Unit Objectives

Intro to Geology and the Physical Properties of Earth

- Define the 2 major branches of geology
- Give a few examples of how geologic processes affect people
- Create a scenario that utilizes each the first 5 steps of the Scientific Method
- Summarize the “historical notes” of modern geology
- Define the fundamental principles of geology
  - Law of Superposition
  - Principle of fossil succession
  - Uniformitarianism
- Describe Earth’s structure
- Compare and contrast lithosphere vs. asthenosphere
- Describe the major topographic features of Earth’s surface

Plate Tectonics

- Be able to answer the question: Who was Alfred Wegener and what was his contribution to modern geology?
- Describe how Wegener used data to support his hypothesis
- Describe the difference between the Hypothesis of Continental Drift and Theory of Plate Tectonics
- Describe how the varying age of the seafloor supports “sea-floor spreading”
- Describe the relative motion between 2 plates and each type of plate boundary (PB) and be able to locate the 3 different types of PBs on a global PB map
- For each type of plate boundary describe the geologic processes that occur there and a provide an example of a landform created by these processes.
- Be able to classify each plate boundary as constructive, destructive, both, or neither
- Define a “hot spot” and explain how the age of the Hawaiian Islands supports the Theory of Plate Tectonics
- Explain why the lithospheric plates move
- Complete laboratory exercises with comprehension

Minerals

- Be able to state the relationship between elements, minerals, and rocks
- Understand the importance of chemical bonding in creating minerals
- Be able to define: mineral
- Be able to identify specific physical properties of minerals in laboratory specimens and exam
- Identify minerals by name during lab and exam
- Categorize silicate minerals as ferromagnesian or nonferromagnesian and know some common nonsilicate minerals
Unit Objectives

Igneous Rocks
- Describe the steps to making an igneous rock forms from making magma to crystallizing into a rock
- Use texture and chemical composition to name igneous rock specimens in lab
- Understand magmatic differentiation and Bowen’s Reaction Series
- Describe the origin of magma and different stages of magma evolution

Topographic Maps
- Be able to locate features on topographic maps using latitude and longitude in degrees, minutes, seconds, and identify features, using map symbols and colors
- Be able to interpret four kinds of map scales and convert one scale to another
- Interpret landform features using contour lines and stereopair glasses
- Understand information along margins of map
- Complete laboratory exercises with comprehension

Volcanoes
- Be able to compare and contrast among the 3 types of volcanoes
- Identify the 3 factors that determine the nature of a volcanic eruption
- List the 3 types of material released during an eruption
- Describe how secondary magma is made and the type of volcanic eruption it can cause
- Be able to illustrate and describe various surficial and subsurface volcanic landforms
- Relate the various types of volcanoes an appropriate plate tectonic setting
- Describe the formation of a caldera

Running Water
- Define vocab terms:
  o Be able to identify stream-related landforms in photographs, diagrams, and topographic maps
- Understand basic flow of the Water Cycle
- Determine the gradient of a stream in lab setting
- Know determinates of stream velocity
- Identify 3 main types of stream channels and describe the characteristics of each
- Be able to compare and contrast among the 3 stream channels
- Describe how and where alluvial fans and deltas form

Mass Wasting Objectives
- Understand the role mass wasting plays in shaping landforms
- Identify the controls and triggers of mass wasting
- Be able to correctly classify mass wasting events based on the material they are composed of and the movement of the material
- Successfully complete “Landslides” laboratory activities in lab and on exam
Weathering Objectives
- Differentiate between constructive and destructive forces and internal vs. external processes
- Be able to define the 3 forces that destroy rock
- Describe the difference between mechanical and chemical weathering
- Describe how different agents of mechanical and chemical weathering act on rocks
- Describe the factors that influence the rate of weathering
- Define differential weathering

Sedimentary Rocks Objectives
- Describe how a sedimentary rock can form
- Describe different sedimentary environments
- Classify sedimentary rocks according to texture and composition
- Identify detrital (clastic) and non detrital (nonclastic) sedimentary minerals and sedimentary rocks in lab

Glaciers Objectives
- Differentiate between the 2 types of glaciers
- Describe the “budget” of a glacier and how a glacier moves
- Identify erosional and depositional glacial landforms in photos/diagrams and on topographic maps and describe how they can form
- Define an “Ice Age” and why they form

Mountain Building Objectives
- Identify the 4 types of mountains
- Identify the 2 tectonic stresses that create mountains
- Identify the plate tectonic setting for different types of mountains
- Be able to identify different types of geologic structures: faults and folds
- Name the 3 types of faults and describe the movement of rock on either side of the fault
- Be able to identify the different structures in cross-sections, block diagrams, maps, or photographs
- Be able to measure the strike and dip of strata

Earthquakes Objectives
- Explain what elastic rebound is and how it causes earthquakes
- Differentiate among the different types of seismic waves
- Use lag time and triangulation to locate the epicenter of an earthquake
- Describe what a tsunami is and how one is created
- Describe the distribution of the world’s earthquakes and their location relative to plate boundaries
- List the factors that determine the destruction caused by earthquakes