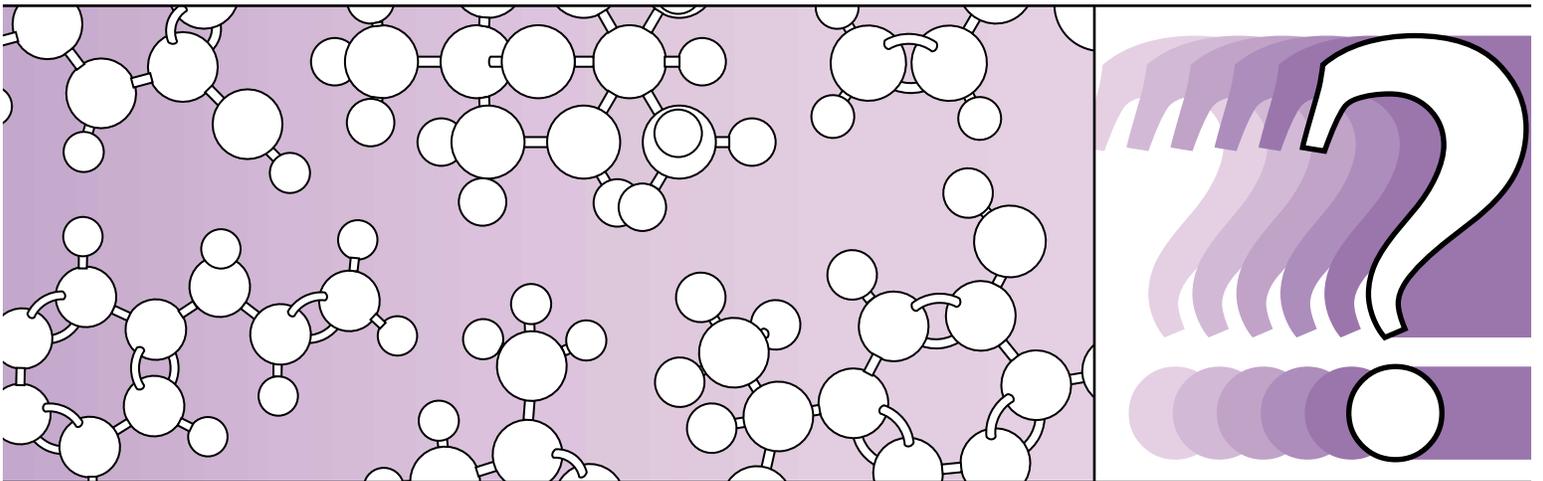


*The Pfizer Foundation Biochemistry*

# Discovery Lab

## What molecules make the holes in bread?



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**Have you ever noticed the holes in bread?**

**Look at the bread in the box and find the holes in it.**

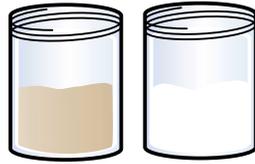
**Find out what molecules  
make these holes.**

Molecules are tiny  
particles that make  
up everything  
around us.

