**Rocket Lab Developer**

**1st Background Information:** Read the “Combustion Reactions and Limiting Reactants” Article and Take NOTES about the combustion of RUBBING ALCOHOL specifically as well as information about combustion in general.

NOTES:

**Balanced Equation:**

What is the **optimal ratio** of **2-propanol (rubbing alcohol): Oxygen** according to the equation above?

Which **reactant** is in a higher demand for the combustion of rubbing alcohol?

**Claim:**

**Evidence:** (Use the mole ratio you solved)

**2nd Calculations:** **5 mL of isopropyl alcohol is an acceptable amount of “rocket” fuel. You will be determining the OPTIMAL amount of rubbing alcohol needed to propel your bottle the greatest distance.**

1. **Calculate the mass** of 5 mL of isopropyl alcohol if the density of isopropyl is 0.786 g/mL.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ g C3H7OH

1. **Calculate the number of moles** of isopropyl this would represent.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ moles C3H7OH

1. Using the mole ratio from the balanced equation, calculate the **molar amount of Oxygen** required for “complete combustion”.
2. A 2 Liter bottle will be used as your “rocket”. Assuming the bottle is filled with air and the percent composition of Oxygen in air is 20.95%, **how many Liters of oxygen** is present in the bottle? **Convert that to moles**.
3. Compare the **mole amount of Oxygen that is needed versus the mole amount of Oxygen that is present**. What do these values tell you about the combustion of rubbing alcohol in the bottle?

**Claim:**

**Evidence:**

**3rd Predictions:** You will choose a **lower amount of alcohol and greater amount of alcohol** (not to exceed 10 mL) that you will be testing to determine the effect on the distance your bottle travels. This will help you determine the OPTIMAL amount of alcohol needed to cause the bottle to travel the farthest distance.

**Problem/Question:** Does alcohol amount have a direct correlation with the distance the “rocket” travels? (Underline and label the Independent and Dependent Variables from the question posed.)

Why could more fuel be beneficial?

Why could less fuel be beneficial?

Form a **hypothesis:** If \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Your “because” could be based on:

* Mole ratios and Limiting Reactants
* Stoichiometric calculations of potential products
* Knowledge and expertise about fuels and combustion

**Hypothesis:**

**If more alcohol is used then the bottle will travel farther because calculations # applied).**

**If less alcohol is used then the bottle will travel farther because (mole ratio #).**

**If the control amount of alcohol, 5 mL, is used then the bottle will travel farther because (mole ratio # or calculations # applied).**