

Labdisc activities

for Elementary School Science



Labdisc Activity

The Temperature

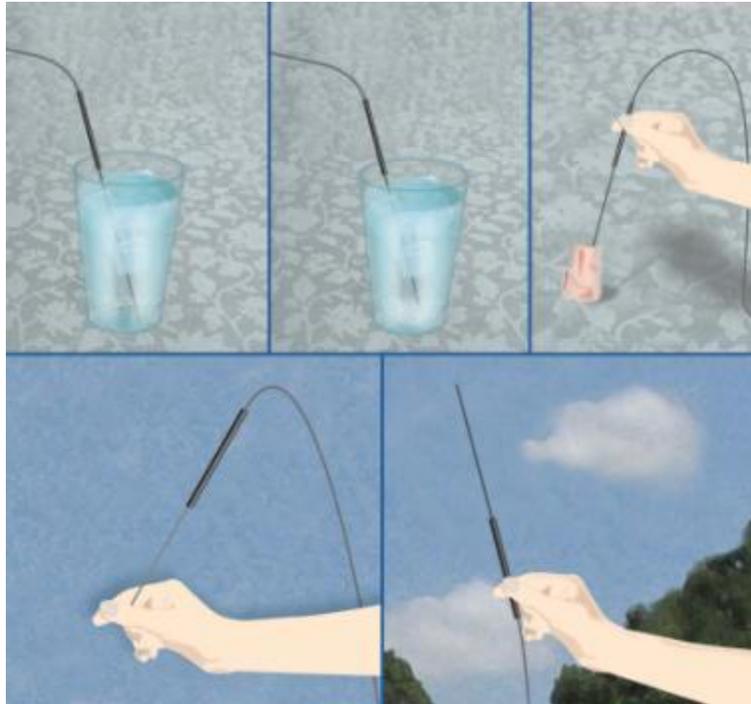
Around Us

Supporting Labdisc Data Logger,
GlobiWorld and GlobiLab
Software

For Elementary School Science



The Temperature Around Us



Introduction

Temperature is the degree of hotness or coldness of any substance. Temperature is also a measure of how fast the atoms and molecules of that substance move and does not depend on the size of the substance. For example, the temperature of a small cup of boiling water is the same as a large pot of boiling water. Even if the pot is much bigger than the cup and has millions more water molecules. Temperature is measured in degrees on the Fahrenheit, Celsius, and Kelvin scales.

We experience temperature every day. We feel hot when it is a hot day or we have a fever and we feel cold when we are in the snow or a cold wind. When we boil water we wait for the water temperature to increase and when we make popsicles we wait for the liquid to become very cold and freeze.

Let's check the temperature around us.

The Experiment

In this activity we will record the temperature of different substances.

Equipment Needed

- Plastic cup
- Ice cubes
- Salt
- Alcohol
- Small piece of tissue paper

Quick Investigation

- Turn on the Labdisc by pressing the On/Off key 
- Rotate the Labdisc plastic ring to expose the sensors

- Connect the external temperature probe  to the input

located under the external temperature key.

- Press this key and you should observe the temperature probe. 

Now you are ready for a quick investigation:

1. Place the probe tip in a cup of ice water, wait for the reading on the Labdisc screen to stabilize and write down the temperature.
 2. Close your hand on the probe tip. Wait for the temperature to stabilize and write down your skin temperature.
 3. Investigate the air temperature in your classroom and in the school yard.
- Using the Labdisc software we can have the Labdisc recorded measurements displayed. Please follow the steps below.

Labdisc Setup

1. Connect the Labdisc to the computer, either with the USB cable or through the wireless Bluetooth channel.

2. Click the Lab icon  to open the Lab software.

3. Click on the sensor icon  and select External Temperature.



Make sure that this is the only selected sensor.

