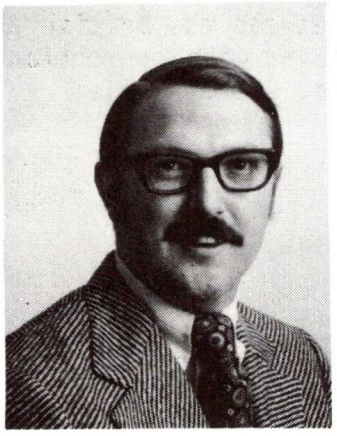

Temperature Measurement

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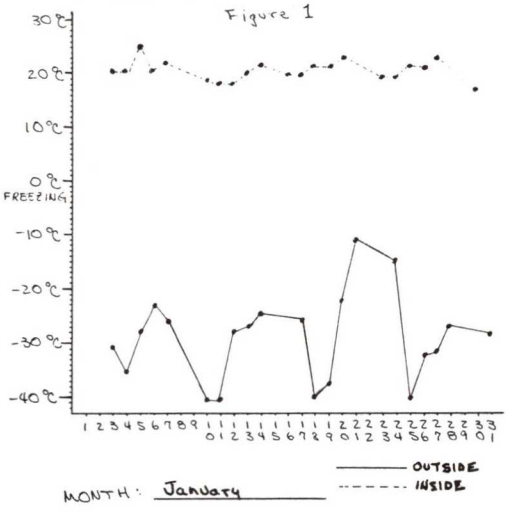
In April of 1975, Canada started using the degree Celsius (^{0}C) as the everyday unit of temperature. The general public is being made vividly aware of the fact that Canada has been "inching" its way to metric conversion since 1970.

The Celsius temperature scale is identical to the centigrade scale. In Europe the centigrade is used as a unit of angular measurement. To avoid confusion, the centigrade scale was renamed after Anders Celsius, the scientist who developed the centigrade scale. It is very important that your students NOT have a special unit on the Celsius scale. Your class (and you) must use the degrees Celsius as a unit of temperature *throughout the year!* The first three activities are designed to be repeated many times.

ACTIVITY ONE

Every day of the school year the temperature both inside and outside the classroom should be measured and recorded. If a Celsius thermometer is placed inside the classroom and another just outside one of the exterior windows, the entire exercise could be completed in one or two minutes each day. Preferably, the readings would be made at the same time each day. After each reading, record the data on a graph (Figure 1).

Figure 1



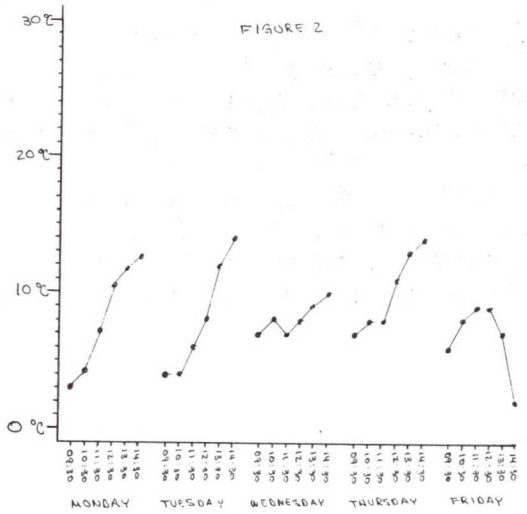
You can run the grids off on dittos. In the example in Figure 1, the blank was filled with the particular month and the data started with the first Monday (or first school day) in the month, which happened to be January 3. Saturdays and Sundays are not recorded and the points are connected for aesthetic reasons only.

According to the grade level, you may want to label the scale "40^{0}C below freezing" instead of -40^{0}C or read -40^{0}C as "Forty degrees Celsius below freezing."

Activity One is an easy activity to implement. It gives the class lots of experience using the degree Celsius and it keeps the terminology (and symbols) in front of them for the whole year. This type of activity also serves to have students thinking about the new system every day and not as some special mathematics project.

