CAREER PATHS

Geology

Sarah Hendrickson - Jenny Dooley

Express Publishing

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Book 1

Express Publishing

Scope and Sequence

Unit	Topic	Reading context	Vocabulary	Function
1	Geology	Webpage	astronomy, biology, chemistry, educational, environmental, geology, historical geology, history, industrial, physical geology, physics	Asking about preference
2	Traits of a Scientist	Cover letter	analytical, broad, creative, critical thinker, dedicated, Earth science, expertise, focus, interdisciplinary, life science, logical, thorough	Reacting to good news
3	History of the Earth	Flyer	celestial body, collision, evolution, particle, planet, planetesimal, solar nebula, solar system, sun, terrestrial	Giving an explanation
4	Parts of the Earth	Textbook chapter	atmosphere, biosphere, core, crust, geosphere, hydrosphere, lithosphere, mantle, stratosphere, troposphere	Correcting a mistake
5	Landforms	Webpage	canyon, escarpment, hill, island, lake, mountain, peninsula, plain, plateau, pond, river, tributary, valley	Discussing plans
6	Describing Geologic Time	Email	age, ago, ancient, BYA, eon, epoch, era, geologic time scale, MYA, period, present	Expressing certainty
7	Measuring Geologic Time	Textbook chapter	absolute dating, carbon-14 dating, correlation, decay, fossil, half-life, hiatus, radiometric dating, relative dating, tree-ring dating, unconformity	Describing differences
8	Measurements 1	Guide	centimeter, convert, foot, imperial, inch, kilogram, kilometer, length, meter, metric, mile, pound, ton, tonne, weight	Questioning accuracy
9	Measurements 2	Note	acre, area, Celsius, degree, Fahrenheit, gallon, hectare, kelvin, liter, scale, temperature, volume	Expressing confusion
10	SI Units	Poster	amount, base unit, derived unit, force, joule, molar mass, mole, newton, pascal, pressure, SI	Asking for assistance
11	Numbers and Basic Math	Chart	add, divide by, equal, -hundred, less, minus, multiply by, over, plus, subtract, times	Making a calculation
12	Large Numbers	Note	cubed, exponent, integer, leading zero, place, rounding error, scientific notation, significant figure, squared, to the nth power, trailing zero	Making an apology
13	Analyzing Quantities	Guide	decimal number, fraction, improper fraction, mixed number, -out of-, percent, point, quantity, reduce, whole number	Making a realization
14	Tables and Graphs	Report summary	bar graph, column, legend, line graph, pie chart, row, scatter plot, table, x-axis, y-axis	Expressing a lack of understanding
15	Describing Change	Article	climb, decline, decrease, expand, fluctuate, increase, plummet, rise, shrink, stabilize	Expressing concern

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Book 2

Express Publishing

Scope and Sequence

Unit	Topic	Reading context	Vocabulary	Function
1	The Scientific Method	Report	conclusion, control group, experiment, experimental group, hypothesis, independent variable, observation, problem, result, scientific method, testable	Expressing surprise
2	Properties of Matter	Guide	atom, compound, electron, element, gas, ion, isotope, liquid, matter, molecule, neutron, proton, solid, subatomic particle	Expressing uncertainty
3	Energy	Course Description	act on, chemical energy, conserve, electromagnetic radiation, energy, heat, kinetic energy, potential energy, release, thermal energy, transfer, work	Talking about necessity
4	Physics	Textbook Chapter	conservation, constant, equilibrium, gravity, law, magnetism, momentum, motion, thermodynamics, wave	Showing understanding
5	Chemical Processes	Article	bonding, carbon, chemical alteration, hydrogen, hydrolysis, nitrogen, oxidation, oxygen, reaction, silicon, soluble, solution	Expressing a lack of knowledge
6	Soil	Report	clay, fertile, grain, horizon, humus, leaching, parent material, regolith, residual, soil, subsoil, top soil, transported	Delivering bad news
7	The Rock Cycle	Poster	aggregate, consolidation, crystallization, igneous rock, lithification, magma, melt, metamorphic rock, metamorphism, pressure, rock, rock cycle, sedimentary rock	Making an assumption
8	Igneous Rock	Encyclopedia Article	aphanitic, coarse, cool, extrusive, fine, intrusive, magnification, mineral grain, phaneritic, poryphyritic, pyroclastic, texture	Pointing out a mistake
9	Sedimentary Rock	Brochure	chemical sediment, compaction, deposit, detrital sediment, gravel, limestone, pore space, sand, sandstone, sediment, silt, solid	Expressing interest
10	Metamorphic Rock	Textbook Chapter	aureole, contact metamorphism, continental crust, dynamic metamorphism, fluid activity, foliated, index mineral, intrusion, mylonite, nonfoliated, regional metamorphism, shield	Correcting someone
11	Minerals	Webpage	calcite, carbonate, cleavage, color, composition, crystalline, hematite, inorganic, luster, magnetite, metallic, mineral, naturally occurring, quartz, range, silicate	Describing duties
12	The Hydrologic Cycle	Poster	advection, cloud formation, condensation, evaporation, hydrologic cycle, infiltration, precipitation, residence time, runoff, sublimation, transpiration, vapor	Recalling information
13	Groundwater	Report	aquiclude, aquifer, artesian, capillary fringe, groundwater, hydrostatic pressure, permeability, porosity, spring, subsidence, water table, well, zone of aeration, zone of saturation	Expressing concern
14	Running Water	Textbook Chapter	channel, channel flow, channel roughness, discharge, flow, frictional resistance, gradient, laminar, sheet flow, stream, turbulent, velocity	Making a realization
15	Glaciers	Encyclopedia Article	basal slip, calving, continental glacier, dynamic, firn, fjord, glacial erratic, glacial ice, glacial polish, glacier, iceberg, plastic flow, plucking, valley glacier	Expressing an opinion

