

EAS 100  
Study Guide to Textbook  
*Foundations of Earth Science*  
(Lutgens and Tarbuck, 6<sup>th</sup> edition, 2011)

The textbook for EAS 100, *Foundations of Earth Science*, by Lutgens and Tarbuck is an excellent book. It is up-to-date, "readable", has good illustrations and an appropriate treatment of the four subject areas - Earth Science, Oceanography, Atmospheric Science, and Astronomy - which constitute the subject matter for EAS 100. The book is of appropriate length for a one-semester course and the authors make an attempt to emphasize and identify fundamental concepts and terms and to illustrate these concepts with relevant and significant examples. Despite the quality of this textbook, the reader may "get lost" in the volume of material and in the detailed and extensive terminology that is used in the book and that is somewhat characteristic of these subject areas. This detail and terminology is necessary in a textbook in order for the book to be complete, authoritative, and useful as a reference. An example of this detail is the use of key terms (in bold print in the chapters and listed at the end of each chapter) which tend to confuse and divert the reader from developing an understanding of the material based on the significant concepts and principles in the chapters. Therefore, we suggest that the reader not try to memorize key terms, definitions or details. **The most effective way to study the material covered in EAS 100 using the textbook will be to use this Study Guide during your reading and review. The Chapter in Review section at the end of each chapter will also be useful in reviewing the chapter.**

The following study guide is intended to provide a list of the most important **concepts and principles (on the left)** and (a small number of) **key words (on the right)** which should be emphasized in reading the chapters of the textbook for EAS 100. In addition, the most important **Focus on Learning** questions (at the beginning of each chapter), **Figures to Study**, and **Questions for Review** for each chapter are also listed. The **Focus on Learning** questions at the beginning of each chapter can be considered to be the main learning objectives for the chapter. **The Chapter in Review** section also provides a convenient synopsis of the chapter for study after reading the chapter.

**In EAS 100, we will cover only a portion of the book as given in the assigned reading in the Course Outline.** This Study Guide covers all of the chapters in the book. In addition, Pearson Prentice Hall provides internet access to a *Foundations of Earth Science* website (<http://www.mygeoscienceplace.com/>) that contains quizzes for review, the Pearson eText, animations, and *GEODE: Earth Science*, formerly (4<sup>th</sup> and 5<sup>th</sup> editions) available in CD format. The *GEODE* also provides additional opportunities for study and learning. To access the online resources, go to the mygeoscienceplace website and log in using the access code included on the first page (inside the front cover) of your 6<sup>th</sup> edition book.

## INTRODUCTION (p. 1)

*Focus on Learning: 1, 2, 3, 4, 5, 6, 7*

The Earth Sciences  
Earth as a System  
Scales of Space and Time  
Resources and Environmental Issues  
Scientific Inquiry, Scientific Method

Hypothesis  
Theory

*Figures to Study: 1.2, 1.4, 1.6, 1.8, 1.9, 1.10*

*Review Questions: 1, 2, 3, 5, 6*

## UNIT 1 - EARTH MATERIALS

### Chapter 1 - Minerals: Building Blocks of Rocks (p. 20)

*Focus on Learning: 1, 2, 3, 4, 6*

Minerals  
Isotopes and Radioactivity  
Properties of Minerals

Mineral  
Radioactivity  
Silicate  
Silicon-Oxygen tetrahedron

*Figures to Study: 1.2, 1.3, 1.8, 1.15, 1.16, 1.17, 1.21, 1.22, 1.23*

*Review Questions: 6, 11, 12, 13, 14*

### Chapter 2 - Rocks: Materials of the Lithosphere (p. 42)

*Focus on Learning: 1, 2*

Rock cycle  
Igneous, Sedimentary, Metamorphic Rocks  
Rock classification

Magma  
Weathering  
Metamorphism  
Mineral composition

*Figures to Study: 2.2, 2.4, 2.9, 2.10, 2.18, 2.19, 2.27, 2.30, 2.31, 2.33*

*Review Questions: 4, 9, 14, 19*

## UNIT 2 – SCULPTURING EARTH'S SURFACE

### Chapter 3 - Landscapes Fashioned by Water (p. 72)

*Focus on Learning: 4, 5, 9, 10, 12*

Water (Hydrologic) Cycle  
Running Water  
Floods  
Groundwater

Mass Wasting  
Erosion  
Deposition  
Deltas  
Porosity  
Aquifer

*Figures to Study: 3.1, 3.4, 3.6, 3.7, 3.11, 3.13, 3.17, 3.19, 3.21, 3.23, 3.26, 3.28, 3.30, 3.39, 3.43*

