and 1 thing they are curious about. Afterwards, 2-3 volunteer students are asked to share.

1.4. Home Energy Saving Detectives

Aim: To monitor energy consumption at home and make arrangements to reduce it.
Duration: 40 minutes
Preliminary preparation:

- 2 weeks before the activity, students are asked to collect recyclable materials. The materials collected in Activity 2.3 can be used in this activity.
- Reproduce the attached "Energy Saving Detective Diary" for the number of students.

Instruction:

Let's Design a Detective Costume

"What is energy saving?" The question is asked and 2-3 students respond. "Saving energy and reducing energy consumption means using less energy to conserve resources and reduce the negative impact on the environment. So, how can we save energy in our home, to find the answer to this question, you will all be energy saving detectives. Each detective will have a costume. We will do a study where everyone will design the costume they want." It is said. Students are asked to design their own detective costumes using the materials they have collected. They are told that they can design bow ties, hats, magnifying glasses, glasses, etc. At the end of the activity, students show their designs to each other by wearing them.

Detectives at Work

"Now we are ready, it's time to investigate." The "Energy Saving Detective Diary" sheets are distributed. They are asked to take notes using the instructions on the paper for a week.

Exit Ticket

At the end of the week, students share with their classmates at least 3 things they would do differently now after the information they have gathered.
Students are supported with the following explanations during their presentation.

- Electronic products that are plugged in but not in use continue to consume electricity, although not as much as when they are working.

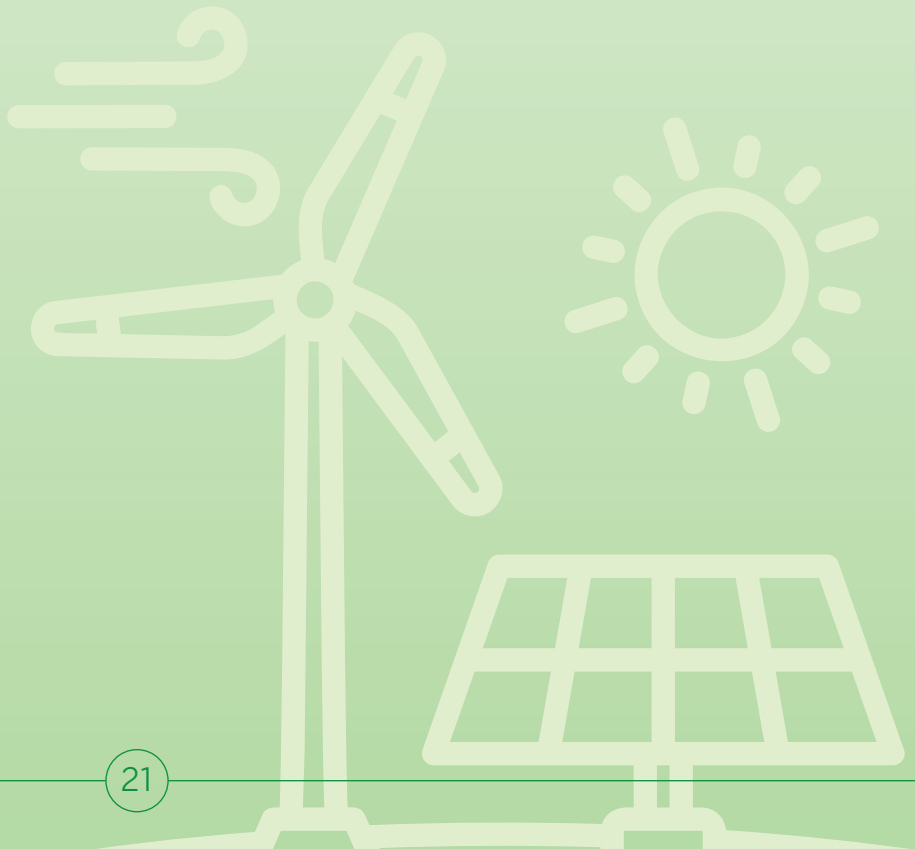
- If the lids of the containers we use while cooking are closed, they cook in a shorter time. Thus, we consume less energy.

