Layered Lunch

Objective
Students will understand that natural gas deposits are trapped and held by certain types of geologic formations.

Curriculum Focus
Science
Art

Materials
- Slices of bread
- Peanut butter or other thick spread (cream cheese)*
- Jelly*
- Plastic wrap or wax paper
- Plastic knife

Key Vocabulary
Permeable
Impermeable
Source rock

Next Generation Science Correlations
4-ETS1 - 1
4-ETS1.A
5-ETS1 - 1
5-ETS1.A
MS-LS4 - 1
MS-LS4.A
MS-ESS1 - 4
MS-ESS1.C
MS-ETS1 - 4
MS-ETS1.B

Introduction

How do we find natural gas? Try this activity to get an idea of the type of rock formations and characteristics geologists look for when locating natural gas deposits.

As natural gas molecules form, they migrate from shale "source rock" into more porous areas such as sandstone. Porous or permeable layers are much like a sponge with little pockets throughout the rock. The natural gas continues to move to either the earth's surface (where it escapes into the atmosphere) or it is trapped when nonporous or impermeable rock layers block its path.

Procedure

Using bread, peanut butter and jelly, create edible models of rock layers.

1. Spread thick layers of peanut butter then jelly on a slice of bread. Top it with another slice of bread.
2. Make a second sandwich just like the first, or gently cut the sandwich in half.
3. Now put one sandwich (or one half) with the peanut butter layer above the jelly and the other sandwich (or other half) with the jelly on top of the peanut butter.
4. Next spread a thick layer of only jelly on a slice of bread, adding another slice on top.
5. Cover your sandwiches with wax paper or plastic wrap and gently press down on them for about three seconds, representing millions of years of pressure.
6. Cut the sandwiches in half and observe what has happened.

Discussion

1. Did the jelly escape or seep into other layers?

2. What do you think the jelly represents?

3. Which layer do you think represents porous rock?

4. Which layer is the nonporous rock?

5. Did the jelly seep into both slices of bread?

6. What made the difference?

7. What do you predict would happen with a sandwich made with only peanut butter?

8. How might the ingredients you used affect your results?

9. Which sandwich do you predict will taste the best? Check to see if your prediction was correct.

10. Draw the layers of your sandwich and use colored pencils or crayons to distinguish the different layers and write labels for each layer that includes: impermeable, permeable, natural gas, nonporous rock and porous rock.

Answers

The jelly represented natural gas or a fossil fuel. The bread was the porous rock where the jelly or natural gas gets into the little pockets or air spaces. Peanut butter acted like a nonporous rock layer blocking the jelly from seeping into the slice of bread above the peanut butter. The results may be different depending on your ingredients: denser bread – less seepage, creamier peanut butter may be less impermeable or thicker jelly may not fill the little pockets as easily.

*Please ensure no one in your classroom has a food allergy to any food items you may use.

To Know and Do More

Assign students to further investigate how natural gas is trapped in rock formations. Have them draw pictures of a formation and the trapping of oil and natural gas in the earth.

Visit a natural history museum and look for prehistoric life forms and rock formations.

Watch a video on natural gas formation or play a natural gas game at *energysafekids.org/students/*.