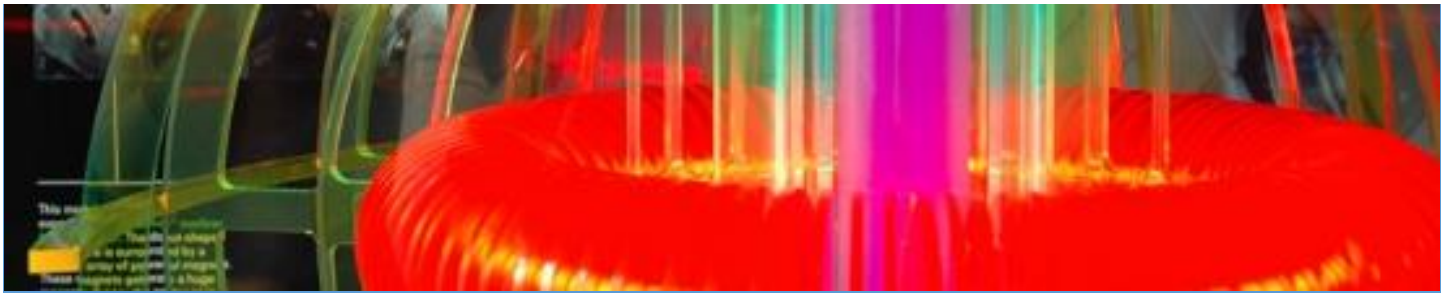

THE HOUSTON MUSEUM OF NATURAL SCIENCE

ONLINE CURRICULUM

WIESS ENERGY HALL

KINDERGARTEN – 2ND GRADE

GENEROUSLY SUPPORTED BY PWC

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Dear Educator,

Thank you for downloading the free, online curriculum available at HMNS! We're thrilled to see that you are including the world-renowned Houston Museum of Natural Science in your educational toolkit.

Here at HMNS our mission has always been to provide exemplary educational opportunities for the community. Providing educators like you with free curriculum is just one of many ways we are fulfilling that mission.

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

Best,

The HMNS Staff

How to use this guide:

1. This curriculum unit is structured to begin at the main entrance to the Wiess Energy Hall (1st floor) and work through the hall.

2. Please ensure that one chaperone is with every group of ten students at all times as they complete these activities.

3. Once you return to the classroom, you can complete the extension activities at the end of this guide.

Please direct any and all questions to **curriculum@hmns.org**

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TEKS Objectives

Science

Each of the following Science TEKS Objectives are met as students explore the Wiess Energy Hall:

Kindergarten:	**K.1(C), K.2(A), K.3(C), K.5(A, B), K.6(A, C, D), K.7(A, C), K.9(A, B)**
1st Grade:	**1.1(C), 1.2(A), 1.3(B, C), 1.5(A, B), 1.6(A, C, D), 1.7(C), 1.9(A, B, C)**
2nd Grade:	**2.1(C), 2.2(A, F), 2.3(A, C), 2.5(A, B, C), 2.6(A, C, D), 2.7(A, C), 2.8(C)**

Vocabulary

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

At the Museum

Introduction

Energy is a part of everything we do! In today's world, 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 as well as the drilling and refining process that allows us to use it in our daily lives. Before entering the hall, have students consider:

What is energy?

Where do we get our energy?

Energy Exploration Theater

When students emerge from the film, see if they can remember the four kinds of energy they learned about in the film. Ask if they know how gasoline, electricity, and natural gas are used in everyday life. Do we produce or consume gasoline, electricity and natural gas?

Sea Creatures Wall

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

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Plate Tectonics

Slowly move the cursor so students can see how continents were once connected in a huge mass called Pangaea. Show them how they separated over millions of years to create the Earth we know today. Help them see where Texas was 200 million years ago and where it is situated today. Show how the United States once had a huge ocean in the middle of it. Today we can find fossils of sea creatures on dry land that was once covered with water.

At 73 million years ago, what did Texas look like? Ask them how they think this relates to all of the oil found in Texas. Why is oil found in some areas but not in others?

Drill Bits

Look at the different drill bits displayed. 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?

Geovator

Take the students on a "ride" in the Geovator to see 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.

Porosity and Permeability

Tell students that the glass beads in the "porosity and permeability" wheel represent rock deep inside the Earth where oil is trapped. Press the button and ask students to describe what happens.

Explain that the oil is flowing through the spaces between the "rocks" reservoir rock is trapping oil. The larger the space, the more porous the rock and the more oil can be taken out. Both sides start with the same amount of oil in them, but it is easier to recover the oil from the more porous "rocks". See if students can guess why. Explain that because there is more space between the large marbles, oil can flow faster out of the space.

