Geology 101 Name _____

Reading Guides for
Ch. 6: Sedimentary Processes, Environments, and Rocks (p. 170)
and Ch. 7: Metamorphism and Metamorphic Rocks (p. 204)

Through the first part of the quarter we have observed several different erosional agents that transport sediment (landslides, glaciers, rivers, etc.). Once the transport of the sediment stops, the sediments are deposited and fortunately for us, the patterns created by deposition permit us to investigate the history of the area.

The Origins of Sedimentary Rocks (p.172)

Sediment Transport and Texture (p.172)

Sediments are classified into two groups. What are these two groups and briefly explain the types of sediments in each group:

1)

2)

Detrital sediments are classified according to the texture of the sediment. Explain what is meant by texture.

In the sediment is all about the same grain size, we term this _____-_____. If, on the other hand, the sediment has many different particle sizes, the sediment is termed _____-_____.

In general, the rounder the sediment, the _____ the sediment is from its source.

Sedimentary Structures (p. 173)

What is meant by the term "sedimentary structures?"

The “bedding” is:

You should be familiar with the following sedimentary structures and what types of environments they indicated occurred in the past: graded-bedding, cross-bedding, and ripple marks

Lithification: Turning Sediment into Sedimentary Rock (p. 178)

What are the two processes that create lithification?

Explain how grains of sediment are cemented together.

Classifying Sedimentary Rocks (p. 179) and **"Reading" Sedimentary Rocks** (p. 191)
Matching: Answers may be used more than once

_____ 1. rock formed of very small, clay-sized particles — A. coal

_____ 2. rocks formed of angular particles in a matrix of sediment — B. gypsum

_____ 3. rocks formed of rounded pebbles and gravel in a matrix of sand — C. sandstone

_____4. Composed primarily of calcium carbonate — D. shale (claystone)

_____ 5. Black, organic sedimentary rock — E. breccia

The following may have more than one correct answer:

_____ 6. Deposited in a continental environment — F. conglomerate

_____ 7. deposited in an evaporite environment — G. chert

_____ 8. deposited in a marine environment — H. halite (salt)

_____ 9. Classified as a detrital sedimentary rock — I. limestone

_____ 10. Classified as a "chemical" sedimentary rock

Here are some of the sedimentary rocks you will **not** be required to know:

arkose, graywacke, dolomite, dolostone

Depositional Environments (p. 191)

What does the "sedimentary environment" of a rock mean?

Sedimentary Facies (p. 194)

This concept is a bit tricky. The basic idea is that different sediments are deposited in a particular environment all at the same time. For example, sediments deposited along a coast may vary from organic sediments to coarse detrital sediments to organic chemical rocks. All of these are being deposited at the same time. They represent the sedimentary facies for that area. As conditions change, such as sea level, the facies will migrate laterally as illustrated in Figure 6-29.

Sedimentary Rocks and Plate Tectonics (p. 195)

Please read, but you will not be held responsible for the details in this section

Sedimentary Rocks from a Distance (p. 198) On field trips sometimes students ask "What kind of rock is that over there?" I use the type of information in this section to try to answer their question. I think the outcrop characteristics of the rocks are very helpful because they help us read the landscape. Please read this section!

Chapter 7: Metamorphism and Metamorphic Rocks (p.204)

Chapter Introduction:

The third major group of rocks is metamorphic rocks. "Metamorphism… is the process by which heat, pressure, and chemical reactions deep within the Earth alter the mineral content and/or structures of preexisting rock_____. "

As the introduction states: it is possible to see many volcanic and sedimentary processes, but by definition we cannot see the processes that form metamorphic rocks.

What Drives Metamorphism? (p. 207)

"*Metamorphic* processes _____break all bonds in a rock's minerals—if _____ its _____were broken, a rock would _____(an _____ process) and become a_____."

Heat (p. 207)

"When a rock moves from near-surface conditions (_____) to a greater depth (_____) by tectonic movement or by deep burial under sedimentary deposits, it is _____ up and _____. Friction is NOT a major source of thermal energy inside the Earth. Some frictional heating occurs along faults, but this is minor in comparison to the Earth's heating from radioactive decay.

Pressure (p. 208)

Explain how foliation develops.

Circulating Fluids (p. 210)

Some interesting ideas in this section, but you will not be tested over this information.

What Controls the Mineralogy of a Metamorphic Rock ? (p. 210)

"The factors that controls the mineralogy of a metamorphic rock include some of the variables that you just learned about-_____, _____, and the amount and composition of fluids. There is one other critical factor: the _____." Give and example of this idea:

Types of Metamorphism (p. 210)

Contact Metamorphism (p. 210)

Contact metamorphism is normally associated with:

And metamorphic alteration tends to _____ the farther you are from the contact.

Regional Metamorphism (p. 211)

This type of metamorphism can be subdivided into _____and_____.
What is the difference in these two types?

Other Types of Metamorphism (p. 212)

The other types of metamorphism are interesting, but not critical for our course. The hydrothermal metamorphism is applicable to rocks in Washington. We find examples of the serpentinization in several parts of Washington.

Common Metamorphic Rocks (p. 213)

You should be familiar with the following rocks types, their possible parent rocks, and what they tell us about the history of metamorphism when we find them:

slate, phyllite, schist, gneiss, marble, quartzite

Temperatures and Pressures of Metamorphism, (p. 219)

Metamorphic Grade (p. 219)

Minerals are stable in only certain ranges of temperature and pressure. If the mineral is exposed to higher or lower temperatures/pressures, the mineral will change to another mineral. This idea leads to the concept that we can use the specific minerals in a metamorphic rock to determine the history of temperature and pressure for the rock. This concept is important in understanding metamorphic rocks, but I will not expect you to know the various types of metamorphic facies noted on page 222.

Plate Tectonics and Metamorphic Rocks (p. 223) and **Metamorphic Rocks in Daily Life** (p. 223)

We will return to the section on plate tectonics later in the quarter You may read these sections now or later, but you will be tested over this information on the next exam.

The Rock Cycle Revisited (p.226)

No new ideas here, but a good review of this important concept!