

Physical Science

Welcome to Physical Science 111 — General Course I. This section of Physical Science 111 is part of a learning community called: **Earth Abides: How Catastrophes Shape Our Planet & Touch Our Lives** ([View Course Poster](#)). Physical Science 111 meets from 8:30 am until 10:50 am on Monday and Wednesday in Room 3833. English 101, taught by Geoffrey Martin, meets 11:00 to 12:20 on Monday and Wednesday in Room 2961. Class begins August 25th. Physical Science 111 is a general science course for non-science majors and includes a laboratory. We will begin with the study of **meteorology**. We will then cover **astronomy**. This will bring us to mid-term. The second half of the semester will be the study of **geology**. Throughout this course we will carry out activities and assignments that reinforce the material you will be learning in English 101. Learning communities are a fantastic way to approach college. You will have an opportunity to know your classmates better, go on a couple of optional field trips, and have so much fun learning! We'll learn about blizzards, tornadoes, hurricanes, earthquakes, volcanoes, landslides, sinkholes, floods, and even near earth objects (meteor/asteroid collisions)!

Science and Natural Hazards

1. Science helps us predict hazards.
2. Knowing hazard risks can help people make decisions.
3. Linkages exist between natural hazards.
4. Humans can turn disastrous events into catastrophes.
5. Consequences of hazards can be minimized.

Definition of abide

abide (v.) Old English abidan, gebidan "remain, wait, delay, remain behind," from ge-completive prefix (denoting onward motion;) + bidan "bide, remain, wait, dwell". Originally intransitive (with genitive of the object: we abidon him "we waited for him"); transitive sense emerged in Middle English. Meaning "to put up with" (now usually negative) first recorded 1520s. Related: Abided; abiding. The historical conjugation is abide, abode, abidden.

Course Catalog Description

PHYSICAL SCIENCE 076 0111 - General Course I - Physical Science

Introduction to the scientific method, astronomy, geology, meteorology. Writing assignments, as appropriate to the discipline, are part of the course. Credit Hours: 4, 3 lecture hours and 2 lab hours per week based on sixteen weeks.

Instructor

Prof J. Walker
 Department Chair, Physical Science and Engineering
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I've been teaching at Truman College in Uptown, Chicago since 1982. Around the year 2000 I spent six years in administration, a valuable experience but ultimately not the path I wanted to follow. During the time that I was in administration I continued to teach courses in web development. I then returned to my first love - physical sciences.

I have a Master's Degree in Chemistry from University of Illinois, Urbana-Champaign. I am self-taught in programming and web development. I speak Spanish, French, Portuguese, Italian and some German. I am working on learning Arabic. My interests include: Chemistry, Cooking, Education, Foreign Languages, Physical Sciences (all of them!) Urban



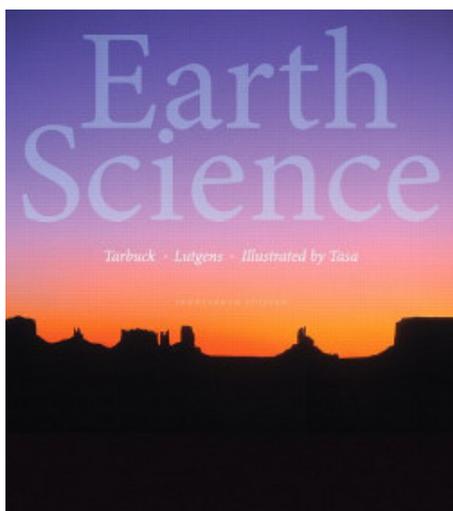
Gardening and Web Development (Visual Display of Information).

