# NWAC Lesson 1

**Snowpit Profiles**

**Learning Objectives:**

* Students will learn to identify layers within a snowpack
* Students will learn how to recognize differences in the layers.
* Students will learn about tests used to determine characteristics of layers.
* Students will learn how density of snow impacts watershed.

**Lesson Goals:**

* Students learn how layers are formed and the role they play in avalanches
* Students learn that there is a science dedicated to understanding snow and avalanches.
* Students make a connection between snow density and how it impacts watershed.

**Materials:**

* Shovel, probe, saw
* Pencil, thermometer, magnifying glass

**Timing:**

* 20 minutes

**Assessment:**

* Assessment is embedded in the activity as it progresses. Inquiry-based teaching techniques are recommended. Questions posed to the group will lead to answers and discussions the educator can use to assess student connection and content understandings.

## Background Information:

Avalanche hazard is a natural phenomenon that we can forecast. This is similar to forecasting significant weather events like wind and precipitation. Scientist and avalanche professionals have studied snow to learn about why avalanches happen, and what weather conditions and terrain features make them more likely to occur. Snowpits are one of many tools that avalanche forecasters use in order to better understand the likeliness of an avalanche occurring, and use them as part of their avalanche forecast.

## Snowpit Activity:

1. [2 minutes] Ensure that all students can see the snowpit, introduce yourself and the center. Walk through the learning objectives of the station.
2. [5 minutes] What: Layers are formed by different weather events. We can see the weather history in a snow profile.
	1. How thick are the layers?
		1. What differences can we see and feel?
		2. How deep are the layers?
			1. How much snow could avalanche if the layers did release?
		3. How hard are the different layers?
			1. Harder layers resting next to softer layers are more likely to fail than layers of similar hardness.
3. [13 minutes] How: Key observations
	1. [2 minute] Can we see evidence of recent weather events in the snow profile? (look, feel, discuss)
	2. [3 minutes] Layer interface: Is there any new snow? How well does it stick to the old surface layer? (shovel tilt test)
	3. [3 minutes] Layer hardness: Are there any harder layers positioned "above" softer layers? Is the snowpack "right-side-up", or "upside-down"? (graphing demonstration/exercise)
	4. [3 minutes] Additional tests and topics:
		1. Compare visual observations with tactile observations. (use probe to "feel" observed layer structure)
		2. Discuss variable distribution of snowpack due to weather effects of sun and wind. (observe sunny/shaded slopes, cornice formation)
	5. [2 minutes] Watershed back-link:
		1. Hard snow, compressed throughout the season, lasts longer into the summer. Thereby increasing our water bank for the coming season.
		2. How can scientists use snowpack data to estimate water resources for a given watershed? What types of data are important in this case?
			1. Citizen science from OSU – David Hill: http://communitysnowobs.org