

# WASTE 4think.eu



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Commission



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# STEAM Lesson

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<b>NAME</b>	<b>WHAT HAS HAPPENED?</b>
<b>DESCRIPTION</b>	<p>You have arrived at your classroom and you realize that the trash can is overturned and there are remains of food Waste 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><b>What happened?</b></p>
<b>DURATION</b>	 <b>80 MIN</b>
<b>RESOURCES</b>	<ul style="list-style-type: none"><li>• Waste available at the classroom</li><li>• Video/photo camera</li><li>• If there is no video camera: Cardboard, markers, glue and paper</li><li>• Computer with office tools</li><li>• If there is no computer: paper rulers and crayons</li></ul>
<b>WORKING METHODOLOGY</b>	<p>Work by projects. Inductive thinking. Team work.</p>  <b>3-5 TEAM MEMBERS</b>
<b>EVALUATION METHODOLOGY</b>	Group evaluation template
<b>OBJECTIVES</b>	<ul style="list-style-type: none"><li>• Think about an event analysing the scenario.</li><li>• Make up a hypothesis</li><li>• Discuss the different hypotheses generated</li><li>• Be able to reach a consensus for the selection of a single hypothesis to be tested</li></ul>



	<ul style="list-style-type: none"> <li>• Be able to suggest a replicable method that allows accepting or rejecting the hypothesis</li> <li>• Generate a planning for your research plan based on predefined guidelines</li> <li>• Identify waste management elements in the classrooms</li> <li>• Elaborate a data collection plan</li> </ul>
<b>COMPETENCES</b>	<ul style="list-style-type: none"> <li>• Competence for verbal, non-verbal and digital communication</li> <li>• Mathematics, Science and Technology</li> <li>• Digital competence</li> <li>• Learn to learn</li> </ul>
<b>CONTENTS</b>	<ul style="list-style-type: none"> <li>• Analysis of an image</li> <li>• Recognition of waste types</li> <li>• Selection of waste</li> <li>• Values</li> </ul>
<b>CREATION</b>	<ul style="list-style-type: none"> <li>• Description of the hypothesis. Set a hypothesis, written, drawn or by other audio-visual means.</li> <li>• Work planning and waste management plan.</li> </ul>



# ACTIVITY 1

## WHAT HAS HAPPENED?

**OBJECTIVES:** Think about, debate and come up describing what has happened in the classroom.

**CONTENT:**

Based on a scene/photo about the current state of the classroom, generate a hypothesis about what has happened. Identification of waste types, identification of animals by their footprints. Use of reliable information on the Internet. See Annex Teaching activity

**COMPETENCES:**

- Competence in verbal, non-verbal and digital communication
- Competence in learning to learn and thinking
- Living together skills
- Social and civic competence

**DURATION:**



**5 minutes** to create working teams and set the problem to be solved. **15 minutes** discussion and hypothesis selection.

**ACTION:**

Reflection on what has happened. Presentation of the results of each group. Discussion and conclusions.

**CONCLUSIONS:**

That there is a hidden animal that feeds on waste.

**RESULT:**

Oral presentation of 1 member of each group with the hypothesis of what happened.



## ACTIVITY 2

The clues, why did this happen? How can the guilty be captured?

**OBJECTIVES:** To be able to map the waste generation systems of the classrooms. Develop the creativity to suggest methods for data collection and catch an animal.

**CONTENT:**

Select the clues to take into account: you cannot empty the bins nor put your hand in them, you must help the animal to go out from the bin alone.

**MATERIALS:**

- Wastey Research Template
- Wastey Research Map
- Wastey Data Capture Template
- Wastey Research Rules
- Scale
- Gloves
- Webcam
- Computers or printer

**COMPETENCES:**

- Competence in verbal, non-verbal and digital communication
- Competence in linguistic and literary communication
- Competence in learning to learn and thinking
- Technological competence
- Mathematical competence

**DURATION:**



**20 minutes** to answer the questions by teams and share the results internally.

**10 minutes** to discuss the research method applied

**30 minutes** to prepare the research material and review it.



**ACTION:**

Perform the search method outline and define the resources needed to apply it.

**RESULT:**

Suggested method guidelines and planning of the research and resources to carry it out.



# STEAM PREPARATION

## TEACHER'S TEMPLATE

**METHODOLOGY:** Research, inductive thinking. Working by projects

**Activity 1 What has happened?**  
analyse what has happened, generate a hypothesis and select the methodology to be accepted or not.

**Objective:** To develop the ability to set a hypothesis based on a real-life situation.

**Hints to induce it:** There is gnawed food in the bin (if this is the paper bin, much better), there are footprints of a small animal on the floor.