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Crude Oil Samples

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

Process and Products

Direct the students to the large, lighted display of a refinery model. It shows how crude oil, which is taken straight from the ground, is transformed into useful substances. Molecules are sorted and shaped. The main goal is to make gasoline like we use in our cars, but it also makes other products such as jet fuel, heating oil, wax, and asphalt.

Energy Excursion Theater

Before going into the theater, tell the students that they are going to see a film about an alien named Blackout Bart that is trying to steal our energy. The Wizard chases it through many of the alternative forms of energy that we are developing to provide energy when oil and coal are used up. After seeing the film, ask students if they can name at least three of the six alternative energy sources presented in the film.

Alternative Energy Sources

Allow students time to look at the alternative energy sources displayed at the end of the Energy Hall. Tell the students that “alternative” means other choices. These energy sources are other choices for energy, beyond nonrenewable sources, that will never be used up.

Discuss each of the following types of alternative energy with students, asking what they already know about them and if they can think of any way in which the energy source is being used.

Solar energy changes heat from the sun into electricity.

Wind is constantly moving, so it can turn the blades on 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 create energy.

The tides in the ocean never stop moving, so tidal energy is always available.

The water on the top of the ocean is warmer than the water at the bottom of the ocean, 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 alternative forms of energy.

Continue on to next page for classroom extension activities.

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In the Classroom: Extension Activities

Moving Continents

Materials

- Craft foam
- Shaving cream
- Waxed paper

Procedure

1. Remind students of the touch screen demonstration of how the Earth's landforms moved for millions of years to form the continents that we know today.
2. Explain that the continents continue to move on a layer of the Earth's crust, 60 to 580 miles below its surface called the *asthenosphere.*
3. Demonstrate with two pieces of craft foam cut in the shape of a continent and a dollop of shaving cream on a sheet of waxed paper. Show how the continents move on this layer. Push the pieces of foam close together, then on top of each other, to show how the movement of the Earth creates a mountain ridge.
4. Give each student a 5x5 piece of craft foam. Allow them to create their own continent shape.
5. On a sheet of waxed paper, give each student a small amount of shaving cream (without menthol). Allow them to experiment with the movement of continents and the creation of mountain ridges.

Auto Alternatives

Materials

- Paper
- Drawing materials

Procedure

1. Review with students some of the alternative energy sources they saw on their Museum visit. Write solar, wind, hydroelectric (water), and nuclear on the board.
2. Tell students that scientists and car manufacturers are trying to think of ways to transport people and goods without using so much gasoline since it is a nonrenewable resource. Take time to talk about why oil and gas are nonrenewable and alternative sources are renewable.
3. Tell the students they are going to be car designers in the future. They are to design and draw a car that will run on some kind of alternative power.
4. After the pictures are completed, allow the students to present their design to the class and explain how it works.

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Thick Liquids

Materials

- Cookie sheet
- Water
- Chocolate syrup
- Pancake syrup
- Cola
- Vegetable oil

Procedure

1. Remind students that they saw different kinds of oil when they were visiting the Energy Hall. Even though oil is a liquid, it moves differently because some oil is thicker than others.
2. To experiment with viscosity, pour about two tablespoons of five different liquids in bathroom cups. Include water, chocolate syrup, pancake syrup, cola, and vegetable oil. Before beginning the experiment, show the students each liquid in its original container.
3. Ask the students to predict which liquid will move the fastest and arrange the five liquids in order from the fastest to the slowest.
4. Hold a large cookie sheet sideways over another cookie sheet. Give five volunteers the cups of liquids in the order the class has predicted they will flow.
5. Ask the volunteers to slowly pour the liquids down the back of the cookie sheet. Record the results along with the predictions.

Mud Pie

Background information: When drilling an oil well, a special mixture called drilling mud is used. Drilling mud is pumped down to help the drill bit keep turning smoothly and steadily as it moves deeper into the ground. Drilling mud is not a solid, but it doesn't always behave like a liquid, making it a "non-Newtonian fluid".

Materials

- Cornstarch
- Water
- Food coloring (optional)

Procedure

1. Students can make their own non-Newtonian fluid by taking 1 cup of cornstarch and gradually mixing in ½ cup of water.
2. Ask students what happens when they stir the mixture? What happens when they squeeze a handful of goop? The cornstarch mixture reacts to applied force, whereas drilling mud reacts to the continuous motion of the drill bit.

NOTE: Do not pour leftover cornstarch mixture down the sink! It should be thrown away in a trash can.

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Do You Have the Energy?

Materials

- Magazines
- Scissors

Procedure

1. Provide a variety of magazines and ask students to cut out pictures of things that are powered by electricity.
2. Ask the students to imagine that they had no electricity and had to find an alternative way to power things such as lights, fans, televisions, ovens, etc.
3. Talk with the students about some of the alternative fuels they saw at the Museum. Ask the students to redesign the item that they cut out to show how it could be powered in a new way. For example, a fan might be turned by the wind.