**Background:**

*Snow Water Equivalent* (SWE) is a common snowpack measurement. *It is the amount of water contained within the snowpack.* It can be thought of as the depth of water that would result if you melted the entire snowpack instantaneously.

For example, say there is a swimming pool that is filled with 36 inches of new powdery snow at 10% snow water density. If you could turn all the snow into water magically, you would be left with a pool of water 3.6 inches deep. In this case, the SWE of your snowpack would equal 36" x 0.10 = 3.6 inches.

To determine snow depth from SWE you need to know the density of the snow. The density of **new** snow can be quite low. After the snow falls its density increases due to various changes it goes through.

Today, you’ll do an activity to simulate the SWE.

1. **Before continuing, describe what you did at the SWE station.**
2. Why is it that if you have 100 cm of snow you won’t get 100 cm of water from it?

**Materials:**

10 Mini Marshmallows

1 100 mL Graduated Cylinders

water

**Procedure:**

1. Put 70 mL water into the graduated cylinder.
2. Measure the volume of 5 mini marshmallows (mm’s) using displacement. Record data in table.
3. Clean your graduated cylinder and dump the marshmallows in the garbage.
4. Get 5 more marshmallows and squash them.
5. Measure the volume using displacement, as you did in steps A-B. Record your data in table.
6. Clean your cylinder. Dump the marshmallows and clean your lab area. Put the graduated cylinder away.

Ratio of squashed to full marshmallows:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Water volume | Volume with mm’s | Volume of mm’s |
| Full mm’s |  |  |  |
| Squashed mm’s |  |  |  |

1. Divide the volume of the squashed marshmallows by the volume of the full marshmallows. This is your ratio of squashed to full.
2. What would be the volume of 100 full marshmallows (representing the snowpack)?
3. What would be the volume of 100 squashed marshmallows (representing water from melted snow) ?
4. How does this lab relate to the water in the snowpack (the SWE)?
5. If you collect 10.0 cm of snow and find that it has 3.0 cm SWE, how many cm of water will every 10.0 cm of snow produce?
6. If the snow is 260 cm deep, how many cm of water will it produce?
7. How might knowing this be important to us during the summer?
   1. What if there was more snow than usual in the mountains?
   2. What if there was less snow than usual in the mountains?
   3. What if the snow melted very quickly in the spring instead of slowly over the spring and summer?
   4. Explain how knowing the SWE can benefit people in our area.