ACTIVITY TWO

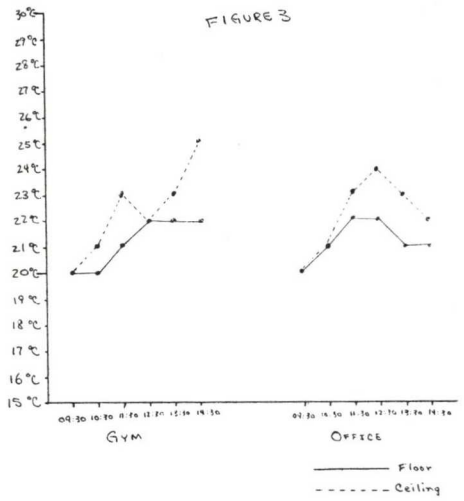
Early in the school year (say the second or third week) of the third grade, or later grade, one should take time to measure and record the outside temperature in degrees Celsius every hour of the school day for a week. This activity gives the students at least 30 measurements in one week. (I wouldn't start quite so early in the school year in Grades I and II since the numbers might give the students some difficulty.) Figure 2 graphs an entire week's measurements. One can compare measurements taken at any particular hour by connecting all the 09:30 dots, then all the 10:30 dots, etc. to see the pattern the temperatures form through the day.



As with Activity One, the key is to let the students make many measurements using metric units.

ACTIVITY THREE

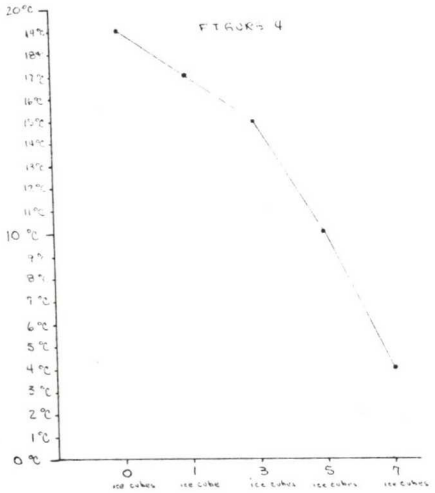
Each hour of the school day the students (in teams and with an adult) measure the temperature at a point on the floor and on the ceiling of, say, the gym, the classroom, hallway, office, etc. The teams then return to the classroom to record the results on the graph(s). Figure 3 is an example of this activity.



Activities One, Two and Three are not "one-shot" affairs to be done and forgotten. *Use* these activities to give the students continual practice in using the degree Celsius as the unit of temperature. Also, as you and your class progress through the year, use the Fahrenheit as little as possible. You may want to have an activity where you record both the Fahrenheit and the degree Celsius on the same graph for the sake of comparison.

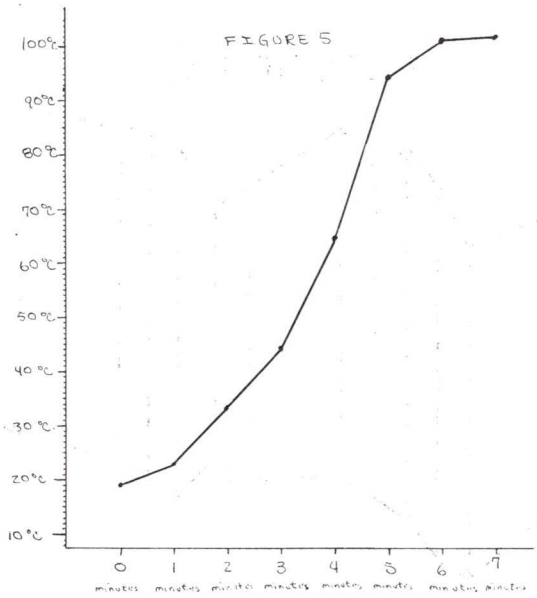
ACTIVITY FOUR

For this activity you will need a source of ice cubes. If no fridge is available in the school, you probably will want to skip this activity. Divide the class into as many teams as you have equipment for. The students pour one litre of regular water from the faucet into a pan and put the Celsius thermometer in it. The students then place one ice cube in the pan, wait two minutes, read the scale, and graph the data. Next the students put two more ice cubes in the pan, wait two minutes, read the scale, and graph the data. Repeat the lab for five, seven etc. ice cubes. Use as many ice cubes as the pan will hold or as many as you have, whichever is fewer. The graphing can be done on a graph similar to the one given in Figure 4.



ACTIVITY FIVE

This activity is similar to Activity Four, except you are warming the water instead of cooling it. You will need an electric kettle if a stove-top heating element is not available. The activity is better done with a pan of water being boiled on a stove-top. Fill the bottle with water and place the Celsius thermometer in the water so that you can still read the scale. Record the temperature after each minute for five minutes. See Figure 5.



