



Reconnect with your environment

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



Youngsters strive for greener planet

By ANNA MCCARTNEY
Contributing writer

North East Middle School students greeted parents, visitors and school board members at their school last week with a Christmas wish for a greener planet.

Large pie-plate peace ornaments, plastic juice bottle angles and snowmen, and Erie Times-News origami were just some of

the creative ways students made their point that recycling is important but it can also be fun.

The entire school participated in making decorations from recycled materials for artificial trees that were kept out of landfills. Student creativity was matched by their enthusiasm for protecting the planet.

Won't you join them by making an effort to recycle at your home, school or workplace?



CONTRIBUTED PHOTO/Anna McCartney

Alicia Castorena and Abby Hakel go green for the holidays.



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Matthew Calhoun shows off some pie-plate peace ornaments.



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North East student Macy Putnam likes the recycled decorations.



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Bastian Pierce finds newspapers useful for origami ornaments.



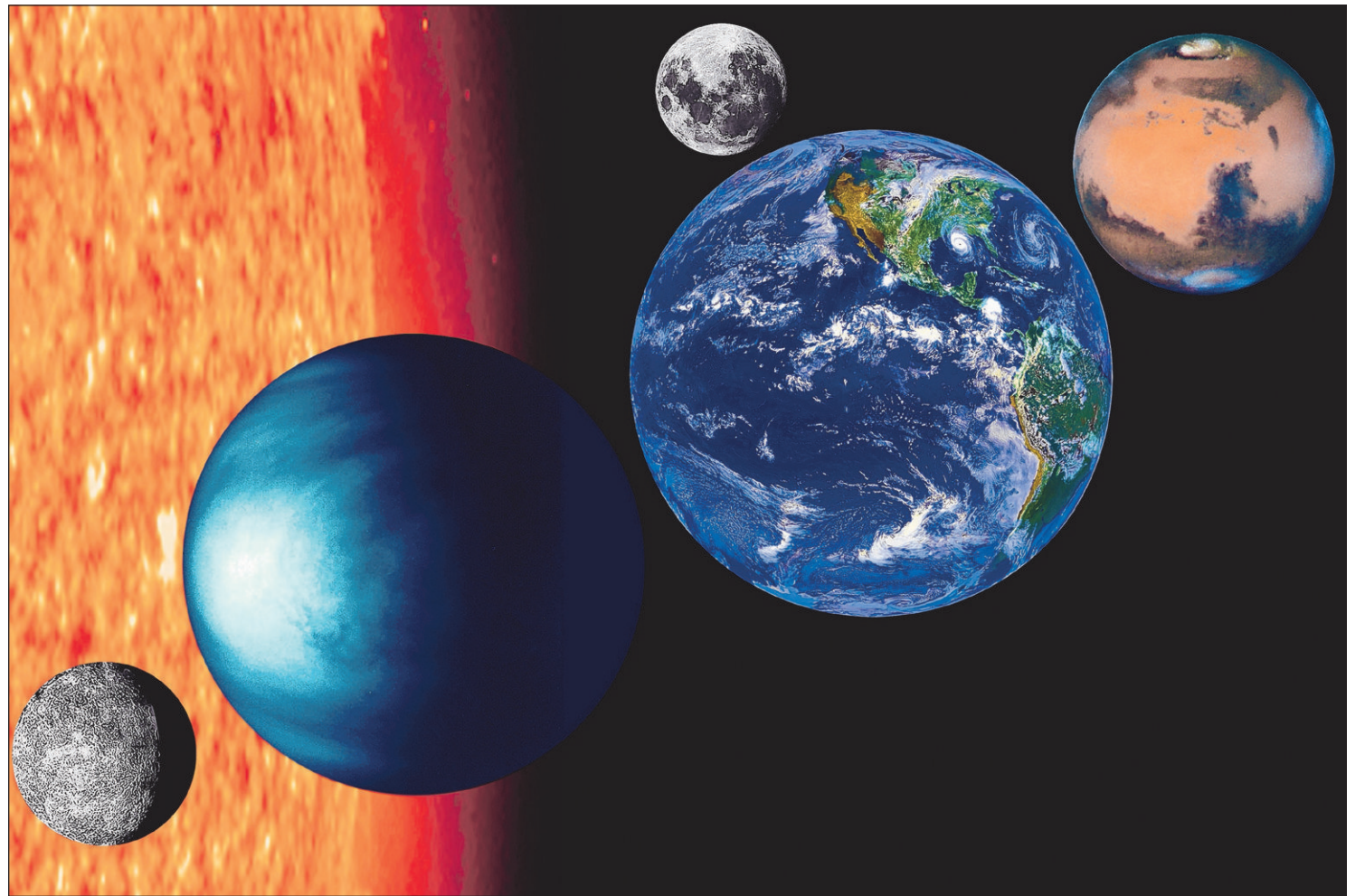
CONTRIBUTED PHOTO/Anna McCartney

Austin Roache likes the bright idea of recycling Capri Sun bags.



