



Society of Petroleum Engineers



## Energy4me Classroom Presentation Guide

Thank you for volunteering for Energy4me!

This helpful guide is your first step in learning how to conduct the best classroom presentation. At Energy4me, we hope you will enjoy demonstrating these fun and informative activities. The more fun students have, the more they learn – and possibly develop an interest in pursuing careers in STEM – Science, Technology, Engineering and Mathematics.

Energy4me has developed a set curriculum that is designed to illustrate basic technical concepts in oil exploration and production. Through this program, volunteers from around the world – members just like you – will educate and encourage students to pursue a STEM career.

Studies prove that hands-on activities create connections between the classroom and real-world situations. This style of teaching also nurtures critical thinking and problem-solving skills, which are traits that many employers value.

This energy education workshop not only is a lot of fun for the students, but the program also is incredibly educational. Because we use hands-on activities, students do not passively listen to a lecture; they must think through a problem or situation. They learn that they can interpret data, which is a fundamental skill for engineers.

The global program can also be used as a public relations tool about the oil and gas industry. Using the Energy4me activities, you can help your community understand the basics of oil exploration and production.

Following these steps will ensure a smooth and efficient workshop that aligns with the objectives of the Energy4me program.

**Above all, be yourself and have fun!**

**Please be sure to [notify the Energy4me](#) team with a count of how many students you meet during your classroom visit. This information is vitally important because we track those statistics.**

### **Part One – Preparations**

All of the materials and lesson plans you'll need for a successful presentation can be found on the [Energy4me website](#).

When preparing for your presentation, consider the overall message you will convey to the students. To make it easy for you to tailor your presentation to different age groups, we have created presentation modules based on the age range of the students, with whom you'll be speaking. Your own experiences, ranging from college classes you took to on-the-job responsibilities, add a relevant personal touch to your presentation. And, of course, be sure to encourage the older students to join SPE once they enter college!

You can find information on energy careers and scholarships under the Resources tab.



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## ENERGY4ME EXAMPLE CLASS PRESENTATION MODULE

<u>Time</u>	<u>Program</u>
10 minutes	<b>Introduction and Presentation Overview</b> <ul style="list-style-type: none"><li>• Describe SPE and Energy4me (See addendum A)</li><li>• Describe the industry in the region (See addendum B)</li></ul>
15 minutes	<b>Hands-on Activity 1</b> <p>Explore the properties of oil, natural gas and their formations. Investigate how we extract resources from these formations through these activities: (select one activity, but do more if time permits)</p>
15 minutes	<b>Your Career</b> <p>Discuss your career. What did you study, what roles have you held up to this point in your career? Incorporate show-and-tell if possible (show core samples or perhaps a computer simulation). Answer students' questions.</p>
15 minutes	<b>Hands-on Activity 2</b> <p>Explore the properties of oil, natural gas and their formations. Investigate how we extract resources from these formations through these activities: (select one activity, but do more if time permits)</p>



### **Activities (Primary Students – 5 to 9 years)**

- **Seeping Stones** – An easy demonstration of the ability for different types of rock to absorb water (i.e. oil) and to explain the properties of connective pores.
- **Sound Waves** – Use the concept of sound waves to explain what geological seismic surveying is all about and what role it plays in the entire process. Explain the tools used during seismic surveying.
- **Core Sampling** – Explains how geologists can analyze the formations deep within the ground and the process of extracting different core samples for analysis.
- **Understanding Density** – A simple experiment that shows that oil, gas and water do not mix and how that affects our ability to produce from the reservoir.
- **Getting the Oil Out** – Students create their own pipeline and try to extract heavy crude and light crude oil by using chocolate syrup and soft drink. Students learn the difference in the energy required to produce each type of oil. Discuss the two types of oil density.

### **Activities (Intermediate Students – 12 to 14 Years Old)**

- **Sound Waves** – The concept of sound waves. Use this concept to explain what geological seismic surveying is about and what role it plays in the entire process. Explain the tools used during seismic surveying.
- **Exploring Porosity** – Shows the different types of pores to hold oil and gas, i.e., the difference between connected and non-connected pores and how different types of rock have different types of pore structure. Discuss permeability.
- **Cartesian Diver** – Demonstrates the effect that pressure has on molecules such as gas and how this can affect the concentration and production of hydrocarbons.
- **Density Bottle** – A simple experiment that shows that oil, gas and water do not mix and how that affects our ability to produce from that reservoir.
- **Perforated Well Casing** – Demonstrates the importance of perforating a well case and what the benefits are. Present how perforations are created.



