Metamorphic Rocks, Sedimentary Rocks, & Geologic Maps; Stream Processes, Topographic Maps, and Interpreting Geologic Processes from Maps and Rocks

*Terms in **boldface** indicate that you should know the meaning, in context.*

Be able to examine **outcrop patterns** on a **geologic map**, and correlate map information to the map legend, to determine the geologic processes that have affected an area, including:

- what type(s) of rocks are present, and what types of environments do they represent (ocean? beach? volcano? other?)
- what is the **relative age** of rock formations present (oldest? youngest?)
- recognize the presence of flat/ horizontal sedimentary layers, exposed by stream erosion
- when horizontal sedimentary rocks are present, be able to use the **geologic contacts** to determine direction of stream flow (in the absence of contour lines)
- recognize **folded** sedimentary layers, and be able to distinguish ***anticline*** from ***syncline***; *plunging fold from non-plunging fold*
- recognize an area representing igneous activity: extrusive *vs*. intrusive rocks
- You should be able to recognize common rock names, and to be able to associate each with the correct rock type represented (**sedimentary; igneous – intrusive** *vs.* **extrusive; metamorphic**):
  granite *basalt* *sandstone* *shale* *limestone*
  schist *marble* any rock called *"meta-(something)" - is metamorphic!*
- from map information (including rock types and geologic structures), be able to comment on possible *tectonic processes* responsible for the geology of an area; be able to *explain/ justify* your interpretation *(e.g., divergent, convergent, transform, not a boundary)*

Be able to explain why *sedimentary* rocks and ***volcanic*** rocks might exhibit a similar relationship between oldest/ youngest rocks in a sequence of layers, and why *metamorphic* and *intrusive* rocks would not be expected to have the same pattern

Be able to illustrate and explain the interpretation of various patterns seen on geologic maps:
"blobs"; "bulls-eye"; "stripes", "swirls"; "maple leaf"
** We saw a kind of 'blob' pattern on the Washington map ***and*** on the Illinois map – but the interpretation of each of these areas is very different. What important map information is used to determine which of the two interpretations fits each of these map areas?

Be able to describe each of the following rock textures, tell what they reveal about how the rock was formed, and recognize their appearance in rocks:
detrital vs. chemical **fossiliferous** **fissility** **foliated**

Be able to describe the changes in foliated textures observed in the sequence of rocks that represent an increasing degree of metamorphism: *slate —> phyllite —> schist —> gneiss*

What is ***foliation***? What <u>*two, specific factors*</u> are both necessary in order to develop a foliated rock texture?
So, what **protolith** characteristics, and what kind of ***tectonic setting*** would be needed to create the sequence of foliated metamorphic rocks listed above?

While we have not spent a lot of time identifying specific minerals, we understand that mineral properties are important to recognizing some of the important rock-forming minerals.
Be able to define: **hardness** **cleavage** **streak**

Be able to describe the types of evidence that we can gather (either from actual mineral/ rock samples, or from various types of maps) for a material's **resistance to weathering**

- "All rocks are classified and named on the basis of their **texture** and **composition**"... what, exactly, does this mean?
- Be able to describe ways that composition and texture of a rock influence its resistance to weathering, and to give examples.
- What are we really testing with *acid reaction*? Why is *acid reaction* a useful test <u>*only*</u> for certain, specific rocks and minerals?

You should be able to read a ***topographic map*** well enough to:

- determine the contour interval (even if that part of the legend is missing)
- determine the elevation of a specific point, whether it is located <u>on</u> a contour or *between* contours
- determine areas that are flat, steep, not steep; high vs. low based on map information
- identify *direction of stream flow* based on the shape of contour lines and/or other map information
- distinguish landforms, including: **hill** **ridge** **valley** **depression** **canyon** **plateau** **plain**

Be able to use map features *other than* contours (such as stream **drainage patterns**, or other map symbols or labels) to determine general topographic characteristics of an area, such as determining high vs. low areas.

Be able to calculate stream ***gradient*** ; be able to collect appropriate data from a map as needed in order to make this calculation
Be able to explain the significance of stream gradient on the expected characteristics of the stream

Be able to recognize the effects of stream processes on a landscape, including:

- the location of a delta (be able to describe how a delta forms);
- be able to label where, in a stream, erosion and deposition would take place; and
- be able to recognize and describe the changes that would occur with a ***meandering stream*** over time (how does it change; what is an ***oxbow lake***?)

Be able to describe and illustrate the relationship between: **map view** and **cross section**
You should be able to use the information found in common map elements, including:

- you should know the *standard conventions* that apply to maps? (*e.g.*, north is "up")
- be able to use a **map scale**; be able to determine the distance between two points
- be able to determine the type of information represented on a map and important features represented on that type of map

You should be able to comment on ways that you have learned to apply a **<u>scientific method</u>** this semester to the study of the earth.

<u>Each person will be allowed one, 8½ x 11, page (single side) of notes for the lab quiz.</u>
You will turn in this page of notes, when you turn in your completed quiz.

You should be prepared to apply information, in the same way that you have done in lab exercises. In other words, (even with your page of notes!), you should make sure that you are familiar with the concepts and their significance, so that you know how to use this information.

On the date of your lab quiz, ***you must arrive on time*** for your lab session.
Tardiness may result in losing the opportunity to take the quiz