4. Click on the sampling rate icon triangle and select manual sampling.



5. Click on the Display option triangle  then select the Bar Graph



Experiment Procedure

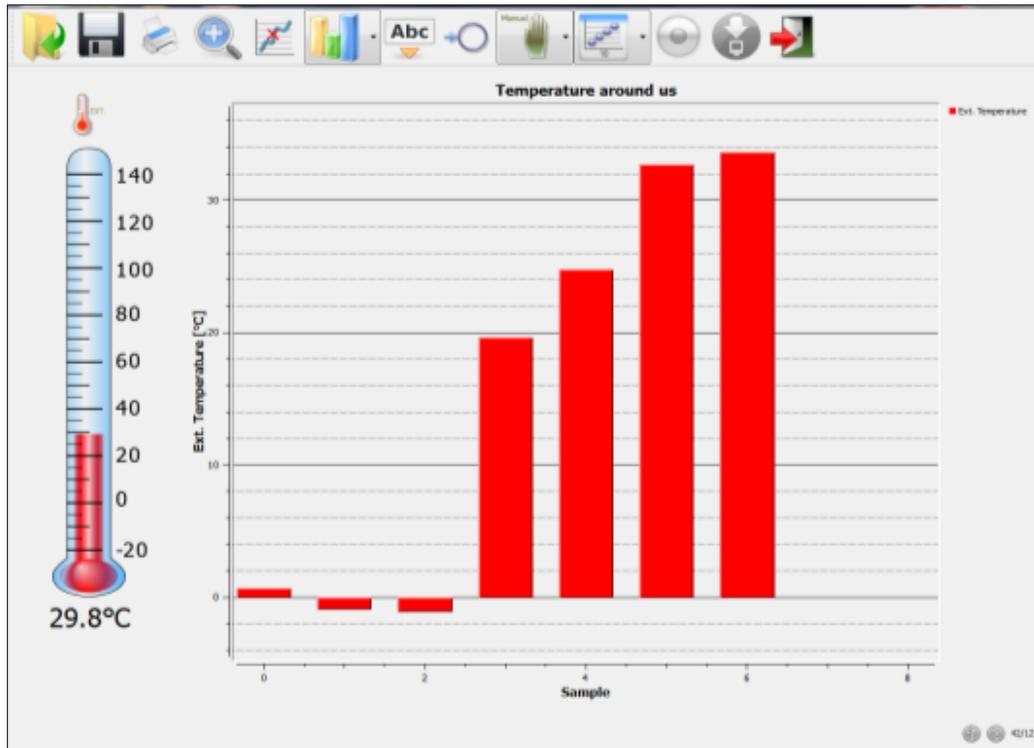


1. Click on the Record icon  to start the experiment.
2. Place the external sensor in the ice water and wait for the temperature reading to stabilize. Then take a manual sample by pressing the Labdisc
SCROLL key.  Each time the SCROLL key is pressed, the software will display another red bar. The bar height represents the measured temperature level.
3. Repeat the above for measuring:
 - a. Tap water
 - b. Your own skin temperature, by closing your hand on the sensor tip
 - c. The skin temperature of one of your classmates
 - d. Ice water with 2 spoons of salt added to it (make sure to stir the cup so that all the salt melts in the water).
 - e. Cover the external temperature sensor tip with a paper tissue soaked in alcohol. Blow air on the covered sensor and observe the temperature change.

When you have finished recording click on the STOP icon.

Data Analysis

Double click on the graph title and a dialog box will open. Write "Temperature around us" and click ok. The software will display the following screen.



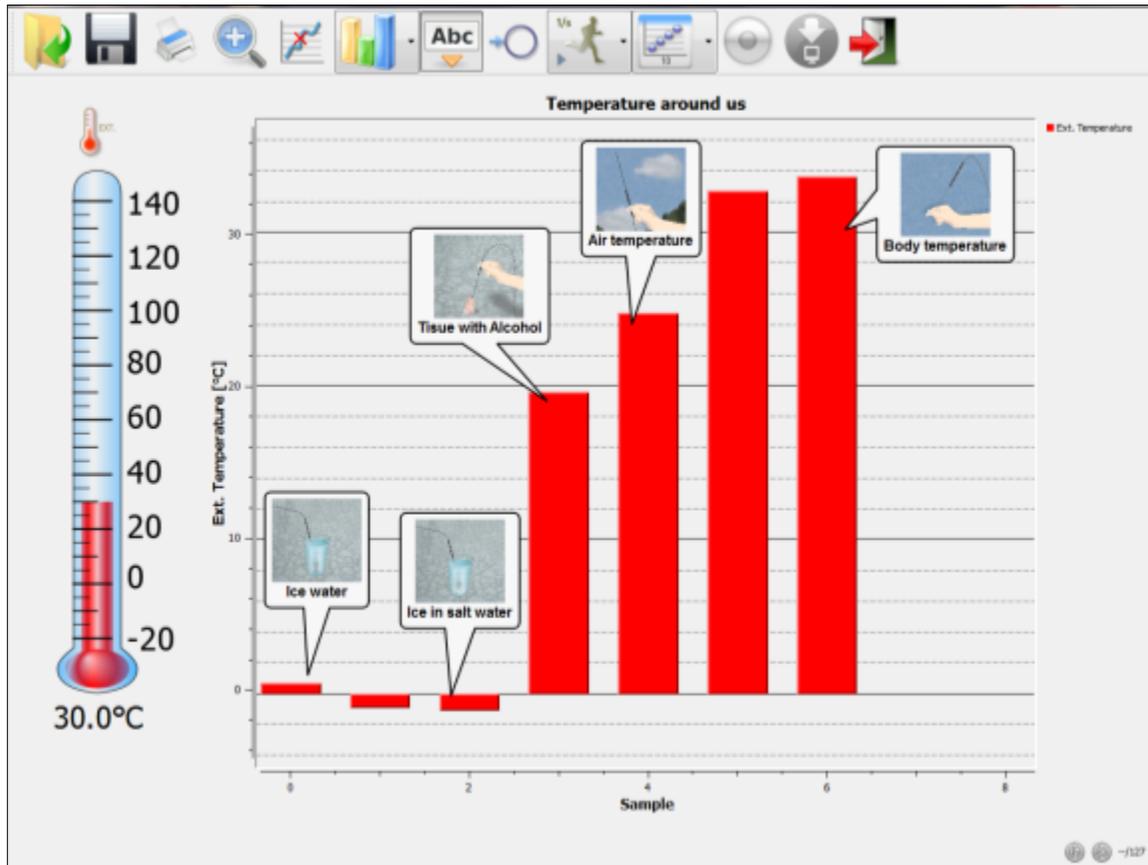
Use annotation to add text and pictures to the Bar graph. Click on the



