



It's A Gas

Formation of a Gas

Time: approximately 4 to 5 days

Adapted from Fossils to Fuel— An Elementary Earth Science Curriculum, developed for the Oklahoma Energy Resources Board, an agency of the State of Oklahoma.

GRADE LEVEL: 3 – 6

SUBJECTS: Science, Math

WONDER WHY...

Have you ever thought about how natural gas is formed? Where would you go to find natural gas?

CONCEPT

Natural gas is a substance formed over millions of years from decaying ocean plants and animals

TEACHER INFORMATION

Note: In this model, lettuce represents the plant material while the tuna, meat or egg represents the animal material. The sand represents the layers of the earth and sediment that provided the pressure necessary for oil and natural gas formation.

Natural gas is a colorless, odorless gas. From the well site, natural gas is carried by pipelines to a refinery. There it is cleaned, and for safety reasons, an odor is added. This enables people to smell natural gas. It is dangerous to breathe and highly flammable. From the refinery, natural gas is piped to storage facilities until needed by consumers. Most natural gas is sold to consumers by public utility companies. Public utilities buy their natural gas supplies from the private companies that produce it.

MATERIALS

- 1 per student – **Student Handout 1 and 2**
- 20g of a protein source such as tuna, raw ground meat **or** 1 hard-boiled egg with the shell, chopped per group
- 2 lettuce leaves or equal amount of shredded lettuce (about 1/3 cup) per group
- 1 Clear plastic bottle (8oz or 16oz) per group
- 1 balloon per group
- 1 Graduated Cylinder per group
- 50g sand per group
- 25ml aquarium or pond water per group
- Masking tape



- Balance scale/weights

Note: This activity can also be done with a sealable baggy in place of the bottle and balloon.

DISCOVERY PROCEDURE

1. Divide students into groups. Each group will measure 20g of a protein source such as canned tuna, raw ground meat or chopped boiled egg with the shell and put in the bottle. Tear the lettuce leaves into small pieces and put them in the bottle.
2. Use the balance scale to measure 50g sand. Carefully pour the sand into the bottle so the sand covers the protein source and the lettuce. Do not shake the bottle.
3. Measure 25ml of water. **Slowly** pour the water into the bottle. Try to make the water run down the inside of the bottle instead of pouring the water directly onto the sand.
4. Stretch the opening of the balloon over the opening of the bottle. Seal with masking tape.
5. Carefully move the bottles to a warm place (preferably outside as contents could produce a strong odor). Let the bottle stay in that place for several days.
6. Predict what will happen over the next few days.
7. Design a chart and record your daily observations (changes in balloon, etc.).

CONCEPT FORMATION

1. Have each group summarize their data and draw conclusions. Share conclusions with the class.
2. What do you think caused the changes in the balloon?
Possible answer: Decaying lettuce (plants) and protein source (animals) caused the change.
3. What happened to the materials in the bottle as time passed? What name could we give this newly formed substance?
Possible answer: The materials start to decay and emit a gas. The new substance is a gas.
4. How did the substance change?
Possible answer: It changed from a solid to a gas.

VOCABULARY



Organic—derived from a living matter

Inorganic—not consisting of living matter

Natural Gas— a gas that comes from the earth’s crust

Chemical Change— a substance that is altered chemically and displays different physical and chemical properties

Physical Change— a change from one state (solid or liquid or gas) to another without a change in chemical composition

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What do you think caused the changes in the balloon? What happened to the materials in the bottle as time passed? What name could we give this newly formed substance? How did the substance change?

Possible answer: The materials in the bottle started to decay. The decaying lettuce and protein source cause the balloon to start to fill up with gas. The newly formed substance is a gas. The substance changed from a solid to a gas.

STUDENT HANDOUTS – (See Arkansas Energy Rocks web site for printable Word documents, teacher answer keys follow)



Name _____ Date _____

**It's a Gas
Student Handout 1
TEACHER KEY**

Wonder Why...

Have you ever thought about how natural gas is formed? Where would you go to find natural **gas**?

Materials

- 20g of a protein source such as tuna, raw ground meat, or 1 hard-boiled egg with shell
- 2 lettuce leaves or equal amount of shredded lettuce (about 1/3 cup)
- Clear plastic bottle (8oz or 16oz)
- 1 balloon
- Graduated Cylinder
- 50g sand
- 25ml aquarium or pond water
- Masking tape
- Balance scale/weights

Procedure

1. Measure 20g of a protein substance such as canned tuna, raw ground meat or chopped boiled egg with the shell and put in the bottle. Tear the lettuce leaves into small pieces and put them in the bottle.
2. Use the balance scale to measure 50g sand. Carefully pour the sand into the bottles so that the sand covers the organic substance and lettuce. Do not shake the bottle.
3. Measure 25ml of water. **Slowly** pour the water into the bottle. Try to make the water run down the inside of the bottle instead of pouring the water directly onto the sand.
4. Stretch the opening of the balloon over the opening of the bottle. Seal with masking tape.
5. Carefully move the bottles to a warm place (preferably outside as contents could produce a strong odor). Let the bottle stay in place for several days.
6. Predict what will happen over the next few days.



Name _____ Date _____

**It's a Gas
Conclusion
Student Handout 2
Teacher Key**

1. In your gas formation bottle that you created, what does each ingredient represent?

Water	<u>Ocean Water</u> _____
Sand	<u>Layers of the earth</u> _____
Lettuce	<u>Plant material</u> _____
Tuna, meat or egg	<u>Animal Material</u> _____

2. After a few days, what happened to the ingredients in your gas formation bottle?

Possible answer: The lettuce and protein source began to decay.

3. What physical changes occurred?

Possible answer: The lettuce started to wilt and the protein source started to grow mold. The bottle began to emit a foul odor.

4. What chemical changes occurred?

Possible answer: The solids began to change and produce a gas.

5. How do you know the chemical changes occurred?

Possible answer: The balloon started to inflate and trap the gas.