- If the vacuum cleaner's bag and filter are cleaned regularly, it will consume less energy as its traction will increase.

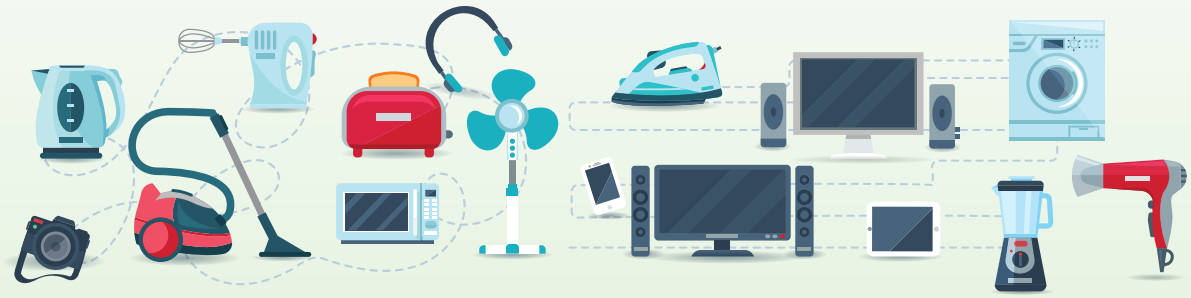
- When your fridge or freezer is overfilled, the air flow is not good enough and the cooling system works harder to compensate, thus increasing electricity consumption.

- Turning air conditioners on and off frequently causes more electricity consumption. For this reason, the temperature setting of the air conditioner should be set according to the ideal home temperature and the device should be operated at the specified temperature continuously. Air conditioners should be operated below 21°C or 23°C. When air conditioners are operated above or below this range, they consume more electricity than normal.

- Public transportation should be preferred over personal vehicles, and walking or cycling should be preferred if possible. Vehicles consume fossil fuels, increasing non-renewable energy consumption and increasing the carbon footprint.



APPENDIX: ENERGY SAVING DETECTIVE DIARY



Are you dressed as a detective? If yes, then you are ready. Let's get started.

- List of various electrical appliances in my home.

- Which of these were left open unnecessarily?

- Which ones were used when they were not needed?

- Which ones remain unplugged and unused?

Did the lights stay on when you were not using them? Circle the green tick symbol if yes and the red cross if no.

Were the lids on the utensils you used for cooking closed? Circle the green tick symbol if yes and the red cross if no.

Are the bag and filter of your vacuum cleaner cleaned regularly? You can ask your family. Circle the green tick symbol if yes and the red cross if no.

How full is your fridge or freezer? Is it filled more than it should be? You can ask your family. Circle the green tick symbol if yes and the red cross if no.

Do you turn the air conditioners on and off frequently and at what temperature? Circle the green tick symbol if yes and the red cross if no. Write how many degrees.

A list of places you visit during a week, e.g. school, market.

.....

.....

.....

How did you get to the places on your list?

I walked:

I rode a bicycle:

I took a bus-train-bus:

I got in the car:

Were there possible alternative modes of transportation?

2. Sustainability in My School

2.1. My Dear Plant, Grow up and Let Me Eat You

Aim: To prevent food waste by understanding the growing conditions of fruits and vegetables and experiencing the labor involved.

Duration: 40 minutes

Preliminary Preparation:

- Various vegetable seeds, carrots, lettuce, parsley, purslane, etc.
- Soil,
- Utility knife,
- Before the activity, each student is asked to bring one waste plastic bottle or can (such as a tomato paste can).

