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KIDS
IN CLOUDS

TEACHING SCENARIO FOR IMPLEMENTATION OF THE INTERDISCIPLINARY PROJECT FOR STUDENTS

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Project Name:	Eco mathematics
Related Subjects	Mathematics, nature/biology, technology
Key Concepts	waste, recycling, waste quantity, waste types, arithmetic mean and average

Activity Name:	What's in the trash can? – introduction
Duration of Activity (min)	10 min

Detailed description of the activity:

Inform the students that their first task will be to guess what we will do in this project.
Divide the students into 6 groups and ask each of them to choose their own leader. Then give the students tablets or allow them to use their phones. The task of each group is to find one QR code that is hidden in the classroom, scan it and find out what is behind it. Students can use apps built into their phone or use free apps such as QR SCAN, QR Code Scanner, etc. QR codes can be found in Annex 1 of this teaching scenario.

Instead of QR codes, you can also put photos of individual waste groups: glass, plastic, paper, bio, metal and others.

After the codes are found and scanned, ask the group leaders to say aloud what they see in the photos. Then ask the class what they think they will do in this project. Direct students to environmental responses related to waste. Point out that in today's class, students will learn how to separate waste.

Adapted activities for students with disabilities

Adapted activities for gifted students and those who want to know more

Make these students leaders in your group.

Activity Name:	What's in the trash can? – waste separation
Duration of Activity (min)	20 min

Detailed description of the activity:

Ask students to stay in the same groups, and ask the group leaders to stay in the middle of the classroom and pick up trash bags that colour-match the trash from the photo they found earlier (QR codes). Then in front of the other students, put a bag or basket with various types of waste. The bag should contain: a branch, a dry flower, an envelope, a newspaper, a cardboard box, a paper box, a paper leaf, a juice carton, a can, a can of a carbonated drink, a yogurt glass, an old screw, a plastic bag, a glass bottle, a jar with cap, old cosmetics, a paper towel, a shampoo packaging, aluminium foil, drug packaging, a battery, a light bulb, small electronic equipment (e.g. headphones), a stuffed toy, a flowerpot, ceramics, a piece of wood. You can also replace this waste with other waste and add other items, if desired or preferably.

Ask the students to take one item from the bag, one by one, without looking at the bag as they pull out the item, and then decide which garbage bag to put it in, or which student. Students sort waste in this way. If a student has difficulty choosing the right type of waste or the right garbage bag, they can ask the class for help. Please note that

if a student/class makes the wrong choice you should comment on their choice. Finally, 3 things should remain: a battery, a light bulb and small electronic equipment. Ask the class why they were not sorted into the bags offered and what should have been done with this type of waste. Finally, ask the students to state why it is so important to separate the waste. It is worth noting that unclassified waste is dangerous, pollutes air, soil and water, permanently pollutes the environment, etc.
Adapted activities for students with disabilities
Have the students pull the waste out (what they want) of the prepared bag.
Adapted activities for gifted students and those who want to know more

Activity Name:	What's in the trash can? – waste separation
Duration of Activity (min)	15 min
Detailed description of the activity:	
Ask students what electronic waste is, how it is created, how it is collected and if they know what happens to it after disposal. Afterwards, show students the video: (83) Support E-Waste Workers' Rights at Agbogbloshie in Accra, Ghana - YouTube. In the movie settings, change the caption display language. Ask students what they think now about electrical waste and its disposal, and whether they will reduce its generation and how. Then ask the students if there is waste in both the seas and oceans, where it comes from, and how the waste ended up in the water. Then show the following video to students (83) The Great Pacific Garbage Patch - YouTube. Change your language in movie settings captions. Ask students what their impression is after watching the video and what they think of what they are shown. Finally, give the students homework. Ask them to collect information about what they throw away as waste over the course of one whole week. The data should include: kilograms, liters, the quantity and type of waste being recycled. Also, let the students note if they collect some waste that cannot be recycled or are not sure how it is recycled.	
Adapted activities for students with disabilities	
Ask students if they the understand videos. If necessary, briefly talk about the video.	
Adapted activities for gifted students and those who want to know more	
Have the students answer the questions first.	

Activity Name:	Waste mathematics – An Introduction
Duration of Activity (min)	10 min

Detailed description of the activity:

Introduce students to the theme of the class – the use of simple mathematical calculations related to waste.

For starters, invite each student to share their research findings. Type the kilograms and all the other data on the board. Ask your students to calculate the sum for each data type separately.

