**Lesson 1**

**Snow Algae**

**Introduction**

* What organisms live in the snow? (Ask students)
* The closer you look the more you see.
* Our lab looks very closely at that snow for microorganisms such as snow algae (*Chlamydomonas nivalis* and others)

**Why might it be important to study snow algae? (Ask students)**

* Base of the food web- supports other organisms they mentioned earlier.
* Photosynthetic algae responsible for about 50% of global oxygen production.
* Snow algae impacts rates and timing of snowmelt.
* Snow algae possesses interesting adaptations for living in snow

**Despite importance, little is known especially in our region. Basic questions still unanswered:**

* Who? What species of snow algae live in our region.
* Where? Snow school is one of many sites around the world mapping collecting data to map the range of snow algae.
* When? Snow school collects data weekly to characterize temporal trends of snow algae distribution.
* How? Where is snow algae in the Winter? Two hypotheses:

1. Snow algae overwinters in the soil and swims to surface in Spring.
2. Snow algae circulates in atmospheric currents and is distributed in snowfall.

* If snow algae is found in top/bottom layer of snow pit, which hypothesis does this support? (Ask Students)

**Students collect samples to help answer these questions:**

* Demonstrate sampling technique with one student and then pass out materials for other students. Encourage them to share so everyone gets a chance to participate.
* Explain the samples they’re collecting while they work
  + Cell Counts: For fluorescent microscopy- Doesn’t tell us who but helps us answer the when/where/how questions by measuring abundance over time.
  + DNA: Answers the what question. Ask students if they can have a definition of DNA they’d like to share. This part varies a lot depending on age/background.
  + Black Carbon: Produced by combustion. Are there any sources of black carbon at the ski area? (Ask students). May act as nutrient source for snow algae.

**Ending discussion (As time permits)**

* How might elevated black carbon levels affect snow algae? Increased algae abundance.
* How might increased algae abundance affect the snow pack? Increased albedo of snow= faster/earlier snow melt.
* What are the effects of faster/earlier snow melt? Flooding in watershed, droughts later in the season, and disrupted nutrient flow to marine ecosystems causing cascading effects through higher trophic levels.
* Microscopic cells in the alpine can have wide-reaching impacts throughout the entire watershed! Wow!!!