

LEARNERS' GUIDELINE

“DOES A DROP OF WATER MAKES A DIFFERENCE IN PLANET EARTH?”



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TABLE OF CONTENTS

PROJECT DETAILS	1
DISCIPLINARY OBJECTIVES AND CROSS-DISCIPLINARY OBJECTIVES ..	3
SEQUENCE OF TASKS.....	6
INDICATORS	7
TASKS.....	9
PREVIOUS TASKS.....	9
RESEARCH / DEVELOPING TASKS	12
FINAL TASKS	21

**PROJECT DETAILS**

SCHOOL YEAR	
SCHOOL YEAR LEVEL	8 th (13-14 year old)
TERM	
SESSIONS	
TITLE	“DOES A DROP OF WATER MAKES A DIFFERENCE IN PLANET EARTH?”
SUBJECTS	Mathematics, Natural Science, Physics-chemistry, Mother tongue, Geography, ICT, English
UNIFYING THREADS (DRIVING QUESTIONS)	How much water is there on, in, and above the Earth? Where is Earth's water located? Why is water so essential for Life? Why do we need to conserve water?





KEY COMPETENCES	A: TRANSVERSAL COMPETENCES	
	COMPETENCE (EU)	TASKS
	1.Learning to learn	4
	2.Sense of initiative and entrepreneurship	3-4-5-19
	3.Social and civic	1-3-15-19-20
	B: SUBJECT COMPETENCES	
	COMPETENCE (EU)	TASKS
	4.Communicating in the mother tongue	17-18-19
	5.Communicating in a foreign language	16-18
	6.Digital	3-4-14
	7.Mathematical, scientific and technological	6-7-8-9-10-11-12-13-19
8.Cultural awareness and expression		





MULTIPLE INTELLIGENCES	INTELLIGENCE	TASKS
	1. Interpersonal	1-3-4-15-18-19-20
	2. Intrapersonal	3-4-5-15
	3. Visual-spatial	5-14
	4. Bodily-kinesthetic	
	5. Musical-rhythmic	
	6. Verbal-linguistic	2-16-17-18-19
	7. Logical-mathematical	8-10
	8. Naturalistic	6-7-9-11-12-13-19
DISCIPLINARY OBJECTIVES and CROSS-DISCIPLINARY OBJECTIVES What do we want students to understand? (COMPREHENSION GOALS)	DISCIPLINARY OBJECTIVES and CROSS-DISCIPLINARY OBJECTIVES	
	MAIN OBJECTIVE	
	To identify behaviours that might reduce the water consumption	
	0.General objectives	
	0.1. To Work as a team and take responsibility	
	1.Natural Science	
	1.1. To identify the water distribution in Nature	
	1.2 To identify the movement of water through the different stages of the water cycle	
	1.3 To identify the several uses of water in human being activities- industry, tourism, energy...	
	1.4 To identify the wastewater treatment procedures	
1.5 To identify the behaviours that reduce water consumption and promote water		



	<p>quality</p> <p>2.Mathematics</p> <p>2.1. Collect and process data</p> <p>2.2. To define one math function to translate the collected data</p> <p>3.Foreign Language (English)</p> <p>3.1. Learn specific vocabulary: Sweet water; Salt water; potable water; percentage; as condensation; evaporation, and precipitation ...</p> <p>3.2. Improve communicating and writing skills</p> <p>4.Mother Tongue</p> <p>4.1. To improve communicating and writing skills</p> <p>4.2. To Improve and enrich vocabulary in mother tongue</p> <p>5.Physics-Chemistry</p> <p>5.1. To identify the parameters of potable water</p> <p>6.Geography</p> <p>6.1. To analyse the water consumption in the world and Europe</p> <p>6.2. To compare the differences in water consumption between development and non-development countries</p> <p>7.ITC</p> <p>7.1. To identify the steps to produce one flyer about the behaviours towards water consumption</p> <p>7.2. Know how to use various computer tools for the development of flyer</p>
PROJECT PRESENTATION	<p>A challenge will be proposed to students to build a flyer with the main tips on behaviours that reduce consumption and conserve water, saving consumers money.</p> <p>Presentation of the flyer in several school networks and in several spaces of</p>





	the school and local community.
FINAL PRODUCT	Flyer about responsible water consumption





SEQUENCE OF TASKS

Tasks in bold are necessary, and the rest are optional. They depend on the teachers involved in the project and the school facilities.

