

WASTE 4think.eu



European
Commission


Horizon 2020
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for Research & Innovation




DIGITAL PROJECT

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NAME	Where is Wastey?
AGE GROUP	Basic Education (primary and secondary)
MAIN SUBJECT	WASTE SEPARATION AND RECYCLING
PROJECT DESCRIPTION	<p>Looking for the Treasure.</p> <p>You have just arrived at your class-room and realized that the trash can is overturned and there are remains of food on the floor. It seems that an animal has entered in the class. You and your group of friends have decided to investigate and look for it.</p> <p>As a highly skilled researcher, you must;</p> <p style="text-align: center;">Analyse the scenario Collect tracks Identify how it could have been avoided Look for solutions Share/Communicate what happened</p>
DURATION	<p style="text-align: center;"> 6 HOURS</p> <p>Distributed in 3 weeks' time</p>
RESOURCES	<ul style="list-style-type: none">• Work scenario 1: Internet connection available: Internet connection, paper or PDF materials.• Work scenario 2: There is no internet connection: Materials on paper, photocopies, cardboards, scissors, markers and glue.



<p>WORKING METHODOLOGY</p>	<p>Work by projects. Inductive thinking. Propose a hypothesis, analysis and presentation of results. Team work.</p> <div style="text-align: center;">  <p>3 TEAM MEMBERS</p> </div>
<p>SPECIFIC OBJECTIVES</p>	<ul style="list-style-type: none"> • Being able to search and correctly recognize accumulated resources in the classroom or school • Identifying people as the origin of the generation and management of urban solid waste • Acquiring the necessary knowledge for the correct identification and classification of USW at the origin, as a first step for further good quality recycling • Internalize the concept of prioritization reducing, reusing and recycling • Developing the capacity to analyse and extract data from generated / managed waste in an approximate manner • Developing the analysis capacity of analyse to identify the necessary resources for the t management of USW in your city • Being able to create ideas, search, present and identify preventive measures for waste reduction • Being able to identify the value of the resources generated in the classroom
<p>GENERAL COMPETENCES</p>	<ul style="list-style-type: none"> • Competence for verbal, non-verbal and digital communication • Mathematics, Science and Technology • Digital competence • Initiative and entrepreneurial spirit • Learn to learn
<p>CONTENTS</p>	<ul style="list-style-type: none"> • Introduction: What is food waste? • Monitoring of generated waste • Prevention measures in the generation of USW • People as agents of change



EVALUATION CRITERIA TRANSVERSAL BASIC COMPETENCES

- Communicating in a mother tongue and foreign language (EU). Competence for verbal, non-verbal communication.
 - Know how to communicate
 - Communicate, orally and in writing, with fluency, autonomy, creativity and effectiveness.
 - Use, in an integrated and harmonious way, the basic codes of body language, arts and maths.
 - Interpret, in a critical way, the socio-communicative reality of the society and the world and participate responsibly and with an ethical sense in the communicative processes of its context.
- Digital competence (EU). Competence for digital communication.
 - Interpret and evaluate, in a critical way, the messages of the social media.
 - Use ICT resources appropriately, effectively and responsibly, for designing and planning a task, managing information, creating digital productions, cooperating and communicating results.
- Learning to learn (EU). Competence to learn to learn and to think.
 - Search select and record information from various sources (printed, oral, audio-visual, digital ...).
 - Understand and memorize information (comprehensive thinking).
 - Interpret and evaluate information (critical thinking).
 - Create and select ideas (creative thinking)
 - Use cognitive resources strategically, mobilizing and transferring learning to other situations.
- Social and civic competences (EU). Competences to live together.
 - combining the satisfaction of their own and others' desires, assertively expressing their own feelings, thoughts and desires, while actively listening and considering the feelings, thoughts and desires of others.
 - Learn and work in groups, assuming their responsibilities and acting cooperatively in the tasks of common objective, recognizing the richness of the diversity of people and opinions.
 - Behaving in accordance with the ethical principles that derive from human rights and in accordance with social norms that derive from the basic social conventions for coexistence.
 - Find a solution to conflicts, through dialogue and negotiation.



