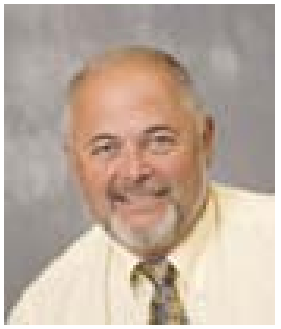
EAPS 10000 Y01
Online Course
Planet Earth

Prof. Lawrence Braile

Welcome to the EAPS 10000 Y01 online course
Planet Earth *(also known as EAPS 100)!*



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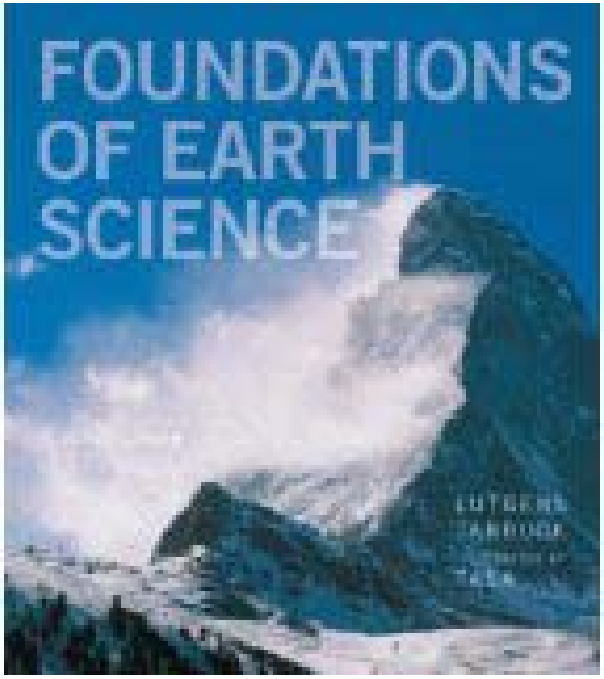
PURDUE UNIVERSITY

Earth Atmospheric Planetary Sciences

EAPS 10000 Y01 – Planet Earth (online course)
Week 1, Chapter I (pages 2-21, text)

Become familiar with the EAPS 10000 Y01 home page (Syllabus, Content, Updates, Hw and WA folders, Study Guide, etc.). When you have finished reading Chapter I (*that's Chapter I, for Introduction, not 1*), take the week 1 Chapter I quiz (be sure to read the Syllabus for more information on quizzes). The PPT files (converted to PDF are best viewed with the Full Screen view in browsers.

Textbook: *Foundations of Earth Science
Lutgens and Tarbuck, 7th Edition, 2014



Course Topics:

- Earth Science (Geology)
- Oceanography
- Atmospheric Science (Meteorology)
- Astronomy (Earth's place in the solar system and the universe)

- Be sure to get the 7th edition (2014) of the textbook

The ***Planet Earth*** course is an introduction to the Earth, ocean, atmospheric and astronomical sciences and is intended primarily for non-science majors. Course materials are available for enrolled students through Blackboard Learn (log in at: https://mycourses.purdue.edu/)

TEXTBOOK: *Foundations of Earth Science*, 7th Edition, Lutgens and Tarbuck, 2014 (be sure to get the **7th edition**; it is possible to use the 6th edition – the content is almost all the same – but it takes some extra work because not all page numbers and figure numbers are the same in the two editions). There is a brief **Study Guide** (6th edition; the 7th edition study guide will be available soon) to the textbook available at: http://web.ics.purdue.edu/~braile/EAS100online/studyguide7th.pdf (and in the **Course Content** area on **BB Learn**). You can obtain the textbook from local bookstores or you can purchase new or used copies online (such as amazon.com). It is also possible to rent an eText version (digital access for 6 months) of the text from coursesmart.com or other online sources. More information on editions, options and obtaining the textbook can be found at: http://web.ics.purdue.edu/~braile/eas100/Textbook.2014.pdf.

We will cover ~one chapter (selected pages) of the textbook per week. A summary of reading assignments and chapter information is available in the syllabus. Due dates for all assignments are in the **Due Dates** file on the EAPS 10000 Y01 **Course Content** page on Blackboard.