My experience has taught me that the ways students learn best depend on many factors. It is my opinion that a teacher must find the best approach for each individual. I've found that a high-tech, high-touch approach is very effective. Various technologies are a great tools for learning but virtual reality is no substitute for tactile, hands-on learning that occurs when we make something for ourselves or experience the world through the visceral senses of smell and touch. My approach requires **laboratory notebooks** or journals in my classes. I love to involve students in classroom demonstrations. I think laboratory work is extremely important in science. What I recommend for every student is to remember what it felt like to have the curiosity of a child - and find that curiosity again! The world is truly amazing.

I believe we are reaching a very important crossroads in the evolution of our species and a knowledge of the physical sciences will be essential.

We face serious challenges that are global in scope. We must learn to work together as humans for the greater good of our planet and humankind. What could be more important than understanding the nature of matter itself - what we all clearly have in common!

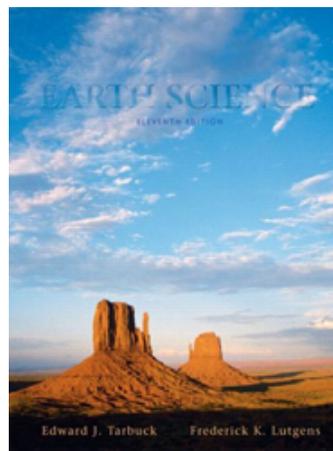
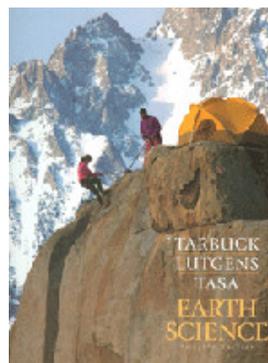
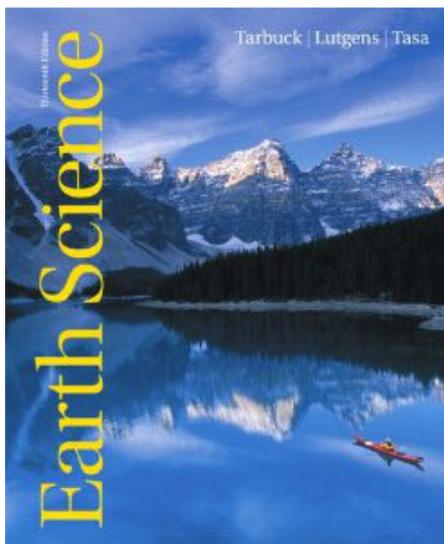
Textbook



Earth Science 14th Ed.

by Tarbuck and Lutgens, Illustrated by Tasa.

If you have an older edition of the textbook (11th, 12th, 13th) that will work just fine.



Recommended Links

General

[World Population](#)

[Google Earth](#)

This is a very powerful program that "provides satellite imagery, maps, terrain and 3D buildings to put the world's geographic information at your fingertips." The newest version included Google Sky! This program continues to amaze and delight me.

[Geology News](#)

Pulls together geology news from many sources.

[The landscape of natural disasters](#)

[USGS Public Lectures](#)

[3-D images of National Parks](#)

[Natural Disasters and Severe Weather](#)

Scale of Measurement

[Powers of Ten](#)

[Timescale](#)

[How small is an atom](#)

[The scale of things](#)

Weather

[National Hurricane Center](#)

Includes RSS feeds for up-to-date information about current tropical storms and hurricanes.

[Tornado History Project](#)

[Incredible tornado video from Mulvane, KS on June 12, 2004](#)

[Ozone Hole Watch](#)

[List of Cloud Types with Images](#)

[Aviation Weather](#)

Astronomy

[3-D Tour of the Solar System and our Planet - Requires Red/Blue 3-D glasses](#)

[Video: Carolyn Porco shows images from the Cassini voyage to Saturn](#), focusing on its largest moon, Titan, and on frozen Enceladus, which seems to shoot jets of ice.

[Astronomy Planetarium and Star Mapping Program - Free](#)

This program allows you to see star charts for any time, any day and any perspective on the planet. There are many options available as to the number of objects in view and the types of labels and grids provided.