Table Example

Waste type	**Kilograms per student**	**Total Quantity**	**Recycled kilograms per student**	**Total Quantity**
Plastics	Student 1 – e.g. 1 kg Student 2 – e.g. 2 kg Student 3 – e.g. 3 kg …	e.g. 6 kg	Student 1 – e.g. 0.5 kg Student 2 – e.g. 1 kg Student 3 – e.g. 0.7 kg …	e.g. 2.2 kg
Paper				
Metal				
Glass				
Bio				
Other				
Total Amount				

Then, in the example, show how to calculate the arithmetic average of the amount of individual waste produced by one person and ask the students to calculate the same based on the remaining recorded data. Point out that in this way they will calculate the average amount of each type of waste produced by one person in the class. Ask students about the results obtained and ask them to compare their results with those of the other students.

Adapted activities for students with disabilities

Prepare the students a formula for calculating the arithmetic average.

Adapted activities for gifted students and those who want to know more

Students can present the results. They can also help you write numeric values on the board.

Activity Name:	The Math of Waste – the amount of waste in the world
Duration of Activity (min)	10 min

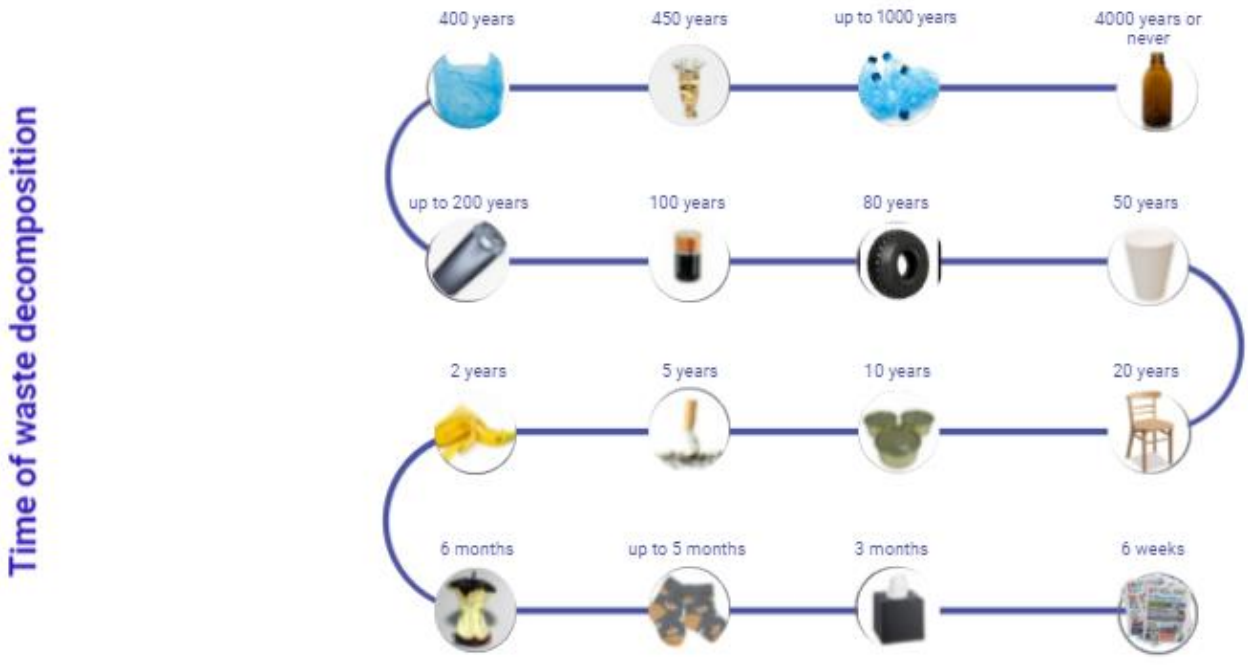
Detailed description of the activity:

Ask students which states they think generate the most waste. Ask the students to write their answers on the board and show the video to other students (83) ➢ Waste Produce by Countries per Year | Waste per country Comparison | 3D country Comparison - YouTube. You can speed up the video playback by choosing to increase

the playback speed in settings. Then, together with your students, compare the data on the board with those in the video. Go to the website https://www.theworldcounts.com/challenges/planet-earth/state-of-the-planet/world-waste-facts/story and together with the students comment on the amount of waste in the world, noting to them that the specific values are constantly increasing. Then comment on the other information on the site such as: the number of planet Earths we need to contain all the waste in the world, the amount of waste in the oceans, etc. Ask students what they think about whether Earth will recover from that amount of waste, what will happen if planet polluting continues, and what life on Earth will look like in 50 or 100 years.
Adapted activities for students with disabilities
Adapted activities for gifted students and those who want to know more

Activity Name:	The Math of Waste – how long does waste break down
Duration of Activity (min)	10 min
Detailed description of the activity:	

Divide students into pairs and share with them a link https://view.genial.ly/6270e3f2f6c1660018248eeb/interactive-content-time-of-waste-decomposition. Explain what their task will be. The timeline shows the number of years during which each type of waste is broken down. The student's task is to connect the waste with the length of its decomposition. Begin by showing how to do the first example with your students, and then let them work in pairs. Note to students that they can use the Internet when completing this activity. When they're done, show students the exact solutions and ask the student pairs how many correct answers they have.