Instruction:

Fruits and Vegetables Game

All students are taken to the school garden. If possible, they are taken to the dirt area. They are asked to close their eyes and given the following instruction:

- "What is your favorite vegetable? Now imagine it. You are the seed of that vegetable. Everyone has become a seed, we are squatting. You are planted in the soil. Someone gave you water, it rained. What do you feel? After a while you start to sprout. Use your body language, visualize it, let's stand up slowly. You have come out of the soil and now you have reached the sun. What do you feel? Stretch your arms to the sky, someone is still giving you water. You are growing, stand on your tiptoes, you are ready.
- Students are asked to share which vegetable they have chosen.
- The same exercise is repeated with the question "what is your least favorite vegetable?".

I'm Growing My Plant, I'm Gobbling It Up!

Students are encouraged to grow a vegetable of their choice in waste materials (plastic bottles, tomato paste cans, etc.). The products that can be grown can be lettuce, parsley, spring onion, mint. These vegetables can grow to an edible size in three to four weeks. Students are told that they can use the compost they made in Activity 1.1 at this stage. A salad is made from the vegetables that have reached edible size and students are allowed to consume the plants they have grown.

Exit Ticket

The students are asked "What did you realize in this process? What will you do differently from now on?" questions are asked. Answers are received from a few students and the activity is finalized with the following explanation.

"Children, as you said, we have spent a lot of time, effort and patience to grow these plants that we consume. When we think about the energy, water and human resources spent in the process of growing these products in the field, collecting them, transporting them with vehicles, packaging them, and selling them in markets and markets, we have experienced the importance of being a conscious consumer." It is said and the activity is finalized.

2.2. The Journey of Water

Aim: To familiarize students with the water cycle and freshwater resources and mobilize them to recycle water, such as rainwater harvesting.

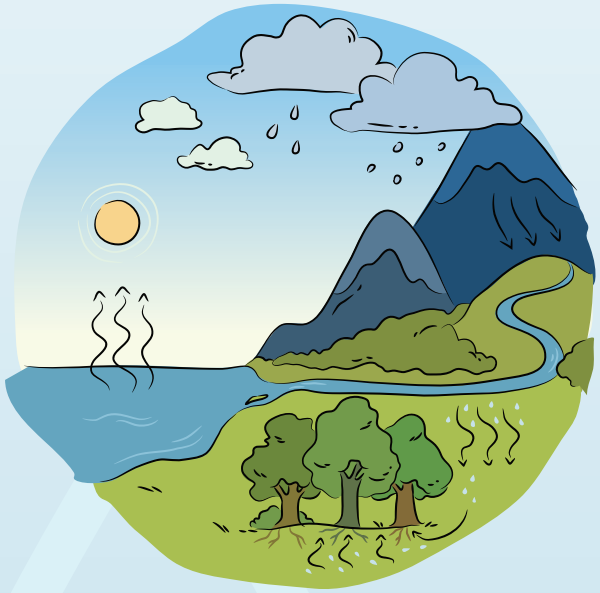
Duration: 40 minutes

Preliminary Preparation:

- Energetic music is prepared to be played on the smart board.
- The words Evaporation, Condensation, Precipitation and Accumulation are written on a draft A4 paper and pasted in the four corners of the classroom.
- Before the activity, each student is asked to collect one waste plastic bottle.
- At least 1 erlenmeyer of at least 200 ml is prepared for each group.
- The narrow mouth parts of the plastic bottles brought by the students are cut by the teacher beforehand.

Instruction:

Water Cycle Game



- "Now I will turn on the music and you can dance as you like until the music ends. When the music is over, you will stay where you are without moving." The music is turned on and the students dance for 1 minute. When the time is over, "Find the 5 people closest to you and come together. Considering the class size, for example, if the class has 20 students, 4 groups are formed in this way. (4 groups should be formed for the game).
- Each group gathers at a station. The following explanation is given.
  - Evaporation Station: At this station, students act out "evaporation" by jumping.
  - Concentration Station: In this station, students come together tightly in groups to act out "concentration".
  - Rainfall Station: At this station, students hold hands and lean towards the floor in the shape of "raindrops" and then stand up.
  - Gathering Station: In this station, students gather together to form a "lake" or an "ocean". For example, they can hold hands or hug each other.