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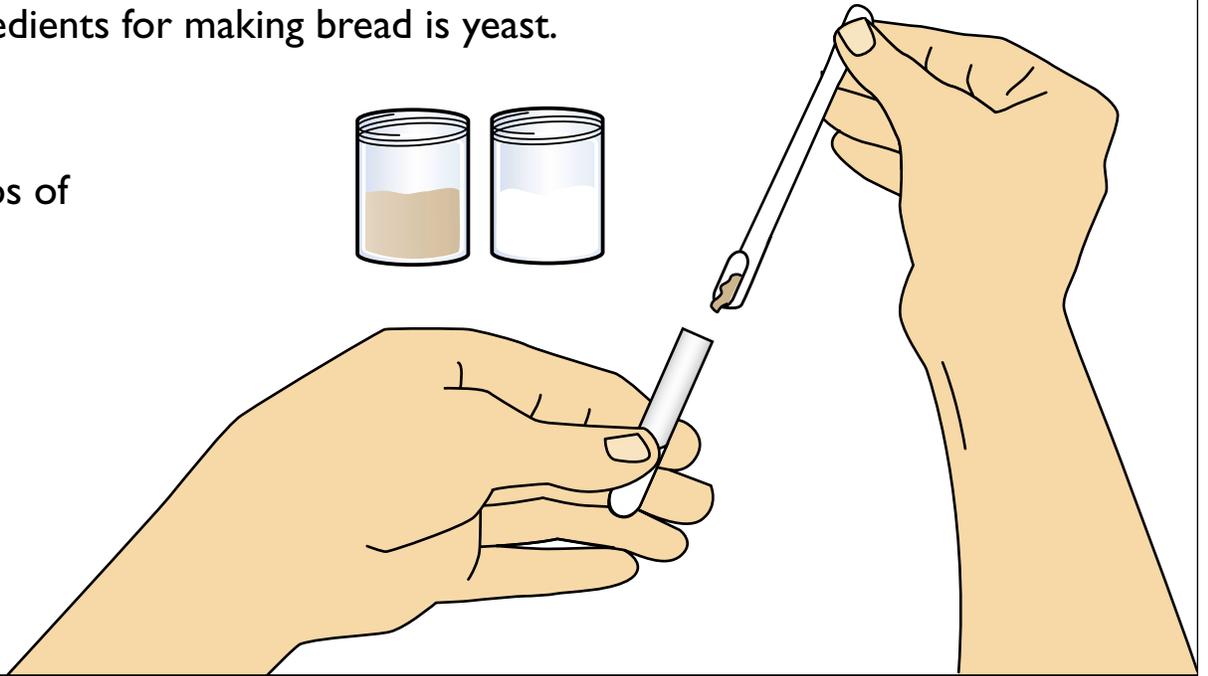
One of the ingredients for making bread is yeast.

Add three scoops of yeast to a tube.



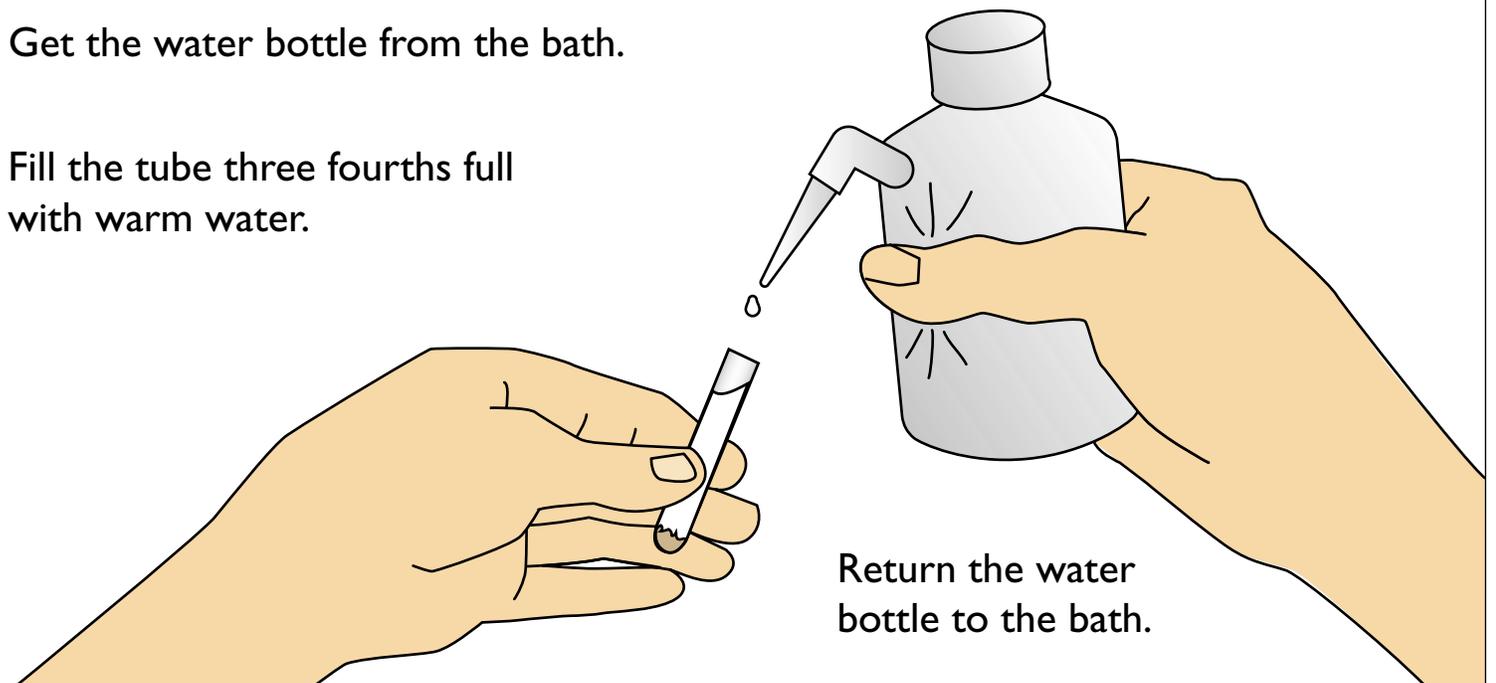
Then add three scoops of sugar.