EAPS 10000 Y01 (online course) – *Planet Earth*

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Requirements and Expectations for the Course (also see course syllabus):

Read assigned pages in textbook (each week)

View PowerPoints with highlights of chapter material

Chapter quizzes (one each week)

View videos, animations, web links (some weeks)

Writing assignment (3; due ~every 5 weeks)

Homework assignments (6 during semester)

Exams (week 9 and finals week)

EAPS 100 – *Planet Earth*

Requirements and Suggestions for the Course:

Honor system – do your own work!

Keep up with assignments (reading in text, online chapter quizzes, viewing weekly chapter PowerPoints, animations, etc.)

Submit homework and writing assignments on or before due date (late homework and writing assignments are accepted with point value reductions)

Online courses require more independent work and therefore self motivation and commitment to learning and staying organized

EAPS 100 – *Planet Earth*

Week 1, Chapter I (not 1) Reading

EAPS 100 Online – Assigned Reading – Lutgens and Tarbuck, *Foundations of Earth Science*, 7th edition, Prentice Hall, 2011 (Not all pages in the text are included in the Assigned Reading).

Week	Chapter	Assigned Pages	Major Concepts	Important Terms
1	**I – Introduction to Earth Science**	2 – 21	Earth science, spheres, systems, scale, resources, environment, hazards, scientific inquiry	Lithosphere, hypothesis, theory, scientific method

Scale – the concept of scale is very important in the geosciences as we deal with very large and very small distances and time scales. Chapter I contains some good discussions and examples of scale.

