GLOBE Trees

The Tree Growth Game*

Background

There is invisible carbon in the air, which can be absorbed by a tree and transformed into its body - leaves and wood. Trees bind a large amount of carbon dioxide and water. Photosynthesis is the process of converting these two components into sugar called glucose. This reaction requires a lot of energy. Trees gain the energy from the sunlight via a special leaf pigment: chlorophyll. Chlorophyll absorbs sunlight and transforms it into the energy needed for photosynthesis.

carbon dioxide + water + energy from the Sun → glucose + oxygen

Task

Students will learn:

- What a tree needs to grow.
- How a tree absorbs and stores carbon.

Time

20-30 minutes

Materials

- Blue construction paper to make 20 blue raindrops
- Green construction paper to make a big green leaf cut-out
- 20 small white paper or cotton balls
- Crayons
- Glue
- Picture of the sun
- Poster paper

What to Do

1. Divide the students into groups, give each group one green paper leaf and invite them to "grow" their tree on a paper. Students in each group choose one of them to represent the Trunk. The other members of the group divide into Leaves and Roots. Spread blue water drops and white carbon balls around tree or classroom.

2. The Trunk draws a tree on a paper - at first, a thin trunk and as many leaves and roots as there are in his group. When instructed, the Leaves run for carbon balls and Roots for water drops, carry them to the Trunk and lay them on the green leaf. For each carbon and water brought by Leaves and Roots, the Trunk draws a new leaf on the tree.

3. For every three new leaves, the Trunk draws additional layers of wood on the tree. The sun is shining all the time (symbolized by a picture).

4. Ask groups to complete their posters so that the tree has all it needs for its growth.

Example of Group Tree Poster

Glossary

Carbon - a widely distributed element that forms organic compounds in combination with hydrogen, oxygen, etc., and that occurs in a pure state as diamond and graphite, and in an impure state as charcoal.

Carbon Dioxide - (CO_2) is an important heat-trapping (greenhouse) gas, which is released through human activities such as deforestation and burning fossil fuels, as well as natural processes such as respiration and volcanic eruptions.

Chlorophyll - a green pigment, present in all green plants and in cyanobacteria, responsible for the absorption of light to provide energy for photosynthesis. Its molecule contains a magnesium atom held in a porphyrin ring.

Glucose - is a sugar that plays a vital role in the metabolism of most living organisms. It is manufactured by plants and certain bacteria and protists during photosynthesis

Oxygen - a colorless, odorless reactive gas, the chemical element of atomic number 8 and the life-supporting component of the air.

Photosynthesis - the process by which green plants and some other organisms use sunlight to synthesize foods from carbon dioxide and water. Photosynthesis in plants generally involves the green pigment chlorophyll and generates oxygen as a byproduct.

***The Tree Growth Game has been adapted from the "Carbon Activity 1 – Tree Growth Game" created by the GLOBE Program's European Phenology Campaign.**