

GEOL 01 – Physical Geology

Mid Term II Study Guide

Minerals

What is an atom, an ion, and an isotope? What are the components of an atom? Which ones have mass? What is the atomic number? What is the atomic mass? What are the charges for the different sub-atomic particles? What are orbital shells? What reside in orbital shells? What is the valence shell? What is a molecule? What is a compound? What are the three different kinds of atomic bonds?

What is a mineral? What is a crystal? How does cooling time affect crystal size? What are the 3 main properties used to identify minerals (look at lab 3.2)? What happens when you place acid on a carbonate? Other than Oxygen, what is the most abundant element in continental crust? What is the most abundant mineral class? This most abundant mineral class has a unique molecular configuration that allows it to form 5 different molecular configurations, leading to minerals with different properties. What are these 5 different configurations? What is the net electronic charge of this most abundant mineral class? What types of ions tend to bond with this most abundant mineral class (what is the charge of these ions and what elements)? What is an example of two elements that can substitute for each other? Name a mineral that this can take place within (there are several examples).

Can you identify a dozen minerals? Be able to identify the following minerals: Quartz, Muscovite, Biotite, K-Feldspar, Na-Plagioclase Feldspar, Ca-Plagioclase Feldspar, Amphibole (Hornblende), Pyroxene (Augite), Olivine, Calcite, Gypsum, Halite, Pyrite, and Galena. Do you know which minerals are silicates? Does quartz have cleavage? If not, what is the name for the type of fracture found in quartz?

Could you use the way we learned to identify minerals to describe the scientific method using these steps as steps in the scientific method? I.e. which step is an observation? Which step might be a test of an hypothesis?

Rocks

What is a rock? What are the 3 main types of rocks?

Igneous Rocks

What are the two main compositions of igneous rocks (different names for granitic and basaltic) and what is a 3rd more extreme type? What is their general composition (relates to their names)? What are some other variations between these two main types of rocks? What are the following: intrusive vs extrusive; plutonic vs volcanic; aphanitic vs phaneritic?

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What are the six main kinds of igneous rocks (you already are given granitic and basaltic, what are the other 4)? What is texture and what controls it? Could you tell which are volcanic and which are plutonic? How could you tell?

Volcanoes

What controls the viscosity of lava/magma? What is magmatic differentiation? What are the causes for magmatic differentiation? Where do we find volcanoes? Why are volcanoes found in these places?

What types of volcanoes are in the Cascades? What relative Silica content (high, med, or low) are associated with each of these types of volcanoes? Why does the Silica content control the behavior of lava flow? Why does the Silica content control the shape of volcanoes? What type of volcanic rock is associated with the different levels of Silica (3 major types of rock, rank them from low to high Si %)? What are the plutonic versions of these rocks? What is the timeline of events that led to the eruption of Mt. Saint Helens? What happened during and after the eruption of Mt. Saint Helens?

Which Cascade volcanoes erupt more frequently than others? What are some hazards associated with volcanic eruptions? What controls the type of volcanic eruption, the shape of volcano, and the way that lava flows? Could you identify the following volcanoes: fissure flow, shield volcano, stratovolcano, lava dome, and caldera?

What was the geologic event that initiated the eruption of the Columbia River Basalts (CRBs)? What is the time span for the CRB eruptions? Where is the source of these lava flows? Where did they flow to? What causes columnar jointing?