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Skylar Daily's angel from heaven is Earth-friendly.



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The differences between Earth and its nearest planetary neighbors, Venus and Mars, have been termed the "Goldilocks Principle" — Venus is too hot, Mars is too cold, but Earth is just right. Earth is rare in the solar system because its atmosphere can support life. The sun, far left, and its inner planets, Mercury, Venus, Earth and its moon and Mars, are shown here.

Our bearable climate

Goldilock's tale helps explain earth's livability and why scientists worry about global warming

By ANNA MCCARTNEY
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Faced with a choice of which planet to inhabit, Goldilocks would certainly pick the Earth over Venus, which is too hot, or Mars, which is too cold.

Like the story of "Goldilocks and the Three Bears," the choices Goldilocks makes will have an impact on planet Earth, which is rare in the universe. Understanding how Earth's systems stay in balance will help Goldilocks make good choices.

Only Earth has an average surface temperature that is suitable for humans and other earthly life-forms. While our planet absorbs just the right amount of solar radiation because it orbits at just the right distance from the sun, it also has just the right kind of atmosphere.

Our atmosphere includes an insulating blanket made up of atmospheric gases just the right thickness to trap sufficient solar energy and maintain a pleasant global average temperature. On Mars, this blanket is too thin, and on Venus it's way too thick, making these planets uninhabitable. The average surface temperature of Earth is 15 degrees Celsius or 59 degrees Fahrenheit.

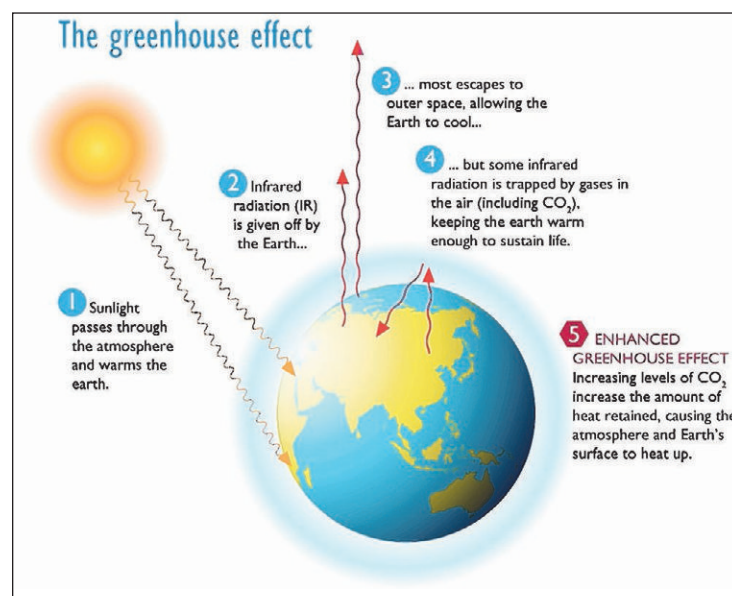
High today? 860 degrees!

Venus has a rich carbon dioxide (CO₂) atmosphere and thick clouds of sulfur dioxide (SO₂) that generate the strongest greenhouse effect in the solar system, creating surface temperatures higher than 460 °C (860 °F). On Mars, temperatures can drop from a high of 21°C (70 °F) at midday to -78°C (-110 °F) the same night. That represents a change of 180 °F every day.

Earth's atmospheric pressure is almost midway between that of Venus and 1/90th that of Venus and 100 times that of Mars). Its normal CO₂ concentration is much less than either of these two planets. In fact, on Earth, CO₂ is considered a trace gas since Earth's atmosphere is made up of 99.8 percent nitrogen (N₂) and oxygen (O₂).