- Sense of initiative and entrepreneurship (EU). Competence for initiative and entrepreneurship.
 - Generation of new ideas and solutions and suggesting alternatives to improve reality with a critical spirit, solidarity and from social responsibility.
 - Execute the planned actions and adjust when necessary.
 - Evaluate the actions carried out and make suggestions for improvement.

- Sources:
 - * Heziberri_2020_c.pdf
 - * GENERAL_STRUCTURE.xlsx (COMPETENCES tab)

EVALUATION CRITERIA. BASIC DISCIPLINARY COMPETENCES

- Communicating in a mother tongue and foreign language (EU). Competence in linguistic and literary communication.
 - including oral and written texts, in different supports, of different genre from the fields of use of interpersonal relationships, media, learning. Recognizing the global meaning and selects the information relevant to the proposed objective.
 - Producing, in a guided way, oral or written texts, in different supports. Belonging to areas of use such as interpersonal relationships, media, learning.
 - Participating in the interactive situations of the classroom and in the centre, respecting the rules of communicative exchange.
 - Using ICT in a guided manner in the recovery, selection, processing and communication of information to answer to the needs of the activity.

- Mathematical, scientific and technological competence (EU). Mathematical competence
 - Developing and cultivating appropriate personal attitudes inherent to the mathematical task in the search for solutions to research and problems. Identifying and posing simple problems of daily life that can be solved using different mathematical contents.
 - Solving and formulating simple problems related to objects, facts and situations of daily life, selecting the operations and using the corresponding basic algorithms or other resolution procedures, including calculator, and orally expressing the process carried out.
 - Solving open problematic situations and simple mathematical investigations and small work projects on numbers, calculations, measurements and geometry, using different strategies, collaborating



- Mathematical, scientific and technological competence (EU). Scientific competence Natural Sciences.
 - Performing with the help of a script, research and field or laboratory practices applying the scientific methodology, assessing its execution and interpreting its results.
 - Applying strategies of scientific work in the realization of tasks and projects.
 - Using digital tools and Internet to manage information and create new content.
 - Linking scientific ideas with technological advances and in other fields, recognizing that they allow an improvement in the quality of life.
 - Suggesting, from examples of daily life, some of the main uses that people make of natural resources, pointing out advantages and disadvantages and making proposals for their conservation.

- Mathematical, scientific and technological competence (EU). Technological competence Technology.
 - Accessing services for the exchange and publication of digital information under criteria of security, privacy and responsible use.
 - Preparing and publishing contents on the web that integrate textual, numerical, sound and graphic information adequately.

- Social and civic competences (EU). Social and civic competence
 - Obtaining relevant and concrete information about facts or phenomena previously delimited, using different sources, both direct and indirect.
 - Developing responsibility, effort, perseverance and reflection on the learning process itself.
 - Value group work, showing attitudes of cooperation and responsible participation, accepting differences and tolerating the ideas and contributions of others in the dialogues and debates.
 - Developing creativity and entrepreneurial spirit, increasing the capacities and competences to using multiple information to obtain innovative conclusions in different situations.
 - Making a responsible use of nature's assets, contributing to preserving the environment by understanding and interpreting events, analysing causes and predicting consequences.



