TangIn

Tangible Programming & Inclusion

TangIn Toolbox

Water Cycle

8 + years old old

Probotic

Itineraries

www.tangin.eu

/tanginproject

Co-funded by the Erasmus+ Programme of the European Union

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein. Project Nº.: 2017-1-PT01-KA201-035975

Summary

Follow the water cycle in a water's drop perspective and in a race dynamic with questions related to the topic.

Expected duration: **50 min** (the lesson plan duration is flexible, and teachers can adapt them accordingly to their needs and class duration).

Learning Outcomes

At the end of the session students are expected to:

- Know and understand the different stages and sequence of the water cycle;
- Give examples of water states in nature and associate them with geographical features;
- Be aware of sustainability issues and regard water as an essential but limited resource;
- Program the robot adequately, taking advantage of the looping tool (if possible);
- Value STEM areas;
- Develop transversal competencies such as problem-solving, communication and reasoning;
- Develop group work skills, namely, to respect and favor the inclusion of all elements, regardless of gender, culture, etc.

Links With Curriculum Topics

Covered Curriculum Topics		
	Subject	**Topics**
Engineering	**Science**	Natural sciences • Water Cycle Living in society • Sustainability of hydrological resources
	Mathematics	Geometry • Localization and orientation – itineraries
	Technology	Programming • Concepts of programming • Programs – Results, errors, and troubleshooting Robotics • Programming objects to solve challenges

Notes for Teachers

The teacher should prepare, in advance, all the materials needed and the classroom according to the activities to be developed, including internet resources available related with the water cycle and some questions related to the topic water cycle and stainability. There are some examples in the supporting material, but try to adapt according to your geography, age of the students and add more questions according to your interests and relevance towards the curriculum.

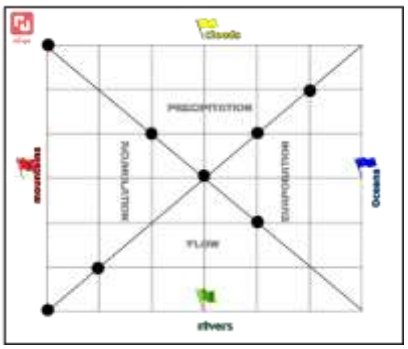
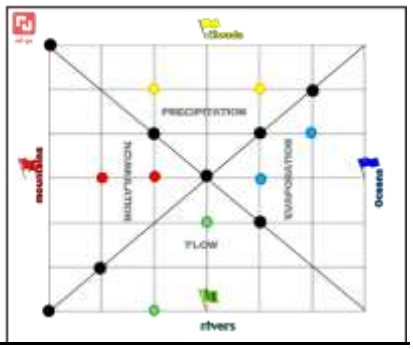
The teams should be as heterogeneous as possible to foster the integration of all students.

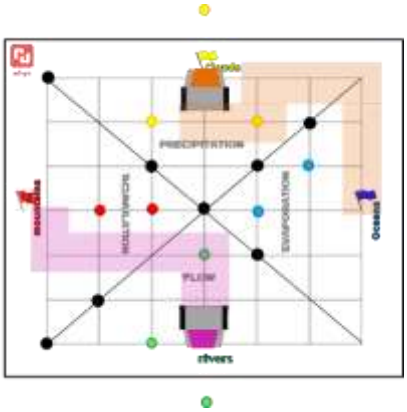
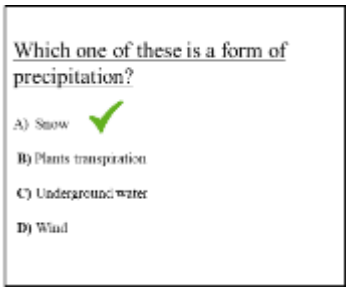
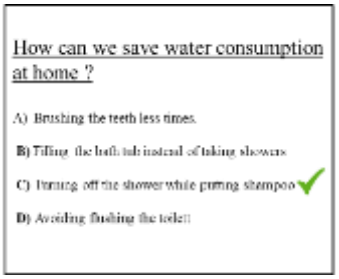
It's important that clear rules are established in terms of group work. This way, it avoids the most active children assuming the lead and the quitter ones only observing.

