Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Lesson 4: How Does the Type of Liquid Affect Rocket Flight?**

The type of liquid fuel used makes a big difference in the physics of a rocket launch. Liquids have many different properties, some that can affect how rockets fly. Density is one important property of a fluid. Fill up your tank and start this investigation of liquids and rockets.

Here are some definitions to help you in your investigation.

Fluid - something that flows freely; a liquid or a gas

Property - a characteristic of something used to identify

Quantity - the amount of something

Mass - the amount of matter in something

Volume - the amount of space taken up by something

Density - a measure of the compactness of something

Viscosity - a measure of how easily a fluid flows

**Doing the Science**

1. Start the Water Rockets Simulation by clicking on the “Simulation” tab.

2. Make the following selections:

* Angle: 30°
* Fluid Volume: 200 mL
* Pumps: 4
* Fluid Type: Glycerin
* Air: Off
* Wind: Off

3. Click on the “Launch” button.

4. Record the flight distance in meters in Table 1.

5. Click on the “RESET” button.

6. Repeat steps 2-5 changing *only* the Fluid Type to Water, and then Methanol so that you have completely filled out Table 1.

**Table 1.**

|  |  |
| --- | --- |
| **Fluid Type** | **Flight Distance (m)** |
| Glycerin |  |
| Water |  |
| Methanol |  |

**Do You Understand?**

1. What liquid type produced the longest distance traveled along the ground by the rocket?

2. Use table 2 to describe the relationship between liquids’ viscosity and the flight distance along the ground by the rocket?

**Table 1.**

|  |  |
| --- | --- |
| **Fluid Type** | **Liquid Viscosity (m)** |
| Glycerin |  |
| Water |  |
| Methanol |  |

3. Based on the liquids’ viscosities, explain why the rocket flew the longest distance using this type of liquid.

4. Use table 3 to describe the relationship between the liquids’ density and the flight distance along the ground by the rocket?

**Table 1.**

|  |  |
| --- | --- |
| **Fluid Type** | **Liquid Density (m)** |
| Glycerin |  |
| Water |  |
| Methanol |  |

5. Based on the liquids’ densities, explain why the rocket flew the longest distance using this type of liquid.