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Book 3

Express Publishing

Scope and Sequence

Unit	Topic	Reading context	Vocabulary	Function
1	Plate Tectonics 1	Syllabus	collide, continental, continental drift, convergent boundary, divergent boundary, fault, oceanic, plate, plate tectonics, ridge, separate, subduction, transform boundary, trench	Expressing certainty
2	Plate Tectonics 2	Textbook Chapter	anticline, basin, dip, dip-slip fault, dome, fold, footwall block, hanging wall block, joint, monocline, oblique-slip fault, strike, strike-slip fault, syncline	Expressing gratitude
3	Earthquakes	Newspaper Article	aftershock, bedrock, consolidated, earthquake, epicenter, intensity, liquefaction, magnitude, Richter scale, seismology, tsunami, unreinforced, wave	Rephrasing information
4	Volcanism	Report	active, ash, ash fall, ash flow, caldera, crater, dormant, erupt, extinct, lava flow, pressure ridge, pyroclastic material, spatter cone, volcanic gas, volcano	Discussing probability
5	The Sea Floor 1	Handout	abyssal plain, break, continental margin, continental rise, continental shelf, continental slope, deep-ocean basin, oceanic crust, overlap, submarine canyon, submarine fan, turbidity current	Expressing enthusiasm
6	The Sea Floor 2	Textbook Chapter	aseismic ridge, deep-sea sediment, displaced, fracture, guyot, oceanic ridge, oceanic trench, ooze, pelagic clay, reef, seafloor spreading, seamount	Confirming information
7	Shorelines	Lecture Notes	beach, berm, dune, headlands, longshore current, longshore drift, sea arch, sea cave, sea stack, shoreline, spit, tide, wave, wave refraction	Asking for clarification
8	Deserts	Encyclopedia Article	abrasion, alluvial fan, bed load, butte, deflation, desert, desert pavement, mesa, playa, suspended load, wind, wind deposit	Correcting a misconception
9	Common Formations	Webpage	block-faulting, cave, dissolve, dripstone, hanging valley, mountain range, mountain system, orogenesis, pluton, series, uplift, volcanic mountain, waterfall	Asking for suggestions
10	Deformation	Textbook Chapter	brittle, compression, deformation, ductile, elastic, elastic limit, plastic strain, shear stress, strain, stress, subject to, tension	Agreeing with an opinion
11	Weathering and Erosion	Letter	chemical weathering, decompose, differential weathering, erosion, frost wedging, mechanical weathering, organism, salt crystal, spheroidal weathering, thermal expansion and contraction, transport, weathering	Making a recommendation
12	Mass Wasting	Report	angle of repose, flow, infrastructure, landslide, mass wasting, overloading, rockfall, shear strength, slide, slope gradient, slump, steep, vegetation	Describing consequences
13	Natural Resources 1	Webpage	coal, copper, gold, hydrocarbon, iron, metal, natural gas, natural resource, ore, petroleum, silver, uranium, zinc	Giving an example
14	Natural Resources 2	Article	agriculture, construction, economy, fertilizer, filter, fuel, gemstone, industry, jewelry, manufacturing, nuclear reactor, preservative, steel, valuable	Expressing surprise
15	Careers	Webpage	bachelor's degree, city planning, education, engineer, environmental geologist, geophysicist, government, highway planning, major, master's degree, mining, oceanographer, paleontologist, PhD, seismologist	Describing interests