- Cultural awareness and expression (EU). Consciousness and cultural expression
 - Applying in visual and musical productions, techniques and resources appropriately to their own needs for expression and communication, arguing the reason for the choice.
- *EB_curriculo_completo.pdf
- *GENERAL_STRUCTURE.xlsx (COMPETENCES sheet)

EVALUATION METHODOLOGY	RULES FOR SELF-EVALUATION, INDIVIDUAL AND / OR GROUP EVALUATION.
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STEAM	<p>STEAM 1</p> <p>WHAT HAS HAPPENED?</p> <p><u>HYPOTHESIS:</u> Analysis of a situation.</p> <p><u>DESCRIPTION:</u> You have arrived to your class-room and you realize that the trash can is overturned and there are remains of food on the floor. It seems like an animal has entered in. You and your group of friends have decided to investigate and look for the animal.</p> <p>LOOKING FOR THE TREASURE</p> <p>What has happened? Work in groups of 3 or 5 people Generate the hypothesis based on real data. Select the best method for data collection. Identify if a correct waste management is carried out or not</p>
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STEAM 2

HOW CAN THE GUILTY BEING FOUND?

DATA COLLECTION AND PROCESSING: Where is the animal who made this disaster? What resources are necessary? Exploration, resources to manage, ideas to obtain data and quantify them. Resources to collect the method and being able to reproduce it.

DESCRIPTION:

It seems that the animal hides in the waste. We cannot empty the bins and neither put your hand in them. The animal could be scared and get aggressive.

We will have to find out where he is by getting information about which is the standard weigh of bins and if find out any change.

How do we collect this data? What elements are needed? Remember to record, collect, write down and explain the method used.

Work in groups of 3 or 5 people

The idea is to think about how weight data can be collected (i.e. empty bins, filled up and so on, using different types of scales, sensors, etc..).

Properly write down and explain the working process followed (data capture of each type of bin, use of spreadsheet, formulas, tables, units of measurement, generation forecast, etc.) and (video of the execution, documentation, presentation, others.).

In addition, the hidden animal can be a stone, or a heavy element decorated in certain way that moves along the different classrooms participating in the project following a pattern (every week is in a different classroom, but following a logical movement prefixed by teachers: i.e. even week in an even classroom and odd week in an odd one).



STEAM 3

WHICH INFORMATION IS SHOWN BY THE CLUES?

CONCLUSIONS AND DEBATE: Based on data obtained, get conclusions about generation in the classroom / hall / course. Where is waste generated? When is more / less waste generated? Which type of waste is generated? Is there valuable anything that cannot be reused?

Work in groups of 3 - 5 people.

As generation data are available, link them to concepts of prevention and reuse as well as separation at source for the correct waste recovery.



MATERIALS

MATERIAL 4

Presentation of the working process followed and results discussion

ACTION: Create a graphical/text material that shows up the global path and the results obtained.

Suggest actions or commitments of each group to improve individual and classroom / or plant management.

Work in groups of 3 or 5 people.

Summarize in a presentation the method used, the tools and resources, the conclusions and suggest improvements.

MOBILE GAME

MOBILE GAME 1

0WASTE

Use the mobile game from de Waste4Think project called 0Waste to reinforce the classification concepts and compare the type of recycling and amount of it among the students.

MOBILE GAME 3

TREASURE MACHINE

Use the mobile game from de Waste4Think project called Treasure Machine to work with concepts related with waste valorisation.



<p>SERIOUS GAME</p>	<p>SERIOUS GAME 1</p> <p>WASTE2SORT</p> <p>Use the serious game from de Waste4Think project called Waste2Sort to reinforce the concepts.</p> <p>SERIOUS GAME 3</p> <p>VIRTUAL CITY</p> <p>Use the serious game from de Waste4Think project called Virtual City to reinforce the concepts.</p> <p>SERIOUS GAME 4</p> <p>PLANNING GAME</p> <p>Use the serious game from de Waste4Think project called Planning Game to reinforce the concepts.</p>
<p>APPS</p>	<p>APP 1-2</p> <p>CITIZEN AND LOCAL TRADE APP</p> <p>Use the app from de Waste4Think project called Citizen and Local Trade to reinforce the concepts.</p>



DIGITAL PROJECT 2

TEACHER'S TEMPLATE

METHODOLOGY:

Research, inductive thinking. Working by projects.