*Review Questions: 4, 6, 17, 19, 21*

**Chapter 4 - Glacial and Arid Landscapes (p. 110)***Focus on Learning: 1, 4, 5, 6, 9*

Glaciers  
 Glacial Deposits  
 Ice Ages  
 Deserts

Till  
 Moraine  
 Drift  
 Loess

*Figures to Study: 4.2, 4.5, 4.9, 4.11, 4.13, 4.15, 4.16, 4.20, 4.22, 4.34**Review Questions: 2, 6, 8, 14, 18***UNIT 3 – FORCES WITHIN****Chapter 5 - Plate Tectonics: A Scientific Theory Unfolds (p. 140)***Focus on Learning: 1, 2, 3, 4, 5, 6, 7*

Plate Boundaries  
 Plate Tectonics  
 Seafloor Spreading  
 The Driving Mechanism

Continental Drift  
 Divergent  
 Convergent  
 Transform  
 Rift  
 Hot Spots  
 Convection Currents

*Figures to Study: 5.2, 5.3, 5.4, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12, 5.13, 5.14, 5.15, 5.16, 5.17, 5.18, 5.19, 5.20, 5.22, 5.24, 5.25, 5.26, 5.27, 5.28, 5.29, 5.30, 5.31, 5.32**Review Questions: 4, 5, 9, 10, 11, 12, 13, 14, 19, 20, 21***Chapter 6 - Restless Earth: Earthquakes, Geologic Structures, and Mountain Building (p. 170)***Focus on Learning: 1, 2, 3, 4, 5, 6, 7, 8, 10*

Elastic Rebound Theory  
 P, S, Surface Waves  
 Earth's Interior Structure  
 Accretion

Earthquake  
 Faults  
 Magnitude  
 Tsunamis  
 Lithosphere  
 Asthenosphere  
 Mantle  
 Core

*Figures to Study: 6.2, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.16, 6.17, 6.18, 6.19, 6.22, 6.25, 6.26, 6.33, 6.35, 6.36, 6.37, 6.39, 6.41, 6.42**Review Questions: 1, 4, 7, 10, 11, 12, 14, 19, 21, 23, 24***Chapter 7 - Fires Within: Igneous Activity (p. 206)***Focus on Learning: 1, 2, 3, 5, 6*

Volcanic Eruptions  
 Volcano Types  
 Volcanic Composition

Viscosity  
 Shield Volcanoes  
 Composite Volcanoes  
 Magma  
 Caldera  
 Pyroclastics

*Figures to Study:* 7.1, 7.5, 7.8, 7.9, 7.10, 7.13, 7.17, 7.18, 7.20, 7.22, 7.29  
*Review Questions:* 3, 9, 10, 19, 21, 22, 27, 28

## UNIT 4 - DECIPHERING EARTH'S HISTORY

### Chapter 8 - Geologic Time (p. 236)

*Focus on Learning:* 1, 2, 3, 4, 5, 6, 7

Catastrophism  
 Uniformitarianism  
 Fossil correlation  
 Radiometric Dating  
 Geologic Time Scale  
 (Pre-Cambrian, Paleozoic, Mesozoic,  
 Cenozoic)

Relative Dating  
 Absolute Date  
 Superposition  
 Horizontality  
 Cross-Cutting Relationships  
 Unconformities  
 Index Fossils  
 Radioactivity  
 Half-Life

*Figures to Study:* 8.3, 8.5, 8.7, 8.10, 8.11, 8.12, 8.13, 8.14, 8.16, 8.18  
*Review Questions:* 1, 2, 3, 14

## UNIT 5 - THE GLOBAL OCEAN

### Chapter 9 - Oceans: The Last Frontier (p. 258)

*Focus on Learning:* 2, 3, 5, 6, 7

Composition of Seawater  
 Ocean Bathymetry

Continental Shelf  
 Continental Slope  
 Abyssal Plain  
 Mid-Ocean Ridge  
 Atolls

