Far off in our solar system is the beautiful planet Saturn. Along with its lovely rings, Saturn is also surrounded by over 50 moons. Two of these moons tell an interesting story that can teach us something about our own planet Earth.

Phoebe (FEE-bee) is the smaller and darker moon. Its dark, dusty surface (as dark as black ink) absorbs around 94 percent of the Sun’s light. But it still isn’t warm. Phoebe is so far from the Sun that its daytime temperature is a chilly -261 degrees Fahrenheit.

Enceladus (in-SELL-uh-dus) is larger and much brighter. This moon is covered with ice, so it reflects 99 percent of the Sun’s light back into space. Even though it is about the same distance from the Sun, it is much colder than Phoebe. The daytime temperature is around -330 degrees Fahrenheit!

Why the difference? You can find out yourself with a simple experiment. Make a small hole in a pair of tennis balls (get an adult to help with this), and insert a thermometer into each hole. Cover one tennis ball with white fabric, the other with black. Label the light ball “Enceladus” and the dark one “Phoebe” and place both “moons” under a warm lamp. Watch for a few minutes to see how the temperatures change.

You’ll probably find that “Phoebe” heated up much faster than “Enceladus.” White or shiny surfaces reflect more light than dark surfaces do, which means they don’t get as hot. Dark surfaces absorb more light, making the temperature rise.

Scientists have a word for how much or little light a surface reflects. They call it albedo. Shiny, ice-covered Enceladus reflects a lot of light. It has a very high albedo (around 99 percent). Dark, dust-covered Phoebe doesn’t reflect very much light. It has a very low albedo (around 6 percent).

What does this have to do with Earth? Just like Saturn’s moons, Earth also reflects light. However, Earth is covered by many different surfaces, like oceans, ice, forests, and fields. Each of these surfaces has a different albedo. On average, Earth’s albedo is around 30 percent. This number has changed during Earth’s history, though.

Flesch-Kincaid RL = 5.8
A SHINY EARTH

During the ice ages, massive ice sheets covered much of Earth’s land. Earth’s albedo was much higher and so temperatures stayed low. Once it starts, this sort of effect can be hard to stop. First, temperatures go down. This causes ice to form, and that ice spreads across the land. The reflective ice bounces lots more sunlight back into space, and temperatures drop even more. More ice forms, more sunlight bounces into space, and on and on and on.

Today temperatures aren’t dropping. Instead, global warming is making temperatures rise. This means that ice is melting, especially in the Arctic. Arctic ice covers dark ocean water. As temperatures rise, the ice melts, and more water is exposed to the Sun. Dark ocean water absorbs sunlight much better than ice. This makes temperatures go up even further. More ice melts, more ocean water is exposed, and on and on.

If you were living on frozen Enceladus, you might welcome such a warming. But here on Earth, this runaway warming could cause big trouble. Polar bears and seals, not to mention the people who live in Arctic regions, depend on the sea ice for their existence. If the ice goes away, an ancient way of life goes away with it.

So what can we do? Global warming can seem overwhelming. Even adults (who should know better) spend more time arguing about the details than trying to solve the problem. One thing we know for sure is that human beings are putting too much of a gas called carbon dioxide into the air. We make carbon dioxide whenever we burn anything, but most of our carbon dioxide comes from burning coal, oil, and gasoline. And carbon dioxide makes temperatures rise.

There are simple things we all can do to slow global warming down at least a little. Take fewer trips. Buy smaller cars. Walk instead of riding; that helps, too. Turn off lights and electrical appliances, and use more efficient light bulbs when you can. That saves electricity, and cuts the carbon dioxide coming from power plants. So save some shiny ice, and some money on the electric bill. Turn out that extra light!

Glossary

absorb – to take in
albedo – a measure of how much light a surface can reflect
reflect – to bounce back

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