- "I'm going to put on some music, while the music is playing, you are going to act out the water cycle phase at your station in your group as I just mentioned. As soon as the music stops, from right to left, those in evaporation will move to condensation, those in condensation to precipitation, those in precipitation to the gathering station. After all groups have arrived at their new station, you will start animating again when the music starts. You will do the animation according to your station." It is said. In this way, after all the groups have acted out once at each station, the round is completed and the game is ended.
- After the students are seated, the teacher asks "Who can summarize what happened in the water cycle?" The teacher can start a discussion about the importance of the water cycle and its effects on the environment. Students can be informed about the role of the water cycle in ecosystems and the effects of human activities on the water cycle. In addition, students are informed that 2/3 of the Earth is covered with water and that 97.5% of the water in the Earth consists of salty water in the oceans. It is pointed out that only 2.5% of the remaining fresh water is used as drinking water and that most of this water is found as groundwater in glaciers and very deep geological layers in the poles (Antarctica, Greenland).

Rainwater Collection Barrel

If possible, students are divided into 5 groups in the classroom, if not in the laboratory. Each group is given at least one measuring jug. With the help of the flasks, students create a rating scale at 100 milliliters intervals in rainwater collection bottles. Students are asked to write a slogan for saving water on the bottle.

Exit Ticket

The students are asked to place the rainwater collection bottles they have prepared in the garden of the school, in the garden of their houses and apartments, to observe and note the amount of water collected for 10 days, and to share them with their friends in the classroom at the end of 10 days. Then, the spokespersons selected among the students are asked to go to the school administrators and talk about the rainwater collection bottle activity and persuade them to place a large rainwater collection barrel in the school garden.

2.3. Is it Recyclable?

Aim: To play a role in raising awareness of the immediate environment about recyclable and non-recyclable materials.
Duration: 40 minutes
Preliminary Preparation:

- The attached "Shared Reading: Is it Recyclable?" is reproduced as many as the number of students.
- The attached "Labyrinth Game" work is reproduced as many as the number of students.
- 2 weeks before the activity, students are asked to bring the following materials. Collect the materials brought by the students in a part of the school or classroom. Four separate bags (recycling hunt) are prepared by dividing at least one of each of the collected materials. In one bag, for example, one toilet paper roll, one plastic bottle, and one paper cup can be divided.

Instruction: Before the game, have a short conversation with the students about the concept of recycling. Recycling bins are mentioned.

Chiki-Chiki-Bum Bum Game

"For two weeks we have been collecting some materials in this corner of our classroom. Now I am going to show some of these materials. If you think it is recyclable, we say "chik chik" and stand up. If you think it is not recyclable, we say "boom boom" and continue to sit in our seats. I am not going to tell you whether it is right or wrong, so don't tell me. We just follow the instruction." The game is played using the materials collected.

Grouping

Using only body language, children are asked to line up alphabetically according to the initial letter of their first name or the initial letter of their last name. The starting point of the line and the direction in which it should continue are indicated. Groups of 6 are formed by counting 6 people in turn and they are directed to their turns.

Shared Reading: Can It Make a Comeback?

The attached "Shared Reading: Is it Recyclable?" page is distributed to the students. One person in the group is asked to take each title in the text, read it and then explain the title they read to their groupmates.