A. PREVIOUS TASKS

1. **Task: Team dynamics** (Attention: If the student group persists from the previous task, it will not be necessary to implement this task)
2. **Task: Project presentation in library school and the social networks**
3. **Task: Team planning**
4. **Task: What I know-What I need to know**
5. **Task: Specify flyer design and appoint the responsibilities**

B. RESEARCH / DEVELOPING TASKS

6. **Task: How is water distributed on planet Earth?**
7. **Task: Where does my water come from?**
8. Task: What is Potable water?
9. Task: Water - what kind of use in the life of the human being?
10. **Task: What is my water consumption when I take a shower?**
11. **Task: What are the wastewater treatment procedures?**
12. **Task: What are the behaviours that reduce water consumption and promote water quality?**
13. **Task: What is the water consumption in the world and Europe? Are there differences in water consumption between development and non-development countries?**
14. **Task: Construction of a flyer with the behaviours that reduce water consumption and promote water quality**
15. **Task: Team planning assessment**
16. **Task: Learn vocabulary in English**
17. Task: The theme "water" in the articles / texts of newspapers, magazines, poems ...

C. FINAL TASKS

18. **Task: flyer presentation**
19. **Task: flyer dissemination**
20. **Task: Final team planning assessment**





INDICATORS

MAIN OBJECTIVE

To identify behaviours that might reduce the water consumption

0. General objectives

- 0.1.1. The student achieves team objectives
- 0.1.2. The student achieves individual objectives
- 0.1.3. The student fulfils his/ her responsibilities

1. Natural Science

- 1.1.1. Describe the water cycle using words, pictures and tools
- 1.1.2. Describe the water cycle creating a water cycle Draw
- 1.2.1. Indicates the different stages of the water cycle as a consequence of the movement of water in nature
- 1.2.2. Be able to name and explain the stages of the water cycle
- 1.3.1. Be able to identify the several uses of water in human being activities - industry, tourism, energy
- 1.4.1. Be able to identify the residual water treatment procedures
- 1.5.1. Be able to identify the behaviours that reduce water consumption and promote water quality

2. Mathematics

- 2.1.1. Collects, organizes and processes the data
- 2.1.2. Construct tables, graphs, diagrams or lists for visualization of results
- 2.2.3. Identifies one math function to translate the collected data

3. Foreign Language (English)

- 3.1.1. States the names about the water cycle, using terms such as condensation, evaporation, and precipitation...
- 3.2.1. Expresses technical verbs in the foreign language

4. Mother Tongue

- 4.1.1. Correct reading and analysis of articles/texts/poems of newspapers, magazines, ... about the theme "water"
- 4.2.1. Learn new words related to water: Basic sanitation, drinking water, fouled water, sweet water...

5. Physics-Chemistry

- 5.1.1. Identifies the physical-chemical parameters of drinking water: colour, temperature, taste and odor and pH.





6. Geography

6.1.1. Identifies the water consumption in the world and Europe

6.2.1. Understands differences in water consumption between development and non-development countries

7. ITC

7.1.1. Use the various steps to develop a flyer

7.2.1. Use various computer tools for the development of flyer

TOOLS:

- **Rubrics**

The table filled in by each student

Report with a qualitative analysis of the flyer

- **Reflections and evidences**

REFLECTIONS (3T; 15T ; 20T)



**TASKS****PREVIOUS TASKS**

1. Task: Team dynamics*			Session: 20 min
COMPETENCES	Social and civic	INTELLIGENCES	Interpersonal
GOALS	Learning to work in teams		

*(Attention: If the student group persists from the previous task, it will not be necessary to implement this task)

Task description:

We will suggest a team dynamics so that students get to know each other.

2. Task: Project presentation			Session: 25 min
COMPETENCES	Social and civic	INTELLIGENCES	Verbal-linguistic
GOALS	To motivate students		

Task description:

Public presentation in the school library and reporting on social networks. The headmaster is worried about the water consumption and costs for the school. For that reason, the headmaster invited the councilman responsible for the environment will be to speak on the "Use and management of water resources in the municipal council".

