

## WHICH BIOMASS IS BEST?

NAME \_\_\_\_\_



In order to keep up with projected energy needs while remaining environmentally responsible, particularly in the transportation sector, we need sustainable fuel options. Biofuels are believed to be the most practical commercial solution in reducing carbon emissions in the transportation sector.

A biofuel is a renewable form of fuel that is created from biomass, recently living organisms (like plants) or their metabolic by-products (like manure from cows). Today's most widely used transportation biofuels are ethanol and biodiesel. Ethanol is produced from a process of basic fermentation of carbohydrates by yeast cells. Fermentation is an energy-yielding process that cells carry out in the absence of oxygen. After fermentation, the ethanol is distilled from the mix and blended with gasoline to create a mixture that can be used in your car!

In this experiment, you will use a basic fermentation process to test the efficiency of several different types of biomass.

### YOU WILL NEED:

- 2-3 different types of biomass, such as corn kernels, soybeans, sugar, fruit, potatoes, paper, cooking oil, etc.
- 2-3 20 oz. soda bottles
- Yeast, 2 grams per bottle
- Balloons, one per bottle
- Calculator
- Measuring tape
- Scale
- Grinding instrument (such as a mortar and pestle)

### Step One:

1. With group members, select 2-3 different types of biomass to test.
2. Label one bottle for each of the different biomass types. For example, if you are using corn kernels, write "corn kernels" on one of your bottles.
3. Measure and place 2 grams of yeast into each bottle.
4. For each type of biomass, use your grinding instrument and a scale to measure 15 grams.
5. Place the 15 grams of biomass in each respective bottle.
6. Add warm water into each balloon until it starts to expand slightly. Place the balloon on top of the soda bottle so that the warm water goes into the soda bottle and the balloon forms a seal on top. Repeat for each bottle.

(cont.)