Sugar is food for the yeast.



Get the water bottle from the bath.

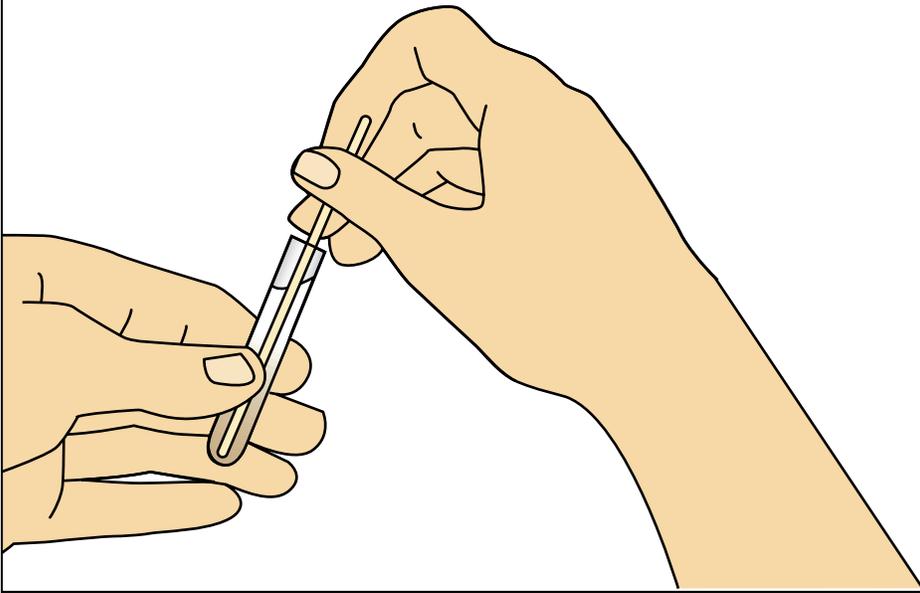
Fill the tube three fourths full with warm water.



Return the water bottle to the bath.

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Use a stick to stir the yeast and sugar into the water.