Here you can find examples of mouse footprints:

[www.uv.es/zoobot/huellas/apodemus.html](http://www.uv.es/zoobot/huellas/apodemus.html)

In this link there is a template and a website (to be used if internet connection is available) for the identification of mammal footprints. The objective is to use it as material to identify the animal:

[www.uv.es/zoobot/huellas/fichas.html](http://www.uv.es/zoobot/huellas/fichas.html)

See Mammal identification Template.

**Materials:**

- Wastey Fingerprint Identification Template (URL or Printed)
- Wastey research template

**Methodology and timing:**

- 5 minutes. Create groups of 2 - 4 people. Raise the problem and describe the scene What has happened? Spread the footprint identification template or URL.
- 10 minutes. Each group suggest a working hypothesis based on data collected.
- 5 minutes group discussion and selection of a single hypothesis to work on.

**Glossary:** Terms to be used

**Basic concepts for all ages:**

- Waste/resource
- Organic Waste
- Inorganic waste
- Waste sorting
- Reduction
- Re-use
- Recycling

**Concepts that can be added at higher levels of knowledge:**

- Inert Waste
- Selective separation
- Hypothesis



## Activity 2 Why did this happen? How can this situation be solved?

analyse the reasons why the mouse is in the classroom. How can it can be captured?

**Objective:** To be able to map the waste generation systems of the classrooms. Develop the creativity thinking to suggest methods for data collection and catching an animal.

### Materials:

- Wastey Research Template
- Wastey Research Map
- Wastey Data Capture Template
- Wastey Research Standards
- Scale
- Gloves
- Webcam
- Computers or printer

### Methodology and timing:

Reflection through open and closed questions. Approach of the working methodology, preparation of the material and of the research groups.

First, 3 questions are asked to help select the method of data collection. Then explain the methodology and prepare the material. The time will depend a lot on the age of the group. For younger ages or lower levels, it is better to leave the material prepared in advanced for each team to verify it, for older ages or more advanced levels it may be the working teams who prepare the material based on the examples provided.

1. Why was the animal there? Do you think the mouse is gone? Where he could be hiding? (5min) (work team)
  - The goal is to show them that the animal can be hidden in any bin of the classroom or in a place where there is food waste.
2. We only have one chance to catch him. To do this, it is necessary to know all the bins available in the classrooms. Identify which of them could have food waste and predict where it will be. The first step is to create a map of the classrooms indicating where the waste management bins are located. (10 min) (work team)
  - Share a wastey research map, tell them to open it on their device or to generate a map by hand. The provided Wastey research map is just a draft example that you will have to modify. On this map you should draw all the bins, indicate each one for which waste type is ready and give a different number to each of them.
3. Six days are available to catch the mouse and there is only one chance to catch it. If there are X bins in the whole plant, how can we know where the mouse is? It's time to create a research map. Think about which of these data can give us information about the presence of the mouse, and which can help us to predict where the sixth day will be. (5 min) (The whole group worked together). b, a and d must be selected.
  - a) There are traces. Footprints, gnawed food, excrement. (valid, observe and confirm the animal have gone this way)
  - b) If the mouse is in the trash can, it's heavier. (valid only if all bins have the same content. It must be included in the research steps to characterize waste management in your school)
  - c) It makes sounds. (It is not valid, they do not usually make noise, moreover, due to the noise of the centre is usually very difficult to check)
  - d) We use a camera to record it (only for +13 years old or tutored by an adult). Valid although it is useful to check that the mouse is there





- at that moment, not to foresee where it will appear. There is only one camera, so you can only use it once a day.
- e) There's food in the bins. If we just leave a trash can with food, we can make it go there. It's hard to control all day that no one throws food in the rest of the garbage, but it might be an option.

4. Delivery of the material for the research and explanation of the working methodology. (10 min explanation and 30 minutes preparation of the material). Review the hypothesis and research methods.

**Process:**

We think there's a mouse in the classroom that feeds on the food in the garbage.

We're going to investigate and gather data to try to capture it.

We have six days to capture the mouse. The first five days data will be collected. On the 5th day all teams will come together to decide where the mouse is. On the sixth day the mouse will be caught.

To do this correctly, the data will be taken every day in the first 15 minutes of action (all teachers must know it to let students leave the classroom, each centre must choose the best time for the weighing). Each person in a team should be responsible for recording the data requested in the Wastey data template.