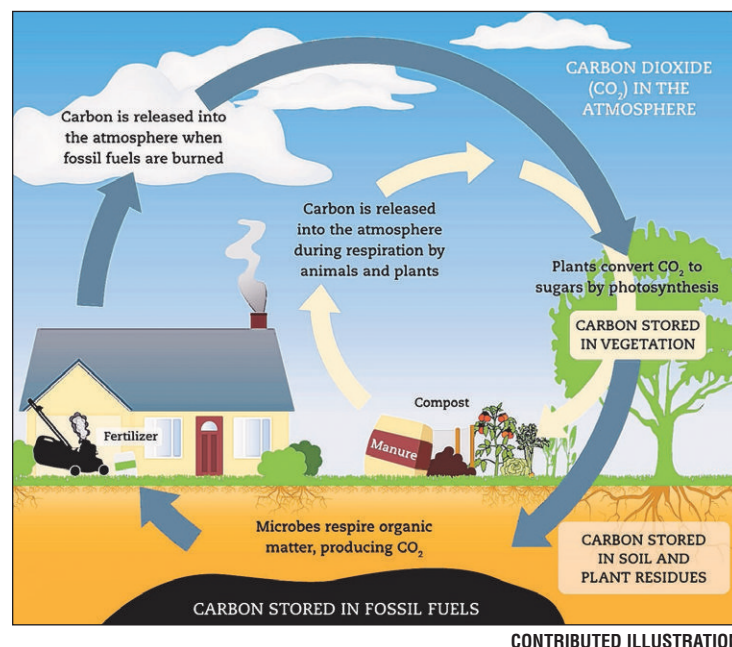
Unlike N₂ and O₂, the CO₂ and other trace gases trap heat in the atmosphere like the glass walls of a greenhouse. CO₂, water vapor (H₂O), methane (CH₄) and nitrous oxide (N₂O) are called "greenhouse gases."

When this blanket is the right thickness and the atmospheric pressure is just right, the energy from the sun's visible light is absorbed by land, oceans and veg-



CONTRIBUTED ILLUSTRATION

The Earth's atmosphere is composed of greenhouse gases of just the right types and in just the right amounts. Without that balance, our planet could become more like Venus or Mars.



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Carbon constantly cycles from the air into plants and soil, and back into the air. Global warming is largely a result of an imbalanced carbon cycle. In just 100 years, humans have upset that balance by increasing CO₂ to levels not experienced in millions of years, by burning ancient carbon found in fossil fuels.

etation during the day. This energy is kept from radiating back into space and rapidly plunging the planet's surface below zero at night by the "greenhouse gases." They absorb and reradiate the heat in all directions. This provides the Earth with temperatures suited to our dynamic and complex biosphere.

This "greenhouse effect" was first used in the early 1800s to describe the naturally occurring functions of the atmospheric trace gases. Because this greenhouse effect produces livable tempera-

tures and because life on Earth is continually producing oxygen through photosynthesis and removing and recirculating CO₂, Earth's atmosphere stays fairly stable. Without that balance, our planet could become more like Venus or Mars.

Understanding local, regional and global albedo (the percentage of the solar energy that is reflected back by a surface) is also critical to predicting global climate change. Ocean surfaces, ice caps, forests, grasslands, deserts and cities absorb, reflect and give

off radiation differently. A white glacier strongly reflects sunlight back into space, resulting in minimal surface or lower atmospheric heating, whereas a dark desert soil absorbs that sunlight, causing a significant increase in surface and lower atmospheric heating.

Cloud cover also affects greenhouse warming by reducing the amount of solar radiation that reaches the Earth's surface and reducing the amount of radiation energy emitted into space.

It's important to note that the greenhouse effect itself is not the culprit causing accelerated global warming. It's the choices Goldilocks and billions of people living on the planet make that are contributing to our current climate-change scenario.

Normally it takes nature thousands of years to create several degrees of sustained global temperature change. But in a century or less, we have created excessive amounts of CO₂ by burning fossil fuels that were underground for millions of years. These CO₂ levels are scientifically measured and recorded by hundreds of stations across the globe, all reporting the same upward trend.

Truth and consequences

Because the system cannot absorb the increase naturally, we are seeing the consequences of these human-produced surplus greenhouse gases.

Excess CO₂ emissions lead to hotter conditions, more droughts and mass extinctions of coral reefs. Glaciers are melting, the ocean is warming and becoming more acidic, and polar bears and many other species are in danger of extinction globally and locally because they cannot adapt on such short time scales.

While Goldilocks and many others may be confused by what they hear or read about climate change, if they stick to the scientific facts, they can begin to reverse the huge amounts of greenhouse gases that are being added to the atmosphere every day.

In the coming weeks, we will examine more facts about greenhouse gases and changing climate, what others are doing and what you can do to combat these problems.

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

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