Recycling Hunt

When the shared reading activity is completed, the groups are asked to choose a representative. Representatives are given recycling hunting bags prepared by the teacher before the activity. Representatives take the bags to their groups. They discuss with their groups and distinguish which of the materials in the bag can be recycled and which cannot be recycled. The recyclable materials are collected and kept for the activity called 3.3. Students are told that these materials will be used in another activity. Non-recyclable products are distributed so that each student has at least one material. If there is not enough material, one material is given to each two or three students. It is carried out as group work. During the break, each student (or group, if there are not enough materials) is asked to inform at least three people (students from other classes, school staff, administrators and other teachers) about the non-recyclable materials they have. At the end of the break, students are asked who they talked to and asked to share their experiences.

Exit Ticket

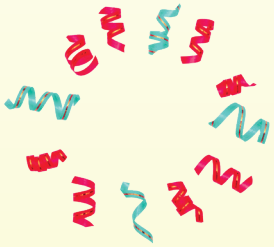
The attached "Labyrinth Game" is given for them to do at school if time permits and at home if not.

APPENDIX - SHARED READING: CAN IT BE RECYCLED?

1. Takeaway coffee cups (cardboard cups)

Many of us think that cardboard cups can be recycled. Unfortunately, this is not true. This is because they are made of paper and coated with a special coating (usually wax) to hold the hot drink. This coating is made of polystyrene, a type of plastic that is soft and stretchable. Polystyrene is rarely recyclable.

2. Wrapping paper



Unfortunately, some of the wrapping paper used for packaged food and gifts cannot be recycled. Foils, glittery or even slightly shiny wrapping paper cannot be recycled because they contain additional substances and cannot be separated.

3. Adhesive tape

Adhesive tapes cannot be recycled. Therefore, adhesive tapes should be separated from the cardboard and paper to be recycled.

4. Plastic bags

Only 1 percent of plastic bags, which can take up to 1000 years to disappear and whose annual production exceeds 335 million tons, can be recycled.

5. Plastic cutlery, straws

Made from polystyrene, these products are soft and flexible. This type of plastic can rarely be recycled, so flexible plastic forks, spoons, knives and straws cannot be recycled. THEREFORE, the European Union banned the use of single-use plastics in 2021.

6. Some materials that can be recycled:

- Unused glassware
- Egg carton
- Toilet paper or paper towel roll
- Waste paper
- Waste oil
- Waste electronic materials
- Waste metals

**The above text is based on the source https://www.netwaste.org.au/recycle-it/what-can-be-recycled/.*

APPENDIX: LABYRENT GAME

APPENDIX: LABYRINTH GAME ANSWER KEY

2.4. Those Who Know the Difference Come Here

Aim: To recognize sustainable and renewable and non-renewable energy sources and to distinguish between environmentally friendly ones.

Duration: 40 minutes

Preliminary Preparation:

- The number of students is divided by 7. The words "Solar, Wind, Geothermal, Hydroelectric, Fossil Fuel, Nuclear, Biomass" are written on a draft A4 paper. For example, if you have a class of 30 students, 4 of each of the five words you will choose because it is not exactly divided, and 5 of each of the other two words. If it divides exactly, for example, if you have a class of 28 students, you write 4 of each word. Cut and fold the papers and put them in a bowl.
- "Sustainable Energy Coloring Page" is reproduced as many as the number of students.

Instruction:

Does Anyone Know the Difference?

Write "Renewable Energy", "Sustainable Energy", "Non-renewable Energy" on the board. The following explanation is summarized in the teacher's own words:

Are the words "Renewable Energy" and "Sustainable Energy" synonymous? Answers are received from 2-3 students.

"Both aim to reduce carbon footprint and mitigate climate change, but they are not the same thing. Sustainable energy is also renewable, but not all renewable energy is sustainable. For example, solar, wind, geothermal and hydropower are both sustainable and renewable energies and are the best option for the environment. Geothermal energy is produced by the decay of radioactive materials in the rock and fluid in the Earth's core. Geothermal energy is renewable because the Earth has an almost unlimited supply of heat generated by its core. Hydroelectric energy, obtained through water, is renewable because the water cycle is a continuous process that recharges itself. Biomass energy is a renewable organic energy source derived from plants and animals. However, it is not sustainable because, for example, the rate of plant harvesting can exceed the rate of plant growth, in which case it is no longer sustainable. Some energies are also non-renewable. Does anyone know?"

