

BACKGROUND

Density is an important property in the formation of an oil and gas reservoir. Most reservoir rocks are porous and saturated with groundwater before oil or gas enters the rock. Because groundwater is more dense, oil and gas is able to rise upward through the rock. The oil and gas continues to rise until trapped against an impermeable rock, or rock with spaces too small to move through, which creates a reservoir. These reservoirs are then discovered by geologists and petroleum engineers and researched for production of the energy source.

This activity explores the property of density in a variety of liquids and solids. Discuss with students other liquids or objects they could test.

QUESTION

Do all liquids have the same densities?

MATERIALS

- | | | |
|---|---|--------------------------------------|
| <input type="checkbox"/> 100 mL Graduated cylinder | <input type="checkbox"/> Vegetable oil | <input type="checkbox"/> Wooden bead |
| <input type="checkbox"/> 600 mL Beaker | <input type="checkbox"/> Plastic button | <input type="checkbox"/> Ice cube |
| <input type="checkbox"/> Corn syrup | <input type="checkbox"/> Penny | |
| <input type="checkbox"/> Water, dyed with food coloring | <input type="checkbox"/> Glass marble | |

INSTRUCTIONS

1. Pour 100 mL each of corn syrup, vegetable oil, and water into the beaker.
2. Let the liquids settle for a few minutes. Observe what happens.
3. One at a time, gently drop each object into the container.
4. Observe where the objects settle.

QUESTIONS

1. How would you compare the densities of liquids? _____

2. How would you compare the densities of objects? _____

Understanding Density

EXTENSION

ELEMENT	DENSITY AT 20 °C
Hydrogen	0.00008 g/cm ³
Carbon	2.25 g/cm ³
Oxygen	.00131 g/cm ³
Sodium	0.97 g/cm ³
Chlorine	.00295 g/cm ³
Calcium	1.54 g/cm ³
Zinc	7.14 g/cm ³
Bromine	3.12 g/cm ³
Gold	19.32 g/cm ³

Density is defined as mass per unit volume ($D = m/v$). The density of water is the standard at 1.00 g/cm³. Discuss the densities of the elements in the chart above. Use the formula for density to calculate the following densities:

1000 cm³ of oil with a mass of 881 g: _____

100 cm³ of oil with a mass of 881 g: _____

10 cm³ of copper with a mass of 89.3 g: _____

200 cm³ of nickel with a mass of 1780 g: _____