STUDY GUIDE
8/04

EAS 100
Study Guide to Textbook
Foundations of Earth Science

(Lutgens and Tarbuck, 4th edition, 2005)

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**, **The Chapter in Review** section, and **Questions for Review** for each chapter are also listed. An 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, internet addresses, review questions and critical thinking exercises are provided in the on-line study guide for the text available at www.prenhall.com/lutgens. The CD-ROM, Geode II, included with the book, also provides additional opportunities for study and learning.

INTRODUCTION (p. 1)

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

The Earth Sciences	Hypothesis
Earth as a System	Theory
Resources and Environmental Issues	
Scientific Inquiry, Scientific Method	

Figures to Study: I.2, I.3, I.4, I.8, I.9
Review Questions: 1, 2, 5,

UNIT 1 - EARTH MATERIALS

Chapter 1 - Minerals: Building Blocks of Rocks (p. 15)

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

Minerals	Mineral
Isotopes and Radioactivity	Radioactivity
Properties of Minerals	Silicate
	Silicon-Oxygen tetrahedron

Figures to Study: 1.2, 1.3, 1.5, 1.15, 1.16
Review Questions: 6, 11, 12, 13

Chapter 2 - Rocks: Materials of the lithosphere (p. 33)

Focus on Learning: 1, 2

Rock cycle	Magma
Igneous, Sedimentary, Metamorphic Rocks	Weathering
	Metamorphism
	Mineral composition

Figures to Study: 2.2, 2.10, 2.11, 2.17, 2.23, 2.24
Review Questions: 4, 6, 9, 19

UNIT 2 - EARTH'S EXTERNAL PROCESSES

Chapter 3 - Landscapes Fashioned by Water (p. 61)

Focus on Learning: 2, 5, 8, 11

Water Cycle	Mass Wasting
Running Water	Erosion
Groundwater	Deposition
	Deltas
	Porosity
	Aquifer

Figures to Study: 3.1, 3.4, 3.5, 3.12, 3.13, 3.15, 3.21, 3.25, 3.32
Review Questions: 4, 5, 16, 17

Chapter 4 - Glacial and Arid Landscapes (p. 93)

Focus on Learning: 1, 4, 5, 6

Glaciers
Glacial Deposits
Ice Ages
Deserts

Till
Moraine
Drift
Loess

Figures to Study: 4.6, 4.7, 4.10, 4.15, 4.19, 4.30
Review Questions: 2, 6, 10, 14, 15

UNIT 3 - EARTH'S INTERNAL PROCESSES

Chapter 5 - Plate Tectonics: A Unifying Theory (p. 121)

Focus on Learning: 1, 2, 3, 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, 5.19, 5.20, 5.21, 5.24, 5.25, 5.26, 5.27, 5.28
Review Questions: 5, 9, 10, 11, 12, 14, 19, 20, 21

Chapter 6 - Restless Earth: Earthquakes, Geological Structures, and Mountain Building (p. 151)

Focus on Learning: 1, 2, 3, 4, 5, 6, 7, 8

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

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, 6.15, 6.17, 6.18, 6.19, 6.24, 6.26, 6.28, 6.29, 6.30, 6.32, 6.33
Review Questions: 4, 10, 11, 12, 14, 18, 19

Chapter 7 - Fires Within: Igneous Activity (p. 183)

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, 7.7, 7.9, 7.11, 7.15, 7.17, 7.19, 7.26, 7.27, 7.28
Review Questions: 3, 9, 19, 21, 22

UNIT 4 - DECIPHERING EARTH'S HISTORY

Chapter 8 - Geologic Time (p. 213)

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

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

Figures to Study: 8.2, 8.3, 8.7, 8.10, 8.11, 8.13, 8.14, 8.16
Review Questions: 1, 2, 3, 14

UNIT 5 - THE GLOBAL OCEAN

Chapter 9 - Oceans: The Last Frontier (p. 235)

Focus on Learning: 2, 3, 5, 6

Composition of Seawater
Ocean Bathymetry
Continental Shelf
Continental Slope
Abyssal Plain
Mid-Ocean Ridge
Atolls

Figures to Study: 9.1, 9.3, 9.6, 9.7, 9.8, 9.9, 9.10, 9.11, 9.13
Review Questions: 4, 8, 9, 11, 14, 16

Chapter 10 - The Restless Ocean (p. 255)

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

Ocean Circulation, Currents
Shoreline Processes
Coriolis Effect
Upwelling
Tides
Waves
Longshore Currents

Figures to Study: 10.2, 10.3, 10.6, 10.7, 10.9, 10.13, 10.17, 10.20, 10.22, 10.23, 10.24, 10.25, 20.26, 10.27
Review Questions: 1, 3, 4, 5, 11, 15, 19

UNIT 6 - THE ATMOSPHERE

Chapter 11 - Heating the Atmosphere (p. 281)

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

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

Figures to Study: 11.2, 11.3, 11.5, 11.7, 11.9, 11.10, 11.11, 11.13, 11.12, 11.14, 11.15, 11.17, 11.22, 11.28, 11.29
Review Questions: 1, 4, 5, 9, 12, 14, 15, 17, 19

Chapter 12 - Clouds and Precipitation (p. 309)

Focus on Learning: 3, 4, 5, 9

Precipitation
Latent Heat
Humidity

Figures to Study: 12.7, 12.8, 12.11, 12.13
Review Questions: 1, 8, 9, 12, 13

Chapter 13 - The Atmosphere in Motion (p. 337)

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

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

Figures to Study: 13.5, 13.6, 13.10, 13.11, 13.13, 13.14
Review Questions: 6, 9, 10

Chapter 14 - Weather Patterns and Severe Weather (p. 355)

Focus on Learning: 1, 3, 4, 5

Air Masses
Fronts
Thunderstorm
Saffir-Simpson Scale

Tornadoes
Hurricanes

Figures to Study: 14.5, 14.7, 14.8, 14.9, 14.11, 14.14, 14.15, 14.16, 14.20, 14.22, 14.23
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. 381)

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

Planets
Origin of the Solar System
Earth's Moon
Asteroids
Impact Craters
Astronomical Units
Terrestrial

Figures to Study: 15.9, 15.12, 15.13, 15.14, 15.15, 15.16, 15.18, 15.19, 15.23, 15.26, 15.27, 15.33, 15.34, 15.35
Review Questions: 9, 12, 13, 16, 26

Chapter 16 - Beyond the Solar System (p. 415)

Focus on Learning: 1, 2, 3, 5, 6, 7, 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, 16.5, 16.9, 16.10, 16.15, 16.17, 16.18, 16.20, 16.21
Review Questions: 2, 3, 5, 8, 20, 25

Compact Disk (CD) – GEODe II (included with Lutgens and Tarbuck, *Foundations of Earth Science*, 2005)

This CD includes most of the material contained in the text in a more visual format. Some useful and interesting animations are included. Some quizzes are included that can be used for a review of the material. (However, be careful not to focus only on terminology and definitions.)

The CD can be a convenient method to review the material in *Foundations of Earth Science*.