

STEAM ... Homemade Lava

Chemical Engineering



Name _____

Date _____

MS-ETS1-1: Criteria & Constraints

MS-ETS1-2: Design Schematics

MS-ETS1-3: Test & Analyze Data

MS-ETS1-4: Revise Model & Test

Content

MS-PS1-1 Atomic and Molecular Structure

MS-PS1-2 Structure Properties of Matter

References (video clip)

TED-Ed Why Don't Oil and Water Mix ?

Oil and water don't mix because of how their molecules are constructed. Water is what is known as a **polar molecule**. A water molecule is shaped like a V, with an oxygen atom at the bottom point of the V and a hydrogen atom on each of the two top ends. However, there is unequal sharing of electrons between the hydrogen and oxygen atoms. This means that the bottom of the molecule has a negative electrical charge, while the top carries a positive charge.

Vegetable oil, on the other hand, is a **nonpolar molecule** made of long chains of hydrocarbons—strings of carbon atoms bonded to hydrogen atoms. Unlike the water molecule, there is equal sharing of electrons between the carbon and hydrogen atoms. This means that the electrical charges of the atoms are not separated, so the molecules don't have opposite positive and negative ends.
(Spangler)

Challenge:

Can you create a create a homemade lava lamp using the properties of density and chemical changes.

MATERIALS:

- Test Tubes
- Warm Water
- Vegetable Oil
- Food Coloring/Colortablets(Fizzers)• AlkaSeltzer

DIRECTIONS

1. Pour 3/4 oil in each test tube
2. Add water to the remaining amount(leave a little space at top).
3. Add food coloring to the test tube.
4. Break an Alka Seltzer into smaller pieces.
5. Add one section of Alka Seltzer to test tube. Observe.
6. When the bubbles stop happening add another chunk to the test tube.
7. Using a light source place, place a light behind the test tube. This should create a luminous light effect.

Why do oil and water not mix? (Use the paragraph above to justify your answer).

What does it mean when the molecule is a polar molecule? What does it mean when the molecule is a nonpolar molecule?

What type of reaction happens when the Alka Seltzer mixes with water?

What evidence did you observe that justifies a chemical reaction?