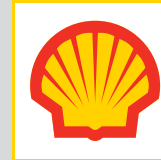


## TO FRACK OR NOT TO FRACK



### Grades 9–12

In this lesson, students will be introduced to hydraulic fracturing (also known as fracking) and research the related environmental, economic, and political benefits and consequences of this technology. They will read about an actual fracking debate in a small town and assume the role of a stakeholder at a simulated town meeting.

**Lesson Printable:** Natural Gas in the Mix

#### Objectives:

- Students will identify and weigh the economic, environmental, and political benefits and trade-offs of hydraulic fracturing (also known as fracking).
- Students will write a speech that includes statistics, facts, and evidence to support one stakeholder's views in a debate about fracking
- Students will testify at a simulated town meeting to express their stakeholder's viewpoint.

**Alignment with National Standards:** Science, Technology, Engineering, Math

**Skills:** Research and investigation, synthesis, data interpretation and analysis, evaluation, presentation

#### MATERIALS

- Internet access
- Printable, "The Fracking Debate" (PDF), one per student
- Art materials, dependent on visual selected for speech

#### Time Required:

Introductory activity: 10 minutes

Reading of article, completion of questions, and group presentations: 45–60 minutes

Research for town meeting and development of speech/printable: 60–90 minutes

Town meeting simulation: 60 minutes

### DIRECTIONS

#### Part One

**Note:** Before students enter the room, hang the six signs (see materials list) in different areas of the room.

1. Write the word "fracking" on the board and ask students to guess what the word means. Explain that "fracking" is actually short for "hydraulic fracturing," a technology in which fractures are created in deep shale formations where natural gas is trapped very tightly. Simply drilling through the rock using traditional methods won't allow the gas to flow easily. Fracking includes

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a horizontal drilling technique and an injection of a pressurized mix of water, sand, and chemicals to allow oil or natural gas to move more freely from the rock pores to production wells that bring the oil or gas to the surface. Note: Students can watch a video that shows the fracking process at [www.shell.com/home/content/innovation/meeting\\_demand/natural\\_gas/gas/technical\\_challenges/](http://www.shell.com/home/content/innovation/meeting_demand/natural_gas/gas/technical_challenges/).

2. Ask students to suggest possible benefits and trade-offs of fracking. Guide them to think about what they already know about natural gas, and to consider environmental, economic, and political benefits and trade-offs. List ideas on the board.
3. Explain to students that the benefits and trade-offs of fracking have led to many debates in small towns and across the country. They are going to read an article about one such debate in Western Maryland. Distribute the printable, "The Fracking Debate." Once they read the article, ask students to form small groups and complete the questions and chart in Part 1 of the printable. Give students ample time to read the article and complete the questions that follow.
4. Have each group present their answers to the rest of the class. Poll students to see how many of them would support or reject fracking based on information from the article. What more would they like to learn to help them reach a decision?
5. Refer students to Part 2 of the printable, which asks them to assume the role of one of the debate's stakeholders at a town meeting with the 14-member advisory committee referenced in the article. Have each group select a stakeholder to represent from the list on the printable. If appropriate, students could also choose to create their own stakeholder as long as it is realistic within the fracking debate. Each group must write a three-to-five minute speech that their stakeholder would give outlining their opinion on fracking. They must include specific facts, statistics, and evidence that would support their position. Specific environmental, economic, and/or political benefits and trade-offs should be included that would help to strengthen the stakeholder's position. At least one visual should also be included as part of the speech. The visual could be a PowerPoint presentation, poster, graph, chart, model, photograph, etc. While all group members should contribute to the speech and/or printable, each group must select one member to deliver the speech at a simulated town meeting.
6. Give each group time to conduct research, write their speech, and create their supporting visual.
7. Hold a simulated town meeting with the advisory panel where each stakeholder gets to present his or her speech. Have other students act as moderators, townspeople, and/or the advisory committee. At the conclusion of the speeches, reserve time for questions from the town meeting attendees.
8. Finally, based on all they learned, repoll students to see if they would recommend fracking in this Maryland town. Have them justify their answers. Guide them to consider whether benefits or trade-offs outweigh each other and debate the best way to consider the views of all stakeholders while meeting the energy demands ahead.

### ADDITIONAL RESOURCES

- American Petroleum Institute: Hydraulic Fracturing  
<http://www.api.org/policy/exploration/hydraulicfracturing/>
- Shell: Unlocking Trapped Natural Gas  
[http://www.shell.com/home/content/innovation/meeting\\_demand/natural\\_gas/gas/](http://www.shell.com/home/content/innovation/meeting_demand/natural_gas/gas/)
- Shell Video: Unlocking Tightly Trapped Gas  
[http://www.shell.com/home/content/innovation/meeting\\_demand/natural\\_gas/gas/technical\\_challenges/](http://www.shell.com/home/content/innovation/meeting_demand/natural_gas/gas/technical_challenges/)

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- United States Environmental Protection Agency: Natural Gas Extraction/Hydraulic Fracturing  
<http://www.epa.gov/hydraulicfracture/>
- United States Environmental Protection Agency: Hydraulic Fracturing Background  
[http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/wells\\_hydrowhat.cfm](http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/wells_hydrowhat.cfm)

Visit [www.shell.us/energizeyourfuture](http://www.shell.us/energizeyourfuture) to learn more about how alternative energy resources will help provide energy for the future..

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