

# P · H · Y · S · I · C · A · L G · E · O · L · O · G · Y

*An Earth Science Course that Rocks!*

From Dallas TeleLearning, a media-rich 4-credit ONLINE **Physical Geology** course with integrated ONLINE lab. This first-of-its-kind earth science design combines interactive activities, Flash animations, integrated video modules and test banks to create a rigorous and comprehensive lab science course with the goal of teaching:





- **Critical thinking skills**
  - **Data collection**
  - **Scientific process**

**Physical Geology** places a strong emphasis on plate tectonics, mineral and rock identification, and topographic map skills --- immersing students in the scientific world of geology while answering the question --- *“Why does this matter to me?”*

## Online Course Components include:

1. Course Orientation
2. Interactive Flash activities
3. Multi-level Flash animations
4. Video modules & lab demos
5. Self-assessment activities
6. Online lab manual
7. Glossary
8. Global Resources - key concept animations easily accessible throughout the course
9. Faculty guide & sample syllabus - includes ideas for discussion boards and web searches
10. Test bank

**The course structure consists of 15 lessons and 15 labs, online lab manual, custom-designed lab kit (purchased by students) and textbook of your choice.**

- **Modules easily integrate** with campus learning management systems so instructors have the option of modifying lesson sequence and assignments however they choose. 
- **Online faculty guide** offers tips, techniques, and best practices to ensure success with the course.
- **Sample syllabi** for a variety of textbooks, or the available syllabus can be easily adapted to your current textbook. 
- **Interactive activities** reinforce textbook material, present new information, facilitate learning of geological terminology, reinforce mineral and rock properties, and promote safety awareness.
- **Flash animations** and **audio** illustrate and clarify geologic concepts and processes through sequential motion graphics. 
- **Integrated videos** expand on lesson specific topics by presenting national and global experts in short mini-documentaries.
- The **“LabPartner” video segments** offer a reassuring figure to demonstrate procedures, anticipate questions and encourage students as they become familiar with the scientific process.
- Each lesson includes a **self-assessment quiz**  to check progress and a **test bank** for instructors.



## LESSONS

## LABS

# Lesson & Lab Summaries

**1 Introduction & Plate Tectonics** introduces the science of geology and its history; relates geology to everyday life; introduces earth systems and sub-systems (rock cycle and hydrologic cycle); explains the theory of plate tectonics and plate boundaries.

**2 The Seafloor** compares oceanic and continental crusts; discusses oceanic crust structure and composition; types of continental margins; deep ocean features and the effects of plate tectonics on the seafloor; ocean reefs.

**3 Minerals** defines minerals and discusses the common rock-forming minerals; covers basic atomic structure and chemical bonding; details silicates and other mineral groups; relates minerals to the rock cycle.

**4 Igneous Rocks** uses the rock cycle to explain how igneous rocks form and their significance in everyday life; discusses features and characteristics of mafic and felsic rocks; explains Bowen's Reaction Series; discusses the properties and behavior of magma and lava that cause mafic and felsic igneous rocks to form; covers plutons.

**5 Volcanoes & Volcanism** relates volcanic activity to plate tectonic process and boundaries; explains types of volcanoes (shield, cinder cone, composite) and their properties; discusses other volcanic forms - lava domes, calderas, fissure eruptions.

**6 Weathering, Soil, & Sedimentary Rocks** explains the processes that create sediment and move it through the rock cycle to form sedimentary rocks; discusses soil formation and composition; explains relationship between depositional environments and sediments; describes lithification process.

**7 Metamorphism & Metamorphic Rocks** explains metamorphism within the rock cycle; identifies the three agents of metamorphism; discusses metamorphic grades and facies; relates metamorphism to plate tectonics activity and plate boundaries; discusses natural resources from metamorphic rocks.

**8 Deformation & Mountain Building** explains and details rock deformation resulting from stress and strain; discusses geologic formations resulting from deformation; covers mountain building along divergent and convergent boundaries, intrusion, uplift, block faulting, and isostatic rebound.

**9 Earthquakes & the Earth's Interior** explains the Elastic Rebound Theory; discusses location and frequency of earthquakes; explains seismology and the types of seismic waves; covers earthquake epicenters, size and strength; explores the earth's interior, explaining the structure and composition of the crust, mantle, and core.

**10 Mass Wasting** defines mass wasting and its impact on everyday life; identifies the factors that influence mass wasting - slope angle, weathering and climate, water content, vegetation, overloading; discusses trigger mechanisms; explains the types of mass wasting, identifying movement and material in falls, slides, and flows.