ACTIVITY SIX

This activity is concerned with body temperatures. Normal body temperature is 37^{0}C. If you have a class set of Celsius thermometers, have each student do this lab individually, otherwise in teams. The students put their thumbs over the "bulb" of the thermometer, wait two minutes, then record the result. The thermometer is left to "cool off" after each measurement. Then the students place it between the palms of their hands, wait two minutes, and record the results. Finally the students place the bulb of the thermometer up against their cheeks, wait two minutes, and record the results.

ACTIVITY SEVEN

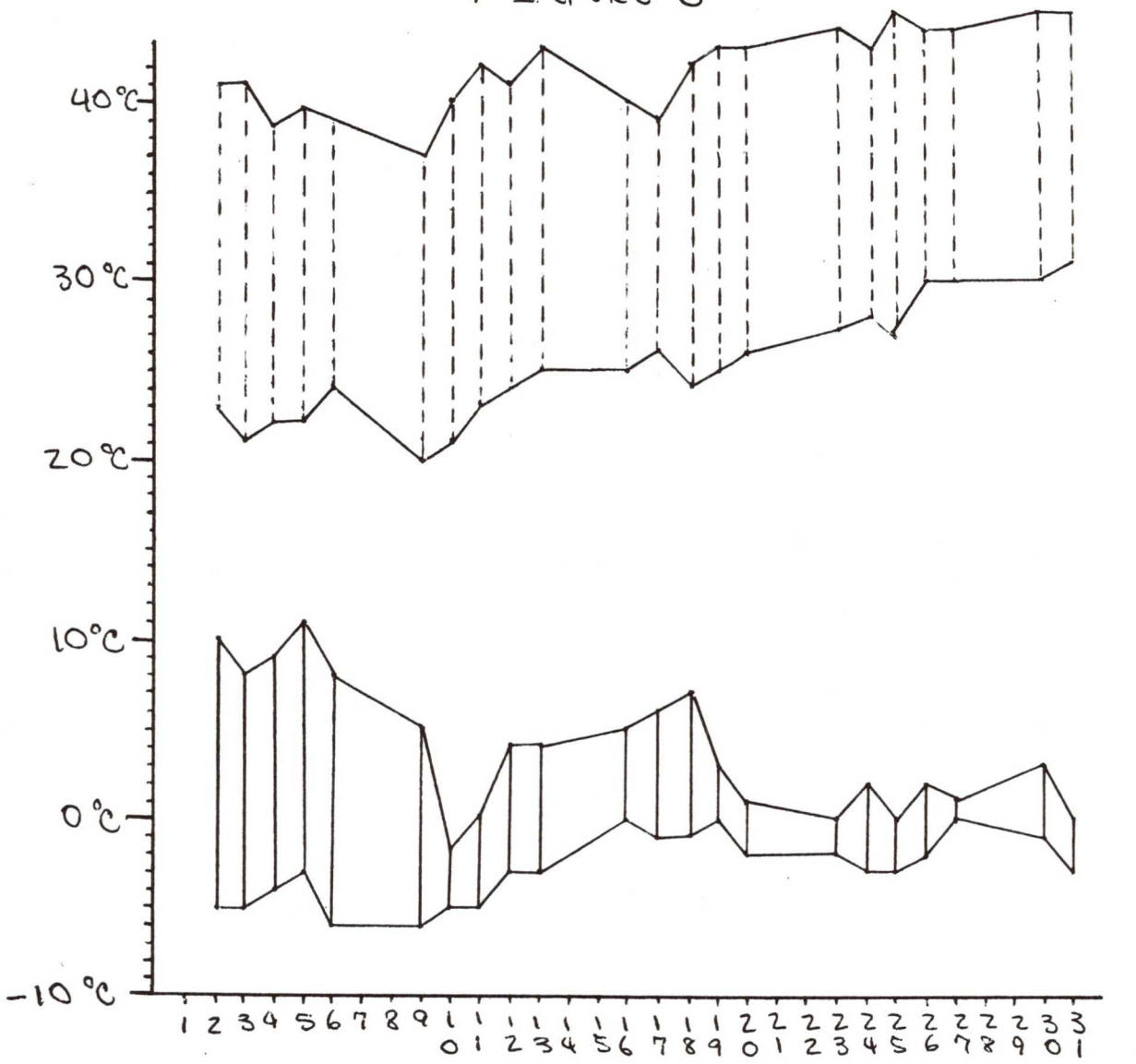
You will need a bright sunny day for this activity. Have the students take their Celsius thermometers outside and measure the temperature in several different places. Measure the temperature outside on the ground in the sun, on the ground in the shade, on a car hood in the sun, holding the thermometer in the air in the shade, holding the thermometer in the air in the sun, on asphalt or cement, etc. After they record the different measurements, then ask them, "What is the temperature outside?" You may want to lead into a discussion or field trip to a weather bureau to see what they mean when they say "It is 15^{0}C today."