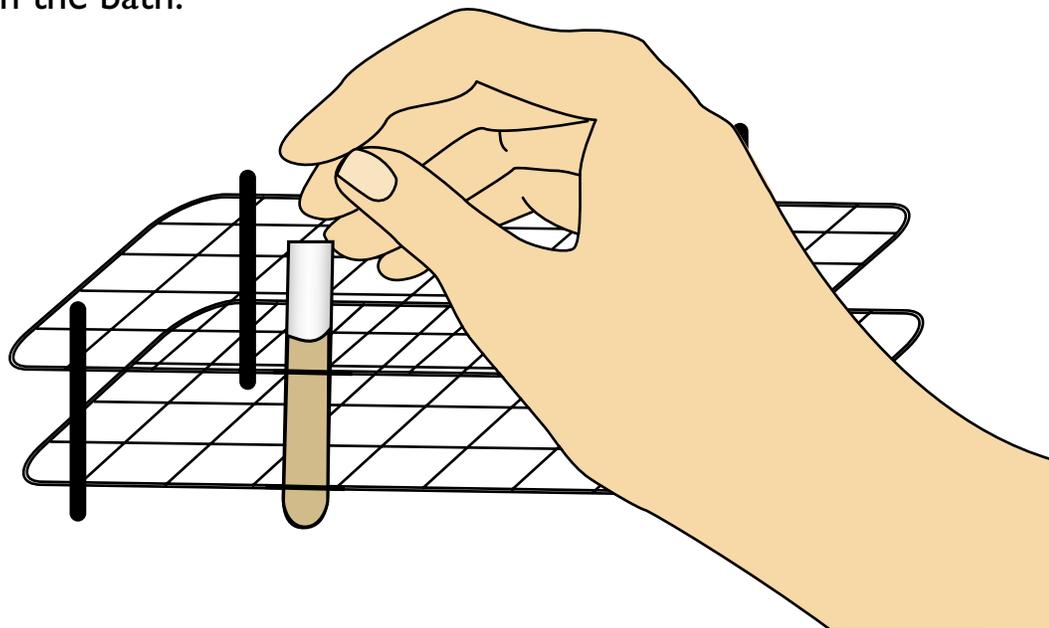


Keep stirring until the water is the same color as the yeast.

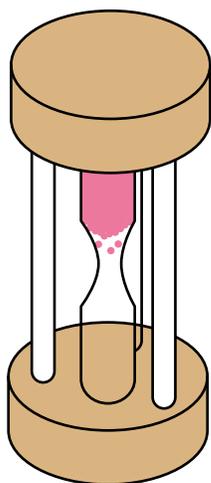
Throw the stick in the trash can.



Put the tube in the rack in the bath.



Start the timer.

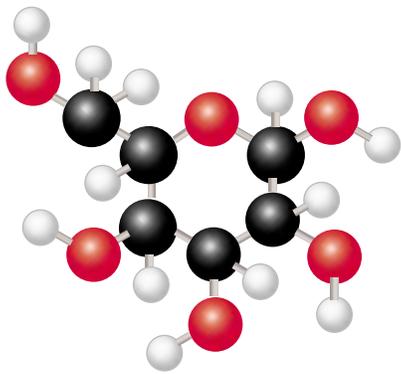


While you wait for the timer, read the next page to find out what is going on in your tube.

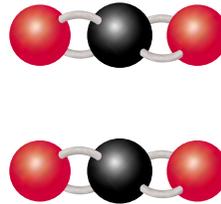
## What's going on in the tube?

Yeast is a living thing that feeds on the sugar molecules you put in the tube.

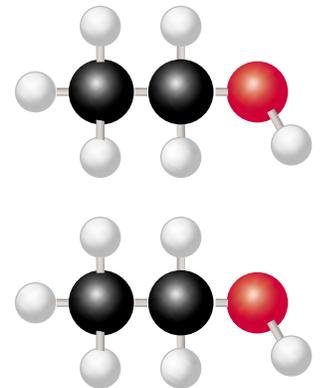
It breaks the sugar molecules apart into carbon dioxide gas molecules and alcohol molecules:



