



Photo courtesy of NASA.

Earth's Energy Sources

The Science of Global Atmospheric Change: Activity 1

Nancy Moreno, PhD.
Barbara Tharp, MS.

Center for
Educational Outreach

Baylor College of Medicine



BioEd Online

Earth's Energy Sources (pre-assessment)

This activity's objectives are aligned with the National Science Education Standards, specifically those related to Science as Inquiry and Physical Science. The Global Atmospheric Change unit allows students to explore the science behind energy use and changes in the atmosphere. At the same time, students learn basic physical and earth/space science concepts related to light and electromagnetic radiation, the atmosphere, fossil fuels and combustion.

The following science concepts are addressed in this activity.

- Teacher assessment of students' prior knowledge related to the atmosphere, carbon cycle, skin and skin cancer risk, and climate change.

Student Worksheets

Student pages in the teacher's guide are provided in English and in Spanish.

Reference

Moreno N., and B. Tharp. (2011). *The Science of Global Atmospheric Change Teacher's Guide*. Third edition. Baylor College of Medicine. ISBN: 978-1-888997-76-7. Development of this student activity was supported, in part, by grant numbers R25 ES06932 and R2510698 from the National Institute of Environmental Health Sciences of the National Institutes of Health to Baylor College of Medicine.

Image Reference


Photo courtesy of NASA. Public domain. The setting of the sun over the Pacific Ocean and a towering thundercloud, July 21, 2003 as seen from the International Space Station (Expedition 7). <http://sunearthday.nasa.gov/2008/promotional/>

Key Words

lesson, Earth, atmosphere, global change, global warming, fossil fuels, skin, air pollution, carbon, greenhouse gas, climate, rainbow, light, sunscreen,

Earth's Energy Sources © Baylor College of Medicine.

Materials




Do You Know?

Name _____

Circle the letter beside the correct answer to each of the questions below.

- Where are fossil fuels found?
 - In a Geomuffin
 - Underground
 - In a tree
 - In the atmosphere
- Why is your skin important?
 - It sends messages to the circulatory system.
 - It can get sunburned.
 - It helps keep germs out of the body.
 - It has no layers.
- What is the source of almost all energy on Earth?
 - The moon
 - The sun
 - Electricity
 - The water cycle
- Most air pollution is found in which layer of the atmosphere?
 - Thermosphere
 - Mesosphere
 - Stratosphere
 - Troposphere
- Which of the following contains carbon?
 - Sugar
 - Water
 - Spoon
 - Glass
- Pick the answer that is not true about greenhouse gases.
 - Are present in large amounts in the atmosphere.
 - Are produced by things people do.
 - We can't see them.
 - They help trap heat in the atmosphere.
- Which of the following zones has a climate with warm temperatures year-round?
 - Polar
 - Temperate
 - Tropical
 - Desert
- How could you estimate how much skin is on an orange?
 - Squeeze out the juice.
 - Use the Law of Nines.
 - Make a rectangle.
 - Peel it and lay the skin out flat.
- A rainbow is made of:
 - Tiny colored specks.
 - Microwaves.
 - Wavelengths of light.
 - A prism.
- When should a person wear sunscreen?
 - Every day
 - Only if a person gets sunburned easily
 - Only at the beach
 - Only if it is hot outside

1. Earth's Energy Sources
Assessment



My World: Global Resources
© 2008 Baylor College of Medicine



BioEd Online

Materials

Have students work individually.

Materials per Student

- Pen or pencil
- Copy of “Do You Know?” page

Reference

Moreno N., and B. Tharp. (2011). *The Science of Global Atmospheric Change Teacher’s Guide*. Third edition. Baylor College of Medicine. ISBN: 978-1-888997-76-7. Development of this student activity was supported, in part, by grant numbers R25 ES06932 and R2510698 from the National Institute of Environmental Health Sciences of the National Institutes of Health to Baylor College of Medicine.

Key Words

materials needed, materials list

Earth's Energy Sources © Baylor College of Medicine.

Energy Resources

- What is the source of energy for your family's car?
- What about for your computer?
- Where does the energy we need come from?
- Do you think our uses of energy affect Earth's environment?



BioEd Online

Energy Resources

Begin a class discussion about sources of energy and energy use. Ask questions such as, *What is the source of energy for your family's car? What about for your computer? Where do get the energy we need?*

To build awareness, have students identify the many different ways in which they rely on energy each day. Follow by asking, *Do you think our uses of energy affect the environment?* Tell students that they will have opportunities to discover the answers to these and other questions over the next several weeks. Challenge them to think about how we can protect Earth's environment.

