
GLG101: INTRODUCTION TO GEOLOGY I (PHYSICAL)
SPRING 2003
PROFESSOR MATT FOUCH

STUDY GUIDE FOR EXAM #1

In this first part of the course, we covered the Prelude, Chapters 1-5, and Interlude A. The most important facts and concepts for you to know and understand are listed below. The exam will be in-class, closed everything, with multiple choice and true/false questions. You will not be allowed to wear hats or sunglasses (unless prescribed by a doctor). Please remember to bring your ASU ID and a Number 2 pencil on exam day.

➤ **What is Geology? (Prelude)**

- Know the difference between and examples of hypothesis, theory, and law.
- What makes a good theory?
- Know the reasoning of the scientific method.
- What is uniformitarianism?

➤ **Cosmology and Birth of Earth (Chapter 1)**

- What are the three primary hypotheses for solar system formation? (nebular, collisional, protoplanet). Know a bit about each hypothesis.
- What are the 2 types of planets in our solar system? What are examples of each?
- Why is the core made of dense iron and the mantle and crust made of less dense silicates?
- How old is Earth?
- In our solar system, what % of the mass is contained within the Sun?

➤ **Journey to the Center of the Earth (Chapter 2)**

- Why does Earth have a magnetic field? (Convection in the outer core)
- What % of Earth's atmosphere is oxygen? What % is nitrogen?
- Know the relative % of Earth's surface covered by mountains, continental interiors, continental shelves, ocean floor, and deep trenches.
- Know the relative abundance of the major elements in both the crust and whole earth
- What are the compositional layers of Earth?
- Know the depths to each of Earth's major compositional layers.
- What are the mechanical layers of Earth?
- Why do we have a magnetic field?
- Know the 3 main contributors to Earth's internal heat engine.

➤ **Drifting Continents and Spreading Seas (Chapter 3)**

- Know the basic ideas behind continental drift and seafloor spreading.
- Who proposed continental drift?
- What is the fossil evidence for continental drift?
- What is the paleoclimate evidence for continental drift?
- Why do mid-ocean ridges show symmetric magnetic stripes?
- Where is most of the world's youngest crust formed?

➤ **The Way Earth Works: Plate Tectonics (Chapter 4)**

- Know the basic evidence for plate tectonics.
- Know the 3 types of plate boundaries (convergent, divergent, and transform).
- List examples of each type of plate boundary.
- Why do accretionary prisms form?
- Know the locations of the following plates: Pacific, North American, South American, Eurasian, Nazca, Antarctic, and Indian-Australian.
- What is the supporting evidence for plate tectonics?
- How and why do hotspot volcanoes form?
- What is mantle convection?

➤ **Patterns in Nature: Minerals (Chapter 5)**

- Why do we care about minerals?
- Define the terms "rock" and "mineral" and explain their differences
- Have a general understanding of atomic mass and atomic number
- What are cations and anions?
- Explain how atoms are involved with the structure of minerals (size, charge)
- What is the importance of pressure and temperature in formation of minerals?
- Describe how minerals form (crystallization, recrystallization in solid state, precipitation)
- Describe the main structures of silicate minerals (isolated, single chain, double chain, sheet, etc.)
- What are the physical properties of minerals?
 - we covered: cleavage, fracture & habit, luster, hardness, density, color & streak

➤ **Rock Groups (Interlude A)**

- What are the three major rock groups?
- What is the source material for each of these groups?
- What is the process by which each of these groups forms?
- What weathering processes contribute to the formation of sedimentary rocks?
- What is lithification?
- What are the two main types of metamorphism?
- Know the concept of the rock cycle