[Night Vision](#)

Another planetarium program that is free and easy to use.

[NASA: National Aeronautics and Space Administration](#)

A few of the activities on this website: You can see the latest Hubble Space Telescope Science Institute images, take a tour of the solar system and visit the lunar eclipse page.

[Wonders of the Solar System](#)

[Solar and Heliospheric Observatory \(SOHO\)](#)

[Best of SOHO Movies](#)

[Near Earth Objects](#)

Minerals and Rocks

[Minerals](#)

An extensive database of minerals ordered by name or by class.

[Common Minerals and Their Uses](#)

[Ulexite or Satin Spar?](#)

[Tell Me Why - Gems, Metals and Minerals \(video\)](#)

[Rocks \(video\)](#)

[The Rock Song \(video\)](#)

Maps

[Topographical Map of Illinois](#)

[Historical Topographical Maps](#)

[Illinois State Geological Survey](#)

An excellent resource for geological maps of Illinois.

[3D anaglyphs: North Dakota State University](#)

A Rocky Bluff
The Grand Canyons
A brook
A river bank

Rivers and Lakes

Rivers - Wikipedia

Origins, Topography, Uses, Biology, Flooding, Mechanics, Management, Links to information about major rivers

Lake Peigneur: The Swirling Vortex of Doom

Caves and Groundwater

Mine of Naica: Largest Crystals in the World This is a short video. You can also [read about these crystals](#).

Bill Stone explores the world's deepest caves

Models of caves and karst topography

Glaciers

Extreme Ice Survey

Glacier Terminology

Glacial terms are illustrated with beautiful photographs.

Wisconsinian Glaciation

Explains some local phenomena including Starved Rock.

Glaciers and Clacial Warming, Receding Glaciers

The Antarctica Challenge and other videos and photos about glaciers.

Earthquakes and Volcanos

National Earthquake Information Center - NEIC

Volcano World

This Dynamic Planet: Interactive Map

Stromboli > Volcanos of the World

New Madrid Fault

Earth's Core

Earth's Core

Geological Time

Video on Relative Dating

Truman College Mission Statement

"Our Mission dedicates us to deliver high-quality, innovative, affordable and accessible educational opportunities and services that prepare students for a rapidly changing and diverse global economy."

FERPA

FERPA (Family Educational Rights and Privacy Act) is a federal law that protects the privacy of student educational records: <http://www.ed.gov/policy/gen/guid/fpco/ferpa/index.html>. Faculty cannot reveal information about students, or discuss student records over the phone or unsecure e-mail. CCC student e-mail meets FERPA requirements.

Student Services

The [Student Services Department](#) provides a broad range of services to assest students in achieving their academic and life goals.

Students with Disabilities

The [Truman College Disability Access Center \(DAC\)](#) verifies needs pursuant to the American Disabilities Act (ADA), determines student academic accommodations, and issues accomodation letters. Phone number: (773) 907-4725. Linda Ford is the director. The DAC is located in Room 1435, Main Bldg.

Tutoring Center

The [tutoring center](#) is located in room 177, Larry McKeon Student Services Building, (773) 907-4785 or (773) 907-4790.

TRIO Student Support Services

TRIO is for low-income students, first generation college students, or students with disabilities who need academic support: (773) 907-4797, Room 1435, Main Bldg. Registration is required at the start of each semester.

Student Success and Leadership Institute (SSLI)

SSLI is for students who need various other support services to achieve their educational goals: (773) 907-4737, Room 1435, Main Bldg.

Wellness Center

The **Wellness Center** provides a variety of services at no cost for students including counseling, crisis intervention, support groups and more. (773) 907-4786, Room 1946, Main Bldg.