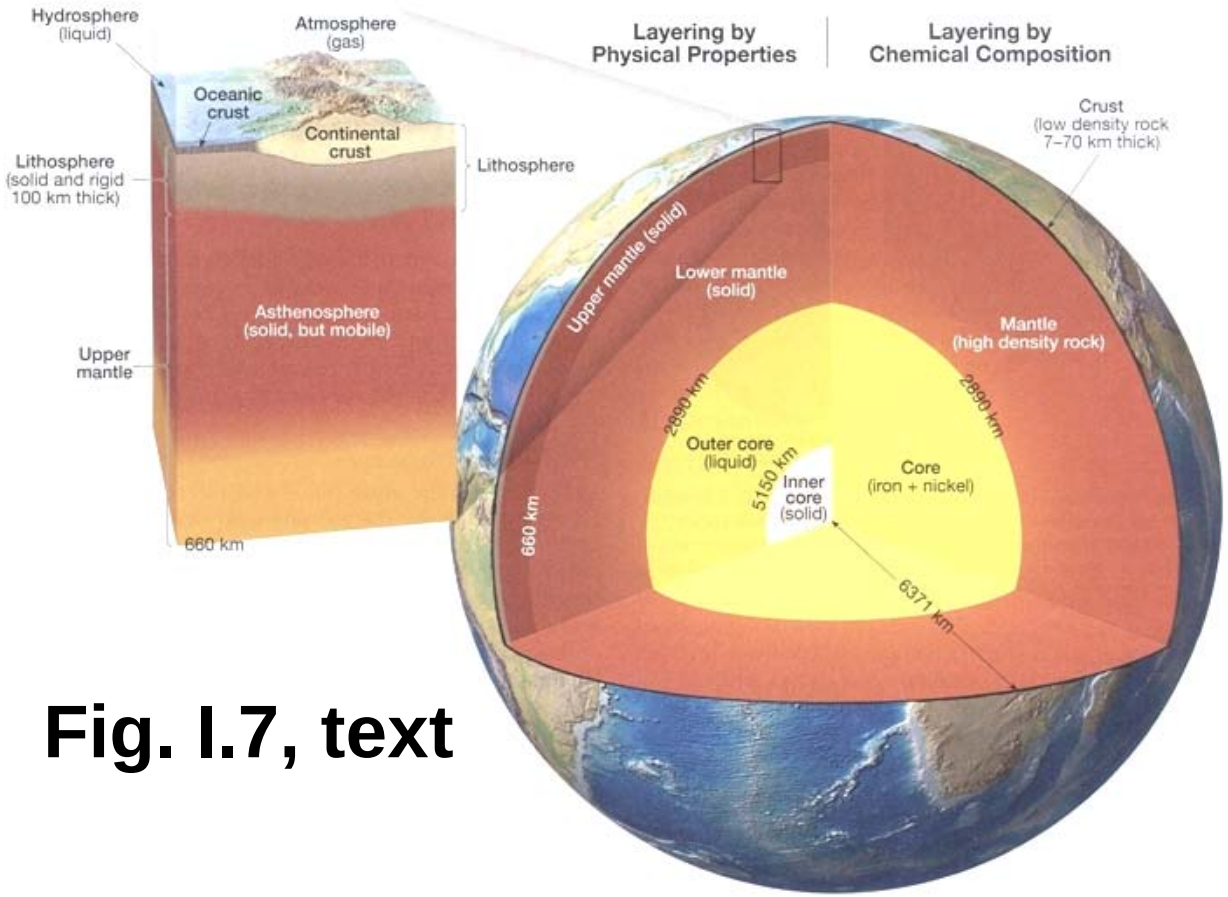


Fig. I.7, text

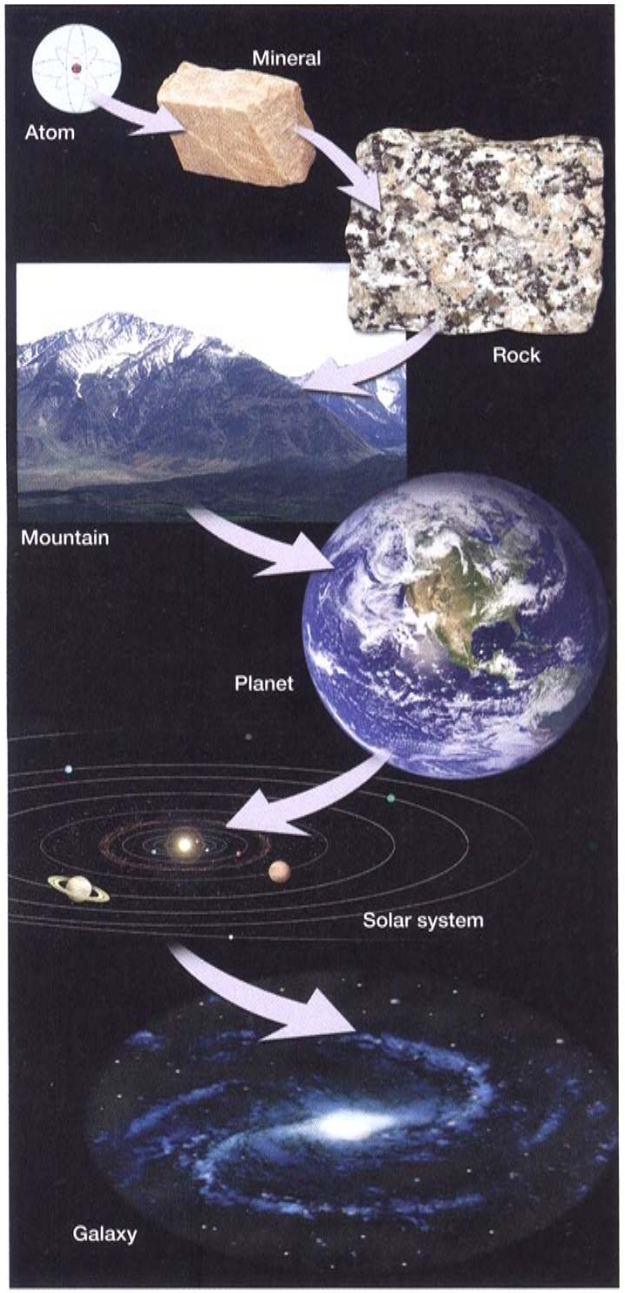


Fig. I.10, text

Scale – Deep time is significant in the geosciences, space science and astronomy. A geologic time analogy (Figure I.11) illustrates the vast age of the Earth back to the formation of the solar system about 4.6 billion years ago (4,600 million years ago). We know more about later time periods (since the end of the Precambrian, 542 million years ago). We will learn more about geologic time in chapter 8. The geologic time scale is illustrated here (Figure 8.22) for comparison to the calendar time model in Figure I.11)