ACTIVITY EIGHT

The last two "activities" are not activities in the true sense of the word.

Activity Eight consists of each student picking a city in Canada and a city outside of North America and keeping a graph of the high and low temperatures of the two cities over a period of one month in the fall and for one month in the spring. The vertical line segments on the graph in Figure 6 connect the low and high temperatures for each day to show the entire temperature range. Notice that December is an early summer month for Melbourne.

FIGURE 6

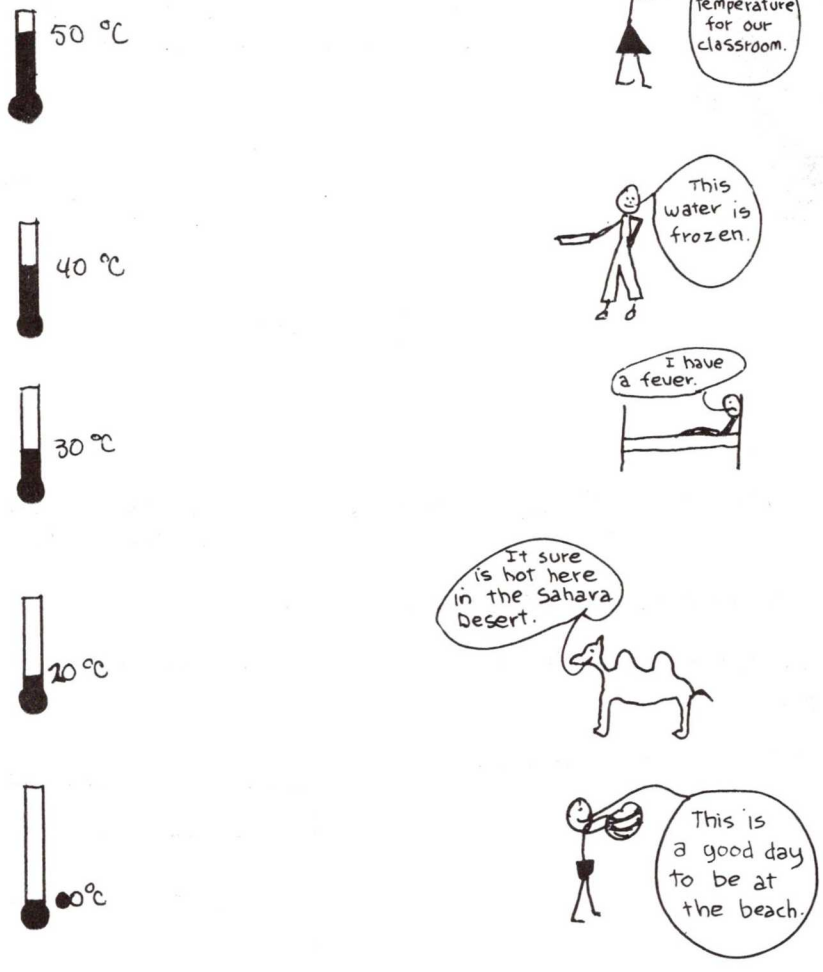


MONTH: December

ACTIVITY NINE

This "activity" is strictly a worksheet, but a very necessary item in teaching metric measurement. After the students have had a chance to use the degree Celsius as the unit of temperature, it is a good idea if they can think in terms of temperatures being given in metric terms. Figure 7 gives some examples to use with your class. The idea is to match the picture with the thermometer that best reflects the temperature.

Figure 7



As you can tell, the main emphasis in this article is for you and your class to go out and *measure temperatures in degrees Celsius!* There is no need to learn the conversion formulas between Fahrenheit and Celsius and/or between Celsius and Fahrenheit. If the students (and you) use the degree Celsius as the unit of temperature throughout the year, by year's end you will be thinking in metric terms. You won't feel the urge to bundle up when going outside into 20°C weather.