

LESSON
Layers Beneath The Earth

Grade Level
3rd/4th Grade

Objective: The student will discover that oil is lighter than water by conducting a hands-on experiment.

Opener: How does oil naturally settle beneath the earth's surface?

- Brainstorm with the class on their conceptions/prior knowledge of what lies beneath the Earth's surface.
- What does oil look like underground?
- What other materials do you think are underground? (liquids, solids, and gases)
- Record student ideas on bulletin board paper and display.
- Pass out construction paper to each student. The student will draw their ideas and visual conception of how oil appears beneath the Earth's surface
- Share finished drawings and discuss.

(At this point, students have not been presented with any facts, only their pre-conceived ideas of oil deposits beneath the surface.)

Experiment: Oil is lighter than water

Materials:	sand cooking oil water molasses 1/4 meas. cups	tall clear plastic cups plastic spoons labels lab sheet/ Scientific method
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Divide the class into six cooperative groups of four to five students. Provide materials for each student at each group.

Students will experiment with different combinations of sand, cooking oil, water, and molasses. Students will record their findings on their Scientific method lab sheet (see sample on following page).

Each group will combine ingredients in different orders. Sample combinations are listed below.

cooking oil sand water	sand molasses water
water sand cooking oil	molasses water sand
sand cooking oil water	water molasses sand



Scientific Method

1. Purpose	2. Hypothesis
3. Materials	4. Procedure
5. Results	6. Conclusion

After each group has performed their experiment, they will report their findings to the rest of the class. (See sample student lab sheet)

Discovery: Students using oil, water, and sand in their experiments will discover the same result every time. The oil will always float to the top no matter what combination of mixing was used.

Students using molasses, water and sand will make a different discovery. They will discover that the heavier molasses will not float on the top. Rather, the sand will sink to the bottom of the cup, mixing slightly with the molasses, with the water rising to the top.

Allow curious students to rotate in groups and try a different experiment than the one they just conducted.

Follow-up: After the experiments, ask students if layers like this could exist below the Earth's surface. Compare the cooking oil to light crude oil, and the molasses to heavy crude oil.

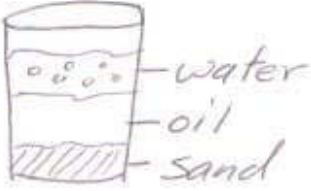
Which type of oil do you think would be easier to get out of the ground?

Show the sample of heavy crude oil and explain that in Kern County, this type of oil is what oil companies find and must extract from the earth.

Refer back to the earlier brainstorm activity, and student drawings. Ask students what they would change or keep the same. Allow students to draw a new picture if they would like in their free time.



Scientific Method

<p>1. Purpose</p> <p>Which is lighter - oil or water?</p>	<p>2. Hypothesis</p> <p>I think the water will be lighter than the oil:</p> 
<p>3. Materials</p> <ol style="list-style-type: none"> 1. 1/4 cup sand 2. 1/4 cup oil 3. 1/4 cup water 4. 1 tall clear plastic cup 5. 1 spoon 	<p>4. Procedure</p> <p>First pour 1/4 cup oil into the plastic cup. Next, pour 1/4 cup sand. Then pour in 1/4 cup water. Use the spoon and mix everything together.</p>
<p>5. Results</p> <p>The sand stayed at the bottom of the cup. Next, the water made a layer. Finally, the oil was floating on top!</p>	<p>6. Conclusion</p> <p>I found out that my hypothesis was wrong. Oil is lighter than water. Even when mixed, it will always go to the top.</p>

Reinforcement: Post posters on Oil and Petroleum Exploration. (Classroom Aids Packet)

- Run copies of pages 2, 3,6, and 7 from the Energy Newsletter, in the Classroom Aids Packet for informative and guided reading.

- Show the video - "Kern County Oil- The First 100 Years"

- Further lessons can explore:

1. How to get oil from the Earth
2. Transporting oil
3. Products from oil
4. Economy