

September 5 - Bacteria

Bacteria are small microscopic organisms that can be found essentially everywhere in the world! Now don't be alarmed, not all bacteria are bad! Our body contains more bacterial cells than it does human cells! These bacteria help our body perform a variety of functions, including break down of food and absorption of nutrients. Our skin serves as an important barrier between bacterial cells and our bodies, sometimes when you cut your finger it gets infected with bacteria, this may turn your cut red and cause it to be more painful. Today we are going to perform an experiment that demonstrates how prevalent bacteria can be in our environment.

***Always remember to ask an adult before doing any science experiment.**

Materials:

- 3 small clean jars with lids
- Milk
- Soil

Procedure:

1. Add milk to each jar so it is about one third full,
2. To one jar had a spoonful of soil,
3. Close all the lids and place one jar of milk in the fridge, and then leave one jar of milk and one jar of milk and soil on the counter.
4. Let the jars sit for a few days without disturbing.
5. After a few days open each jar and notice if there is any change in smell, whether the milk has turned sour, and the also note the appearance of the milk. **DO NOT TASTE THE MILK.** What did you notice?

Explanation:

You should have noticed that the milk in the fridge was normal; it did not look nor smell sour. The milk on the counter without the soil would be slightly sour smelling while the milk with the soil added would smell very sour and is not very appealing. So what's happening? The milk was pasteurized when packaged, this process killed most of the bacteria in the milk, when we added soil we were essentially adding bacteria. As the milk sat on the counter, the warm temperatures, coupled with all the milk for nutrients, allowed the bacteria to grow and multiply. The bacteria continued to multiply using nutrients from the milk all the while producing waste by-products; this led to the milk going bad. You essentially set up a culture of bacteria in your own home, hooray for bacteria! Now if bacteria sound gross, consider these foods which make use of bacteria in their production; cheese, yoghurt, dill pickles, sourdough bread, salami, soy sauce and even some chocolates! Yum!

Jeff Unrau
Regional Executive Director
Praxis the Science and Technology Hotline

September 12 – Candles and Oxygen

This weeks experiment involves oxygen...technically all of our experiments involve oxygen unless you are holding your breath while doing it! This experiment however is an excellent demonstration of how oxygen is necessary to sustain the burning of a candle. We are going to take it one step further in that we are also going to do some scientific analysis of our results!

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Materials:

- Several glass jars of different sizes, you can also use drinking glasses (make sure they are not plastic!),
- Several candles; tea lights or birthday candles work well,
- A clock with a second hand, watch, or stop watch,
- Paper and pencil for recording data,
- An adult to help you.

Procedure:

1. Label all your jars with a number (1,2,3...) so you can accurately record your data. If you like you can even measure the approximate volume of your jar, however this is not entirely necessary (volume is equal to 3.14 multiplied by the radius of the jar (squared) multiplied by the height of the jar).
2. Light your candle, place the jar on top the candle, and begin timing. Once the candle goes out stop timing.
3. Repeat with each size of jar; be sure to record the information on your piece of paper. Then repeat 2 more times with each jar and record the time. Between samples you must remove all the old air from the jar, do this by shaking the jar, moving it quickly through the air, blow in it, etc. Why are we doing this?
4. Average the time the candle burned for each jar, was each trial of the same jar similar?

Explanation:

I think everyone knew what was going to happen before even doing the experiment...of course the candle was going to go out! The air inside the jar originally contained around 20% oxygen – oxygen which is necessary for the flame to burn. That oxygen was used up inside the jar and was replaced with carbon dioxide and water vapour (you may have seen condensation on the jar if you looked carefully) this is why we had to make sure new air was inside the jar before trying the experiment again. You also should have noticed that the bigger the jar, the more oxygen, and the longer the candle burned. You repeated the experiment several times with each jar, these times should have been very similar. If you measured the volumes you can graph the average time the candle burned (vertical axis) and the size of the jar (horizontal axis) this would give you a straight line relationship which would allow you to estimate how long a candle would burn in any size of jar! Fun!

Jeff Unrau

Regional Executive Director

Praxis the Science and Technology Hotline

September 19 – Bernoulli's Principle

I am not sure if anyone remembers my first article, so to refresh your memory it involved a ping pong ball, a blow dryer, and a little phenomenon known as Bernoulli's Principle. Today we are going to again demonstrate Bernoulli's Principle, this time using only a ping pong ball and a funnel.

Always remember to ask an adult before doing any science experiment.

Materials:

- Ping pong ball,
- Long stem funnel.

Procedure:

1. Place the ping pong ball on a flat surface and proceed to try and pick it up using the funnel. You can not touch the ping pong ball with your hands nor can you try to suck the ping pong ball up through the funnel.
2. Figure it out yet? Try placing the funnel overtop the ping pong ball so the wide end is flat on the surface. Proceed to blow through the stem and slowly raise the funnel at the same time. The ping pong ball will stay in the funnel until you stop blowing!
3. Now pick the funnel up from the stem and hold vertically, place the ping pong ball inside the funnel and try to blow the ping pong ball out the top. Can you do it? I bet you can't! It's impossible, the more you blow the more the ping pong ball wants to stay in the funnel.

Explanation:

According to Bernoulli's Principle, the faster the air flows, the lower the pressure. As we blow through the thin stem of the funnel the air moves very quickly so the pressure decreases.. Once the air exits the stem of the funnel it slows down and the air pressure increases. This is what holds the ping pong ball in place when we were picking it up with the funnel. The ping pong ball is held near the opening of the stem as this is an area of lower pressure, the high pressure regions outside this area work to hold the ping pong ball in place. The same reasoning is true when we were trying to blow the ping pong ball out of the funnel! This experiment was adapted from the book Invitations to Science Inquiry by Tik L. Liem.

Upcoming Events

Praxis will once again be offering its' Robotics Club for children 8-12 years of age. Each club runs on Wednesday evenings from 6:00 pm – 8:00 pm and is five weeks in duration. A parent must accompany the child to each session. We are currently taking registrations, call 403-527-5365 or visit our website www.praxismh.ca for more information.

Jeff Unrau
Regional Executive Director
Praxis the Science and Technology Hotline

September 26 – Pop bottle Pressure

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Always remember to ask an adult before doing any science experiment.

Materials:

- Ping pong ball,
- Long stem funnel.

Procedure:

4. Place the ping pong ball on a flat surface and proceed to try and pick it up using the funnel. You can not touch the ping pong ball with your hands nor can you try to suck the ping pong ball up through the funnel.
5. Figure it out yet? Try placing the funnel overtop the ping pong ball so the wide end is flat on the surface. Proceed to blow through the stem and slowly raise the funnel at the same time. The ping pong ball will stay in the funnel until you stop blowing!
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