**Remember:**

1. You must have a well-designed bin map; each bin must have a number. In the research data template, you must write down the corresponding number for each bin. There must be as many bins on the template as the ones on the map. (This may be prepared in advance by the teacher).
2. You must decide in the groups who will oversee collecting data every day.
3. Everyday bins should be weighed and write down which kind of waste each one has (just by observing them without touching).
4. You must indicate in which bins there are traces of the mouse.
5. You must collect the waste dispersed by the mouse and sort it out.
6. If you have a webcam remember that you can only use it twice on the 5th and 6th day of the investigation.
7. If you can, take pictures or videos of the working process. They will be useful for research reporting.

Here you have all you need:

- 1 Wastey research data template for each team (Excel, or printed table). Adapt it to the bins in your school
- A scale
- Some gloves
- A webcam if the image registration method has been selected. (Recording template for +13 years)
- Template with the rules and steps of the research (Research methodology sheet)
- Research template

Remember, as only one scale and some gloves are available, everyday work should be properly distributed (one person will weigh the bins, another person will look for waste on the floor and pick it up properly with the gloves, the rest of the team will review which type of waste is in each bin and will record the data in the Data Template).



### **Glossary of terms**

- Food waste vs. organic waste (It is not the same. Food waste is part of biowaste more than organic waste)
- Selective separation (source separation/separate collection)
- Paper waste
- Plastic waste
- Prevention
- Reduction
- Re-use
- Recycling
- Waste/resource

### **Possible solutions:**

#### **Why did this happen?**

Someone has thrown food into the paper/plastic wastebasket.

In addition, there are other wastes that should not be there, sort and place each waste where it should be

#### **Who is the guilty? How can be catches?**

Many capture methods may appear. There is only one chance to capture it so you must first guess which trash can it be from the different classrooms available and then capture it.

To this end, 3 methods are proposed:

- Level 1: Waste characterisation. Look for food residue in the bins. If there is food waste the mouse must have been there.
- Level 2: Weighting method. The trash containing food waste weighs more than the others.
- Level 3: Recording with a camera. If we know where it is, we can record it (this option can only be done with students over 13 years old or managed by a teacher who will be the person registering the web recording system).



