



## Oil Drop Hide and Seek

Renewable and Non-Renewable Resources

Grades 2-4

### TEACHER RESOURCE

Subject	Arkansas Standard Correlations:
Science	<p>2-PS1-1 Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.</p> <p>2-PS1-4 Construct an argument that some changes caused by heating and cooling can be reversed and some cannot.</p> <p>3-LS4-4 Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.</p> <p style="padding-left: 20px;">LS4-A Fossil provide evidence about the types of organisms that lived long ago and also about the nature of their environments.</p> <p>3-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.</p> <p>4-PS3-2 Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat and electrical currents.</p> <p>4-PS3-4 Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.</p> <p style="padding-left: 20px;">PS3.A Energy can be moved from place to place by moving objects or through sound, light, or electrical currents.</p> <p>4-ESS3-1 Obtain and combine information to describe energy and fuels are derived from natural resources and their uses affect the environment (renewable and non-renewable energy sources).</p> <p style="padding-left: 20px;">4-ETS1-1 Define a simple design problem reflecting a need or want that includes specific criteria for success and constraints on materials, time, cost</p> <p style="padding-left: 20px;">4-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of problem</p> <p>4-ESS-1 Identify evidence from patterns in rock formations and fossils in rock layers to support and explanation for changes in landscape over time.</p>
Math	<p>AR.Math Content 1.NBT.A.1 Count to 120, starting at any number less than 120 read and write numeral and represent a number of objects with a written numeral.</p> <p>AR.Math Content1.NBT.B.2 Understand that two digits of a two-digit number represent amounts of tens and ones.</p> <p>AR.Math Content1.NBT.B3 Compare two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols &lt;, = and &gt;</p> <p>AR.Math Content.1.MD.C.6 Organize, represent and interpret data with up to three categories, using tally tables, picture graphs, and bar graphs</p> <p style="padding-left: 20px;">Ask and answer questions about te total number represented, how many in each category and how many more or less are in one category than another</p> <p>AR.Math Content.2.OA.C.4 Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns</p> <p style="padding-left: 20px;">Write an equation to express the total as a sum of equal addends</p> <p>AR.Math Content.2.MD.D.10 Draw a picture graph and a bar graph, with single-unit scale, to represent a data set with up to four categories</p> <p style="padding-left: 20px;">Solve simple put-together, take-apart, and compare problems using information presented in a bar graph</p> <p>AR.Math Content.3.MD.B.3 Draw a scaled picture graph and scaled bar graph to represent data set with several categories</p>



History	K	Grade1	Grade 2	Grade 3	Grade 4
Economics	E.1.K.1 Discuss needs and wants and how they are restricted by limited resources E.1.K.3, E.1.K.4 and E.1.K.5 AR	E.1.1.1 Identify examples of scarcity and opportunity costs E.1.1.3, E.1.1.4, E.1.1.5 AR	E.1.2.1 Explain examples of scarcity and opportunity cost E.1.2.3 AR E.1.2.4 AR E.1.2.5 AR	E.1.3.1 AR Discuss how scarcity and opportunity cost influence decision making E.1.3.3 E.1.3.4AR E.1.3.5 AR	E.1.4.1 AR Analyze the effects of scarcity and opportunity cost during the decision-making process E 1.4.3 AR E 1.4.4 AR E.1.4.5 AR
Global Economy	E.1.K.9 Identify common products that come from other countries	E.1.19 Identify reasons why people trade goods and services between countries.	E.1.2.9 Explain challenges that cause people in one country to trade goods and services with people in other countries.	E.1.3.10 AR Construct explanations that demonstrate the relationships among imports, exports, and global interdependence (oil, energy, lumber, crops, technology)	E.1.4.10 AR Explain how trading commodities has led to economic interdependence between AR, other states and other countries.
Geography	G.1.K.7AR Identify natural resources that meet the needs of a community such as timber, minerals, oil, coal, and natural gas	G.1.1.7AR Explain ways people utilize natural resources such as timber, minerals, oil, coal, and natural gas in their community	G.1.2.7 Examine how natural resources such as timber, minerals, oil, coal, and natural gas influence human settlement		
Language	Grade 1	Grade 2	Grade 3	Grade 4	
	1.RC.4.RF Build general and academic vocabulary and background knowledge of age and grade appropriate topics through discussion, reading and writing.	2.RC.4.RF Build general and academic vocabulary and background knowledge of age and grade appropriate topics through discussion, reading and writing.	3.RC.4.RF Build general and academic vocabulary and background knowledge of age and grade appropriate topics through discussion, reading and writing. 3.CC.1.OL Participate in collaborative conversations following	4.RC.4.RF Build general and academic vocabulary and background knowledge of age and grade appropriate topics through discussion, reading and writing. 4.CC.1.OL Participate in collaborative conversations following class created discussions guidelines to expand upon conversations.	



			class created discussions guidelines to expand upon conversations. 3.CC.2.OL Ask and answer questions about what a speaker says to gather additional information and clarify understanding	4.CC.2.OL Ask and answer questions about what a speaker says to gather additional information and clarify understanding
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## **Teacher Lesson Plan**

### **Teacher Background Information:**

Crude oil is a fossil fuel, meaning that it was made naturally from decaying plants and animals living in ancient seas millions of years ago. Most places you can find crude oil were once sea beds. Crude oils vary in color, from clear to tar-black, and in viscosity, from water to almost solid. The Earth is millions of years old and overtime all of the plants and animals that have died, have collected on the land and created layer upon layer overtime becoming solid layers of rock called sedimentary rocks. Organisms break down the parts of these rocks and that turns into methane or oil depending on how deep the layer is.