Annotation icon. Move the mouse over one of the red bars and make a left click. A dialog box will open, allowing you to type text and even add pictures to the graph. In the dialog box text window type the material temperature you have measured. Click OK and use the mouse to drag the annotation to any point on the graph. You can also click on the annotation tip and move it over the graph window.



After annotation you'll see the graph below.



Investigation and Questions

Observe the measurements you've collected and answer the following questions:

- Which material was the coldest and which material was the hottest?
 - Ice water was the coldest material and a human hand was the hottest
 - Salty ice water was the coldest material and a human hand was the hottest
 - Air temperature was the hottest and the tissue soaked alcohol was the coldest

2. In cold winters city municipalities use salt to melt the ice on the main roads. In view of the above experiment can you explain this?
- Car metal parts exposed to salty ice will not rust
 - Salt prevent car tiers from slipping on icy roads
 - Salt reduces the melting temperature of water and prevents ice accumulation on roads
3. Why did the alcohol soaked tissue drop in temperature?
- Alcohol is colder than air
 - When alcohol starts to evaporate it "takes" the heat needed for evaporation from the tissue - reduces its temperature
 - Any wet material is colder than air
4. Are our body and skin temperatures the same?
- Yes, body and skin temperature are the same
 - Skin temperature is always lower than body temperature
 - Our body temperature must be kept between 36 °C and 41 °C, while our skin temperature, exposed to the ambient temperature, can reach temperatures as low as 5 °C, or as high as 50 °C

Further Suggestions

Do a fun activity in the classroom to verify who has the warmest hand.

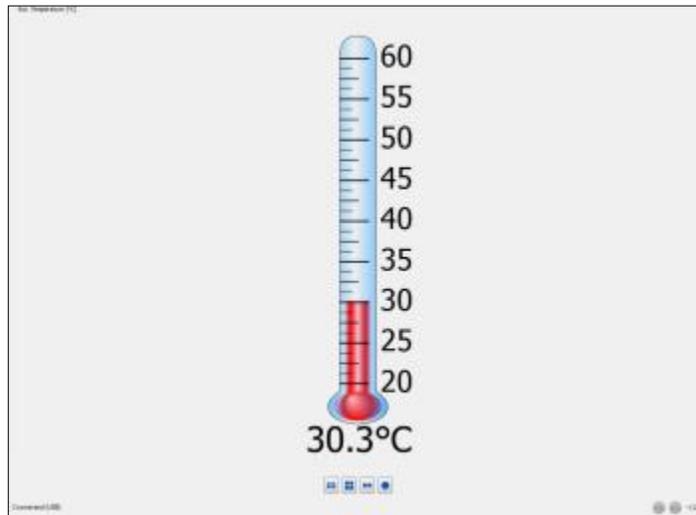
Use the same Labdisc setup. Connect it to the computer.



Press the Meter icon.

The software will open with 4 meters on the screen.

Use the bottom single meter icon  to see only one meter on the screen. With a right mouse click on the meter body you can change it to digital meter, analog gauge, bar graph, color changing display or thermometer.



Changing the range of the meter, or the type of sensors displayed by the meter is done with a right click on the sensor name located at the top left corner of the meter. The right click opens a dialog box where the sensor type and new range can be changed.