2-3 students respond. "Fossil fuels and nuclear energy can be categorized under two main headings. Fossil fuels are natural resources with high levels of carbon in their structure. These energy sources obtained from living remains include oil, coal and natural gas. They are very harmful for the environment."

Grouping

Each student draws one of the prepared papers from the bowl. Students who have the type of energy and the answer to the definition/explanation come together and form a group.

- Sustainable and renewable radiant energy (solar)
- It is the energy obtained from non-renewable fuels such as coal, oil and natural gas, which are formed by the dissolution of dying living organisms in an oxygen-free environment for millions of years. (Fossil Fuel)
- Sustainable and renewable, it is the energy of movement of air currents (Wind).
- Sustainable and renewable, it is the energy generated by the heat from hot water, steam or magma deep in the earth coming to the surface through cracks. (Geothermal)
- A renewable, non-sustainable, organic energy source derived from plants and animals (Biomass)
- Sustainable and renewable energy obtained by utilizing flowing water (Hydroelectricity)
- A non-renewable form of energy derived from the nucleus of the atom (Nuclear)

After the groups are formed, this instruction is given. "Those who have environmentally friendly energy, hold your arm up with your thumb up 👍 and jump by saying "YEEEEEES"." Solar, wind, hydroelectric, biomass and geothermal groups jump.
"Those who have not environmentally friendly non-renewable energy, squat with your thumbs down 👎 cross your arms and say "NOOOOOO"." Fossil fuel and nuclear energy groups squat.

Find the 7 Differences

The attached "Find the 7 Differences" activity is projected on the smart board. 7 groups work silently until they find all the differences and take notes. Then each group is asked to show and tell one difference. When all the differences are found, the whole class applauds themselves.