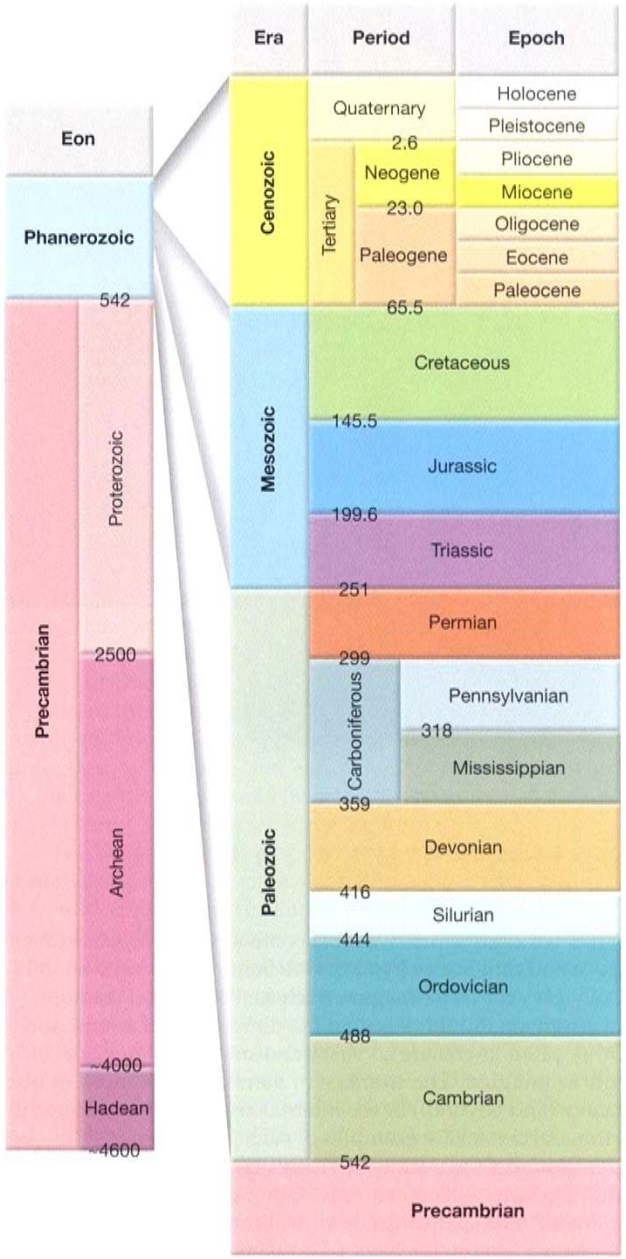


Fig. 8.22, text

Scale – examples of scale for microscopic (less than a nanometer) to the size of the Solar System (~9 x 10^9 km in diameter)