Reference

Moreno N., and B. Tharp. (2011). *The Science of Global Atmospheric Change Teacher's Guide*. Third edition. Baylor College of Medicine. ISBN: 978-1-888997-76-7. Development of this student activity was supported, in part, by grant numbers R25 ES06932 and R2510698 from the National Institute of Environmental Health Sciences of the National Institutes of Health to Baylor College of Medicine.

Image Reference

Photo © Stefan Redel. Licensed for use.

Key Words

lesson, Earth, global change, global warming, fossil fuels, energy, environment,
Earth's Energy Sources © Baylor College of Medicine.

Let's Get Started

- Read the questions and complete the worksheet.
- Answer all of the questions the best that you can.
- Your worksheet will not be graded.
- You can change your answers at the end of our study on global change.



BioEd Online

Let's Get Started

Give each student a copy of the pre-assessment. Each student should complete his or her own assessment. Tell students that the assessments will not be graded. Collect and save completed pre-assessments. These will be used as part of the post-assessment at the conclusion of the Global Atmospheric Change unit.

Reference

Moreno N., and B. Tharp. (2011). *The Science of Global Atmospheric Change Teacher's Guide*. Third edition. Baylor College of Medicine. ISBN: 978-1-888997-76-7. Development of this student activity was supported, in part, by grant numbers R25 ES06932 and R2510698 from the National Institute of Environmental Health Sciences of the National Institutes of Health to Baylor College of Medicine.

Key Words

lesson, Earth, atmosphere, global change, global warming, fossil fuels, skin, air pollution, carbon, greenhouse gas, climate, rainbow, light, sunscreen,

Earth's Energy Sources © Baylor College of Medicine.

Let's Talk About It

You will learn about the following topics.

- Energy sources
- Earth's atmosphere
- Electromagnetic radiation
- Fossil fuels
- Carbon Cycle
- Combustion
- Energy uses
- Skin
- Greenhouse effect
- Climate
- Alternate energy sources



BioEd Online

Let's Talk About It

Introduce students to the terms shown on the slide. Tell them that they will be learning more about each of them soon.

Reference

Moreno N., and B. Tharp. (2011). *The Science of Global Atmospheric Change Teacher's Guide*. Third edition. Baylor College of Medicine. ISBN: 978-1-888997-76-7. Development of this student activity was supported, in part, by grant numbers R25 ES06932 and R2510698 from the National Institute of Environmental Health Sciences of the National Institutes of Health to Baylor College of Medicine.

Key Words

lesson, Earth, atmosphere, global change, global warming, fossil fuels, skin, air pollution, carbon, greenhouse gas, climate, rainbow, light, sunscreen, carbon cycle, combustion,

Earth's Energy Sources © Baylor College of Medicine.

The Science Behind Earth's Energy Sources

- The sun is the source of Earth's energy.
- We feel part of this energy as heat and see another part as light.
- Radiation traveling toward Earth passes through a thin layer of gases called the atmosphere.
- The atmosphere protects us from the sun's damaging radiation.
- Green plants and algae absorb energy from the sun to make energy-rich food that forms the base of almost all food webs.
- Ancient plants and other organisms are the source of fuels, such as wood, coal, oil and natural gas.
- When these fuels are burned they release heat energy that can be used.



BioEd Online

The Science Behind Earth's Energy Sources

Fossil fuels—coal, oil and natural gas—consist of the remains of ancient plants, animals and one-celled organisms that have been buried under intense pressures and high temperatures for millions of years. The resulting substances deliver much more useful energy than raw plant materials, such as wood.

When fossil fuels are burned, carbon-containing molecules combine rapidly with oxygen. This chemical reaction releases energy in the form of heat. It also releases CO₂ into the air.

Many other chemical substances also are produced by the burning or incomplete burning of fossil fuels.

Reference

Moreno N., and B. Tharp. (2011). *The Science of Global Atmospheric Change Teacher's Guide*. Third edition. Baylor College of Medicine. ISBN: 978-1-888997-76-7. Development of this student activity was

supported, in part, by grant numbers R25 ES06932 and R2510698 from the National Institute of Environmental Health Sciences of the National Institutes of Health to Baylor College of Medicine.

Key Words

lesson, Earth, atmosphere, global change, global warming, light, heat, energy, radiation, food webs, fuel, coal, oil, natural gas, fossil fuels, green plants, combustion,

Earth's Energy Sources © Baylor College of Medicine.