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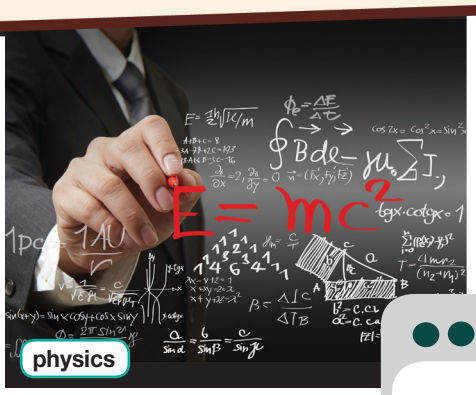
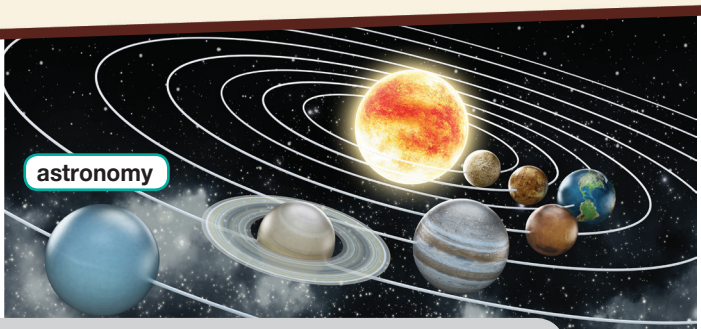
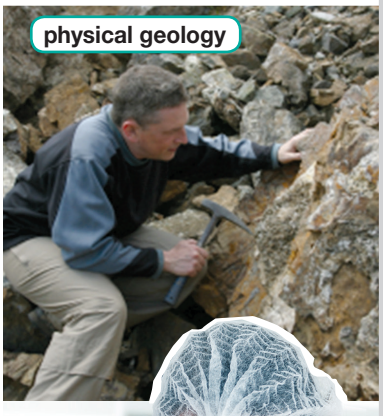
1 Geology







Standish University – Science – Geology

Study geology at SU!

Physical geology combines ideas from many different areas of study. Geology majors need a strong understanding of **physics** and **chemistry**. These disciplines explain how the Earth moves and changes. They must understand concepts in **historical geology** as well. This requires knowledge of **history** and **astronomy**. Even **biology** is important. It ties geology to the development of life on Earth.

Geology students have many career options. Some choose **industrial** fields. For example, they might be valuable to construction projects or mining operations. Others choose to pursue **environmental** protection projects. Many find work in **educational** fields. Some of the finest geologists are here at SU!

For a list of career options, **click here**.

Get ready!

1 Before you read the passage, talk about these questions.

1 What other areas of science are important in geology?

2 What are some different career paths for geologists?

Reading

2 Read the webpage. Then, complete the table.

Area	Relationship to Geology
Physics	1 _____
2 _____	Ties geology to the development of life on Earth
3 _____	Need geologists for construction projects and mining operations

Vocabulary

3 Match the words (1-6) with the definitions (A-F).

1 __ physics
2 __ history
3 __ geology
4 __ industrial
5 __ educational
6 __ environmental

A the study of the physical processes of the Earth
B related to the conditions in a particular place
C the study of how matter moves and behaves
D the study of events that happened in the past
E related to the process of building or making something
F related to teaching or learning

4 Fill in the blanks with the correct words or phrases from the word bank.

WORD BANK

biology astronomy chemistry
historical geology

1 Students of _____ focus on the early formation of the Earth.
2 To study the stars and planets, a student should take a course in _____ is mostly about the properties of the Earth today.
3 Humans and animals are a major focus of _____ .
4 In _____ , scientists study how substances change when they mix with each other.

5 Listen to and read the webpage again. What is the difference between physical geology and historical geology?

Listening

6 Listen to a conversation between an advisor and a student. Mark the following statements as true (T) or false (F).

1 __ The woman plans to student physical geology.
2 __ The woman is mostly interested in industrial applications.
3 __ The man recommends starting with an astronomy course.

7 Listen again and complete the conversation.

Advisor: Have a seat, Rachel. What can I do for you?
Student: I want to **1** _____ _____ _____ .
Advisor: That's a great choice! **2** _____ _____ _____ pursue historical or physical geology?
Student: I'm not sure. What's **3** _____ _____ ?
Advisor: It focuses on the **4** _____ and formation of the Earth.
Student: I don't think that's what I want. I'm interested in conducting **5** _____ studies.
Advisor: You'll have a lot of options with **6** _____ _____ , then. It's a broad field.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

Would you rather ...?
I'm interested in ...
Let's get you ...

