HOW MUCH WATER IS IN THE SNOW?

Students will collect snow samples and find out how much water there is in the snow. This information can be used to discuss implications for water supply and flooding.

MATERIALS NEEDED

Clear sampling containers (same volume and weight), scale, small shovels or metal serving spoons, and data sheet.

THE ACTIVITY

Assign groups to take samples from the top, middle and bottom of a snow bank in different areas on the schoolyard. Focus on areas that are very different in degree of snow pack (middle of field, snow left by plow, along footpath, in shrubs).

1. Split class into groups, and set boundaries for where you are going to extract your samples before you head outside. Have students label their sampling containers with waterproof labels, and record the weight of their containers.
2. Make sure when collecting snow samples to fill containers to the top, without leaving air space, but don’t pack the snow down.
3. Return to classroom to review your data. Have students weigh their samples and record information about the snow. Allow snow to melt in containers to visually compare water content.
4. Have all groups share their answers. Discuss why there is variation. Where in the snowpack does the snow seem to be the most dense (top, middle, bottom)? The looser snow at the bottom of the snowbank is known as pukak snow and is used as shelter by many animals such as voles and ermine. Heat trapped next to the ground will keep these animals warm all winter long.
5. As a class discuss the importance of snow density. Why would we want to know how much water is in the snow? This affects the prediction of floods, which is a very important thing to know in Manitoba. What else would we need to know, other than snow density, to calculate how much water is in the snow around our school? (snow depth)

6. Find a Manitoba snow depth map at: http://mobile.theweathernetwork.com/snow/snowmb

Applications: Science and Math

If you are interested in sharing your project’s results, or would like more ideas on teaching outside at your school, please contact FortWhyte Alive by email at education@fortwhyte.org.
HOW MUCH WATER IS IN THE SNOW?
Adapted from a National Park Service activity

Don’t forget to record units!
1. Mass of empty sample container ________

2. Mass of sample container with snow ________

3. Mass of just the snow (Line 1 – Line 2) ________

4. Volume of sample container (get the volume from your teacher OR calculate it yourself with the formula your teacher provides)

5. Calculate Snow Density (Line 3 (Mass) ÷ Line 4 (Volume)) ____________________________

6. Calculate the percentage of water in your snow sample (Line 5 x100) _____________%

7. Compare your answer for snow density to the class results. Did every sample have the same snow density? Why or why not? Where in the snowpack does the snow seem to be densest: top, middle, or bottom? Why?

8. Snow water equivalent (SWE) is calculated by multiplying snow density by the depth of snow covering an area. Why would this measurement be helpful in Manitoba?