The school principal will propose a challenge to the students to build a flyer with the main tips on behaviours that reduce consumption and conserve water, saving consumers money.

At the end of the project, the flyer will be presented at school, libraries, Town hall and in social networks, with a view to changing behaviours and habits of water consumption.

3. Task: Team planning			Session: 45 min
COMPETENCES	Social and civic Sense of initiative and entrepreneurship Digital	INTELLIGENCES	Interpersonal Intrapersonal





GOALS	Learning to work in teams and to control teamwork
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Task description:

Each team will define its team planning, which will consist of three parts: team objectives, individual objectives and responsibilities.

Team objectives:

All teams will have objectives: Each team will be responsible for their own task concerning “Does a drop of water makes a difference in Planet Earth?” and will be responsible, as well, to add their presentation in the flyer.

Individual objectives:

Each student will have 2 individual objectives: one about their role in the task and another about the deadlines accomplishments.

Responsibilities: Responsibilities will be assigned by the teacher.

Assessment tools (rubrics...):

- Checklist; 3T TEAM PLANNING_Task2_Portugal.xlsx

Checklist Example:



Date:.....		Work Checklist (Name):.....		Classe:.....			N.º:.....
Did you....	Check		Evaluation			Comments	
	Yes	No					
Personal Objectives:							
1.							
2.							
3.							
4.							
5.							
Team Objectives:							
1.							
2.							
3.							
Responsibilities:							
1.							
2.							
3.							
Self-evaluation:							
1. I stay focused while doing my work							
2. I did work I am proud of							
3. I am confident that I did my best							
4.							
5.							

4. Task: What I know – What I need to know			Session: 30 min
COMPETENCES	Learning to learn Sense of initiative and entrepreneurship Digital	INTELLIGENCES	Interpersonal Intrapersonal
GOALS	Learning to work in teams		

Task description:

Each team will consider what they already know about the task and what they need to know in order to carry it out.

Assessment tools:

- See annex: 4T-12T-13T-15T WHAT I KNOW - WHAT I NEED TO KNOW - WHAT I'VE LEARNT_Task2_Portugal.xlsx





- Diagnose what the student knows about the distribution of water on planet Earth, movement of water on the planet, use of water by humans, how to preserve water 4th Task – What do I know? What do I want to know?

5. Task: Specify the parts of flyer and appoint the responsibilities			Session: 30 min
COMPETENCES	Sense of initiative and entrepreneurship	INTELLIGENCES	Interpersonal Verbal-linguistic
GOALS	Learning to work in teams		

Task description:

After specifying the amount parts of flyer, each team will designate one member of the group to take part of another team who will do the final version of the flyer.

In order to do that, it is necessary that all the students reach an agreement.

RESEARCH / DEVELOPING TASKS

6. Task: How is water distributed on planet Earth?			Session: 1 h
COMPETENCES	Mathematical, scientific and technological	INTELLIGENCES	Naturalistic
GOALS	To identify the water distribution in Nature		

Task description:

Students watch videos about of the distribution of water on planet earth.

The students record in a table the differences related to the topics "Of the distribution of water on planet earth".

Assessment tools (rubrics...):





The table filled in by each student will be used for an intermediate assessment. (See annex: behaviours that might reduce the water consumption_project rubric_portugal.xlsx – Science Sheet)

Sites to explorer:

<https://www.youtube.com/watch?v=W-TPG72FSgl>

7. Task: Where does my water come from?			Session: 1 h
COMPETENCES	Mathematical, scientific and technological	INTELLIGENCES	Naturalistic
GOALS	To identify the movement of water through the different stages of the water cycle		

Task description:

Students will observe/investigate the movement of water through the different stages of the water cycle and determine what drives this cycle. (Use videos or images to explore the theme)

Sites to explorer:

<http://www2.elken.com/wp/home-appliances/k-series/where-does-your-water-come-from/>

<http://green-behavior.com/about-gb/where-does-our-water-comes-from-infographic.htm>

<https://water.usgs.gov/edu/watercycle.html>

<https://water.usgs.gov/edu/watercycle-kids.html>

<https://www.youtube.com/watch?v=iohKd5FWZOE>

Assessment tools:

The worksheet filled in by each student will be used for an intermediate assessment (see annex: behaviours that might reduce the water consumption_project rubric_portugal.xlsx – Science Sheet)

8. Task: What is Potable water?			Session: 30 min
COMPETENCES	Mathematical, scientific and technological	INTELLIGENCES	Logical-Mathematical
GOALS	To identify the parameters of potable water		



**Task description:**

The students have to look for the definition of drinking water. Students should look in the region for the parameters used by the responsible entities for piped water.

