

## November 7 – Ice

We have been pretty lucky so far, but believe it or not winter is fast approaching...Pretty soon it will be very cold and the river will be covered with ice. At what point does water freeze? Is this freezing point the same for all water or is there something we can do to change it?

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

### **Materials:**

- Two paper or plastic cups (do not use glass)
- Tap water
- Salt
- Timer

### **Procedure:**

1. Fill both cups with tap water, to one of the cups add one tablespoon of salt. Mix until it dissolves. Be sure to label which cup contains the salt.
2. Place both cups in the freezer – be careful not to spill!
3. Check the cups every hour for four hours and record what you see. Also check the cup the following morning and note any observations.
4. What did you notice?
5. You can repeat the experiment again using different amounts of salt – see if it makes a difference! Even give sugar a try – that’s why it’s called an experiment!

### **Explanation:**

You should have noticed that the water with the salt didn’t freeze – depending on the temperature of your freezer it may have gone a little slushy but the cup with only water was frozen solid. So what’s going on? When water freezes the molecules cling together to form ice crystals – the addition of salt into the water disrupted the formation of these crystals and prevented it from freezing. Cool (literally)! The saltiness of our oceans allows them to reach colder temperatures than a fresh water lake – something to keep in mind if you plan on boating in the winter (I don’t recommend it!).

Check us out on Twitter at [Praxismedhat](#). Have a great week!

Jeff Unrau  
Regional Executive Director  
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## November 21 - Viscosity

How thick is water? Well that sounds like a weird question doesn't it? Well in fact water is very thin – it has a very low viscosity. Viscosity describes a fluid's resistance to flow. Water – as you very well know flows very easily. Let's examine some other liquids to determine how viscous they are.

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### Materials:

- Several small clear cups or glasses,
- A variety of household liquids with different thicknesses (water, syrup, molasses, cooking oil – are good examples),
- Marbles,
- Timer.

### Procedures:

1. Label each cup with the fluid you will be adding to it. Fill up each cup with the appropriate liquid – be sure they are all filled to the same level.
2. Hold a marble above the liquid just so it is touching the surface. Release the marble and record the time it takes to reach the bottom of the cup.
3. Repeat with each liquid, compare the times – which is longest?
4. Try again using a larger marble (a rock could also work).

### Explanation

You should have noticed that the thicker the liquid (higher viscosity) the longer it took for the marble to reach the bottom of the cup. The marble sank to the bottom of the cup of water very easily; there was very little resistance to keep the marble afloat. However the marble sank much slower through the syrup, this was due to the syrup opposing the force of the marble. The viscosity of a liquid is actually a measurement of the shear stress between the layers of liquid that oppose any applied force (our applied force was the marble) – sounds confusing and it is, so I will leave it up to you to learn more! Try to think of some consequences or challenges that we would face if water was as viscous as syrup – it could cause some trouble! Have a great week!

Jeff Unrau  
Regional Executive Director  
Praxis the Science and Technology Hotline

## November 28 – LED's

I recently attended several presentations discussing greenhouse gases, climate change, and our environment. One topic I found very interesting, especially with Christmas coming up, was LED lights.

Most of Alberta's energy comes from coal, more specifically the burning of coal – this process is a large emitter of greenhouse gases – so anything that can reduce energy output should be examined. One excellent way to reduce electricity use is LED Christmas lights – the energy consumption of one incandescent Christmas light is equivalent to a string of 70 LED lights!

So what exactly is an LED light? LED stands for Light Emitting Diode – they use a semiconductor to help produce light – typically electrons can flow in either direction but when a semiconductor diode is used they can only travel one way. This allows for electrons to be funnelled into the device where they recombine to produce photons (think of a photon as a little packet of light). This is known as electroluminescence which is different than a conventional light bulb which produces light by incandescence. Incandescence is light emission via heat production – this heat production is what makes conventional bulbs so inefficient and is not the case for LED's!

LED's are not only more energy efficient than conventional bulbs but they last longer – some companies suggest that their bulbs will last between 25 – 50 years! 50 years with one light bulb – I can't even imagine that! LED bulbs even offer an advantage over fluorescent bulbs in that they use even less energy and do not require mercury!

So this year when looking at Christmas lights – consider LED – even though they are more expensive the reduction in energy use and their excellent durability can more than make up for the price difference!

Have a great week!

Jeff Unrau  
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