**11 Deserts & Winds** discusses how wind transports sediments; explains the types of wind erosion and deposits; details types of dunes and loess; discusses the characteristics of deserts and the landforms found in deserts; relates material to earth's subsystems - lithosphere and atmosphere.

**12 Running Water** revisits the hydrologic cycle and focuses on the role running water plays in eroding, transporting, and depositing sediments; discusses sheet flow, channel flow, gradient, velocity, and discharge; details types of deposits; discusses flood control, drainage basins, and patterns; explains graded streams and the effects of running water on valleys.

**13 Groundwater** discusses role of groundwater in the hydrologic cycle; explains the absorption properties of earth's materials and water table zones; details groundwater movement, springs, water wells, and artesian systems; explains how groundwater can erode and deposit material; explores the results of lowering the water table through saltwater incursion or subsidence.

**14 Glaciers and Glaciation** defines glaciers, how they form and move, distinguishes types of glaciers; explains glacial budget, erosion, transport and deposit sediments; discusses landforms composed of glacial till and stratified drift; looks at ice ages and short term climactic events.

**15 Shorelines** discusses the forces of waves, tides, and nearshore currents on shorelines; explains deposition along shorelines - beaches, spits, bars, and barrier islands; covers shoreline erosion and coastal management; explains depositional and erosional coasts, and submergent and emergent coasts.

**1 Topographic Maps** - Introduces basic map skills and topographic maps; activities include identifying map symbols, creating topographic profiles and contours.

**2 Seafloor Spreading** - Activities include calculating seafloor spreading rates in the Mid-Atlantic and Pacific Oceans; using map skills to create a seafloor profile of an active and a passive margin; reinforces map skills by identifying seafloor features.

**3 Mineral Identification** - Defines physical properties of minerals and explains how each is used in the mineral identification process. Student uses decision tree to identify mineral samples in lab kit.

**4 Igneous Rock Identification** - Videos explain the igneous rock identification process - texture and composition, phaneritic and aphanitic. Activities review mineral ID and match minerals to igneous rocks, identify textures, classify rocks, and use decision tree to identify igneous rock samples from lab kit.

**5 Volcanoes** - Activities require students to use topographic and bathymetric map skills to draw topo profiles and calculate slope and relief of various volcanic landforms.

**6 Sedimentary Rock Identification** - Videos explain how to classify and identify sedimentary rocks using texture and composition. Activities review minerals and match minerals to sedimentary rocks; identify sedimentary textures. Student uses decision tree to identify sedimentary rock samples from lab kit.

**7 Metamorphic Rock Identification** - Classifies and identifies metamorphic rocks using texture and composition. Activities review minerals and match minerals to metamorphic rocks; identify metamorphic textures. Student uses decision tree to identify metamorphic rock samples from lab kit.

**8 Structural Deformation** - Video illustrates how to use play-doh to simulate stress and strain on geologic formations. Activities require student to use play-doh to simulate deformation processes and complete lab form with deformation sketches.

**9 Earthquakes** - Activities require completion of "Virtual Earthquake" exercise and calculating the epicenter of earthquakes; completing a Mercalli scale exercise; working with a Seismic Risk Map; possible web research on specifics of recent earthquakes.

**10 Mass Wasting** - Topographical map analysis and activities about landslides and slumps; activity comparing pre- and post-slide gradients; calculation of angle of repose.

**11 Deserts & Winds** - Student uses map skills to complete activities interpreting maps -- drawing topographical contours; identifying features of desert landscapes, dune types, and wind direction.

**12 Running Water** - Map skills used in activities that require outlining drainage basins of rivers; interpreting topographical maps to calculate discharge rates, velocity, and gradient of rivers; detailed exercise on one specific river - calculate discharge rate, velocity, gradient, drainage system, depositional pattern.

**13 Groundwater** - Student uses map skills to construct contour map of an aquifer water table; Q&A activity based on topographical map of subsidence; video demos experiment about the effects of grain size and sorting on permeability; identification and topo map profiles of karst landforms.

**14 Glaciers and Glaciation** - Detailed map exercises to identify glacial features, construct topographic profiles, calculate slope and relief; locating and labeling moraines; constructing topo profiles of moraine features; identifying erosional and depositional features on topo profile.

**15 Shorelines** - Student uses map skills to identify, label and do Q&A about coastal features including sediment deposits, fluvial deltas, wave action, estuaries; distinguish features of submergent and emergent coastlines.