Sites to explorer:

<https://www.enkiverywell.com/potable-water.html>

9. Task: Water- what kind of use in the life of the human being?			Session: 30 min
COMPETENCES	Mathematical, scientific and technological	INTELLIGENCES	Naturalistic
GOALS	To identify the several uses of water in human being activities - industry, tourism, energy...		

Task description:

Students will identify activities where humans use water. Students should identify and name these activities by filling out a table for this purpose.

Example:

Activity Name	Type: Industrial; Recreation; Domestic...

Sites to explorer:

https://www.youtube.com/watch?v=_axryuZdKT0

<https://www.youtube.com/watch?v=Dcdo7sRSUEw>

<https://fracfocus.org/water-protection/hydraulic-fracturing-usage>

<http://www.thegarsts.com/plumbing.htm>

10. Task: What is my water consumption when I take a shower?			Session: 2 h
COMPETENCES	Mathematical, scientific and technological	INTELLIGENCES	Logical-mathematical





GOALS	
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Task description:

Students explore a worksheet (see annex worksheet_Math_shower_English.doc) with various water consumption situations (graphs of water consumption as a function of time). From the examples identify the formula that explains the data obtained.

Example in worksheet_Math_shower_English.doc:

**D) Which of the following graphs can represent the amount of water Michael spent in the bath?
Present a reason that you reject each of the other three graphs.**

(A) Amount of water spent vs Time: The graph shows a linear increase in water consumption, followed by a constant amount of water consumption, and finally a linear decrease.

(B) Amount of water spent vs Time: The graph shows a linear increase in water consumption, followed by a constant amount of water consumption, and finally a linear increase.

(C) Amount of water spent vs Time: The graph shows a linear increase in water consumption, followed by a constant amount of water consumption, and finally a linear increase.

(D) Amount of water spent vs Time: The graph shows a linear increase in water consumption, followed by a constant amount of water consumption, and finally a linear decrease.

Assessment tools:

The worksheet filled in by each student will be used for an intermediate assessment (see annex: behaviours that might reduce the water consumption_project rubric_portugal.xlsx – Math Sheet)

11. Task: What are the wastewater treatment procedures?	Session: 2 h
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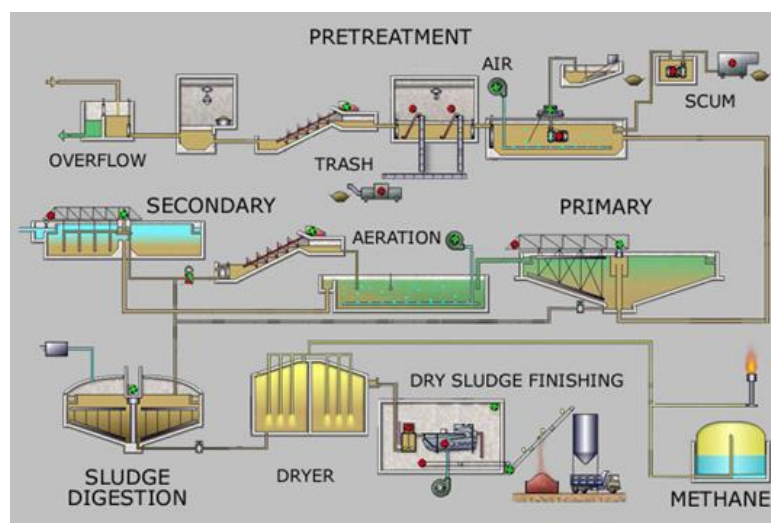


COMPETENCES	Mathematical, scientific, technological	INTELLIGENCES	Naturalistic
GOALS	To identify the wastewater treatment procedures		