The teacher must circulate through the various groups to support the activities and the dynamics of each one. In the end, it should promote a collective discussion of the main issues focused and the constraints and difficulties experienced.

Lesson Plan

Intro	15'	Class	Discuss the extra-class research that students previously did about the water cycle, the different water stages (evaporation, accumulation, precipitation, flow) and its relationship with geological features (rivers, mountains, oceans, clouds). Discuss also the different water states through the process and the importance of sustainable consumption of water. Explain that today Mi-go will go on an adventure to understand a water drop's perspective and we must help him complete the cycle.	

Prep	10'	Groups	Divide the class into groups and each group into two teams. Each team will have a *Bot* and both teams will use the same *Set* and blocks. 1) The first step is to prepare the Set by dividing it in four (by drawing the two diagonals). Each area (triangle) will have the name of a water cycle stage: precipitation, accumulation, flow, evaporation. In the bottom center, will be drawn (or make of paper) a flag of a different color for each stage and an example of geological feature associated with the stage (mountains, rivers, oceans, clouds). Finally, **dark circles** will be drawn along the diagonals representing obstacles. 2) Now, every team will draw one circle for every stage, in one vertex at choice inside the limits of its area (not including the diagonal lines). In the end, they should have two circles of the same color in each triangle.	1)  2) 

Play	25'	Groups	**Rules**: each team will play on turns and try to complete the water cycle as fast as possible (fewer turns). They will start in two opposite flags (ex: oceans and mountains) and the Bots will be moving along the lines. The goal will be to catch one color circle (representing the geological feature) per stage and take it to the correspondent flag while avoiding the obstacles (dark circles and the second circle). Once there, the other team will take a card and make a question. If they answer correctly, they take the color circle out of the set (erase); if not, they will continue (when it's their turn again) to the next stage but will have to come back for this one later. Both teams have always to go through all the stages anti-clockwise - meaning they have to follow the natural order of the cycle: accumulation – flow – evaporation - precipitation...). **Goa**l: To be the first team to collect all colors and complete the cycle. **Obstacles**: If a team run over obstacles (dark or a second/repeated color circle), it will lose the turn and return the *Bot* to the starting point. The other team's *Bot* is also considered an obstacle. **Cards**: under the supporting material you can find some examples of question cards related to the water cycle and sustainability theme. There are also examples of questions regarding Portuguese rivers. Try to adapt to your own geography and add more questions according to the curriculum.	  

Resources List & Support Material

For the teacher or per each group:

- Two robot Kits with drawing capabilities;
- Black markers for each group (easy to erase/clean);
- Four color markers for each group (easy to erase/clean);
- Alcohol for cleaning the scenarios (for teacher use only);
- Two Transparent scenarios with a 6x6 grid;
- Question cards (at least 20 - Annex).

TangIn

Co-funded by the European Union

Which one of these is a form of waste?

✓ **A)** Watering plants

B) washing the car with a water hose

C) using a dishwasher machine

D) Closing the water tap between washes

During a drought there is more …

A) Precipitation

B) Accumulation

C) Flow

✓ **D)** Evaporation

How can we save water consumption at home?

A) Brushing the teeth less times.

B) Filling the bathtub instead of taking showers

✓ **C)** Turning off the shower while putting shampoo

D) Avoiding flushing the toilet

Where can we find more ice?

A) Clouds

B) Mountains

C) Rivers

✓ **D)** Oceans

Which one of these is a form of precipitation?

✓ **A)** Snow

B) Plants transpiration

C) Underground water

D) Wind

In what state can water exist in the clouds?

A) Solid

B) Gas

C) Liquid

✓ **D)** All of the above

Which one is the **third** biggest river with origin in Portugal?

✓ **A)** Guadiana

B) Tejo

C) Mondego

D) Douro

Which one of these rivers **does not have origin** in Spain?

A) Guadiana

B) Tejo

✓ **C)** Mondego

D) Douro

Which one of these rivers has more than 1000 km in length?

A) Guadiana

✓ **B)** Tejo

C) Mondego

D) Douro

Where does the river Mondego origins at?

✓ **A)** Estrela Mountain

B) Spain

C) Alentejo

D) Gerês Mountain