WHICH MATTERS THE PROJECT IS RELATED WITH?

MATHEMATICS. Planning, measurements, monitoring, prediction, data capture, interpretation of data, conclusions, presentation and interpretation of tables and graphs.

LANGUAGE Terminology: hypothesis, food waste, types of waste, organic waste, inorganic. Create and write down instructions for research (Title of research, necessary tools, planning, methodology, results and conclusions). Presentation of the data through an audio-visual format (use of spoken and written language) or through a graphic format (only through graphic materials).

ENVIRONMENT. Separation and waste management, monitoring, introduction to scientific thinking. Introduction to the concept of food waste.

TECHNOLOGY. Creation of own materials using on-line tools. Use of spreadsheets Use of individual or collaborative text processors (Google forms, Google drive ...)

SETTING-UP OF WORKING GROUPS:

PREPARING THE ACTIVITY.

Level 1: The teacher draws up the activity.

Level 2: A team formed by students (3 people) draws up the activity (choosing the pattern to be followed by the mouse and have bins ready every day for the activity). These people can be members of the school environment committee, volunteers, etc.

RESEARCH TEAM

At least 2 research teams.

They are in charge of making a hypothesis, planning the work methodology, collecting the data and coming up with the results. Each research team should be about 2 and 4 people.



TIME FRAME

3-4 SESSIONS IN CLASSROOM - depending on the duration of each session.

5 days for data capture.

People in charge of the activity will prepare the work to be done in class in advance. The session involves an initial activity, a period of one week for data collection and three final sessions of data analysis, showing data and conclusions.

It is very important that during that week school/classroom bins not be empty by the cleaning staff to avoid losing the mouse.

For this purpose, it's necessary to have the following **elements in the classroom**:

- Paper management bin inside the classroom or any bin placed inside the classroom (this way, it is easier to weigh and not generate too much dirtiness). All bins should have a similar size. To manage paper helps to keep quite a similar bin weight. An in this case, the weight of the mouse stands out and makes easier to find out weight changes and helps to decide.
- A stone or solid element with an approximate weight of 500gr, where eyes, tail, and ears are added simulating a mouse. This element will be hidden inside each bin (see instructions to create the mouse).
- Waste bins for the selection of waste, in the classroom, corridors or other school spaces. The ideal scenario is to use the classrooms of the same floor
- Scale for bin weighing.
- Paper and pen or portable digital device (tablet, mobile) with spreadsheet (i.e. google sheet or Excel) to record the temporary data.
- DinA3 sheet (physical or digital) to create a map with the location of the bins and for writing down when and where the mouse appears each day.
- **ADVANCED OPTION:** Place a camera that records and saves or streams the images. This option would be valid on day 4, 5 and 6. Only use one camera could be used and should be placed in the trash bin where the mouse is expected to be (see options about how to install a camera to save or broadcast images in streaming).



PREPARATION OF THE ACTIVITY

Every day the teacher or team responsible for being "Wastey" must prepare the corresponding bin (there can be 1 team in charge of creating wastey and of placing it in a different bin every day following an established pattern)

- check that bins to be used have quite a similar weight.
- place "Wastey" in the corresponding bin.

This exercise that be used in mathematics or environment classes, as well as in the language one (given more emphasis to different topics, for example, in the language class the most important point to pay attention to will be the terminology used)