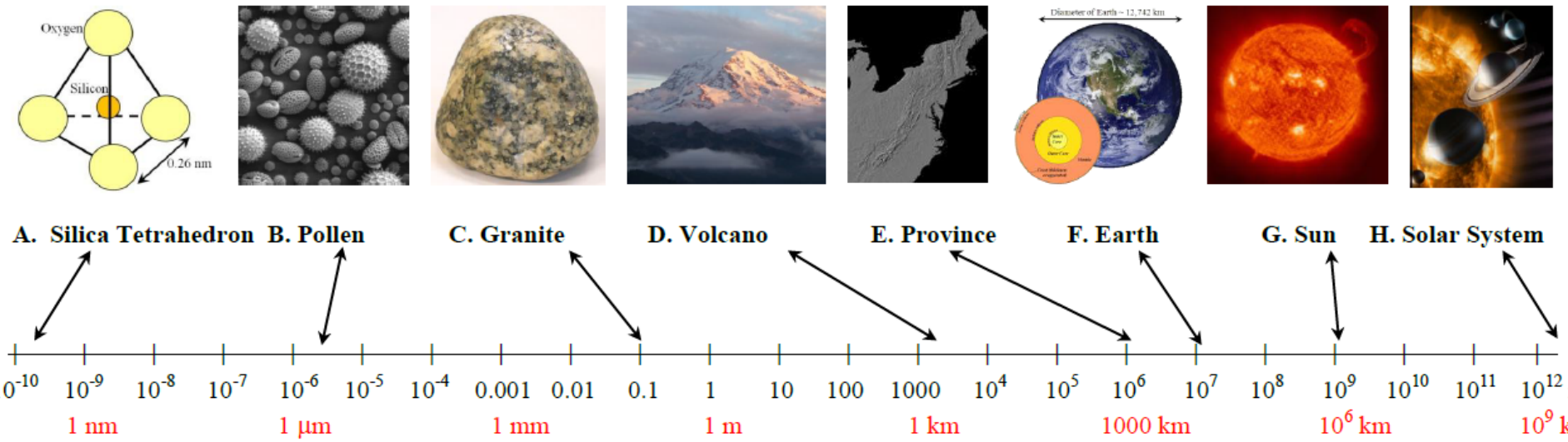
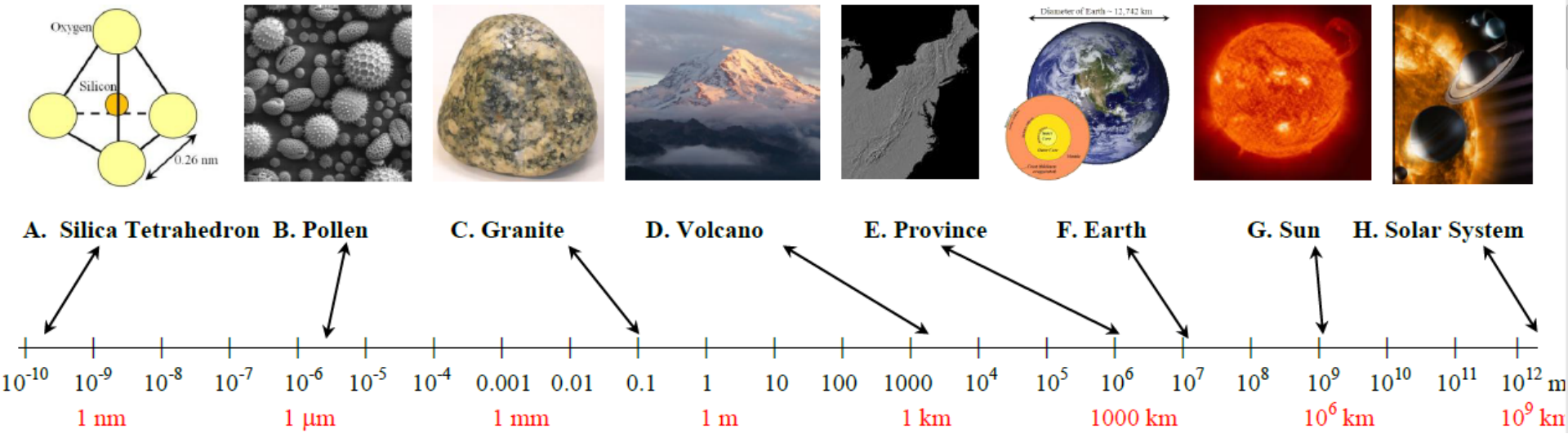


Figure 1. Examples of scale for Earth materials, the Sun and the solar system. The top line of numbers shows size on the powers-of-10 number line in meters (m). The bottom line shows size on the number line in commonly used units. Description of the images are given below:

- **A.** *The silica tetrahedron, one silicon atom bonded to four oxygen atoms, is the "building block" of silicate minerals that make up the majority of the solid Earth. The silica tetrahedron is about 0.26 nm in size.*
- **B.** *Scanning Electron Microscope image of pollen (Dartmouth Electron Microscope Facility, http://www.dartmouth.edu/~emlab/gallery/, http://trynanotechnology.com/pdf/explorenano.pdf). Largest spherical pollens are ~40 µm in diameter.*
- **C.** *"Hand specimen" of granite, about 10 cm in size – similar to the size of a tennis ball. Granite is a common igneous rock in the Earth's continental crust.*
- **D.** *Mt. Rainier volcano (National Park Service photo, http://www.nps.gov/mora/photosmultimedia/Views-of-the-Mountain.htm). The volcano is about 15 km in diameter and the peak has an elevation of 4,400 meters.*
- **E.** *The Appalachian Mountains province of the United States, about 2,000 km in length. Adapted from Landforms of the Conterminous United States - A Digital Shaded-Relief Portrayal, 1991, U.S. Geological Survey map I-2206, http://pubs.usgs.gov/imap/i2206/.*
- **F.** *Satellite image of planet Earth from NASA (http://visibleearth.nasa.gov/view_rec.php?id=2429) and cross section diagram showing the main spherical shells of the Earth's interior – crust, mantle, outer core and inner core (from http://web.ics.purdue.edu/~braile/edumod/threedearth/threedearth.htm). The Earth's diameter is ~12,750 km.*
- **G.** *Ultraviolet wavelength image of the Sun (NASA, http://www.nasa.gov/multimedia/imagegallery/image_feature_21.html). The diameter of the Sun is ~1.39 x 10^6 km (1.39 million kilometers).*
- **H.** *The Solar System – about 5 billion km from the Sun to the distant planets (http://solarsystem.nasa.gov/eyes/). (For comparison, the scale of the known universe is about 13.2 billion light years or about 125 x 10^{21} km [10^{21} km is a billion-trillion km!]. One light year – the distance that light travels in one year – is 9.4607 x 10^{12} km, or almost 10 trillion km!)*

Scale – examples of scale for microscopic (less than a nanometer) to the size of the Solar System (~9 x 10^9 km in diameter)

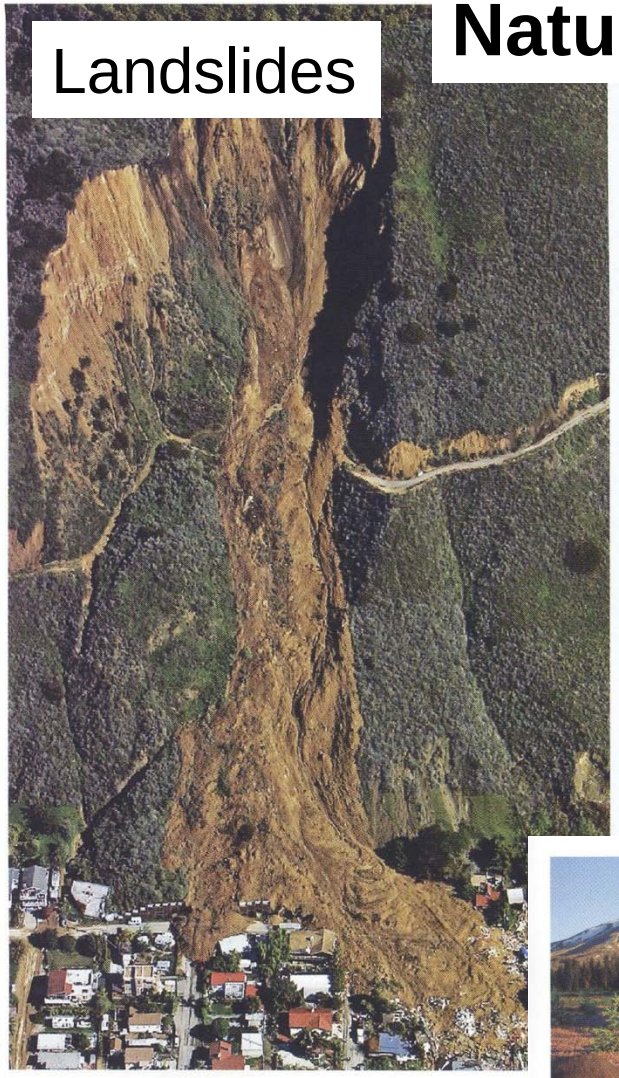


Also, please view (before taking the first Quiz – Qz I (that's an "I", not a one) the YouTube video *Powers of Ten* (http://www.youtube.com/watch?v=0fKBhvDjuy0, 9 minutes long, best viewed at full screen - click on icon in lower right corner of screen), an excellent illustration of the concept of scale and the nature of the universe.

