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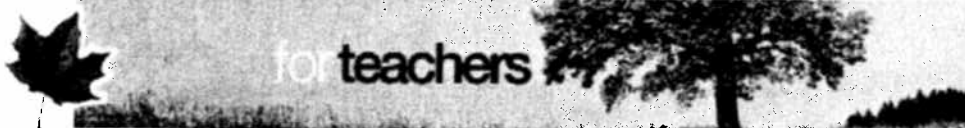
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Lesson 1: Carbon Sinks and Carbon Sources (Part I)



Goal(s):

- Gain an understanding of how carbon cycling occurs
- Use questioning techniques to determine the differences between a carbon sink and a carbon source
- Discuss how humans can influence the amount of carbon in our atmosphere

Background Information

The Activity

Part I | Part II >

1. Draw a quick illustration of the carbon cycle on the board. Give a brief definition of sinks and sources.

- Processes that release CO₂ to the atmosphere are called carbon sources.
- Processes that absorb CO₂ are called carbon sinks.

2. Ask students for examples of processes that release CO₂ to the atmosphere - carbon sources. List the sources on the board

- Point to the candle
- Us - we breathe out CO₂ - we are carbon sources along with all air-breathing organisms
- Volcanoes
- Fires
- Oceans and fresh water bodies (CO₂ dissolves easily in water)
- Decomposition - vegetation (CH₄ - methane producer) in swamps
- Agriculture - grazing animals (cows, sheep, pigs) produce methane
- Burning fossil fuels - gas energy plants, coal, oil, gas, tar sands
- Fossil fuel production: coals, oil gas, tar sands - including the burning of natural gas during oil extraction (water, oil and gas mix) and the escape of methane during extraction and processing of oil, gas and coal.
- Decomposing garbage in landfills/ dumps (methane)

Select grade level:
All Grades

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- Rice farms (produce methane)
- Degrading farm soils: release of carbon from soils when plowed - causes it to oxidize creating CO₂
- Wetland destruction
- Deforestation
- Urban sprawl

3. Ask students for examples of processes that absorb carbon dioxide from the atmosphere - carbon sinks. List the sinks on the board

- Point to a green plant - photosynthesis in plants. All green plants, peat bogs (these are green plants in storage), growing forests: photosynthesis equation $H_2O + CO_2 + \text{energy} = C_6H_{12}O_6 \text{ glucose} = \text{carbon storage}$.
- Diatoms, algae
- Fossilized organic remains become fossil fuels like coal, oil and gas stored safely underground
- Oceans can absorb CO₂ directly from the atmosphere. CO₂ will stay in storage for a long time provided oceans stay cool and undisturbed. The carbon hydrate is in the slurry at the bottom in the form of sediments
- Shells, coral
- Carbonate rocks
- Wetlands – organic matter builds up at bottom of ponds providing long-term storage of carbon
- Soil
- Limestone / dolomite sedimentary rocks: shale, mudstone, and coal. The Rocky Mountains are a good example of this

4. Reiterate that this system of sinks and sources operates all over the globe and is known as the Carbon Cycle.

5. Explain to students that they are about to become either a carbon sink or a carbon source. They will not know which they are but will have to figure it out by asking questions that can be answered only by yes or no. Note: it may be necessary to demonstrate what yes/no questions sound like.

6. Hang a card on each student's back so the wearer cannot see it. Participants must circulate and ask others just one Yes or No question to determine what they are. They then must move onto another person, show the card and ask a question. Students should repeat until they have determined what they are.

7. Have sinks and sources group themselves into 2 groups in the room and describe who they are and how they work as carbon sinks or carbon sources.

Acknowledgements

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How would you rate the quality of this lesson plan?

Poor 1 2 3 4 5 Outstanding

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