*Video: Fossil Fuel for Kids*

<https://youtu.be/JaslvS7oYw4>

*Additional links:*

[https://www.teachengineering.org/lessons/view/cub\\_earth\\_lesson07](https://www.teachengineering.org/lessons/view/cub_earth_lesson07)

<https://www.need.org/resources/oil-natural-gas-materials/>

### **Lab Materials:**

- 200 Black discs of laminated drop shape cut-outs (template below)
  - Hide 200 oil drops around room before starting activity and could also be done outside
  - Variations:
    - groups are in pairs
    - save a few oil drops for after the 3rd round to sprinkle closer to one of the team (simulates an oil company finding new reserves of oil)
    - 4 groups-1 group conduct the first search, 2 group second and so on and compare data.
- Pinwheel
- Crude oil sample link-<https://www.onta.com/2-crude-oils.html>
  - Alternative option: simulate using molasses-heavy crude, light corn syrup for lighter crudes
  - Mixture of motor oil, tar, diesel, paraffin and small amount of WD-40 (extreme caution when preparing this sample)
- Transparency, smartboard, whiteboard, posterboard for developing definition of renewable and nonrenewable resources
- Overhead markers



- Crayons
- 4-3oz. cups per pair of students
- Oil Drop Hide and Seek Teacher Sheet
- Oil Drop Hide and Seek Data Sheet

### ***Teacher Introduction and Demonstration:***

***Ever Wonder....***How did you arrive at school today? Did you take a bus or a car? What is the most common way people get around??? (Answers will vary.)

***What....***What made the vehicle run to get you from point A to point B? (Gasoline)

Do you know what gasoline is or where it comes from? (Gasoline is a product of petroleum, or oil. It is a refined by-product of the crude oil that comes from the ground.)

***How....***How do we get “oil” out of the ground?

1. Begin class by showing a container of crude oil or simulation of and ask students what is it and how is it used? Help students identify products they may know that are made from petroleum. Record the responses on the overhead or whiteboard so students can see the responses. (Possible answers: it is a fossil fuel, gasoline, gas stations, plastic, seen in news stories when there is a spill, natural gas is another fossil fuel along with coal, asphalt, tar.)
2. Lead students to classify it as a source of energy.
3. Show students a pinwheel and demonstrate its movement by blowing toward it or let a volunteer show how it is done. (You can also purchase a class set of pinwheels for each student.)
4. Question: What is the source of energy when the pinwheel moves? (If they say “you” be sure to translate that into “wind” comes from the movement of Earth, natural processes, the water cycle, etc.)
5. Question: How does the pinwheel use the wind? or How does the pinwheel capture or harness the wind? Students should be able to recognize that the shape of the pinwheel creates the rotation when a current of air strikes it.
6. Question: Which energy source is more likely to run out of it’s supply? Petroleum/Oil or Wind? Compare the two on the board or class made chart table with non-renewable (oil) and



renewable (wind) columns and fill in as students make comparisons. Students can add to their notes on their student lab sheet.

Renewable	Non-Renewable
Any natural resource that can be replenished naturally with the passage of time	any natural resource that exists in limited supply and cannot be replaced if it is used up

7. Arrange students in pairs and hand out the Oil Drop Hide and Seek Lab Sheet, plastic cups, pencils and permanent markers.

8. Tell students they are going to form an oil company and begin searching for a nonrenewable source of energy (oil drops). Show an example of the oil drops that are hidden around the room.

- Create a name for their oil company and add to their lab sheet using a marker have students label the cups 1-4. Pre-label for younger grades
- Give students four 15-second opportunities to find the oil drops stopping between intervals.
- After each search have them count and record the number of oil drops found in the cup

10. At the end of 4 searches, they should make a bar graph on their data sheet and analyze their data.

11. Share results as a class and lead the class in a discussion on limitations of the activity and how that relates to limits of supply and demand-the less you have the more in demand a product is, the more you have, the less of a demand.

- Take a look at your graph. Did you collect the most oil drops in the first, second, third or fourth search?
- What is the difference between the number of oil drops you found in your tallest graph and your shortest graph?
- Why do you think it became increasingly harder to find oil drops?
- What other factors may have influenced the exploration for oil?
  - size of companies
  - more oil drops in a particular location
  - if oil drops were taken from one location over another



## ***Student Activity Sheet***

**GROUP MEMBERS:** \_\_\_\_\_

**OIL COMPANY NAME:** \_\_\_\_\_

### ***Student Notes/Information:***

First, to harvest oil, we must find it even though it is deep underground where we cannot see. After drilling test holes, engineers set up equipment to drill in the exact area that their tests show contain a lot of oil. The oil is extracted, brought up to the surface by a pump. Sometimes parts of the sediments cannot be used and can be harmful to the environment so the engineers make sure to dispose of them carefully to avoid spilling. Then the oil is transported to a refinery where it is broken down into multiple substances that can be used to make many products. Most of our nation's cars run on gasoline, which is made from oil, and many houses are heated by oil, as well as the production of plastics products.

### ***Vocabulary:***

- renewable energy
- nonrenewable energy
- fossil fuel
- oil
- natural gas
- coal
- capture
- harness



**Graph your results:**

45				
40				
35				
30				
25				
20				
15				
10				
5				
0				
	1st Search	2nd Search	3rd Search	4th Search

1. Look at your graph, did you find the most oil in the 1st, 2nd, 3rd, or 4th search?
2. What is the difference between the number of oil drops you found in your tallest graph and your shortest graph?
3. Why do you think it became increasingly harder to find oil drops?





Oil Drop Pattern

Using heavy paper, make 21 copies of this page of oil drops (210 drops)