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SYLLABUS

Week	Topic	Text Reference
Week 1: 08-25	Overview of the Course. The Nature of Scientific Inquiry. Earth's Spheres. Scales of Measurement. Systems and Energy.	Chapter 1
Meteorology		
Week 1: 08-27	The Atmosphere: Composition, Structure and Temperature Weather and Climate, Height and Structure of the Atmosphere, Earth-Sun Relationships, Mechanisms of Heat Transfer, The Greenhouse Effect, Cloud Cover and Albedo, World Distribution of Temperature	Chapter 16 LAB: Air and Air Pressure
Week 2: 09-01	Labor Day Holiday	
	Moisture, Clouds and Precipitation: Phase Changes of Water, Relative and Absolute Humidity, Dew Point, Stability and Instability of Air Masses, Classification of Cloud Types, Precipitation	Chapter 17 LAB: Cloud Journal: directions cover page
Week 3: 09-08	, Air Pressure and Wind: Measuring Air Pressure, Idealized Global Circulation, Local Winds, Land and Sea Breezes	Chapter 18 LAB: Using the NOAA website
	Weather Patterns and Severe Storms: Types of Air Masses, Fronts, Cyclones and Anti-cyclones, Thunderstorms, Tornadoes, Hurricanes	Chapter 19 LAB: Tracking Hurricane Katrina
Week 4: 09-15	Climate	Chapter 20 LAB: To Be Announced
	Quiz One	Chapters 16 to 20 Cloud Journals are Due
Astronomy		
Week 5: 09-22	Origin of Modern Astronomy: Early Greeks, Ptolemaic System, Copernican System, Kepler's Laws, Galileo, Constellations, Rotation, Revolution, Precession, Phases of the Moon	Chapter 21
	Touring Our Solar System: Terrestrial Planets, Jovian Planets, The Moon, Asteroids, Comets, Meteoroids	Chapter 22 LAB: Relative Distance of the Planets
Week 6: 09-29	Light and the Sun: Nature of Light, Spectroscopy, Doppler Effect, Telescopes, Structure and Composition of the Sun	Chapter 23 LAB: Night Vision
	Beyond the Solar System: Stellar Brightness, Hertzsprung-Russell Diagram, Variable Stars, Interstellar Matter, Stellar Evolution	Chapter 24
Week 7: 10-06	Quiz Two	Chapters 21 to 24
	Exit Exam Part One: Meteorology and Astronomy	Chapters 16 to 24
Geology		
Week 8: 10-13	Minerals: Definition, Atomic Structure, Properties, Abundance, Mining	Chapter 2 LAB: Identification of Minerals
Week 9: 10-20	Rocks: The Rock Cycle, Igneous, Metamorphic, Sedimentary, Ores	Chapter 3 LAB: Identification of Rocks
Week 10: 10-27	Weathering, Soil and Mass Wasting: Weathering, Soil Formation, Types of Mass Wasting	Chapter 4 LAB: Map Reading Latitude and Longitude Contour Lines

Week 11: 11-02	Running Water and Groundwater: The Hydrologic Cycle, River Systems, Work From Running Water, Erosion, Deposition, Floods, Storage and Movement of Groundwater, Springs and Wells, Contamination	Chapter 5
	Glaciers, Deserts and Wind: Gacial Erosion, Landforms, Glacial Deposits, Ice Ages, Evolution of a Desert, Dunes	Chapter 6 LAB: Geological Models: Models 4 and 6 - Glaciers
Week 12: 11-09	Quiz Three	Chapters 1 to 6
	Plate Tectonics: Continental Drift, Plate Boundaries, Hot Spots, Mechanisms	Chapter 7
Week 13: 11-16	Earthquakes and Earth's Interior: Faults, Foreshocks and Aftershocks, Seismology, Scales, Tsunamis, Subsidence, Earth's Layers	Chapter 8 LAB: Earthquake Data (Computer Simulation)
Week 14: 11-23	Volcanoes: Flows, Gases and Pyroclastics, Types of Volcanoes, Volcanic Landforms, Plate Tectonics and Vulcanism	Chapter 9 LAB: Geological Models - Volcanoes and Mountains
Week 15: 11-30	Mountain Building: Folds, Faults, Types of Mountain Ranges, Isostasy, Joints	Chapter 10 LAB: Clay Models
	Geological Time: Relative Dating, Law of Superposition, Cross-Cutting Relationships, Inclusions, Principle of Original Horizontality, Unconformities, Disconformity, Fossils, Radiometric Dating, The Geologic Timescale	Chapter 11 LAB: Simulation of Radioactive Decay
Week 16: 12-07	Quiz Four	Chapters 7 to 11
	Exit Exam Part Two: Geology	Chapters 1 to 11

