

**Lab 1: First outcrop description**  
**EPSC 240, Geology in the Field**  
Sept 5, 2018

**Due date: Monday Sept 10** (turn in notebooks)

**Meet:** 1:35 pm in FDA 348. After a brief intro, we'll to walk together to the rock outcrop on Ave. des Pins at the top of Peel St.

**Bring:** Bound, hardcover field notebook (Rite-in-the-Rain is best, Moleskine is also good). Hand lens (loupe) or magnifying glass. Sharp pencils, fine-line black pen, and pencil crayons. See syllabus for details.

**Wear:** Comfortable clothes, rain protection (rain coat +/- umbrella), sturdy shoes for walking up the mountain.

**Instructions:** Today we will start looking at the rocks of Mount Royal to learn about describing rock outcrops. Record all observations in your notebook.

Bring your notes to class on Monday to hand in, and I will return it to you by Wednesday next week with comments to help you for future assignments. Today's notes will not count toward your grade - this feedback is only to help you learn to describe rocks.

**Outcrop description includes:**

A combination of narrative (written) and visual (photos and sketches) descriptions is used to represent what a geologist sees when encountering rocks in the field. There is no set order to rock descriptions, but normally the large-scale attributes are described first, and details after. For today, write a description for someone at your same level of expertise (beginner geologist) so that they might be able to picture the outcrop accurately using only your notes. This is a crucial standard to meet – professional geologists are required to make notes that their colleagues can easily follow.

**1. Describe / measure the overall outcrop**

- a) Location (give landmarks and, if appropriate, GPS coordinates)
- b) Size (3D), shape, prominent features (so you can recognize it again in 10 years' time).
- c) Orientation of rock faces you are observing (e.g. "north-facing", "west-striking", "vertical", "sub-horizontal")

**2. Rock types (lithology)**

- i. How many different types of rock are present? What is the distribution of the different rocks through the outcrop? Draw a quick sketch of the outcrop with something for scale, direction indicated, and labels showing the main rock types and other features.
- ii. Describe the contacts between different rocks - are they sharp or gradational? Planar or wavy? Parallel or at some angle to each other? When contacts intersect, does one crosscut another? Is there any alteration (change in colour or grain size) of the rock near a contact?
- iii. For each rock type, record the following:  
  
Note that rocks look different on fresh broken surfaces than on weathered surfaces. This is why geologists are always carrying hammers, but NOT in a city or in a park... Roadcuts are made by blasting, which produces fresh breaks. You will have to look around the outcrop to find different-aged surfaces to describe both fresh and weathered rock. You may also find

variations in the weathered rock, due to contact with water, acids from soil, etc. Describe all the common variants.

- i. Colour and colour variations (some geologists use colour charts for this)
- ii. Textural appearance of rock surface - smooth, bumpy, rough, jagged?
- iii. Grains in the rock - can you make out individual grains or crystals? Use your hand lens. If the rock appears homogenous even with magnification, describe it as 'aphanitic'. If you can make out different grains, describe each type:
  - A. Colour
  - B. Shape (rounded, subrounded, sub-angular, angular. Elongate, equant; if it has a crystal form, it is 'euhedral')
  - C. Lustre (glassy (vitreous), metallic, matte, earthy)
  - D. Abundance (estimate % of area on surface you are viewing)
  - E. Size (use ruler); give a range if necessary
  - F. Relationship to other grains (interlocked, interstitial, matrix)
  - G. Sorting - how homogenous is the grain size? If all the grains are similar in size and shape, they are "well-sorted". If grains of different shapes and sizes are mixed together, we call it "poorly sorted"
- iv. Is there cement or matrix? (This would be crystalline or fine-grained material in between large, visible grains). If so, describe.
- v. After describing the grains, identify their mineral composition. If you don't know any minerals yet, a good and complete description will allow you to ask somebody or look it up.
- vi. Any unusual features in the rock that are not just mineral grains?
  - A. Fossils? If so, it may be possible to identify species
  - B. Vesicles or amygdales? (These are bubbles indicating a lava flow, sometimes filled with later crystal growth)
  - C. Areas of smaller or larger crystals?
  - D. Alignment or patterns in the grains or crystals?
- vii. Strength of the rock - this may also vary on weathered vs. fresh samples.
  - A. Is the rock very hard and cohesive? (well-cemented or crystalline)
  - B. Is the rock easy to break apart or falling apart grain by grain? (friable (crumbly) or fissile (splits easily))