

# Fermentation factories

<b>Focus questions</b>	What is fermentation? How do yeast consume sugars to make ethanol and carbon dioxide?
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## Phenomenon

More cars are on the road than ever before, so we need to be able to produce high quality ethanol quickly and efficiently to provide fuel for the increase of active automobiles.

Write down the materials in each bag from the demonstration. What is the function of each of the reactants?

Bag ingredients				Reaction	
<b>A</b>	yeast	water			
<b>B</b>	yeast	water			
<b>C</b>	yeast	water			
<b>D</b>	yeast	water			

Create the greatest volume of ethanol (measured by the volume of CO<sub>2</sub> generated) in the fastest time possible. Follow these guidelines:

- Work together in groups of 2–3 students.
- Plan an (several) experiment(s) to produce ethanol in a small bag environment.
- You can only use the materials/amounts provided by your teacher.
- You have 1 or more class period(s) to experiment on your initial design(s) based on your plan.
- Data must be collected and analyzed to provide evidence for your conclusion.
- Report back to the class and provide future experimental designs as a result of your current data/conclusion.

Write your experimental ideas below. Be sure to include your reasons for your investigative choices.

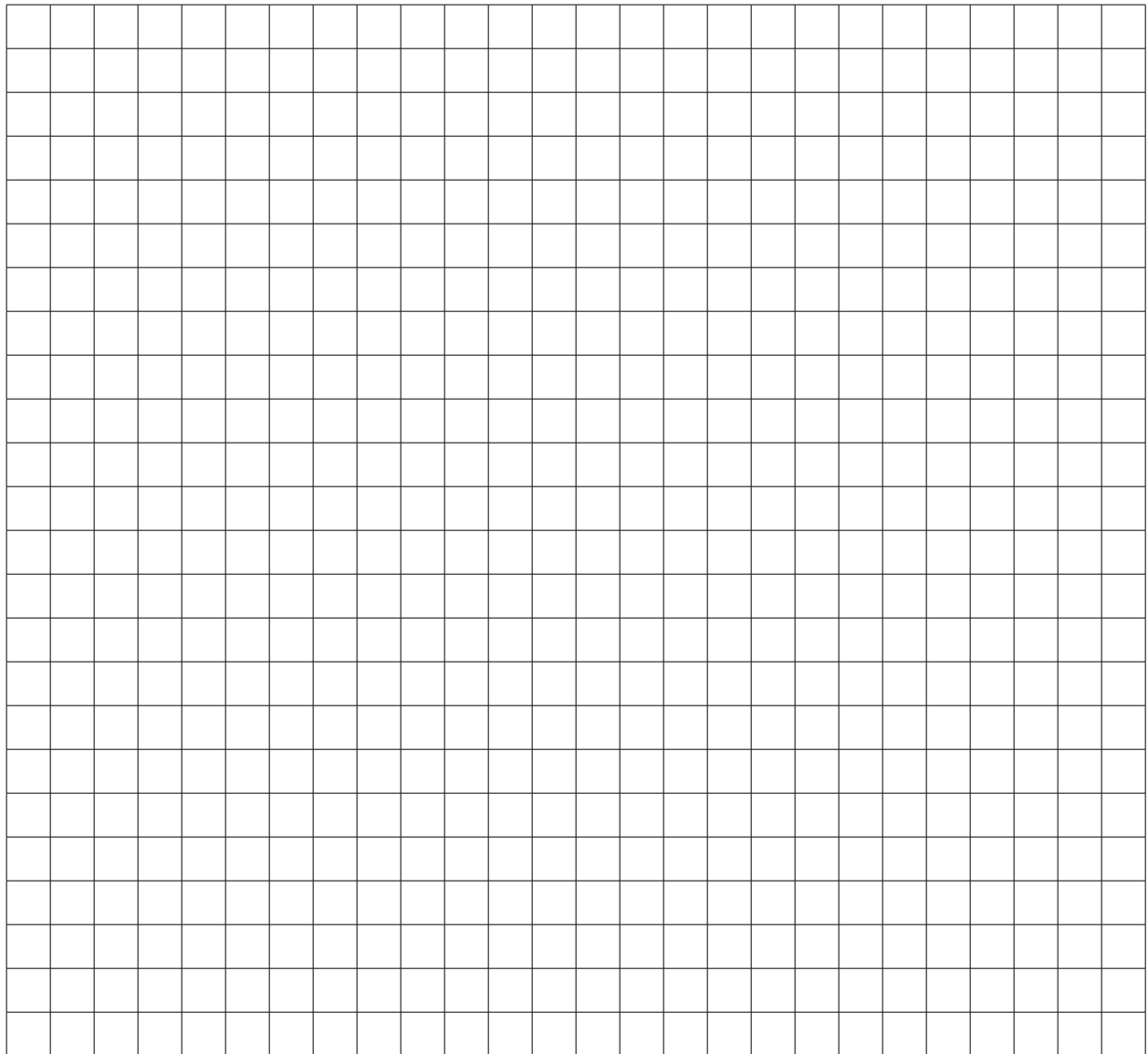
What do you think will happen to each experimental bag and why?

Bag	Reactants in fermentation bag	Prediction/why
Bag 1		
Bag 2		
Bag 3		

How will your group measure the carbon dioxide that is generated? Write your plan to measure CO<sub>2</sub> below.

Collect data from the group's experimental designs below. Include charts here to show your results.

Graph your results.



**Model:** Draw and explain your group's model of fermentation below. Be sure to demonstrate the relationships between the components of the fermentation ecosystem that your group utilized in their design.

## Rubric for self-assessment

Skill	Yes	No	Unsure
I developed a model that shows fermentation.			
I can explain how my model demonstrates the relationships between components of the fermentation factory.			
I developed a model that generated data to enable a prediction of outcomes from components in a fermentation factory.			