Title of scientific report

Photo of experiment

Author details

* Student name
* Subject/year level
* Teachers name

Date investigation was completed

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# Introduction

## Investigation Aim

## Hypothesis

## Background Information

### Properties of alcohols and hydrocarbons

Create a table that lists the following properties of alcohols & hydrocarbons (methanol, ethanol, propanol, butanol, unleaded, diesel)

* Chemical formula
* Molecular structure
* Density
* Boiling temperature

### Alcohol Combustion Reactions

Describe the common combustion reaction for alcohols and provide balanced chemical equations for each alcohol type (methanol, ethanol, propanol, butanol).

### Alcohols and Hydrocarbons – Similarities & Differences in their chemical structure and composition

Compare and contrast the similarities and differences in the chemical structure and composition between alcohols and hydrocarbons.

### Importance of understanding the potential heat energy of fuels

Explain why it is important to understand the amount of energy produced by each fuel (methanol, ethanol, propanol, butanol, unleaded, diesel) in relation to where each fuel type is used.

# Materials & Method

## Variables

### Independent Variable

### Dependent Variable

### Control Variables

## Material Setup

Figure 1 - Material Setup title (insert image above)

## Safety Considerations

Describe the safe and appropriate laboratory behaviour required for this experiment.

Discuss what the implications could be if these measures are not adhered to.

# Results

## Table of Observations

Table 1 –title (observations)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Fuel** | Initial Temp | Final Temp | **Temp Change** | Initial mass | Final mass | **Mass used** | **Time Taken** |
| **Methanol** | | | | | | | |
| Trial 1 |  |  |  |  |  |  |  |
| Trial 2 |  |  |  |  |  |  |  |
| Trial 3 |  |  |  |  |  |  |  |
| Average |  |  |  |  |  |  |  |
| **Ethanol** | | | | | | | |
| Trial 1 |  |  |  |  |  |  |  |
| Trial 2 |  |  |  |  |  |  |  |
| Trial 3 |  |  |  |  |  |  |  |
| Average |  |  |  |  |  |  |  |
| **Propanol** | | | | | | | |
| Trial 1 |  |  |  |  |  |  |  |
| Trial 2 |  |  |  |  |  |  |  |
| Trial 3 |  |  |  |  |  |  |  |
| Average |  |  |  |  |  |  |  |
| **Butanol** | | | | | | | |
| Trial 1 |  |  |  |  |  |  |  |
| Trial 2 |  |  |  |  |  |  |  |
| Trial 3 |  |  |  |  |  |  |  |
| Average |  |  |  |  |  |  |  |

## Calculations

Include what calculations you have used

## Table of Averages

Table - title (averages)

## Graph

Figure 2 - Graph of Results title (insert figure above)

# Discussion

## Introduction paragraph

Identify what the investigation was comparing and describe the results, ranking the fuels in terms of energy produced, justifying your answer with scientific concepts.

## Scientific Explanation of Results

### Energy Loss in Chemical Reactions

Describe the process where energy is lost in a chemical reaction and how heat can be produced by combustion to cause the temperature of the water to increase.

### Effect of Molecular Size on the Amount of Energy Produced in Combustion Reactions

Explain the effect that the size of the molecule has on the amount of energy produced in a combustion reaction.

### Similarities and Difference between Diesel and Unleaded Fuels

Identify the similarities and differences between diesel and unleaded fuels. Use this information to explain why trucks and 4WD vehicles primarily use diesel, while family cars tend to use unleaded fuels.

### Fuel Type and the Environment

Discuss which fuel type is better for the environment, in terms of the amount of CO2 that is produced.

# Conclusion

# References