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### **Activities (Secondary Students – 15 to 18 Years Old)**

- [Exploring Oil Seeps](#) – How we discovered oil and how it rose to the surface before we had the tools to produce it.
- [Cartesian Diver](#) – Demonstrates the effect that pressure has on molecules such as gas and how this can affect the concentration and production of hydrocarbons.
- [Perforated Well Casing](#) – Demonstrates the importance of perforating a well case and what the benefits are. Present how perforations are created.
- [Modeling Oil Reserves](#) – Participants are required to model the different geological formations that are typically found subsurface. The students will create a geological setup within a cardboard box to mimic an oil reserve. Participants then exchange their boxes with another group and compete to find oil.

## Room

Ideally, the room should be set up so that participants can work in groups of three to five. No more than five students per group. Communicate with the teacher before your scheduled presentation to ensure you can have a table to set up the activity materials.

## Materials

- Divide the materials according to the number of groups.
- Pre-measure the materials into smaller plastic (disposable) cups.
- Pre-arrange experiment materials and nominate one person from each group to collect materials at the start of each activity.



## Part Two – The Presentation

### Lesson Plans

- Ensure that each group has a lesson plan (instructions) with each set of materials.
- You should give only an overall description of the activity; don't offer hints or direction. Let them figure it out – that's part of the fun!

### Timing

Each activity should be an average of 10 minutes long; activities such as “Perforated Well Casing” may take 15 minutes.

### Wrap Up

Conduct a five-minute wrap-up of each activity. Explain how the activity relates to both the working environment in the oil and gas industry and the scientific concept. If you have videos or images from your own company, this is a good time to show them.



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## Social Media

- Once a workshop has been completed, it is important to share the workshop on Energy4me's social media platforms.
- Teachers should send a detailed report with pictures and videos. The Energy4me team will post your activity on social media and on our blog. Send your report/images to [energyped@spe.org](mailto:energyped@spe.org)
- Please take note that in most countries, pictures of students are not allowed. Ask the teacher for written consent before taking and posting any pictures. When submitting your report to Energy4me, please include the written consent.

## Photo and video instructions

Please ensure that you take photos and videos that highlight the following:

- Students conducting the experiments
- Students showing group work participation
- Students being enthusiastic about the results of the experiment
- An overall picture of the setup of the room which can include a picture of the speaker engaging with the students
- A picture on the set up of the materials

## Addendum A

### What is the Society of Petroleum Engineers?

SPE is a not-for-profit organization whose mission is to collect, disseminate, and exchange technical knowledge concerning the exploration, development and production of oil and gas resources and related technologies

SPE provides a worldwide forum for oil and natural gas exploration and production professionals for the exchange of technical knowledge and serves as a professional home for more than 158,000 engineers, scientists, managers and educators from 143 countries.

### What is the Energy4me program?

Energy4me is an energy educational public outreach program that highlights how energy works in our everyday lives and provides factual, non-biased information about the energy sector.

Energy is a critical issue worldwide, and SPE believes in spreading the word about energy conservation, the future of the oil and gas industry, and its impact on the planet. Students can use this opportunity to

learn about emerging technology in the petroleum industry, career opportunities and why STEM subjects are so important.

## Addendum B

Statistics on the country's energy consumption and production should be given. Example:

### United Arab Emirates' Key Energy Statistics

		world rank
Total Primary Energy Production 2013	8.987 Quadrillion Btu	<b>11</b>
Total Primary Energy Consumption 2013	4.004 Quadrillion Btu	<b>25</b>
Total Petroleum and Other Liquids Production 2015	3,473.7 Thousand Barrels Per Day	<b>7</b>
Crude Oil Proved Reserves 2015	97.8 Billion Barrels	<b>7</b>
Proved Reserves of Natural Gas 2015	215.1 Trillion Cubic Feet	<b>7</b>