Laboratories: All laboratory exercises are provided as handouts. There is no lab manual for this course.

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Physical Science 111 Grading Policy

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Your Grade will be based on laboratory reports and activities (40%), quizzes (best 3 out of 4) (30%), Exit Exam (Part One and Part Two) * (20%) and attendance/class participation/homework (10%).

GRADING SCALE

Letter Grade	Percentage
A	90%
B	80%
C	70%
D	60%
F	below 60%
I	*Incomplete
ADW	**Administrative Withdrawal
NSW	***No Show Withdrawal

*"I" (Incomplete) are non-grades received by students who have actively pursued the course and are doing passing work at the end of the course, but who have not completed the course's final examination and/or other specific course assignments.

**ADW (Administrative Withdrawal). Any student who is not actively pursuing the course objectives will be administratively withdrawn from the course at mid-term. An ADW will be given if a student does not complete at least 70% of all assignments; homework, exams, laboratories, quizzes due prior to mid-term by the mid-term date. Since make up work is NOT permitted this means that attendance is extremely important and excessive absences will most likely result in an ADW.

***NSW (No Show Withdrawal). Any student who misses the first two classes and does not discuss with me the circumstances of these absences will be given an NSW after the second class. A student who attends the first class and then fails to attend the next two classes and fails to discuss with me the

circumstances of these absences will be given an NSW. Any student who misses more than half of the classes in the first two weeks of the term will also be given an NSW if we do not discuss the circumstances of these absences. In my discussion with you I will determine if it is feasible for you to successfully pursue the course objectives under whatever circumstances are causing you to miss class. Your success is very important to me and I know, from years of experience, that your success depends on your commitment and ability to attend the class and participate in all activities.

* You must correctly answer 20/50 questions on the Exit Exam (sum of correct answers on both parts) to receive a "C" or better in this course. Passing the Exit Exam does not guarantee passing the course.

Make-Up Policy

Make-Up work is not permitted under any circumstances. This includes but is not limited to hospitalization, deaths in the family, illness, family emergencies. Life happens to everyone. This is why some quizzes, one exam and one laboratory are dropped from your grade with no penalties. If circumstances arise that prevent you from actively participating in all aspects of this course please let me know. There is no substitute for attending classes regularly and on time. Please choose someone else in the class that will be able to exchange notes with you in the event either of you misses class. You are responsible for all missed announcements, assignments and class work. Please do not use the phrase "I didn't know" to excuse any missed work. Check the website often. Announcements and assignments are posted and updated regularly.

Success in the Laboratory

Preparation: The moment lab begins is **not** an ideal time to begin to read a laboratory. You need to read the laboratory ahead of time and look up the meaning of any unfamiliar vocabulary.

Lab Reports: Laboratory reports are formal writing assignments and need to be taken seriously. You are expected to turn laboratory reports in on time, with all questions answered clearly and legibly and all pages neatly stapled (not folded or mutilated) together. Points will be deducted for late reports, messy reports, incomplete sentences and poor grammar/spelling, handwriting that is difficult to read. Points will also be deducted for errors in content.

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General Education Goals Established by Truman College

Taking a course in Physical Science helps a student achieve all of the following general education goals. How this occurs is explained below.

