

ENERGY BLAST + ENERGY HALL

Your students will journey through time as they begin to understand the large gas reserve under North Texas known as the Barnett Shale. Begin the journey on the ocean floor and watch as micro-organisms rain down, settling on the bottom of the ocean. Enjoy the 4D theater then visit the gas field and participate in hands-on activities that will help build background knowledge for your students. End your experience in the Alternative Energy Hall where your students can experience using alternative power sources.



ENERGY

The Energy Blast exhibit at the Fort Worth Museum of Science and History is a captivating and interactive exploration of the fascinating world of energy. This exhibit is designed to engage students of all ages and offers a dynamic learning experience that combines hands-on activities, multimedia presentations, and immersive displays. Students will embark on an educational journey, gaining a deeper understanding of the Barnett Shale's impact and its place in our ever-evolving energy world.

Our way of life is powered by energy resources. Energy generates electricity for our computers, phones and TVs. It fuels cars, planes, trains and boats. And it powers factories that make the things you use every day.

We need a steady supply of energy resources. But demand for energy is rising rapidly. Non-renewable resources, such as oil and natural gas, will not last forever. And renewable resources, such as wind and geothermal, aren't reliable or widespread enough to replace them yet.

All kinds of energy will be needed to meet our future needs. This exhibit invites students to explore the challenges of developing new resources and conserving these valuable resources for generations to come!

VIBROSEIS TRUCK

Vibe trucks are used to send sound waves deep underground. These waves bounce rock strata and are recorded by geophones on the surface.

The data is then converted into 3D visualizations to help geologists "see" the best places to drill for natural gas. These trucks are used in groups of three to generate a sound wave that is powerful enough to reach the Barnett Shale, over a mile and half underground.

3D VIS

Geophysicists use computers to transform seismic data into 3D interactive visualizations of geologic formations. This technology helps them "see" the optimum place to drill for natural gas in Barnett Shale.



ALL ABOUT SHALE

Formation of the Barnett Shale began 340 to 318 million years ago. Where Texas is now was covered by part of a vast ocean that was up to 800 feet deep. The most abundant form of life in this sea were tiny single-celled organisms called plankton. As organic matter and marine life decayed over millions of years, they fell to the bottom of the sea, where they were embedded in the mud seafloor. Time, heat, pressure, and chemical reactions turned the mud into shale and the plankton into natural gas.

The Fort Worth Basin portion of the Barnett Shale formation covers approximately 5,000 square miles and extends under at least 23 Texas Counties. It is one of the largest natural gas fields in the U.S. and one of American's most active drilling areas. It was named after the town of Barnett, located in Johnson County, Texas, where it was first identified. Natural gas production from the Barnett exceeds five billion cubic feet per day. And it holds 39 trillion cubic feet of natural gas that's expected to flow for at least 50 years. That's enough gas to fill over half a million AT&T Stadiums!



TEKS:

3RD: 3A,B,C, 6A, 7C

4TH: 3A,B,C, 6A, 7C

5TH: 1A, 3A,B,C, 6A, 7A

6TH: 3A,B,D

7TH: 2E, 3A,C,D

8TH: 3A,B,C,D

WHAT IS NATURAL GAS?

Natural gas is a gaseous fossil energy resource. It's colorless and odorless and consists mainly of methane gas. A rotten egg smell is added to the gas so people can smell leaks or unlit pilot lights. Natural gas is a preferred energy resource because it's relatively clean-burning, emits less carbon dioxide than oil or coal, and gives off a great deal of heat. Don't confuse natural gas with gasoline, which is a liquid refined from oil used in most cars. But that's changing as more and more cars and buses are using compressed natural gas. Fort Worth city buses all use natural gas.

WHAT ELSE IS NATURAL GAS USED FOR?

Ethane is used to make ethylene, which is used in a wide variety of products including antifreeze, plastics and pharmaceuticals. Nitrogen dioxide is used in certain rocket fuels a flour bleaching agent and to increase the wet strength of paper. Carbon dioxide is used in a wide variety of industries and products including carbonated drinks, pneumatics, fire extinguishers, welding, caffeine removal, pharmaceuticals, agriculture, lasers, refrigerants, and wine making. Propane is used as a fuel for transportation as well as for heating and cooking and is used in many barbeques. Butane is used as a propellant in aerosol sprays.

CLASSROOM CONNECTIONS

PRE-VISIT ACTIVITY:

Formation of Sedimentary Rocks: Explore the formation of sedimentary rocks. This website features an activity that models the formation of sedimentary rocks:

http://www.windows.ucar.edu/tour/link=/teacher_resources/teach_makerock.html

Pros & Cons of Energy Resources: Divide your class into small groups. Assign each group a different energy source: natural gas, oil, geothermal, hydroelectric, nuclear energy, solar energy or wind energy. Each group is responsible for researching information and investigating their energy source during their visit to the Museum and Energy Blast. Encourage critical thinking about the advantages and disadvantages of each energy source.

Historical Energy Timeline: Have students work with partners or small groups to research and create a timeline of the evolution of energy use throughout history. Discuss how the discovery and utilization of various energy sources have shaped human civilization and impacted the environment.

TRY THIS BACK IN THE CLASSROOM!

These post-field trip classroom lessons will reinforce the students' learning and experiences from the Energy Blast gallery, foster critical thinking, and empower them to think creatively about energy-related challenges and solutions.

Energy Conservation Campaign: Have students create an energy conservation campaign for their school or community. They can design posters, write persuasive essays, or develop social media content to raise awareness about the importance of energy conservation.

Energy in Our Lives: Ask students to keep an energy journal for a week, documenting how they use energy in their daily lives. After the week, have a class discussion about their findings, identifying areas where energy could be conserved or replaced with renewable alternatives.

Energy Engineering Challenge: Task students with designing and building a model of an energy-efficient house or a renewable energy-powered device (ex. solar-powered phone charger). Have students include a list of at least 5 energy efficiency, sustainability or alternative energy features with a description of how each will help to conserve our resources. Print the following page for your students to use for planning and designing!

SPARK CURIOSITY!

Encouraging children to use "I Notice, I Wonder, I Imagine" questions during a field trip can help them engage actively with the exhibits, stimulate their curiosity, and foster their creativity and critical thinking skills. It also provides an opportunity for meaningful discussions and reflections on their experiences.

For Example: "I noticed how solar panels can capture sunlight to generate electricity, but I wonder how we can store excess energy for use on cloudy days. I imagine a future where renewable energy storage technologies are more efficient and accessible."



ENERGY ENGINEERING CHALLENGE:

