STUDY GUIDE
8/20/2013

EAPS 100
Study Guide to Textbook
Foundations of Earth Science
(Lutgens and Tarbuck, 7th edition, 2014)

The textbook for EAPS 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 EAPS 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 in the Concepts in Review) 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 most memorize key terms, definitions or details. You will see some terms (such as the ones shown on the list on the right in the chapter summaries below) so often that you will automatically learn their meaning or definition. **The most effective way to study the material covered in EAPS 100 using the textbook will be to use this Study Guide (note the key concepts and key terms in the study guide for each chapter) during your reading and review. The Concepts 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 EAPS 100. In addition, the most important **Focus on Concepts** (at the beginning of each chapter), **Figures to Study**, and Questions for Review (**Give it Some Thought**) for each chapter are also listed. The **Focus on Concepts** at the beginning of each chapter contain most of the main learning objectives for the chapter. **The Concepts in Review** section also provides a convenient synopsis of the chapter for study after reading the chapter.

In EAPS 100, we will cover only a portion certain chapters of the book as given in the assigned reading in the Syllabus. 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 (requires and access code from your textbook, http://www.mygeoscienceplace.com/) that contains quizzes for review, the Pearson eText, animations, and *GEODe: Earth Science*, formerly (4th and 5th 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 7th edition book. There are QR links on some of the Figures (called **SmartFigures**) that allow you to connect to online animations (with access code).

There are two versions of the 7th edition – content, chapters and page numbers are the same in both versions. The only difference is that one version includes online access to MasteringGeology. The ISBN numbers are listed here:

7th edition without MasteringGeology ISBN-13: 9780321811790
7th edition with MasteringGeology access card package ISBN-13: 9780321811141

Additional information on obtaining the textbook is available at:
http://web.ics.purdue.edu/~braile/eas100/Textbook.2013.pdf.

INTRODUCTION TO EARTH SCIENCE (p. 2-21)

Focus on Concepts: I.1, I.2, I.3, I.4, I.5, I.6

Concepts and Principles:	**Key Terns:**
The Earth Sciences	Hypothesis
Earth as a System	Theory
Scales of Space and Time	
Resources and Environmental Issues	
Scientific Inquiry, Scientific Method	

Figures to Study: I.4, I.5, I.7, I.9, I.10, I.11, I.12, I.13, I.16
Give It Some Thought: 1, 2, 3, 4, 5, 6

UNIT 1 - EARTH MATERIALS

Chapter 1 – Matter and Minerals (p. 22-43)

Focus on Concepts: 1.1, 1.2, 1.3, 1.4, 1.5

Concepts and Principles:	**Key Terns:**
Minerals	Mineral
Isotopes and Radioactivity	Radioactivity
Properties of Minerals	Silicate
Bonds	Silicon-Oxygen tetrahedron

Figures to Study: 1.8, 1.10, 1.11, 1.12, 1.13, 1.15, 1.16, 1.17, 1.21, 1.22, 1.23, 1.30
Give It Some Thought: 1, 4, 5, 6, 8

Chapter 2 - Rocks: Materials of the Solid Earth (p. 44-75)

Focus on Concepts: 2.1, 2.2, 2.3, 2.4, 2.5

Concepts and Principles:	**Key Terns:**
Rock cycle	Magma
Igneous, Sedimentary, Metamorphic Rocks	Weathering
Rock classification	Metamorphism
	Mineral composition

Figures to Study: 2.1, 2.4, 2.10, 2.12, 2.18, 2.19, 2.28, 2.31
Give It Some Thought: 1, 2, 3, 4, 6, 7, 8, 9

UNIT 2 – SCULPTURING EARTH'S SURFACE

Chapter 3 - Landscapes Fashioned by Water (p. 75-117)

Focus on Concepts: 3.1, 3.3, 3.8, 3.10, 3.11, 3.13

Concepts and Principles:	**Key Terns:**
Water (Hydrologic) Cycle	Mass Wasting
Running Water	Erosion
Floods	Deposition
Groundwater	Deltas
	Porosity
	Aquifer

Figures to Study: 3.4, 3.5, 3.7, 3.25, 3.27, 3.29, 3.31, 3.39, 3.43
Give It Some Thought: 4, 5, 6, 8

Chapter 4 - Glacial and Arid Landscapes (p. 118-149)

Focus on Concepts: 4.2, 4.3, 4.5, 4.6, 4.9

Concepts and Principles:	**Key Terns:**
Glaciers	Till
Glacial Deposits	Moraine
Ice Ages	Drift
Deserts	Loess

Figures to Study: 4.2, 4.5, 4.10, 4.11, 4.13, 4.14, 4.17, 4.22, 4.24, 4.25, 4.35, 4.36
Give It Some Thought: 2, 3, 8

UNIT 3 – FORCES WITHIN

Chapter 5 - Plate Tectonics: A Scientific Revolution Unfolds (p. 150-187)

Focus on Concepts: 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10

Concepts and Principles:	**Key Terns:**
Plate Boundaries	Continental Drift
Plate Tectonics	Divergent
Seafloor Spreading	Convergent
The Driving Mechanism	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, 5.21, 5.22, 5.23, 5.24, 5.25, 5.26, 5.27, 5.28, 5.29, 5.30, 5.31, 5.32, 5.33, 5.34, 5.35, 5.36, 5.37
Give It Some Thought: 1, 2, 4, 6, 5, 8, 9

Chapter 6 - Restless Earth: Earthquakes, Geologic Structures, and Mountain Building (p. 188-229)

Focus on Concepts: 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.12

Concepts and Principles:	**Key Terns:**
Elastic Rebound Theory	Earthquake
P, S, Surface Waves	Faults
Earth's Interior Structure	Magnitude
Accretion	Tsunamis
	Lithosphere
	Asthenosphere
	Mantle
	Core

Figures to Study: 6.2, 6.4, 6.5, 6.6, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.15, 6.16, 6.17, 6.18, 6.19, 6.24, 6.26, 6.29, 6.30, 6.31, 6.32, 6.33, 6.39, 6.40, 6.41, 6.42, 6.44, 6.45, 6.46
Give it Some Thought: 1, 2, 3, 5, 8, 12, 14

Chapter 7 – Volcanoes and Other Igneous Activity (p. 230-269)

Focus on Concepts: 7.1, 7.2, 7.3, 7.5, 7.7, 7.8, 7.12

Concepts and Principles:
Volcanic Eruptions
Volcano Types
Volcanic Composition

Key Terns:
Viscosity
Shield Volcanoes
Composite Volcanoes
Magma
Caldera
Pyroclastics

Figures to Study: 7.1, 7.2, 7.3, 7.4, 7.5, 7.7, 7.9, 7.10, 7.11, 7.13, 7.14, 7.15, 7.16, 7.17, 7.19, 7.20, 7.21, 7.22, 7.23, 7.25, 7.30, 7.31, 7.32, 7.33, 7.34, 7.35
Give it Some Thought: 1, 3, 5, 7, 9

UNIT 4 - DECIPHERING EARTH'S HISTORY

Chapter 8 - Geologic Time (p. 270-293)

Focus on Concepts: 8.1, 8.2, 8.4

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: 8.2, 8.3, 8.4, 8.7, 8.8, 8.11, 8.12, 8.13, 8.14, 8.16, 8.17, 8.19, 8.20, 8.22, 8.24
Give it Some Thought: 1, 2, 4, 7, 8

UNIT 5 - THE GLOBAL OCEAN

Chapter 9 - Oceans: The Last Frontier (p. 294-319)

Focus on Concepts: 9.1, 9.2, 9.3, 9.4, 9.6

Concepts and Principles:
Composition of Seawater
Ocean Bathymetry

Key Terns:
Continental Shelf
Continental Slope
Abyssal Plain
Mid-Ocean Ridge
Atolls

Figures to Study: 9.1, 9.3, 9.11, 9.12, 9.13, 9.14, 9.15, 9.16, 9.17, 9.19, 9.21, 9.22
Give it Some Thought: 1, 2, 6, 7, 9

Chapter 10 - The Restless Ocean (p. 320-351)

Focus on Concepts: 10.1, 10.2, 10.3, 10.5, 10.7, 10.9

Concepts and Principles:	**Key Terns:**
Ocean Circulation, Currents	Coriolis Effect
Shoreline Processes	Upwelling
	Tides
	Waves
	Longshore Currents

Figures to Study: 10.1, 10.2, 10.5, 10.7, 10.8, 10.9, 10.10, 10.11, 10.16, 10.19, 10.20, 10.22, 10.23, 10.24, 10.25, 10.26, 10.27, 10.28, 10.29, 10.30
Give it Some Thought: 5, 7, 8, 9

UNIT 6 - THE ATMOSPHERE

Chapter 11 - Heating the Atmosphere (p. 352-385)

Focus on Concepts: 11.1, 11.2, 11.3, 11.4, 11.5, 11.6, 11.7, 11.9, 11.10

Concepts and Principles:	**Key Terns:**
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, 11.5, 11.7, 11.8, 11.10, 11.12, 11.13, 11.14, 11.15, 11.16, 11.18, 11.19, 11.20, 11.22, 11.23, 11.24, 11.26, 11.27, 11.28, 11.29, 11.31, 11.37, 11.38
Give it Some Thought: 1, 3, 4, 5, 7, 9

Chapter 12 – Moisture, Clouds, and Precipitation (p. 386-419)

Focus on Concepts: 12.1, 12.3, 12.4

Concepts and Principles:	**Key Terns:**
Precipitation	Latent Heat
Condensation	Humidity
Evaporation	
Adiabatic Cooling	

Figures to Study: 12.2, 12.8, 12.11, 12.12, 12.15, 12.34
Give it Some Thought: 1, 7

Chapter 13 - The Atmosphere in Motion (p. 420-441)

Focus on Concepts: 13.1, 13.2, 13.3, 13.4, 13.7

Concepts and Principles:	**Key Terns:**
Atmospheric Circulation	Air Pressure
High and Low Pressure Systems	Wind
	Gradient
	Coriolis Effect

Figures to Study: 13.1, 13.7, 13.8, 13.13, 13.14, 13.16, 13.17, 13.19, 13.21, 13.24
Give it Some Thought: 1, 3, 5, 6, 7, 8, 9

Chapter 14 - Weather Patterns and Severe Weather (p. 442-471)

Focus on Concepts: 14.1, 14.4, 14.5, 14.6

Concepts and Principles:	**Key Terns:**
Air Masses	Thunderstorm
Fronts	Saffir-Simpson Scale
Tornadoes	
Hurricanes	

Figures to Study: 14.8, 14.12, 14.13, 14.14, 14.16, 14.17, 14.20, 14.21, 14.22, 14.23, 14.24, 14.27, 14.28, 14.29, 14.30, 14.31. 14.32, 14.32
Give it Some thought: 2, 4, 5, 6, 7, 8, 9

UNIT 7 - EARTH'S PLACE IN THE UNIVERSE

Chapter 15 - The Nature of the Solar System (p. 472-513)

Focus on Concepts: 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7

Concepts and Principles:	**Key Terns:**
Planets	Asteroids
Origin of the Solar System	Impact Craters
Earth's Moon	Astronomical Units
	Terrestrial Planets

Figures to Study: 15.3, 15.9, 15.10, 15.13, 15.16, 15.17, 15.18, 15.19, 15.20, 15.21, 15.22, 15.23, 15.24, 15.28, 15.29, 15.31, 15.32, 15.33, 15.34, 15.35, 15.40, 15.42, 15.45, 15.46, 15.47
Give it Some Thought: 1 2, 5, 7

Chapter 16 - Beyond the Solar System (p. 514-545 [including Appendix D]**)**

Focus on Concepts: 16.1, 16.3, 16.4, 16.5, 16.6, 16.7

Concepts and Principles:	**Key Terns:**
Measuring Distances	Stellar Parallax
Hertzsprung-Russell Diagram	Light Year
Stellar Evolution	Apparent Magnitude
Galaxies	Absolute Magnitude
Big Bang Theory	Red Shift
	Doppler Effect
	Hubble's Law

Figures to Study: 16.2, 16.6, 16.7, 16.8, 16.9, 16.10, 16.11, 16.14, 16.15, 16.16, 16.17, 16.19, 16.21, 16.22
Give it Some Thought: 2, 7, 8