

Forests retain water

GLOBE		Associated SDG	Type of Activity
Spheres	Associated Protocols		
Hidrospherera	Dissolved Oxygen, Conductivity, pH, water temperature, Transparency.	6 Clean Water and sanitation 15 Life on Land	Exploratory
Atmosphere	Precipitation, Water Vapor		
Biosphere	Biometry, Tree Hight		

Overview

Using a simple model of the physical shape of a forest, we can examine the physical reasons that allow water retention in forests, allowing water vapor to condense into droplets that feed our water sources. Understanding this phenomenon will allow us to assess the importance of our forests and moors.

Time

1 class

Prerequisites

Basic knowledge of ecosystems, ecology, conservation, and meteorology.

School-level

Primary school students.

Purpose

Identify the physical characteristics that allow water retention in forests.

Students outcomes

- ❖ Design a simple model of a forest simulator.
- ❖ To bring the student closer to the understanding of the water cycle.

Background

Forests play a fundamental role in regulating temperature and the water cycle, that is, the process by which water is transported in different forms of precipitation from the air to Earth,

where forests and vegetation in general, recycle that precipitation and it returns to the atmosphere, completing its journey.

The natural capacity of forests to intercept and evaporate a greater amount of water than other types of vegetation or other surfaces to capture a greater amount of water through their deeper root systems than those of other types of vegetation and; Filtering and improving the quality of water has also become more important after the water crisis, which affects a large part of the world's population.

Finally, clean fresh water has become a key asset of the 21st century, as continued increases in demand and global change-induced drought are causing chronic shortages in many countries. Forests are essential in the stable supply of clean fresh water and related ecosystem services, such as drinking water, protection against floods, erosion, and landslides, and climate regulation.

Guiding Research Questions

Why can't places without trees or vegetation hold water?

Scientific concepts

- *Ecology.*
- *Conservation.*
- *Climate change.*
- *Precipitation.*

Materials and Tools

- *Three-eighths of black cardboard.*
- *Frost. (Purpurin)*
- *Sheets.*
- *Scissors.*
- *Scotch tape.*

What to do and how to do it

1. *Before doing the experiment you have to do the tree simulators, like this:*
2. *Make fifteen 20cm x 30cm rolls of paper, with a diameter of approximately 2cm.*
3. *Make cuts along the paper roll halfway.*
4. *Then roll the paper into a funnel shape.*
5. *Lay out the paper strips to make it look like a tree.*
6. *Paste the rolls, in a grid shape on black cardboard.*

Now you have a tree-planting simulator!

1. *Now make thirty rolls of paper, but in this case in all shapes and sizes.*

2. Glue them haphazardly to the other poster board.

You already have a tropical forest simulator!

1. Approximately 30 cm from the poster board and 10 cm from the surface, blow a teaspoon full of frost onto the tree planting simulator.
2. Repeat the same procedure for the forest simulator.
3. Repeat the same procedure on a black card that does not have trees.

To observe:

Where was the frost concentrated? In which case is the frost retained? In which case was it not?

Suggested resources

To learn more, the following resources are suggested:

What role do forests play in the water cycle? https://efi.int/forestquestions/q7_en

Trees and Water: Don't Underestimate the Connection

<https://forestsnews.cifor.org/62808/los-arboles-y-el-agua-no-underestimate-let's-connect>

Bibliography

Cristiano, P. M., Campanello, P. I., Bucci, S. J., Rodriguez, S. A., Lezcano, O. A., Scholz, F. G., ... & Goldstein, G. (2015). Evapotranspiration of subtropical forests and tree plantations: A comparative analysis at different temporal and spatial scales. *Agricultural and Forest Meteorology*, 203, 96-106. <https://doi.org/10.1016/j.agrformet.2015.01.007>

Delgado, M. I., Gaspari, F. & Senisterra, G. (2017). Respuesta a la infiltración en distintos complejos suelo-vegetación en las sierras de Ventania, Argentina. *Revista de Tecnología, Universidad El Bosque, Colombia*. Volumen 16, Número 1: 157-168. <https://doi.org/10.18270/rt.v16i1.2322>

De Diego M.S., Cristiano P.M., Díaz Villa M.V.E., Eiza M.J., Carfagno P., Becerra F., Goldstein G.H. (2019). Impacto de la actividad forestal sobre la biomasa de raíces en bosques de Misiones y su relación con algunas propiedades del suelo. XII Reunión Nacional Científico Técnica de Biología de Suelos (REBIOS). Facultad de Agronomía-Universidad de Buenos Aires.

Rodríguez, S. A. (2015). *Propiedades biomecánicas y ecofisiológicas de especies de árboles nativos y cultivados en la provincia de Misiones. (Tesis Doctoral. Universidad de Buenos Aires. Facultad de Ciencias Exactas y Naturales.)*. Recuperado de http://hdl.handle.net/20.500.12110/tesis_n5778_Rodriguez