*Figures to Study:* 9.1, 9.3, 9.11, 9.12, 9.14, 9.15, 9.16, 9.18, 9.19, 9.20  
*Review Questions:* 4, 8, 11, 14, 17, 19

### Chapter 10 - The Restless Ocean (p. 280)

*Focus on Learning:* 1, 2, 3, 4, 6, 7, 8

Ocean Circulation, Currents  
 Shoreline Processes

Coriolis Effect  
 Upwelling  
 Tides  
 Waves

## Longshore Currents

*Figures to Study:* 10.2, 10.3, 10.6, 10.8, 10.9, 10.12, 10.16, 10.22, 10.23, 10.24, 10.25, 20.26, 10.27

*Review Questions:* 1, 3, 4, 5, 11, 15, 20

**UNIT 6 - THE ATMOSPHERE****Chapter 11 - Heating the Atmosphere (p. 308)**

*Focus on Learning:* 1, 2, 3, 4, 5, 6, 7, 9, 10, 11

Composition of the Atmosphere	Weather
Structure of the Atmosphere	Climate
Cause of Seasons	Rotation
Electromagnetic Radiation	Revolution
Greenhouse Effect	Radiation
Global Warming	Conduction
	Convection

*Figures to Study:* 11.2, 11.4, 11.7, 11.9, 11.11, 11.12, 11.13, 11.14, 11.17, 11.18, 11.20, 11.24, 11.26, 11.27, 11.28, 11.29, 11.30, 11.39, 11.40

*Review Questions:* 1, 4, 5, 9, 12, 14, 15, 17, 19

**Chapter 12 – Moisture, Clouds, and Precipitation (p. 340)**

*Focus on Learning:* 1, 4, 5, 9

Precipitation	Latent Heat
Condensation	Humidity
Evaporation	
Adiabatic Cooling	

*Figures to Study:* 12.2, 12.10, 12.11, 12.12, 12.13

*Review Questions:* 1, 8, 9, 13, 15

**Chapter 13 - The Atmosphere in Motion (p. 370)**

*Focus on Learning:* 1, 2, 3, 4, 5

Atmospheric Circulation	Air Pressure
High and Low Pressure Systems	Wind
	Gradient
	Coriolis Effect

*Figures to Study:* 13.5, 13.6, 13.10, 13.11, 13.14, 13.15, 13.18, 13.19

*Review Questions:* 4, 5, 6, 9, 10

**Chapter 14 - Weather Patterns and Severe Weather (p. 390)**

*Focus on Learning: 1, 3, 4, 5*

Air Masses  
Fronts  
Tornadoes  
Hurricanes

Thunderstorm  
Saffir-Simpson Scale

*Figures to Study: 14.1, 14.5, 14.6, 14.8, 14.9, 14.10, 14.13, 14.16, 14.17, 14.18, 14.21, 14.22, 14.23, 14.24, 14.26*

*Review Questions: 3, 7, 9, 10, 15, 16*

## UNIT 7 - EARTH'S PLACE IN THE UNIVERSE

### Chapter 15 - The Nature of the Solar System (p. 418)

*Focus on Learning: 1, 2, 3, 4, 5, 6, 7*

Planets  
Origin of the Solar System  
Earth's Moon

Asteroids  
Impact Craters  
Astronomical Units  
Terrestrial

*Figures to Study: 15.10, 15.13, 15.14, 15.16, 15.17, 15.18, 15.19, 15.20, 15.21, 15.23, 15.25, 15.28, 15.30, 15.34, 15.36, 15.37, 15.41, 15.42, 15.46*

*Review Questions: 6, 9, 12, 13, 16*

### Chapter 16 - Beyond the Solar System (p. 456)

*Focus on Learning: 1, 2, 3, 5, 6, 8, 9, 10*

Measuring Distances  
Hertzsprung-Russell Diagram  
Stellar Evolution  
Galaxies  
Big Bang Theory

Stellar Parallax  
Light Year  
Apparent Magnitude  
Absolute Magnitude  
Red Shift  
Doppler Effect  
Hubble's Law

*Figures to Study: 16.2, 16.7, 16.10, 16.11, 16.12, 16.17, 16.19, 16.20, 16.21, 16.23, 16.24, 16.25*

*Review Questions: 1, 2, 3, 5, 8, 10, 20, 25*