Name: _____

Lab 9. Reading Geologic Maps

First, try to get a sense of the overall geologic structure of the area depicted in the map. Determine the directions of the tilt of the major geologic formations. Identify and describe the basic geologic structures that are present (synclines, anticlines, domes, basins, etc.). Also determine any other specific characteristics of the features, such as asymmetry or plunge.

Answer the questions on this sheet.

Bedrock Geologic Map of Maine

This map displays many resources supplementing the identification of bedrock units: reconstructed cross sections at transects, a stratigraphic correlation chart, a tectonic map, and a map of regional metamorphic zones. These indicate some overlying trends encompassing considerable local complexity.

- How can you tell the name of the bedrock formation at any particular location?

- How can you tell the age of a bedrock formation on the map?

- How can you tell the composition (type of rock) of a formation?

- In what direction do most of the faults and other structures trend?

Identify and describe the basic geologic structures that are present (synclines, anticlines, domes, basins, etc.).

One particular geologic formation overlies the north-central part of the state.

- What is its name? _____
- What is its geologic age? _____
- What kind of rock is it? _____

Find the location of your home town on the map.

- What is the town and where is it on the map?
- What are the major formations underlying your home town?

Wyoming

Identify and describe the basic geologic structures that are present (synclines, anticlines, domes, basins, etc.). There are lots. Wyoming is a big state.

Looking at the bedrock patterns in the state overall, answer these questions.

- Where in the state are the bedrock structures the least deformed?
- Where in the state are the bedrock structures the most intensely folded?

Find the geologic regions below on the map. Imagine traveling the transects (lines) identified. How would the bedrock beneath your path change as you travel? What crustal deformations would cause these changes? What notable features would you observe?

Powder River basin: Examine a transect from Casper to Gillette.

- Structures:
- Notable features:

Rock Springs uplift: Follow Interstate 80 near Rock Springs (not surprisingly).

- Structures:

- Notable features:

Bedrock Geology of Michigan

The geologic ages of the formations are not given in the key. However, they are listed in the standard geologic order, with the youngest formations at the top and the oldest at the bottom.

The entire lower peninsula of Michigan is one broad geologic feature.

- What kind of feature is it? _____

- How can you tell?

- What sort(s) of structure(s) make up the Upper Peninsula?

Black Hills

This is a more detailed map than the segment of the Black Hills found in the Wyoming map. It also contains the entire Black Hills region, most of which is in South Dakota.

- What is the general geologic structure of the Black Hills? _____

- How do you know?

- What type of rock forms the center of the Black Hills?

Grand Canyon

This map can be tricky to read, because it shows topographic contours as well as stratigraphy. There is good geologic reason for this: the canyon exposes different formations at different elevations.

Most of the surface of the plateau surrounding the Canyon is one particular geologic formation.

- What is the name of this formation?

- What is its geologic period?

- What type of rock is it?

Find the feature marked *Shiva Temple*.

- What sort of land form is Shiva Temple?

The slope of the Canyon is fairly steep in some rock layers, and more level in others.

- Name one formation that is usually in steep slopes.

- Name one formation that is usually fairly flat.

Some of the tributary canyons are eroded along faults.

- Name some of these faults.

There are volcanic features outside of the Canyon, in the northwest portion of the map.

- Of what geologic age are these features?

- What kind of volcanic features are they?

Tectonic Lithofacies of the Appalachian Orogen

This map was made to convince geologists that the Appalachian mountains are the suture of a continental collision. It shows bedrock rather than surface deposits. Colors indicate rocks that were formed under similar tectonic conditions (sedimentation, volcanism, metamorphic deformation).

The black formations (7, 9, 22) represent ultramafic rocks. Our best guess of how they got to the surface is by uplift when oceanic crust atop an ocean-ocean subduction was caught between two approaching continents. These formations are often to the east of Zone 7, which is thought to be the eastern edge of an ancient continent before major collisions occurred.

- Where else do these ultramafic rocks occur?

The oldest rocks on this map are labeled Zone 1.

- Where are these rocks exposed?

- What type of structural deformation must have exposed them?

Much of this map is yellow Zone 17, sediments deposited in shallow water.

- How does the nature of this zone relate to the name of the town in which MSSM is located?

Geologic Map of North and South Dakota

Identify and describe the basic geologic structures that are present (synclines, anticlines, domes, basins, etc.).

Where in the Dakotas might you look for dinosaur fossils?

There is a brown region at the southeast of South Dakota. What is the name of this formation? How is it related in age to the formations adjoining it?

Geologic Map of Washington

This map does not show the entire state.

There is a large fault in the map area. Where is it? What is the direction of the strike of the fault?

One side of the fault is Pre-Upper Jurassic Gneiss. The other side is Paleocene-Cretaceous nonmarine rocks. If the fault is a dip-slip fault, which side moved up and which side moved down

Where is the active volcano on the map?

When did volcanic activity begin at this volcano?