

Back Through Time



Today's fossil fuels and most plastic products were made by ancient sunlight. In this activity students explore the properties of oil and its history.

GRADES
5-8



ISRI
Voice of the Recycling Industry



JASON
Learning



PREPARE:

Time Required: 2 class periods (90 minutes) without extensions

- Gather materials (see activity pages).
- Divide students into groups of 3-4.
- Make copies of the student data sheet.
- Make copies of the Venn diagram.
- Confirm students will have access to computers and internet.



MOTIVATE:

- Show students several Google images of the earth in the Paleozoic Era. As a group, make a list of what they think the earth would have been like during that time (warm seas, active volcanoes, no birds, reptiles and mammals that we are familiar with today).
- Explain that the oceans were full of life including tiny organisms like the bacteria and algae we know today. These organisms could use the energy of the sun and make food for themselves. Marine organisms that use the sun to make their own food are called Phytoplankton. What other organisms can you think of that use the sun to make food? (plants) What is the name for the process? (photosynthesis)
- Article: [Illuminating Photosynthesis](#) may be used to provide further background or review for students.
- Explain that some of the food was in the form of carbohydrates. Can you name some carbohydrates? (cookies, pasta, bread)
- As these organisms died they took their trapped carbon with them to the bottom of the ocean and after millions of years, this material became fossil fuels like oil.



TEACH:

- Introduce the activity by explaining that each group of students will be recording observations as they place drops of water and oil on a piece of wax paper.
- Pass out the data collection table and Venn diagram to each student.
- Conduct activity with students, helping as needed.
- After students compare and contrast water and oil, Explain that the ancient plankton used some of the energy for

their food and to build tissues. The consumers who ate the plankton also used some of the energy. When the plankton died and fell to the bottom of the sea, the organic matter accumulated in layers, and became trapped in clay, sand and rock. Millions of years later this matter is now a fossil fuel.

- Explain that the ancient sunshine trapped by the phytoplankton 500 million years ago is waiting to be extracted, refined for use.
- Have students conduct research and design a poster that traces the history of a drop of oil from photosynthesis in the prehistoric plankton through extraction and use today.
- Display posters around the room and have students conduct a “gallery walk”.
- Students will then modify their posters with new information from other posters.
- HINT: Be sure to have a class discussion about the history before students modify their posters to make sure that all groups have a clear understanding of the process.



REFLECT/ASSESS

Students should be able to:

- Design a poster that traces a drop of oil from photosynthesis to one of its many uses.
- Describe some the physical properties of oil.
- Explain how these properties are similar to and different from the physical properties of water.
- Explain how the carbon trapped during the photosynthesis process in ancient phytoplankton is still useful to us today.



EXTEND

Because the oil and gas we use took so long to make, these materials are too valuable to just use once. Some mechanics use recycled motor oil to lubricate automobiles. Have students interview an auto mechanic to investigate the properties of recycled oil and how it differs from first-use motor oil.



JOURNAL QUESTION

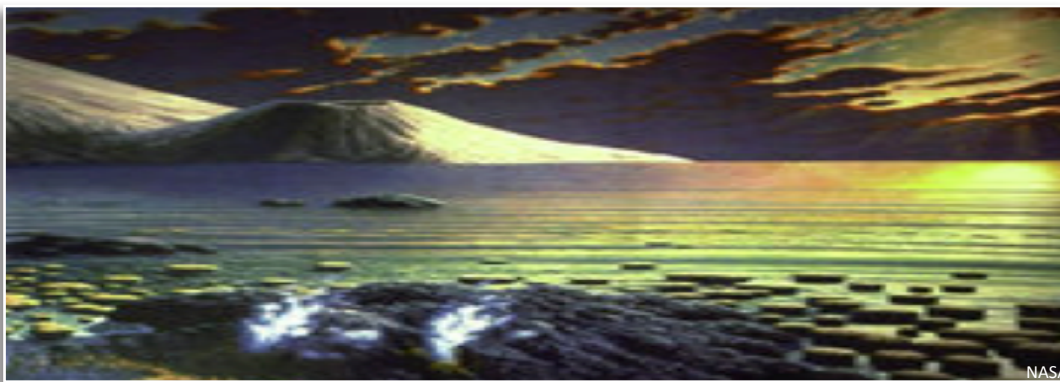
The energy of ancient sunshine that was trapped by tiny phytoplankton 500 million years ago is now available for us to extract and refine for use. Have students explain why is this resource considered to be non-renewable? What are some of the ways we use this resource? What are some of the ways we recycle this resource?



WEBLINKS

Illuminating Photosynthesis

<http://www.pbs.org/wgbh/nova/nature/photosynthesis.html>



Back Through Time

500 million years ago life on earth was very different than it is today. The seas were filled with life known as phytoplankton. Through the process of photosynthesis these ancient plankton used sunlight and water to make carbon that was used for food and tissues building. Eventually the plankton died and settled on the floor of the ocean. The energy of the sunshine trapped by these organisms is still available for us to use. In this activity, you will compare the physical properties of a drop of oil with a drop of water. Next you will design a poster that traces the history of a drop of oil from photosynthesis in prehistoric plankton through extraction and use today.

Materials

- Student data sheets
- 2 droppers
- 10 mL non-toxic oil (baby, cooking)
- 10 mL water
- square of wax paper
- stir sticks
- poster paper
- markers
- goggles

Part I: Compare Properties of Oil and Water

1. In small groups, discuss what you already know about the physical properties water and oil.
2. Place one drop of oil on the wax paper and one drop of water on the second piece of wax paper.
3. Record observations in the data table.
4. Add another drop of oil and water to each of the samples. Record observations in the data table.
5. Repeat this process at least five more times.
6. Do you know the term for the property that makes the drops look a bubble?
7. Using the data from the table, have each group complete the Venn diagram comparing and contrasting the drop of oil with the drop of water.

Part II: Trace a Drop of Oil

1. Using the internet and other library sources, research how oil is formed, extracted from the ground, and then used. Design a poster that illustrates this process, tracing the history of a drop of oil. Your poster should begin with photosynthesis and the prehistoric plankton.
2. In your group make the final touches to your poster. Be sure to include labels and captions.
3. Display your poster in the classroom.
4. Take a look at the posters that each of the groups have designed. After the “gallery walk”, discuss with your group what changes you might make to your own poster, based on the information presented by other teams. Add any new information that might enhance your story of the history of a drop of oil.

Reflect and Apply:

1. What are some of the physical properties of oil?
2. How are these properties similar to and different from physical properties of water?
3. Explain how the carbon trapped during the photosynthesis process in ancient phytoplankton is still useful to us today.

Extension:

Because the oil and gas we use took so long to make, these materials are too valuable to just use once. Some mechanics use recycled motor oil to lubricate automobiles. Interview an auto mechanic to investigate the properties of recycled oil and how it differs from first-use motor oil.



JOURNAL QUESTION

The energy of ancient sunshine that was trapped by tiny phytoplankton 500 million years ago is now available for us to extract and refine for use. Why is this resource considered to be non-renewable? What are some of the ways we use this resource? What are some of the ways we recycle this resource?

Student Name:

Period:

Observations of Physical Properties

Oil	Water

Venn Diagram

Compare and Contrast a Drop of Oil and a Drop of Water