- communicate effectively in both written and oral forms
 - Students will keep a homework notebook. Students will write short essays after viewing films about volcanoes, caves, floods, hurricanes and other appropriate subjects. Students will keep a cloud journal.
- gather, interpret and analyze data
 - Students will learn to collect data in the laboratory, create graphs, compare qualitative and quantitative data and draw conclusions about the data obtained.
- demonstrate the ability to think critically, abstractly and logically
 - The Scientific Method is predicated upon deductive and inductive logical reasoning. Students will study applications of the scientific method to information gathered by the scientific community. Students will use the scientific method during laboratory activities.
- work with a variety of technologies
 - Students use computers, digital imaging devices, media, the Internet, podcasts, all in the pursuit of scientific knowledge.
- exhibit social and ethical responsibility
 - This very serious goal is addressed on many levels in the physical science course, from the discussion of the factors that brought about the destruction of New Orleans during hurricane Katrina to the problems with disappearing groundwater. Many references are made to the connection between geology, meteorology and astronomy to social and ethical responsibility.
- perform productively in the workforce
 - Organizational skills are improved in this general education course. Scientific literacy is developed.
- demonstrate the ability to learn independently
 - Students are given independent projects to complete in the course. They are also given questions to research independently. Reporting these results to the class develops their ability to speak confidently to their peers.
- gain awareness of their role in the global community
 - By discussing the way that physical science is connected to other occupations and careers we develop student awareness about their career choice and its dependencies on a basic understanding of the general science.

Physical Science and Engineering Departmental Learning Outcomes

Upon graduation with an Associate degree from Truman College a student should be able to:

- Organize, analyze and interpret information and use the scientific method to make inferences.
- Exhibit knowledge of scientific concepts through written and oral communication.
- Demonstrate excellent laboratory skills and techniques including the proper use of relevant instruments and related technologies.
- Use the lexicon of science to explain abstract scientific concepts.
- Relate concepts learned in Physical Science and Engineering Department classes to real world situations.

Student Learning Outcomes for Physical Science 111

At the completion of this course the successful student will be able to do the following:

- Relate information obtained in the course to current stories in the media about geological, meteorological and astronomical phenomena
- Describe the role the scientific method has played in arriving at our current theories about Earth Science.
- Read and interpret a variety of maps: topographical, meteorological, geographical
- Discuss the historical development and present rational arguments for our current state of knowledge in the Earth sciences

Course Objectives for Physical Science 111

At the completion of this course the successful student will be able to do the following:

In Geology:

- Differentiate between minerals and rocks and identify many of the common rocks.
- Classify types of rocks and draw the rock cycle.
- List causative agents and products of various types of erosion.
- Describe the causes and results of diastrophism.
- Classify earthquake waves, faults and types of unconformities.
- Use the laws of geology to determine the relative age of rock structure.
- Describe the gross structure of the Earth, i.e., crust, mantle, core.
- Sort and identify a mixture of minerals according to their physical properties
- Identify geological land forms and describe their origin.
- Relate diastrophism and land forms to tectonic plate motion.

In Meteorology:

- Describe the structure and composition of the atmosphere.
- Describe atmospheric circulation patterns.
- Read simple weather maps and identify fronts, air masses and wind direction.
- Describe the movement of air about high and low pressure centers.
- Use principles of air mass and frontal movement to predict weather in various parts of the U.S. using maps and weather satellite information.

In Astronomy:

- Give evidence of the sphericity, rotation and revolution of the Earth.
- Use latitude and longitude to identify geographical and time zones on Earth.
- Describe the motions of the Earth and the Moon in their orbits
- State and explain the various cosmological models.
- List Kepler's Laws.
- Use scale models as they relate to astronomical systems.
- List types of stars and describe the process of stellar evolution.
- Describe composition, structure, and possible origin of the solar system.
- Describe the structure and evolution of the universe.

Generally:

- Use laboratory equipment to perform experiments and demonstrations.

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