

# PRACTICAL INVESTIGATION



## Making Biofuel



### What is Ethanol and how is it made?

Ethanol is a flammable and colourless chemical which can be mixed with petrol to provide an alternative fuel source. It is made from the fermentation of a range of plants including sugar cane, wheat, corn, sorghum and barley.

### Most ethanol is produced using a four-step process:

1. The crops or plants are ground up for easier processing;
2. Sugar is dissolved from the ground up material, or an added enzyme converts the starch or cellulose into sugar;
3. Microbes (yeast) feed on the sugar, producing ethanol and carbon dioxide as by products
4. The ethanol is separated and purified.

To learn more and watch a short video visit: <http://pbskids.org/dragonflytv/show/windtunnel.html>

### PRACTICAL INVESTIGATION – HOW TO FERMENT DIFFERENT TYPES OF SUGAR

This experiment investigates the fermentation rates of different sources of sugar: rolled oats, corn starch, and sucrose.

### MATERIALS & EQUIPMENT

- 20g table sugar (sucrose)
- 20g rolled oats
- 20g corn starch flour
- 7g sachet of yeast
- 40ml warm water
- Electronic balance/measuring cylinder
- Conical flask (make sure the neck is small enough for the balloon to stretch over it)
- Balloon

### PROCEDURE

1. Place the yeast in the conical flask.
2. Add the sugar source and then the warm water.
3. Swirl the flask to mix the contents (make sure they are thoroughly mixed).
4. Cover the top of the flask tightly with a balloon.
5. Leave the flasks for a few days and observe what happens.

### RESULTS

Which balloon inflates faster?

Which sugar source is more efficient at producing ethanol fuel?

## **ADDITIONAL TASKS**

1. Students/Teacher can distil the ethanol.
2. Use the internet to find other sources of sugar that could be tested for their fermentation efficiency.