Part A. Slicing Ice

Concepts

Pressure; Regelation; Freezing; Melting

Introduction

Metal is one of the best conductors of heat and it has a very low specific heat (it changes temperature easily). We are all familiar with this because if you go to a metal telephone pole on a cold (< 30° F) winter day, you don't want to lick the pole. We also know this because a metal spoon will dish the first scoop of ice cream pretty well, but the second sticks to it, because the spoon has already gotten so cold. Why then are ice skates made out of metal? Shouldn't the skates freeze to the icy surface?

As you have learned in class, the reason ice skates work is because of regelation. The pressure that the blade exerts on the ice locally melts the ice and allows the blade to slide along with low friction. This experiment will demonstrate regelation.

Procedure

- Hang two heavy masses with a metal cord over a large block of ice.
- Wait for a long time (do another lab and come back to it).
- Answer the lab questions.

Part B: Cool Off By Boiling!? No Way ...

Concepts

Pressure; Boiling Point; Temperature; Cooling Process

Introduction

Coastal cities and small islands have temperatures that don't fluctuate very much because it takes a lot of energy to change the temperature of the water that surrounds the area. The temperature of the water is not easily changed because it has a high specific heat. It is even harder to change the phase of water, which means that it takes even more energy. In this experiment you will see where some of the extra energy comes from.

Procedure

- Measure the temperature the big jug of water.
- Put some water from the big jug into your little beaker
- Put the beaker into a bell jar.
- Pump the air out of the chamber.
- Watch what happens.
- Bring the chamber back to atmospheric pressure (Very slowly!).
- Measure the temperature of the water.

Name:_	
Date:_	

Part A: Slicing Ice

• What happens to the cord over the time period?

• Did the block get sliced in half? Why or why not?

 On a really cold day (-10°F) with a good amount of packed snow (1 foot) a runner sled is generally a better sled than a saucer sled. Why?

Part B: Cool Off By Boiling? No Way ...

• Did the temperature of the water change after it boiled? Which way did it change and why?

• How could keeping a large vat of water in your house keep your houseplants from freezing?

• Why does your body sweat when it gets hot?

- If boiling is a cooling process, what is condensation? Why?
- What is freezing (heating or cooling process)? Why?
- What is melting (heating or cooling process)? Why?