**The Houston Museum of Natural Science**

**Wiess Energy Hall**

Knowledge Hunt

Kindergarten – 2nd Grade

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Thank you again, and we hope you enjoy your field trip to HMNS!

### How to use this guide:

1. Feel free to edit the questions to suit your student group.
2. The Knowledge Hunt is specifically for the Wiess Energy Hall.
3. Visitor services and security staff are posted around the Museum and will be happy to assist you in finding any of the locations or objects mentioned.
4. Please ensure that one chaperone is with every group of ten students at all times as they complete these activities.

If you have any questions, please contact [**curriculum@hmns.org**](mailto:curriculum@hmns.org%0d%0c)

### Vocabulary

fossil fuels, energy, renewable, nonrenewable, sediment, geology, organism, solar, porous, permeability, refinery, producer, consumer, alternative

**Knowledge Hunt Instructions**: Use the following questions to guide your students through the Wiess Energy Hall.

**Introduction**

Energy is a part of everything we do! The petrochemical industry has become integrated into almost every aspect of the modern world: transportation, food preparation, electricity, medicines, plastics, and much more. In the Wiess Energy hall, students will learn how oil is formed in the earth and the drilling and refining process that allows us to use it in our daily lives. Before entering the hall, point out the red-lighted “Wiess Energy Hall” sign to students. Why is it lit up this way? Is this energy?

Ask students what they think energy is. How do we get energy? Can they give you an example of energy?

**Energy Exploration Theater**

Allow students to watch the short movie. When students emerge from the film, see if they remember the four kinds of energy they learned about. Ask if they know how gasoline, electricity, and natural gas are used daily.

**Sea Creatures Wall**

Ask the students what these creatures are. Do they resemble other plants or animals? Explain that these plants and animals live in the sea, but the real ones can only be seen with a microscope. When they die in the ocean, there is no oxygen to decay them, so they eventually become layered rock called shale. Today, we can find oil in shale.

**Plate Tectonics**

Slowly move the cursor so students can see how continents were once connected in a giant landmass called Pangaea. Show them how it separated over millions of years to create the Earth as we know it today. Let them see where Texas was 200 million years ago and where it is today. Show how the United States once had a vast ocean in the middle of it. Today, we can find fossils of sea creatures on dry land once covered with water. Ask the following questions.

What did Texas look like 73 million years ago? How does this relate to the oil found in Texas? Why is oil found in some areas but not in others?

**Sedimentation**

Have students count the layers of rock on the rock wall. How can you tell one layer from another? What direction are the “stripes” of rock? Is each layer the same size?

Rock layers are different colors because different minerals and materials comprise each layer. Notice how the rock layers shown are horizontal because of how the materials settled, but there can be giant “cracks” in the rock or faults that disrupt this horizontal pattern.

Use the buttons on the podium to show that oil can flow through some layers but not others. Which layers can the oil flow freely through?

**Drill Bits**

Ask students what kind of motion drills do. Can they demonstrate that motion with their bodies? What happens to the rock as the drill moves downward?

Some of the drill bits are shaped differently. Can students describe the difference between two drill bits? Explain that different shapes may help drill through various types of rock. Specific shapes may help grind, whereas others might be useful for shaving flakes off the rock.

Point out the drill bit with industrial diamonds embedded in the metal. Explain that this is because diamonds are very hard and can cut through tough rock layers as the drill moves. Can the students think of soft materials that would NOT be good to cut through solid rock?

**Geovator**

Take the students on a "ride" on the Geovator to experience what it is like to journey deep underground inside an oil well. Remind students that natural gas is often buried under many layers of rock and soil, and it is the job of a geologist to find this oil.

**Porosity and Permeability**

The glass beads represent rock deep inside the Earth where oil is trapped. Note that the round container is divided in half with a barrier.

Press the button to let the oil flow through the spaces between the “rocks” and show students how a reservoir rock traps oil. The larger the space, the more porous the rock, and the more oil can be removed. The two sides of the container are the same size, and both sides start with the same amount of oil in them, but it is easier to recover the oil from the more porous “rocks.” Explain that because there is more space between the large marbles, oil can flow faster out of the space.

**Crude Oil Samples**

Allow the students to look at the different kinds of oil found worldwide. Tell them to notice the various colors and thicknesses of oil. Point out the one from Texas. Ask the students how it differs from the other oil in the exhibit.

**Process and Products**

Direct the students to the large, illuminated display of a model refinery. It illustrates how crude oil, extracted directly from the ground, is converted into valuable substances. The primary objective is to produce gasoline for car use. Still, it also yields other products such as jet fuel, heating oil, wax, and asphalt.

Ask the students to share what they did when they woke up this morning. Discuss how their routines might have been different if they didn't have access to plastic, gas for heating water, electricity, etc. Every day, we rely on a variety of products derived from oil.

Remind the students that oil and natural gas are nonrenewable resources. Prompt them to consider the potential outcomes when these resources are depleted.

**Energy Excursion Theater**

Before entering the theater, inform the students that they will be watching a film featuring an alien named Blackout Bart, who attempts to steal our energy. The Wizard pursues the alien through various alternative forms of energy that we are developing to provide energy once oil and coal resources have been depleted. After the film, ask the students if they can list at least three of the six alternative energy sources presented in the movie.

**Alternative Energy Sources**

Give the students time to examine all the alternative energy sources showcased at the end of the Energy Hall. Explain to the students that "alternative" refers to other options. These energy sources are different choices for energy that go beyond nonrenewable sources and will never be depleted.



Solar energy changes heat from the sun into electricity. The wind is constantly moving, so it can turn the blades of a windmill to create energy. Geothermal heat is inside the Earth, but ways are being found to bring that heat up to the surface of the Earth to produce energy. The tides in the ocean never stop moving, so tidal energy is always available. The water at the top of the sea is warmer than the water at the bottom, so the warm water can be used to create energy. There are fuel cells in cars that do not need gas to run. Ask the students if they have ever heard of any of these forms of energy.

What are some things that could be done at home or at school to conserve energy and use renewable resources?