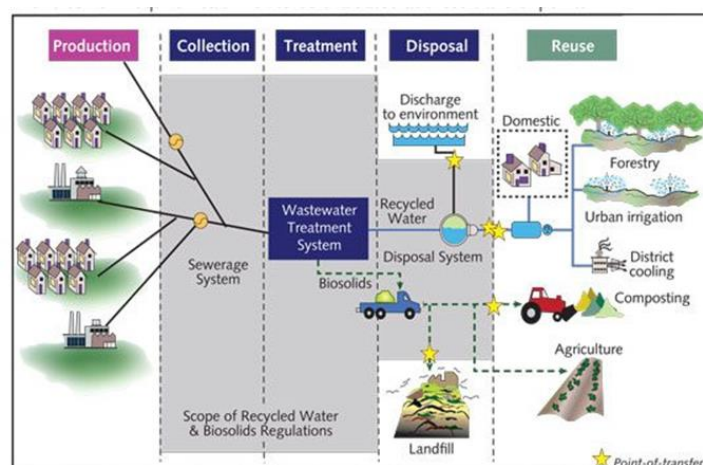
Task description:

Students identify wastewater treatment processes by watching videos/images or visiting a "Wastewater Treatment Plant".

Example:



https://en.wikipedia.org/wiki/Sewage_treatment



<http://www.waterworld.com/articles/wwi/print/volume-28/issue-1/regional-spotlight/middle-east-africa/stepping-up-monitoring-for-the-gcc-s.html>



Sites to explorer:http://www.beachapedia.org/Wastewater_Recycling<https://www.youtube.com/watch?v=GVm-d-zOxJs>https://metro council.org/Wastewater-Water/Publications-And-Resources/MCES-INFORMATION/Educational/ES_kids_book-pdf.aspxhttp://steonline.org/circles/lessons/water/water_stinky-clean.html

12. Task: What are the behaviours that reduce water consumption and promote water quality?			Session: 2 h
COMPETENCES	Mathematical, scientific and technological	INTELLIGENCES	Naturalistic
GOALS	To identify the behaviours that reduce water consumption and promote water quality		

Task description:

Students will identify behaviours that reduce water consumption and promote water quality. Students should, in workgroup, identify this behaviour by filling out a table for this purpose.

Example:

Behaviours	Advantages/ Disadvantages

Sites to explorer:<https://www.youtube.com/watch?v=Vlaw5mCjHPI><https://www.youtube.com/watch?v=UAmkL977oAQ><https://www.youtube.com/watch?v=4MDLpVHY8LE><https://www.youtube.com/watch?v=hLcKn1M5fRQ>https://www.youtube.com/watch?v=cV_Vr_xgrn0<http://www.watercalculator.org>



<http://www.nationalgeographic.com/environment/freshwater/water-conservation-tips/>

<http://www.sswm.info/category/implementation-tools/water-use/hardware/optimisation-water-use-home/reduce-water-consumptio>

Assessment tools:

The table filled in by each student will be used for an intermediate assessment (see annex: behaviours that might reduce the water consumption_project rubric_portugal.xlsx;

4T-12T-13T-15T WHAT I KNOW - WHAT I NEED TO KNOW - WHAT I'VE LEARNT_Task2_Portugal.xlsx) – 12th Task - What Have I Learnt?

13. Task: What is the water consumption in the world and Europe? Are there differences in water consumption between development and non-development countries?			Session: 90 min
COMPETENCES	Mathematical, scientific and technological	INTELLIGENCES	Naturalistic
GOALS	To analyse the water consumption in the world and Europe To compare the differences in water consumption between development and non-development countries		

Task description:

See a video about the water consumption in the world. Analyse charts about these reality

Divide students between developed and developing countries and each presents the difficulties and arguments about water consumption in their country.

Make a summary table

	Water consumption	difficulties	solutions
Non-development countries			
Development countries			

14. Task: Construction of a flyer with the behaviours that reduce water consumption and promote water quality	Session: 6 h
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COMPETENCES	Digital	INTELLIGENCES	Visual-spatial
GOALS	To identify the steps to produce one flyer about the behaviours towards water consumption Know how to use various computer tools for the development of flyer		

Task description:

Students will explore the various computer tools for the development of a flyer.

Students will develop various flyers (group or individual).

Organization of a final flyer to present and disseminate the work developed in the various activities.