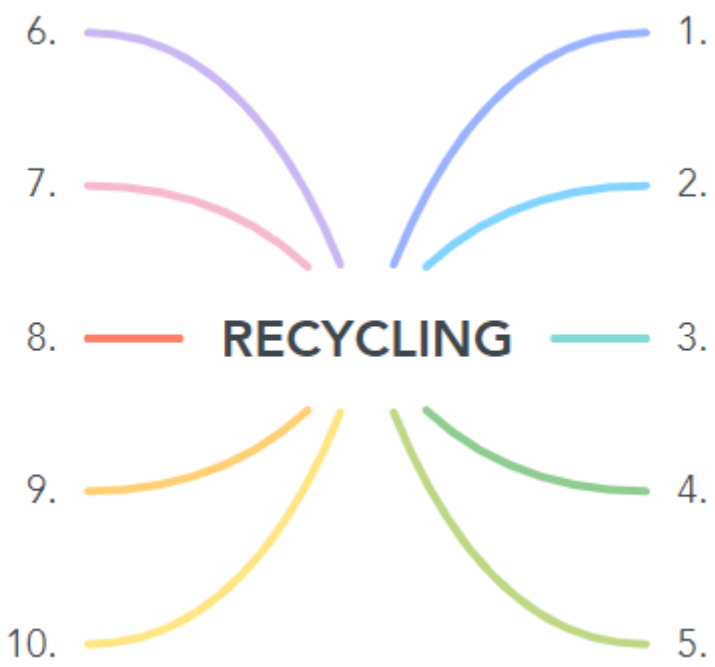


Adapted activities for students with disabilities
Pair your students carefully to not put 2 students together with disabilities.
Adapted activities for gifted students and those who want to know more

Name of Activity	The Math of Waste – Math Challenge
Duration of Activity (min)	15 min
Detailed Description of the activity:	
Keep the students in pairs. Distribute a worksheet with them: https://app.wizer.me/learn/OIR7II and instruct students to solve mathematical tasks related to the amount of waste in the world in pairs. Give the students homework. Have them make a short collage in the Genial.ly app showing wild landfills and rubbish in their environment. Instruct students to walk around their village in search of places like this, take pictures of them and add them to their collage.	
Adapted activities for students with disabilities	
Pay attention to the work of students with disabilities. If necessary, give them indicative advice, in no case solve the task for the student. Make sure that there are no two students with disabilities working in the couple. Assess whether a student can solve this homework in view of their difficulties and adjust it as needed.	
Adapted activities for gifted students and those who want to know more	
You can prepare a more specific task for these students in the same or another worksheet.	

Activity Name:	The second life of waste – An introduction
Duration of Activity (min)	7 min
Detailed description of the activity:	
Inform students that after today's class they will be able to explain the concept of waste recycling and describe how waste is recycled. Ask students what recycling is and direct them to the correct answer if necessary. Divide students into 4 groups and ask them to think together for a moment about the benefits of recycling. Then tell them that you sent them an invitation to collaborate on a previously prepared mind folder. The central word on this mind map is RECYCLING, and their task is to add fields that describe the benefits of recycling waste.	

Example: Mind Master



After students type answers to the mind map, open the presentation prepared on the Genial.ly https://view.genial.ly/6270d9308c0707001a723eb3/presentation-second-life-of-wastes briefly comment on students' responses and possibly add those missing components.

Adapted activities for students for disabilities
Adapted activities for gifted students and those who want to know more

Activity Name:	The other life of waste – 5R + 3R
Duration of Activity (min)	13 min
Detailed description of the activity:	

Show students slide 3 of your presentation and comment briefly on what the abbreviation 5R stands for. Comment on the meaning of each of the above terms. Let the students continue to work in the same groups as during the previous activity. Instruct them to devise as many activities as possible within 5 minutes using these individual elements: REFUSE, REDUCE, REUSE, RECYCLE, ROT. Comment on the last element (ROT) yourself. Translations of the concepts within the presentation will help students when designing activities.

Ask each group to present their ideas and eventually complete the clarification of each "R" concept by going through the accompanying slides of the presentation. Also, mention the remaining 3R in the accompanying slides of the presentation and comment on them briefly with your students.

