April 3

Hello everyone! First of all let me introduce myself. My name is Alannah Maurer and I'm the new Regional Executive Director of Praxis. I was born and raised in Medicine Hat. I spent a couple of years at the Medicine Hat College where I had the opportunity to work with lots of kids running sport camps over the summer. I then attended the University of Calgary where I completed a Bachelor of Kinesiology degree. Just in case some don't know what kinesiology involves, the word means the science of anatomy, physiology and mechanics as they relate to human movement. That means that I spent half my time in science class and the other half of my time playing sports! I stayed at the U of C to complete my PhD in Nutrition, Metabolism and Genetics. I love science and I love Medicine Hat so I'm excited to be here in this position with Praxis!

Let's try some fun experiments with slime!

***Remember to ask an adult before doing these experiments.**

Materials

Cornstarch
Measuring cup
Small mixing bowl
Stirrer
Warm water

Procedure

Add ½ cup of cornstarch into the mixing bowl
Add ¼ cup of warm water to the cornstarch
Keep stirring until the slime is smooth (this may take a little while!)

Experiments with the slime

Watch what the slime does as you:

- Poke the slime with your finger – try poking it quickly and slowly
- Run your finger through the slime – try doing this quickly and slowly
- Squeeze a handful of the slime
- Roll the slime between your hands
- Carefully swirl the slime in the bowl – do this slowly and quickly
- Set something small on top of the slime

Explanation

Did you notice that sometimes the slime was a runny liquid, but sometimes it seemed like a solid! How did different movements change the slime? If the movement was quick or hard enough, the slime acts like a solid. If the movement was slow or gentle, the slime stayed in a liquid form.

This is called a Non-Newtonian Fluid, which is a liquid that gets more viscous (thick and sticky) when it is squeezed or stirred, even to the point that it may act like a solid. A Non-Newtonian Fluid that you might have seen on TV or in a movie is quicksand! Now you can think about the best way to get out of quicksand (though I don't think many of us will ever come across any quicksand!)

Alannah Maurer
Regional Executive Director
Praxis – The Science & Technology Hotline

April 10 - Mixing Oil & Water

All right … I know this experiment has been done before, but I thought it might be interesting to play around with it a little more and for each of you to add your own contributions. Start with the basic experiment and then you can come up with your own ideas or variations.
This test is a really great, yet simple way for everyone to become a scientist!
***Remember to ask an adult before doing these experiments.**

Materials

Small plastic pop bottle (500 mL)

Water (approximately ½ cup)

Food colouring

2 tablespoons of cooking oil

Dish washing liquid

Procedure

1. Add 1 or 2 drops of food colouring to the water
2. Pour about 2 tbsp of the coloured water along with the 2 tbsp of cooking oil into the bottle
3. Screw the lid back on tight and shake the bottle as hard as you can
4. Put the bottle back down, wait for approximately 1 minute, and have a look – it may have seemed as though the liquids were mixing together but the oil will float back to the top

Explanation

While water often mixes with other liquids to form a solution, water will not mix with oil. Water molecules are strongly attracted to each other. This is also true of oil molecules. Since they are each more attracted to their own molecules, they don't mix together. Oil and water separate, and the oil floats above the water because it has a lower density.

Is it ever possible to make oil and water mix?

Let's try adding some dish washing liquid or detergent. Add 1 or 2 drops to the bottle.

Detergent is attracted to both water and oil, helping them all join together and form something called an emulsion. An emulsion is a mixture of two or more liquids that normally would not mix together. This is why dish washing liquid takes the oil and grime off the plates and into the water.

April 17 - Oil and Ice

Last week we tried an experiment with oil and water. This week we're going to see what happens when oil comes into contact with water when it's in its solid form of ice.

***Remember to ask an adult before doing these experiments.**

Materials

Small glass
Vegetable oil
Ice cube

Procedure

Fill the glass almost full of oil.
Place the glass of oil on a flat surface and then very gently add an ice cube to the glass (the ice should float – if it does not, try using a different kind of oil)

Results

Oil floats on top of water and ice floats on top of oil.
What happens when the ice begins to melt?
Watch the ice carefully for a few minutes.
As the ice begins to melt, you should see a drop of water hanging from the bottom of the ice cube. As the drop grows, the ice cube will float lower, as it is being weighted down by the water. Finally, the drop gets large enough to pull free of the ice and it slowly sinks.

Explanation

We talked a little about water last week and know it is a strange chemical. Most liquids get smaller when they freeze, which means the solid form is denser. When water freezes, it gets larger. It still weighs the same, but it takes up more space, which means it is less dense. That is why ice floats both in water and in oil. As the ice melts, the water takes up less space, becoming denser, and the denser drops of water sink to the bottom of the glass.

Additional Experiments

After all of the ice has melted, try putting the glass of oil and water in the freezer.
Wait for 2 or 3 hours (depending on how cold your freezer is) and take the glass out.
What happened? Is the lump of ice at the bottom?
As the water began to freeze, the surface tension of the water was strong enough to keep the ice from rising up through the oil. Soon, it froze to the side of the glass and then was firmly trapped at the bottom.
Now allow the glass to warm slightly. **Caution**: warm the glass slowly so it doesn't crack. Did the ice to come free and float to the top? Now we're back at the beginning of the experiment!

Alannah Maurer, PhD
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April 24 - Hard Water

The past few experiments have all involved water. And here's one more!
We all use water in a variety of different ways every day. So it's not surprising that there is no end to what we can learn about water. Here are a couple of questions for you.
What is "hard" water? How is it different than "soft" water?
All natural water contains some dissolved solutes (a solute is just a substance dissolved in a solution). The solutes found in natural water are minerals.
Today we'll do an experiment that will demonstrate what "hard" water is.

***Remember to ask an adult before doing these experiments.**

Materials

Distilled water (or reverse osmosis – non-carbonated bottled water)
Epsom salt
Dishwashing liquid
2 small jars or containers with a lid
Spoon

Procedure

1. Prepare your control jar. This jar will only contain ¼ cup of distilled water and has no added minerals.
2. Add 1 drop of dishwashing liquid to the jar.
3. Secure the lid tightly on the container.
4. Shake the jar vigorously for approximately 30 seconds.
5. Allow the jar to stand for 15 seconds.
6. Describe what the suds look like – how high are they in the jar.
7. Now prepare your hard water sample by combining ¼ cup of water and 2 teaspoons of Epsom salt in your container. Stir well.
8. Add 1 drop of dishwashing liquid to the jar.
9. Secure the lid tightly on the container.
10. Shake the jar vigorously for approximately 30 seconds.
11. Allow the jar to stand for 15 seconds.
12. Describe what the suds look like – does the hard water sample look different?

Results

The height of the suds in the jar with the hard water should be quite low when compared to the control jar.

Explanation

Hard water is water that contains minerals such as calcium (Ca^{2+}) or magnesium (Mg^{2+}). Soft water usually only contains sodium (Na^{+}). The minerals found in hard water make it difficult for soap to make suds. Epsom salt is something called magnesium sulfate ($MgSO_4$) and when it combines with dishwashing liquid soap scum forms instead of soap suds.

Additional Experiments and Questions

Try this experiment with water from various sources, such as tap water, pond water or rain water. Is the water from these sources hard or soft according to our experiment?
Take a look at the labels on different types of bottled spring waters. Which minerals do these contain? Do you think these minerals make the water taste better? Why are they added?
Why do some people have water-softeners in their homes? What can hard water do to the pipes in a house?

If you have a great experiment of your own or have any questions, please email me at praxis@praxismh.ca.
Happy experimenting!

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