Examples:

<https://designschool.canva.com/tutorials/>

<https://www.flyerforfree.com/tuto.php>

Assessment tools:

The table filled by each student will be used for an intermediate assessment. (see annex: behaviours that might reduce the water consumption_project rubric_portugal.xlsx – ITC Sheet; 4T-12T-13T-15T WHAT I KNOW - WHAT I NEED TO KNOW - WHAT I'VE LEARNT_Task2_Portugal.xlsx) – What do I know? ; What Do I want know?

15. Task: Team planning assessment			Session: 45 min
COMPETENCES	Social and civic	INTELLIGENCES	Interpersonal Intrapersonal
GOALS	Learning to work in teams		

Task description:

We will assess all the objectives established in the 3rd task, individual and team objectives as well as the responsibilities to reflect upon the things we are doing well and the issues that must be improved.

Assessment tools (rubrics...):



Students' will self-assess the objectives and responsibilities established in team planning (see annex- Checklist; 3T TEAM PLANNING_Task2_Portugal.xlsx)

16. Task: Vegetable production			Session: 2 h
COMPETENCES	Communicating in a foreign language	INTELLIGENCES	Verbal-linguistic
GOALS	Learn specific vocabulary: Sweet water; Salt water; potable water; percentage; condensation; evaporation and precipitation ... Improve communicating and writing skills		

Task description:

Students will build and translate texts for a flyer.

Recourse to dictionaries for translation.

Assessment tools (rubrics...):

See in "18. Task: Flyer presentation" - The construction of sentences and the use of correct scientific terms (English). – Main Objectives sheet.

See annex: behaviours that might reduce the water consumption_project rubric_portugal.xlsx – English sheet.

17. Task: The theme "water" in the articles / texts of newspapers, magazines, poems ...			Session: 1 h
COMPETENCES	Communicating in a mother tongue	INTELLIGENCES	Verbal-linguistic
GOALS	To improve communicating and writing skills To Improve and enrich vocabulary in mother tongue		

Task description:

The students research on articles/poems... (Newspapers, magazines ...) related to the theme "water". Reading and analysis of these articles.

All the texts researched and that will be the basis for the production of the flyer must be read and analysed in this task. New words should be pointed out and see their meaning, for example, in dictionaries, encyclopedias...





FINAL TASKS

18. Task: Flyer presentation			Session: 2 h
COMPETENCES	Communicating in the mother tongue Communicating in a foreign language	INTELLIGENCES	Verbal linguistic Interpersonal
GOALS	To explain what students have worked on and learn throughout the making of the multimedia document		

Task description:

The students will propose some spokesmen chosen from those who participated in the preparation of the flyer, to present the project to parents. Students should try to organize it as much as possible and invite more people than their parents.

Assessment tools:

Report with a qualitative analysis of the flyer: Evaluation of scientific content (Mathematics, Physical-chemical, Natural Sciences, Geography). The construction of sentences and the use of correct scientific terms (English). Use of the main commands of the different software used to construct the flyer (ITC). Quality of the flyer (Mathematics, Physical-chemical, Natural Sciences, Geography, English, ITC).

(See annex: behaviours that might reduce the water consumption_project rubric_portugal.xlsx) – Main Objective sheet

19. Task: Flyer dissemination			Session: 3 h
COMPETENCES	Sense of initiative and entrepreneurship Social and civic Communicating in the mother tongue Mathematical, scientific and technological	INTELLIGENCES	Interpersonal Naturalistic Verbal linguistic
GOALS	To improve communicating and writing skills in the mother tongue		

Task description:

Students will have to prepare in the classroom and orally what they will say when the flyer is released. Thus, students will also rehearse this disclosure in the classroom.





Students will identify the appropriate places where we could disseminate the flyer:

After identifying the places, the students will be divided into groups to complete the task. All groups need to participate in the activity.

20. Task: Final team planning assessment		Session: 1 h	
COMPETENCES	Social and civic	INTELLIGENCES	Interpersonal
GOALS	Learning to work in groups		

Task description:

Students will self-assess the objectives and responsibilities established in team planning

- See Checklist; 3T TEAM PLANNING_Task2_Portugal.xlsx ; 4T-12T-13T-15T-after 14T WHAT I KNOW - WHAT I NEED TO KNOW - WHAT I'VE LEARNT_Task2_Portugal.xlsx

- After 15th Task – What Have I Learnt ?

Afterwards the students will do a reflection on the things they did well or not.