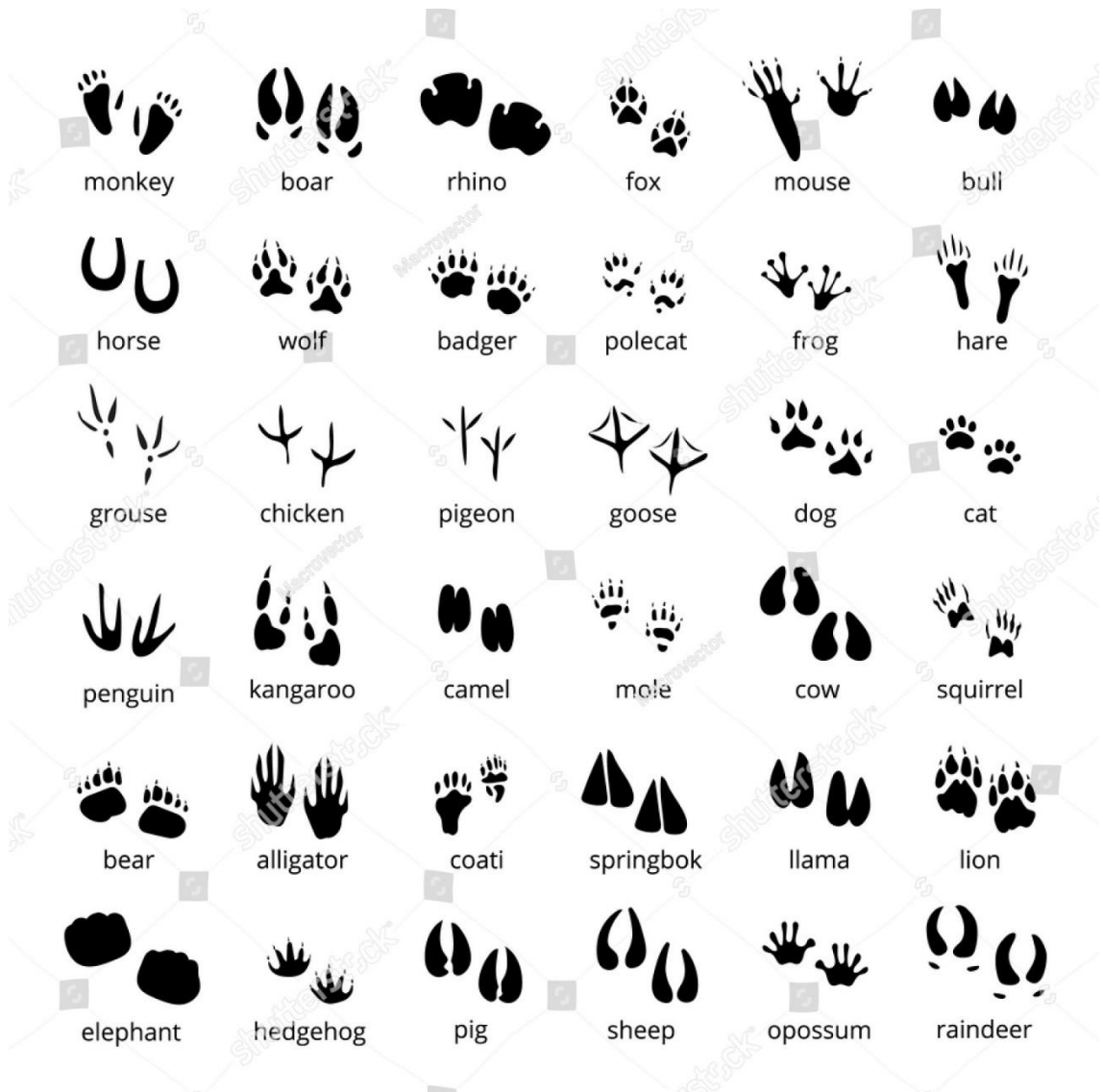
# ACTIVITY 1 - CARD

## ANIMAL FOOTPRINTS

- Make sure you have both the research template and the footprint identification template with you
- Complete the first 4 sections of the research template

### MAMMALS IDENTIFICATION FORM ACCORDING TO THEIR FOOTPRINT

<https://www.uv.es/zoobot/huellas/fichas.html>



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IMAGE ID: 552731050  
www.shutterstock.com



# ACTIVITY 1 - CARD

## WASTEY RESEARCH

<b>ACTIVITY 1 - CARD</b>		
<b>WASTEY RESEARCH</b>		
<b>NAME OF THE RESEARCH TEAM</b>		
<b>NAME FOR PERSONS INVOLVED AND ASSOCIATED TASKS</b>	<b>NAME</b>	<b>TASK</b>
<b>WORK HYPOTHESIS</b>		
<b>SELECTED HYPOTHESIS</b>		
<b>METHODOLOGY (MÁX 5 LINES)</b>		
<b>RESULTS</b> (Including results of the obtained data and images of the working process followed).		
<b>CONCLUSIONS</b> (Indicating if the selected hypothesis has been validated and write down other conclusions)		



# ACTIVITY 1 – EVALUATION

## WHAT HAVE YOU LEARNT?

CONTENTS & COMPETENCES	Totally agree	I agree	I disagree
We know the difference between waste and waste as a resource			
We know that it is a hypothesis			
We can make up a methodology for working			
We can plan a data collection			
We can place in a map the bins of our classroom and the closer ones in other classrooms			
We can identify what waste is thrown in each bin			
We can identify when waste is not in correctly thrown in the corresponding bin			
We can analyse footprints to identify an animal			
We can deduce a hypothesis starting from data			
We know the difference between waste and waste as a resource			
GROUP WORK	Totally agree	I agree	I disagree
We have created a team			
We have put a name to the team			
We have shared the work equally			
We have participated all the people fairly			
We were able to reach an agreement when different opinions raised.			
We have helped our group partners when it has been necessary			
If we had a problem, we tried to solve it			
If we have not been able to solve it, we have asked the tutor for help			
USE OF ORAL AND WRITTEN LANGUAGE	Totally agree	I agree	I disagree
We have spoken clearly respecting available time and in the requested language			
The texts created have no spelling mistakes			
We have used commas and punctuation marks correctly			
We have used capital letters at the beginning			
We have look for words that we did not understand			
We have used at least one new word throughout the activity			
USE OF TECHNOLOGY	Totally agree	I agree	I disagree
We have used internet images correctly (free images or quitting authorship)			
We have surf in internet searching for information from reliable sources			
We have verified the sources of information and validate the contents shown.			
We have used digital tools to create a video or podcast			



What would you improve in your next group activity? Free space for suggestions



## ACTIVITY 2 - CARD

### ANIMAL FOOTPRINTS

- Make sure you have the WASTEY RESEARCH template (ACTIVITY 1)
  - Fill in section 5 RESULTS

BE SURE YOU HAVE ALL THE MATERIALS YOU NEED TO START THE RESEARCH PROCESS

- WASTEY research map. You will have to adapt it to your school (if you prefer you can draw it by hand).
- WASTEY data capture template. (Adapt it to your school needs, 1 template by each classroom).



## ACTIVITY 2 – EVALUATION

### WHAT HAVE YOU LEARNT?

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We know that it is a hypothesis			
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What would you improve in your next group activity? Free space for suggestions

