



Reconnect with your environment

Learn about environmental issues, their effect on your community and actions for your involvement.



CONTRIBUTED PHOTO

The 2010 local Envirothon winners, team Green Flash from North East High School, placed third in state competition.

Teens can compete in 2011 Envirothon

By ANNA MCCARTNEY
Contributing writer

The Erie County Conservation District is looking for new and returning high school students and their advisers to participate in the 2011 Envirothon.

This exciting competition was created in 1979 by Pennsylvania's Soil and Water Conservation districts to inspire young adults to conserve ecosystems and introduce them to natural science career options. It quickly gained national popularity as a hands-on outdoor contest that challenges high school students in the field of environmental science.

Since its creation, more than 500,000 students across the United States and Canada have had the chance to shine in the five testing categories of soils/land use, aquatic ecology, forestry, wildlife and current environmental issues.

Each team consists of three to five high school students and an adviser. During the competition, the team members work together to answer basic questions in each category. There is no cost to register or participate; the Conservation District covers all costs for the regional competition. But advisers must create a team and contact Kristen Currier, the Envirothon coordinator, for the competition informational packet by Feb. 1.

The 2011 Erie County Envirothon is scheduled for May 5 at the Erie County Conservation District's Headwaters Park. The local winning team will advance to the state level. The state winner then advances to the national competition.

For more information about this opportunity contact Currier at kcurrier@erieconservation.com or call 825-6403.



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In a short period of time, humans have added significant amounts of carbon dioxide to the atmosphere by burning fossil fuels. Coal, oil and natural gas currently provide more than 85 percent of all the energy consumed in the United States, nearly two-thirds of our electricity, and virtually all of our transportation fuels.

Losing our equilibrium

Why 'carbon sinks' are out of sync

By ANNA MCCARTNEY
Contributing writer

Long winter evenings became a little less cold and dark when humans realized burning wood could provide heat and light when the sun went down.

What they didn't understand is the critical role carbon played in their life cycle, or carbon's movement from the burning wood back into the natural environment.

Yet even today with all our scientific knowledge of the carbon cycle, many people still don't understand this important element and the balancing act that makes life on earth possible.

Since the Industrial Revolution, humans have significantly altered this important balance. An escalating population has caused the largest disturbance to the global carbon cycle because of ongoing large-scale use of fossil fuels to meet increasing energy demands.

Great quantities of carbon are found in the earth's crust, its surface waters, the atmosphere, and in green plants. Carbon is one of the four most abundant chemical elements in the universe.



CONTRIBUTED PHOTO/NOAA

There is a close correlation between population growth, fossil fuel use and increased atmospheric carbon dioxide concentration.

Along with hydrogen and oxygen, it is an essential building block for all living organisms. It is the foundation of carbohydrates, proteins, lipids and nucleic acids or DNA. And when carbon is combined with oxygen, it forms an insulating blanket of carbon dioxide in the atmosphere that makes the earth livable.

The total amount of carbon on earth always remains the same but there is a constant exchange of carbon between this biotic (living) and abiotic (nonliving) world. This carbon cycle plays an important role in maintaining proper levels of CO₂ in the earth's atmosphere.

Carbon is regularly exchanged between the atmosphere, land, water and living beings. A carbon atom in your body may have been part of an extinct dinosaur at one time. Since that dinosaur

died and decomposed, its carbon atoms may have been recycled many times in plants, trees, or floated free in the air as carbon dioxide. Those same atoms could also have been locked away in the shell of sea creatures that are buried at the ocean bottom or even be part of a recent volcanic eruption. And some was likely turned into fossil fuel.

Oceans and growing plants are considered carbon sinks because they absorb more carbon dioxide than they emit. A carbon source, on the other hand, is any place or process that releases carbon dioxide into the atmosphere, such as the decay of dead plants and animals.

Because natural carbon sources and natural carbon sinks experience a natural equilibrium, carbon dioxide levels in the atmosphere have shown very little

change during the last 10,000 years, until human activities upset that balance.

Activities such as rapid industrialization and deforestation along with explosive population growth and our dependence on burning fossil fuels for energy have increased the levels of CO₂ at a very rapid rate. The current level of atmospheric CO₂ is more than 35 percent greater than its highest level over at least 800,000 years.

This measured increase since the Industrial Revolution cannot be accounted for by other sources, such as volcanoes or forest fires. There is, however, a close correlation between fossil fuel use, population growth and atmospheric carbon dioxide concentration.

These human emissions are not counterbalanced by CO₂ absorption in the natural cycle. Therefore, these emissions exceed the ability of carbon sinks to absorb the excess we are adding to the system.

In coming weeks, we'll examine the evidence of human-induced CO₂ production and its effect on the planet.

To extend today's learning, teachers can find lessons at www.goerie.com/nie.

ANNA MCCARTNEY, a communications and education specialist for Pennsylvania Sea Grant, can be reached by e-mail at aam40@psu.edu.



LEARN MORE

What: Special showing of action film, "Wintervention" by Warren Miller.

Where: Tom Ridge Environmental Center, Big Green Screen Theater

When: Friday and Saturday at 7 p.m.

Cost: Advance tickets are \$10 or \$15 at the door. Tickets are available at Peek'n Peak Ski Resort, Tom Ridge Environmental Center Big Green Screen Theater, Erie Sport Store Peach Street location, Elements Board Shop and Erie Ski Club or by contacting the Big Green Screen at 838-4123 or Scott Cable at 873-3071 or scable6934@yahoo.com.