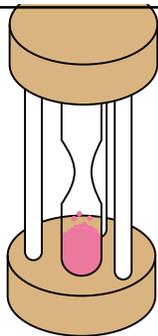
sugar molecule



carbon dioxide gas molecules

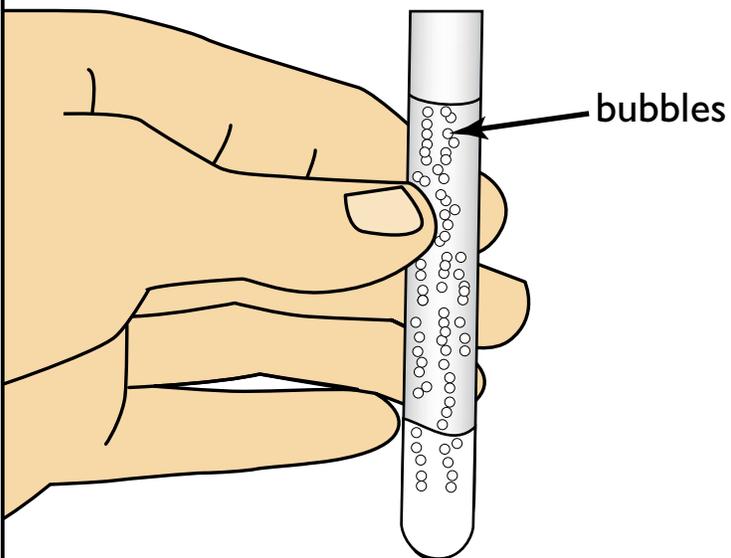
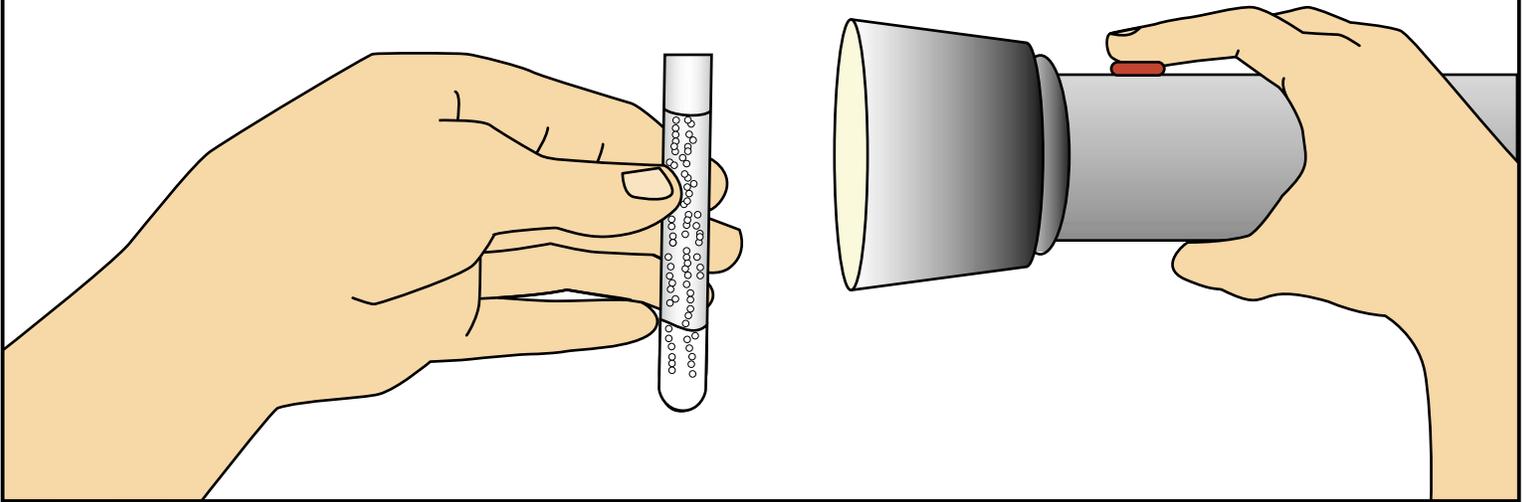


alcohol molecules



When the timer is done,  
turn to the next page.

When the timer is done, pick up your tube and shine the flashlight on it from the side.



Look for tiny bubbles streaming up the side of the tube.

Look carefully — the bubbles are very small.