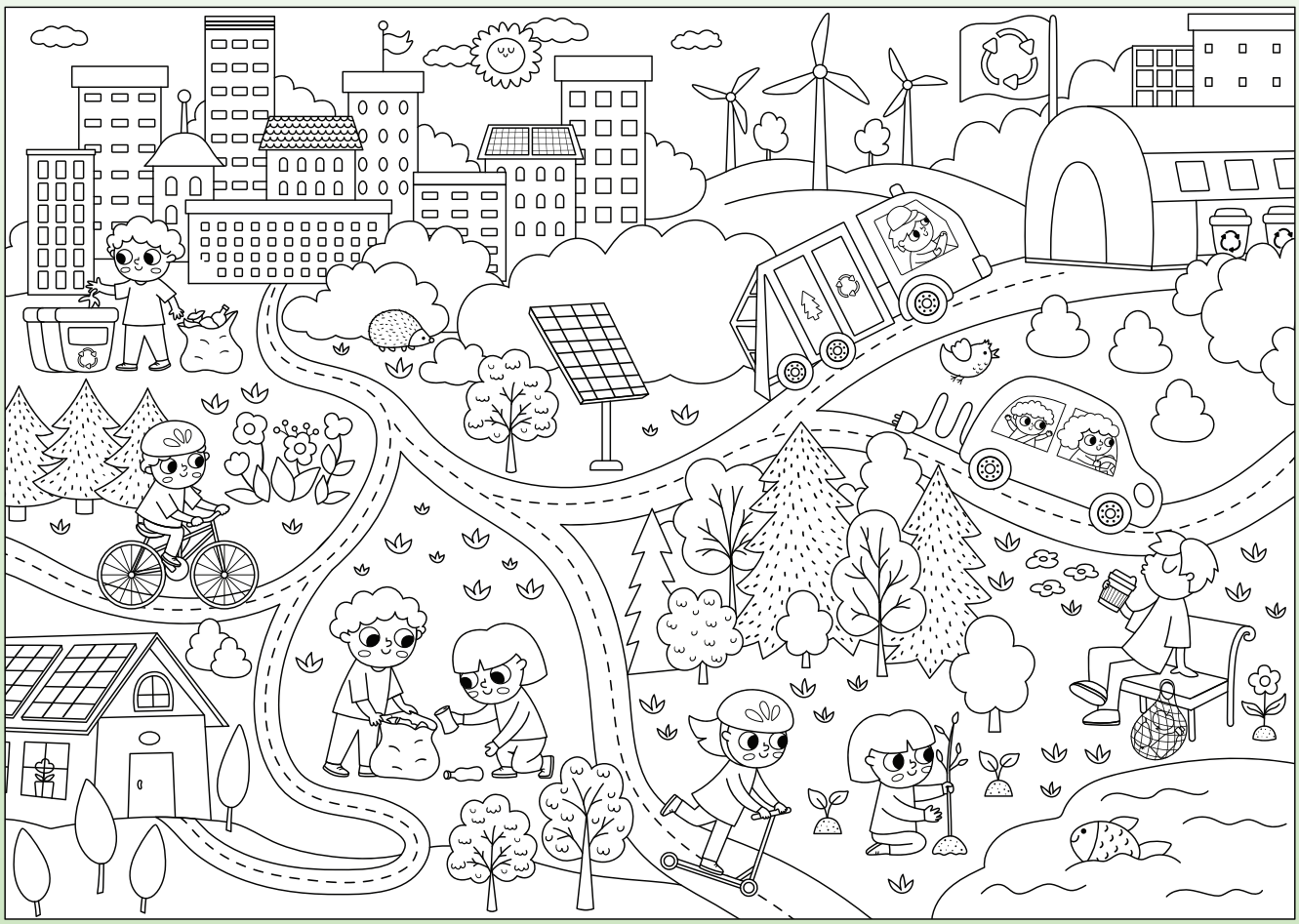
Let's Paint for a Sustainable Environment

The attached "Sustainable Energy Coloring Page" is distributed. Students are asked to color only sustainable environmentally friendly images. All students' products are hung and exhibited.

APPENDIX: FIND THE 7 DIFFERENCES

APPENDIX: FIND THE 7 DIFFERENCES ANSWER KEY

APPENDIX: SUSTAINABLE ENERGY COLORING PAGE



3. Sustainability in My Neighborhood

3.1. Water Saving Ambassadors

Aim: To have knowledge about water saving methods and to enable people around them to take action to save water.

Duration: 40 minutes

Preliminary Preparation: Reproduce 4 copies of the attached "Water Saving Story Cube". They are cut, glued with adhesive and turned into cubes.

Instruction:

Silent Movie Theater Water Saving Game

- The class is divided into 2 equal groups. 3 volunteer students from each group are selected as representatives. "Now I am going to tell an action about saving water to the friends you have chosen as representatives. Your friend will act it out silently and you will try to guess it as a group." Then the representative from the first group is called. The action to be acted out is said in the student's ear. The student tries to act it out silently. The following examples of actions related to saving water are given for the representatives to act out. "Turning off the faucet", "Fixing the dripping faucet", "Taking a shower in a short time", "Washing the food in a container full of water instead of running water", "Washing the dishes in the dishwasher instead of washing them by hand", "Collecting rainwater and watering the flowers with this water".
- The player's team members try to guess the action or clue within the set time limit (usually 1-2 minutes). If the team guesses the action correctly within the time limit, they score 10 points.
- Once guessed, it is the other team's turn.
- The game ends after all 3 representatives have taken part. The team with the most points wins.

At the end of the play, all the actions acted out in charades are briefly summarized. For example, "we use less water when we wash the dishes in the dishwasher instead of washing them by hand".