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Earth Action Erie and the PA Department of Environmental Protection recently hosted a sustainable energy Youth Training Day at the Tom Ridge Environmental Center.

Alternative energy day fires up Erie students

By ANNA MCCARTNEY
Contributing writer

Alternative sustainable energy solutions could ease problems attributed to burning fossil fuels.

More than 140 students who attended the Erie Earth Action Youth training day at the Tom Ridge Environmental Center learned about choices that could replace or eliminate the need for fossil fuels, including wind, solar, geothermal, biofuels and green technology.

"When the wind blows, anything connected to the windmill will get the wind power. We made music with power from our windmill," said Orion McConnell from the Perseus House Charter School of Excellence Maritime Center.

Fort LeBoeuf student Caitlynn Orr was also impressed with the wind power. "There is a guy that makes windmills out of old wheelchair motors, which is awesome," she said.

Brent Hartsting from the Perseus House Charter School of Excellence liked building the windmills because he likes electronics. "It would be a good job," he added.

Joanna Connell student Tyler Vaughn said: "Solar (energy) can power America. You can even get solar cell-phone chargers."

Teachers and students in grades four to eight explored sustainable energy sources and technologies with local experts from Hero BX, the local biofuels plant, and from Solar Revolution, North Coast Energy Systems, Gannon University, Mercyhurst College and Renewery. Educators from the Pennsylvania Department of Conservation and Natural Resources also led some of the workshops for students.

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Follow carbon's natural global cycle

By ANNA MCCARTNEY
Contributing writer

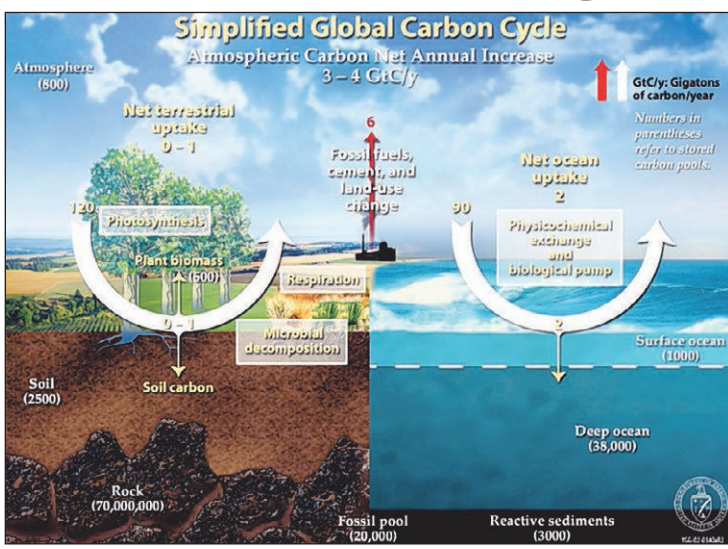
Carbon is constantly on the move! Scientists collect data to track this movement and to measure the atmospheric concentrations of CO₂ to understand the natural carbon cycle and the effect caused by human contributions. With knowledge come solutions that can lessen global catastrophes caused by a rapid rise in average global temperatures.

Carbon moves this way:

■ **From the atmosphere to plants.** Green plants constantly remove CO₂ from the atmosphere through photosynthesis (the process whereby plants make food in the presence of sunlight and water). Certain bacteria also use CO₂ to synthesize the organic compounds they need.

■ **From plants to animals.** Carbon present in the food made by green plants reaches animals through the food chain. Carnivorous animals receive this carbon when they eat other animals.

■ **From the atmosphere to water bodies.** Carbon dioxide is continuously dissolved in the seas and oceans through the process



CONTRIBUTED PHOTO/Department of Energy

The carbon atom, an essential building block of all living organisms, constantly moves through all living things, and through the oceans, atmosphere, and earth's crust. The natural carbon cycle experiences a natural equilibrium but emissions created from burning fossil fuels that have been underground for millions of years are not absorbed in the natural cycle, so it builds up in the system.

of diffusion. This dissolved CO₂ may remain as it is in the marine waters, may be used by marine plants for photosynthesis or may get converted into carbonates and bicarbonates, which are

converted into calcium carbonate by certain marine organisms such as corals and oysters to make their shells. When these organisms die, their shells deposit on the sea floor and finally

turn into sedimentary rocks.

■ **From living things to the land.** As plants and animals die, carbon is deposited in the ground. Some of these dead organisms get buried under the ground, and after millions of years, change into fossil fuels due to high pressure and other physical and chemical changes.

■ **From living things to the atmosphere.** Carbon dioxide is regularly returned to the atmosphere by the process of respiration in plants and animals. Other natural sources of CO₂ are forest fires and volcanoes.

■ **From fossil fuels to the atmosphere.** When humans remove fossil fuels (coal, oil and gas) from below the ground surface, they reintroduce carbon that has been out of circulation for millions of years to the global carbon cycle. Burning fossil fuels releases this stored carbon, converting it to CO₂, which then enters and builds up in the atmosphere.

ANNA MCCARTNEY, a communications and education specialist for Pennsylvania Sea Grant, can be reached by e-mail at aam40@psu.edu.

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