- **Day 1**
Preparation of the activity scene. The overturned paper bin will be placed. Inside among the papers, food waste could be seen (i.e., an apple, some cookies, a piece of bread ...).
Outside the bin some footprints simulating they belong to a mouse will appear (paint the path to generate them).
- **Day 2**
Level 1: The mouse will be placed in the paper bin of the classroom next door (the objective is to create a recognizable pattern. Depending on how the classrooms are arranged a more complex pattern can be generated - another factor to be considered are the level and abilities of the students to recognize patterns).
Level 2: The mouse will be placed two doors apart from the classroom of the group that is taking part in the activity.
- **Day 3**
Level 1: The wastebasket where the mouse was on Day 2 will appear overturned and footprinted. The mouse will be placed in the paper bin of the classroom next to the one of Day 2.
Level 2: The bin where the mouse was on Day 2 will appear overturned and footprinted. The mouse will be placed two doors classrooms away from day 2 working space.
- **Day 4**
Level 1: The wastebasket where the mouse was on Day 3 will appear overturned and footprinted. The mouse will be placed in the paper bin of the classroom next to the one of Day 3.
Level 2: The bin where the mouse was on Day 3 will appear overturned and footprinted. The mouse will be placed two doors classrooms away from Day 3 working space.
- **Day 5**
Level 1: The wastebasket where the mouse was on Day 4 will appear overturned and footprinted. The mouse will be placed in the paper bin of the classroom next to the one of Day 4.
Level 2: The bin where the mouse was on Day 4 will appear overturned and footprinted. The mouse will be placed two doors classrooms away from Day 4 working space.
- **Day 6**
Level 1 and Level 2 must find out which bin the mouse is and capture it.

Note: If there are not enough classrooms, the working class will be repeated. Not to change floor is recommended (to help create the map of the presence of the mouse). If there are special classrooms on the floor, they can be used (laboratory, crafts, etc.) as long as access to them is assured. If there are no paper bins in the classrooms and they can be used the ones at the corridor. If not, Bins of the classrooms will be used even though they are not paper bins.



RESEARCH

STEAM 1. DAY 1 (50-minute session in the classroom):

Statement of the problem. Working teams will be created and possible hypotheses will be considered.

One single hypothesis will be validated or refused.

The main objective is to verify the hypothesis and capture the guilty of this disaster without harming it.

The professor or team responsible for "Wastey" must clearly explain the rules to achieve the goal:

RULES

- **RULE 0:** Each research team must have a name.
- **RULE 1:** Starting 5 days data could only be taking without touching the items inside the bins. The animal who provoked this situation could be scared and disappear. It is very important to capture it this situation not to happen again.
- **RULE 2:** The 6th Day may select a trash bin to capture the person responsible for the disaster.
- **RULE 3:** Everything that is in the overturned bins should be properly recorded and measured (weight) to get clues about the mouse.
- **RULE 4:** The results presented will only be valid if they are based on real data. The methodology used should be easily replicable.



DATA CAPTURE METHODOLOGY

(do not mention which type of animal is, it should be proposed by the working teams)

- **Use of a scale:** All the bins must be weighed, the one with the mouse will have a greater weight.
- **Waste characterization:** analyses the waste that is in the bins. The one having food waste should be the one where the mouse is.
- **Use of a camera to capture images of the guilty:** This could be an extra method, it should only be allowed to be used twice in the investigation after the 3rd working day. Camera should be placed in a bin only once.
- **DAY 2, 3, 4 and 5.** They must be consecutive. If there is a weekend pause in the middle, you can play as 2 days have passed.
- Therefore, the pattern is followed and the mouse jumps two classrooms or keep it as if a single day had passed.
- Collection of weighing data, waste characterization and / or placement of cameras.
- **STEAM 2. DAY 6** (50-minute slot in the classroom). Data analysis and capture of the rodent.
- **STEAM 3. DAY 7** (50-minute session in the classroom). Data analysis to think about the way waste management and separation at source is performed. Consider if it is correct or not and possible improvement actions based on the concept of waste resource and prioritization in waste management (reduction, reuse, recycling).
- **STEAM 4. DAY 8** (50-minute slot in the classroom). Making up a video, poster or podcast showing up the hypothesis, the methodological approach, the results and the conclusions. Wrapping up ideas to improve the performance of the classroom.
- **NOTE:** It is highly recommended to keep data/images to show each step of the investigation followed It is also encouraged to show-up results using the Excel sheet or the generated graphs.