Water Saving Cube

Students are divided into 4 groups. Each group is given one "Water saving story cube". Students in the group are asked to throw the cube in turn. The student who throws the cube starts a story about water conservation inspired by the image on the top square of the cube. In the next step, another student in the group throws the cube and continues the story inspired by whichever image appears. If there are 5 students in the group, the cube is thrown five times and a story consisting of at least five sentences is written. In each throw, the story is continued by using the image in the square that comes on top. After all students have thrown the cube once and contributed to the story, the group story is completed. A representative is selected from each group. He/she reads the written story to the other groups. During story writing, students should be reminded to use positive language and to express what needs to be done. For example, instead of saying "I left the tap on and the water flowed down the drain, I took my first step towards becoming a water saving ambassador by turning off the tap while brushing my teeth."

Exit Ticket

"What impressed and surprised you the most in this activity? What will you do differently from now on?" Questions are asked. Responses are received from 2-3 volunteer students.

The students are asked to choose one of the tradesmen closest to their homes in their neighborhood, such as a tailor, grocery store, bakery, etc., and to share the water saving method that affected them the most in the story they wrote with the tradesmen they chose. For example, they can go to the bakery and share the information that washing dishes in the dishwasher consumes less water than hand washing. Students are asked to present their experiences in the classroom.

APPENDIX: WATER SAVING CUBE

3.2. Let The Neighbors Know

Aim:

- Ensure that they are aware of the location of recycling and waste collection bins in their surroundings.
- Ensure that others take responsibility for taking action for a sustainable environment.

Duration: 40 minutes

Preliminary Preparation:

- One week before the activity, students are asked to identify and take notes on the locations of recycling bins, unused goods collection bins, waste electronic material collection bins, waste battery collection bins in their neighborhoods.
- The materials collected in the preparation for activity 2.3. and separated as recyclable materials during the activity are used in this activity.

Instruction:

Where Where Game

If there is enough space in the classroom, students are positioned in a circle in the hallway or in the garden. The teacher is a part of the circle.

For activity number 2.3., the materials collected in the preparation part of the activity and allocated as recyclable materials during the activity are distributed to the students, one for each student (if there is not enough material, one material is given to every two or 3 students). Each student has one material in his/her hand. "Children, you have recyclable materials. Now I am going to ask you some questions and I want you to come together according to the answer. When you come together, you will go to the first friend who says 'here!' and you will say 'here here here! For example, when I ask, "Where are the people who have material suitable for the paper recycling bin?", someone with waste paper in their hands will raise their hand and say "here here here!". Whoever is the first to raise their hand and respond, and if your material is also waste paper, you will say 'here here here! The others will stay in their places" and the game is played by asking the following questions:

- Where is the material that fits in the metal recycling bin?
- Where is the material that fits in the plastic recycling bin?
- Where is the material you have that fits in the waste electronic materials box?
- Where are the waste paper materials that are suitable for the recycling bin?
- Where are the waste glass materials that are suitable for the recycling bin?

Map of Recycling Bins in My Neighborhood

Students are asked to draw a map using the notes they have taken about the locations of recycling bins, waste collection bins, waste electronic material collection bins, waste battery collection bins in their neighborhoods. They are asked to indicate the locations of recycling and waste or unused goods bins on their maps. The map is titled "Neighbors Don't Let It Be Unknown". The purpose is written under the map, for example: "Dear neighbors, I drew this map showing the locations of recycling and waste collection bins in our neighborhood for a sustainable environment. Love, Name-Surname, Age"

Let the Neighbors Know

Each student rings the bells of at least three neighbors and informs them using the map he/she prepared individually. Then they get permission from the building manager and hang their map at the entrance of the building. Students are asked to take photos with their neighbors or in front of the map hanging at the entrance of the apartment building. Photos and student experiences are shared in the classroom.

Exit Ticket

Students are asked to give a color to the day. They are asked to share why they chose this color.

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