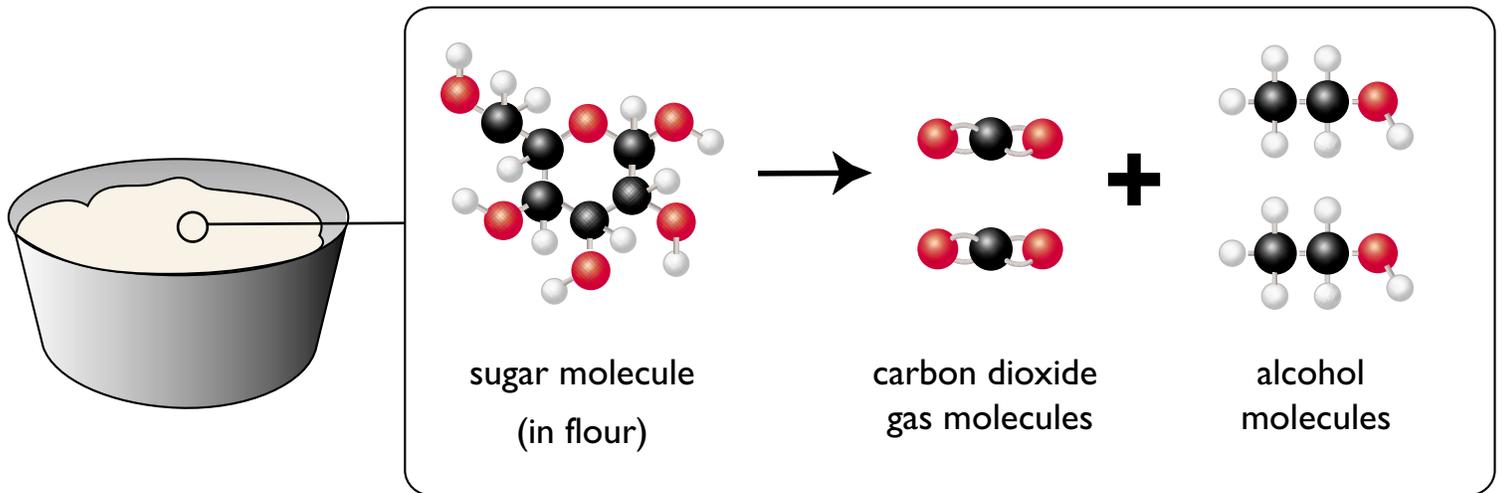
These are bubbles of carbon dioxide gas, made by the yeast as they eat the sugar.

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## What about the holes in bread?

The chemical reaction in your tube also happens in bread.

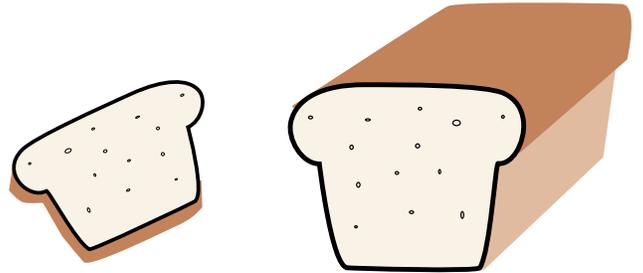
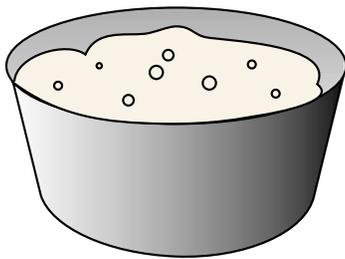
Yeast added to bread dough breaks apart the sugar molecules in flour:



The carbon dioxide gas molecules make bubbles, like they did in your tube.

The carbon dioxide bubbles are trapped in the bread dough ...

... and leave holes when the bread is baked.



The Biochemistry Discovery Lab project has been funded by generous support from:

**The National Science Foundation:** The material is based upon work supported buy the National Science Foundation Grant No. 9814954.

Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation (NSF).

**The Pfizer Foundation and the Camille and Henry Dreyfus Foundation, Inc.**