Adapted activities for students with disabilities
Have students write down their answers to consolidate their knowledge of the topic and to help them accompany the activity.
Adapted activities for gifted students and those who want to know more
Have the students present the results of their group.

Activity Name:	The other life of waste – how would you use it?
Duration of Activity (min)	10 min
Detailed description of the activity:	
Divide the students into four groups: paper, plastic, metal and glass. Instruct students to have at their disposal 5 minutes of time during which each group must remember and write down as many different types of waste as possible from the material allocated to their group (paper, plastic, metal or glass). Also, students should write options for reusing any waste they can think of. In the beginning, help students with several examples, such as: old newspapers that can be used to make toilet paper, a plastic bottle for making toys, etc. Groups write down their ideas on paper. After the expiration of the indicated time, the students then share their ideas.	
Adapting activities for students with disabilities	
To make it easier for students to participate in activities, point out to them that they can use examples of waste that we mentioned during the activities *What is everything in the trash can? – waste separation* (a branch, a dry flower, an envelope, a newspaper, a cardboard box, a paper box, a paper leaf, a juice carton, a can, a can of a carbonated drink, a yogurt glass, an old screw, a plastic bag, a glass bottle, a jar with cap, old cosmetics, a paper towel, a shampoo packaging, aluminium foil, drug packaging, a battery, a light bulb, small electronic equipment (e.g. headphones), a stuffed toy, a flowerpot, ceramics, a piece of wood).	
Adapted activities for gifted students and those who want to know more	
Have the students present the results of their group. Encourage them to find interesting information at home about the reuse of various types of waste. Also, if you have more gifted students in your class, they can be members of a special, fifth group that will deal with bio-waste or mixed waste and the various ways to recycle them.	

Activity Name:	The other life of waste – mathematical challenge
Duration of Activity (min)	15 min
Detailed description of the activity:	
Share the https://app.wizer.me/learn/C19A69 sheet with students and instruct students to start solving math problems related to waste recycling on their own.	

Ask students to write down for their homework all the unnecessary things they have in their room and how they might use them. Let them know that they can bring these things to the next lesson to make some new items out of them.
Adapting activities for students with disabilities
Pay attention to the work of these students. If necessary, give them directions and support, but do solve the task for the student.
Adapted activities for gifted students and those who want to know more
You can prepare a task for these students in the same or another worksheet.

Activity Name:	Useful things from unnecessary waste – An introduction
Duration of Activity (min)	5 min
Detailed description of the activity:	
Inform students that they will be creating new things out of waste in today's class. Let them know they can use unnecessary items they brought from home. Divide students into groups of 4 people and assign roles to individual members: 1. Thinker – his task is to prepare the project in cooperation with other members of the group 2. Analyst – writes down all the numbers when creating a project 3. Builder – prepares the project according to the plan of the Thinker 4. Supervisor – the task of this person is to assist and supervise all activities carried out in the project Give the students one minute to decide which of them will play which role. If a group must have 5 students, decide what role the fifth student will play.	
Adapting activities for students with disabilities	
Adapted activities for gifted students and those who want to know more	

Activity Name:	Useful things from unnecessary waste
Duration of Activity (min)	30 min
Detailed description of the activity:	
Inform the students that their task is to prepare a functional object from the waste that they brought in and from the one you have prepared for them. You can prepare all kinds of waste: newspapers, books, plastic bottles, etc. you can also use waste from previous hours. Students should connect different elements, so they should also be provided with adhesive tape, glue, scissors, plasticine, etc.	

Inform students that each element they use for construction should be measured – e.g. the length, height and width of the element, the amount of plasticine used, glue, adhesive tape, etc. If you work with older students, you can ask them to make a calculation of the area and volume of the constructed functional subject. Also, if you are able, you can prepare the scales and have the students weigh individual subjects. An example of the data entry table can be found in Annex 2 of this teaching scenario.
Adapting activities for students with disabilities
Make sure that the student's dysfunction does not affect the role in the group. If a student has a diagnosis of numerical dissonance, he cannot be an Analyst.
Adapted activities for gifted students and those who want to know more
Make sure that the student chooses a role in the group according to his predispositions. If the student is creative, he should be a Thinker, if he is creative and has a well-developed motor skills he should be a Builder, etc.

Activity Name:	Useful things from unnecessary waste
Duration of Activity (min)	10 min
Detailed description of the activity:	
Ask the groups to present the results of their work. Each group, in addition to a brief description of the new functional object, should also provide numerical data on the size, quantity and possibly weight of the waste and material used.	
Adapting activities for students with disabilities	
Adapted activities for gifted students and those who want to know more	
Have students present the results of their group's work.	

Annex 1

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Annex 2

Useful things from unnecessary waste

Material Used	Quantity	Length	Width	Height	Weight