Another useful animation of the scale of the universe is: *The Scale of the Universe 2* (http://htwins.net/scale2/); also on YouTube (http://www.youtube.com/watch?v=uaGEjrADGPA).

Natural Hazards

Landslides



Earthquake Damage

Fig. 6.1, text

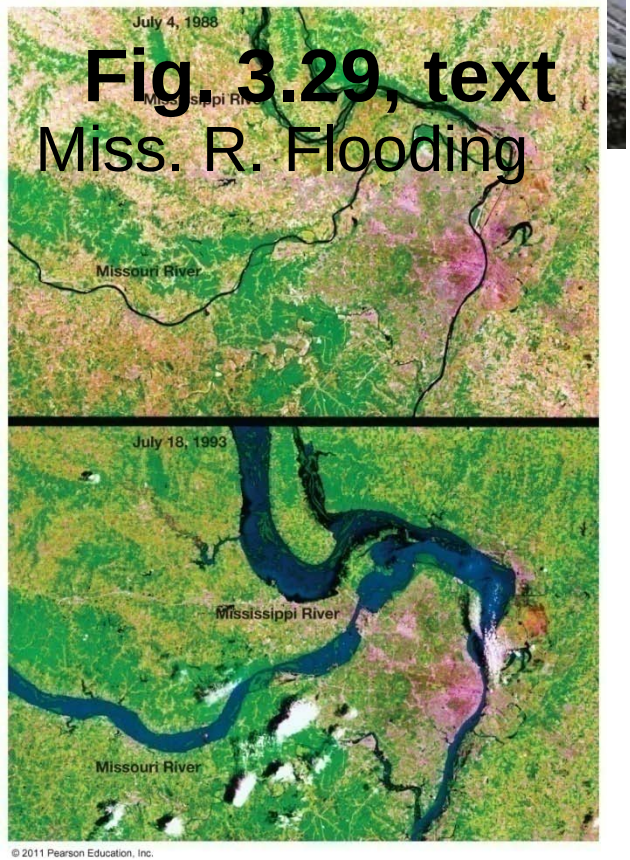


Fig. 3.29, text

Miss. R. Flooding

Fig. I.8, text

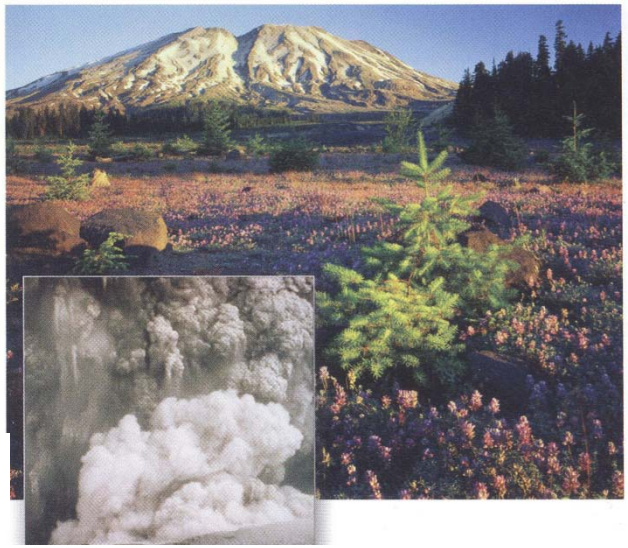
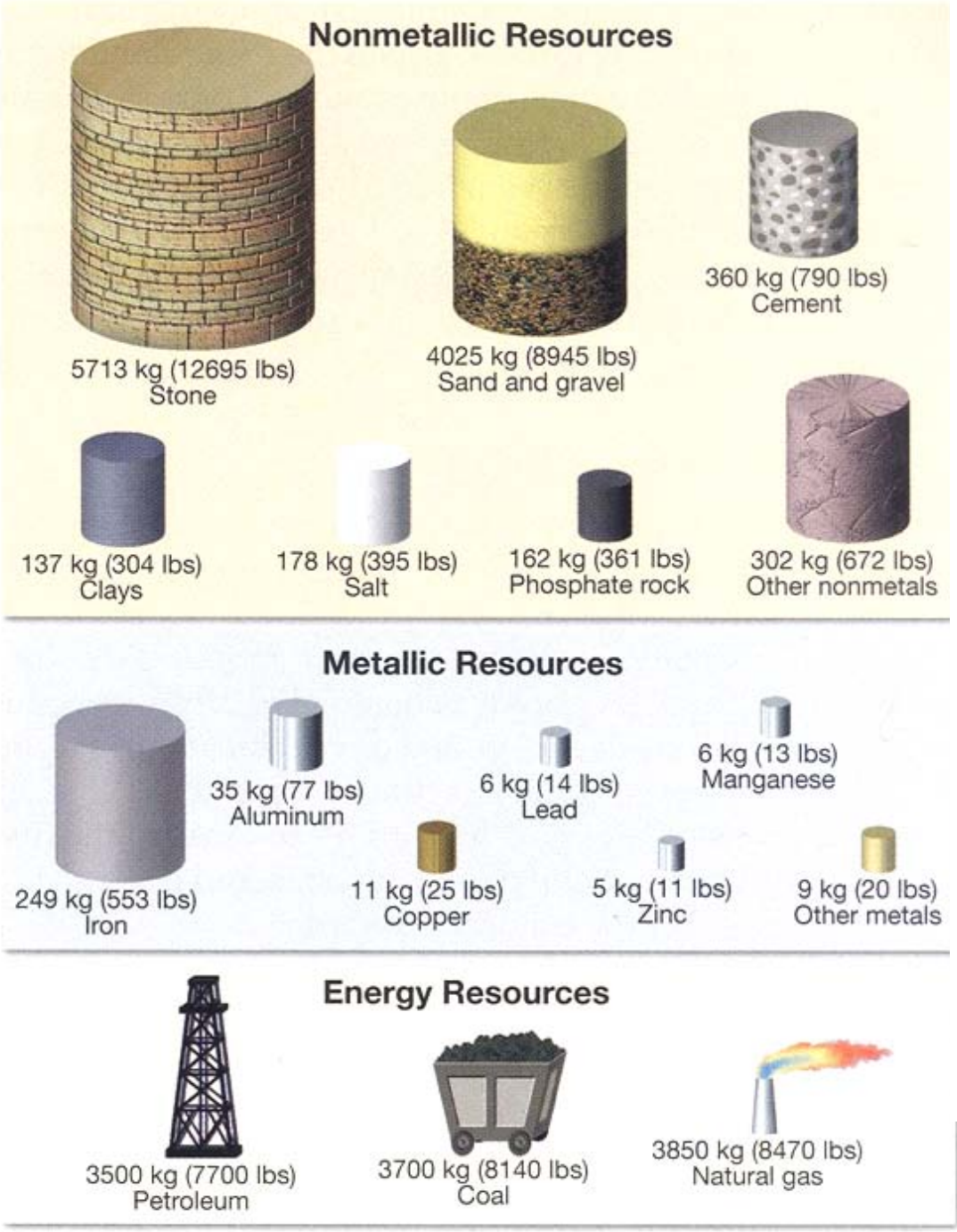


Fig. I.9, text

Volcanic Hazards



Natural Resources

We are increasingly dependent on limited natural resources from Planet Earth. The numbers in the Figure are the annual per capita consumption for the United States. You might say that you don't use 3500 kg (~900 gallons) of petroleum or 3700 kg of coal per year but that is the average per person in the U.S. and includes personal use and each person's share of public transportation, industrial and manufacturing consumption.

Fig. I.13, text