Student A: You are an advisor. Talk to Student B about:

- his or her interest in geology
- the type of work he or she plans to do
- your recommendations

Student B: You are a student. Talk to Student A about your interest in geology.

Writing

9 Use the conversation from Task 8 to complete the email.

Hi Tim,

I understand that you're interested in Geology. That's a great major. Before we proceed, you need to make some decisions.

First, are you more interested in _____ or _____ ? This is important because _____ . Also, would you rather work in _____ or _____ ? This is important because _____ .

Let's meet and talk further.

Inga Lassig
Academic Advisor

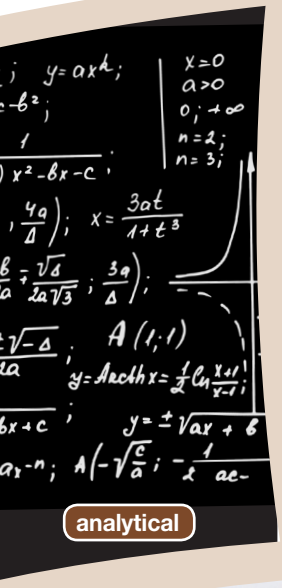
2 Traits of a Scientist

Get ready!

1 Before you read the passage, talk about these questions.

1 What is the benefit of an interdisciplinary education?

2 What are some typical traits of a good scientist?



Reading

2 Read the cover letter. Then, mark the following statements as true (T) or false (F).

1 __ The applicant has special expertise in several life sciences.

2 __ The applicant focused on environmental geology as a graduate student.

3 __ Environmental protection is especially important to the applicant.

To: The Park Protection Foundation
From: Diana Walker

Dear Mr. Lewis,

I would love to work for the Park Protection Foundation! My qualifications are excellent for the position.

I have a **broad** science education. As an undergraduate, I participated in an **interdisciplinary** program. My studies included both **Earth sciences** and **life sciences**. Then, as a graduate student, I **focused** on environmental geology.
I now have special **expertise** in that area.

Additionally, I am very **dedicated** to environmental protection. I hope to apply my **analytical** skills to this important field.
As a **critical thinker**, I always seek **logical** solutions. However, I can also be **creative** when necessary. And I am always **thorough**, regardless of the task.

I look forward to hearing from you.

Sincerely,

Diana Walker

Vocabulary

3 Match the words or phrases (1-6) with the definitions (A-F).

1 __ focus
2 __ broad
3 __ expertise
4 __ dedicated
5 __ analytical
6 __ critical thinker

A the state of having extensive knowledge of something

B someone who can draw reasonable, complex conclusions

C examining things carefully to learn more about them

D placing great importance on something and working hard for it

E including many factors or ideas

F to give attention to one particular thing

4 **Read the sentence pairs. Choose which word or phrase best fits each blank.**

1 creative / logical

A A _____ thinker often finds unusual solutions that others might not think of.

B A _____ conclusion is always based on facts and reasoning.

2 Earth science / life science

A Biology is an example of a(n) _____ .

B Geology is an example of a(n) _____ .

3 interdisciplinary / thorough

A A(n) _____ person does not usually forget important details.

B In a(n) _____ program, students learn about many topics.

5 **Listen to and read the cover letter again. What did Diana study as an undergraduate?**

Listening

6 **Listen to a conversation between an interviewer and a job applicant. Mark the following statements as true (T) or false (F).**

1 __ The woman plans to pursue a master's degree in biology.

2 __ The man is seeking a candidate with knowledge of oceans.

3 __ The woman studied both Earth sciences and life sciences.

7 **Listen again and complete the conversation.**

Interviewer: It's good to meet you, Lisa. So, you **1** _____ _____ a master's degree?

Applicant: That's right. I **2** _____ _____ marine geology.

Interviewer: That's what we need. We **3** _____ _____ issues facing the oceans.

Applicant: Then I'm a great candidate. I'm **4** _____ _____ to ocean protection.

Interviewer: I'm glad to hear it. Now, do you know much **5** _____ _____ in the ocean?

Applicant: Yes. As an undergraduate, I studied **6** _____ .

Speaking

8 **With a partner, act out the roles below based on Task 7. Then, switch roles.**

USE LANGUAGE SUCH AS:

I focused on ...

I'm glad to hear it.

It sounds like ...

Student A: You are an interviewer. Talk to Student B about:

- his or her educational background
- his or her qualities as a scientist
- the knowledge required for the job

Student B: You are a job applicant. Talk to Student A about your qualities as a scientist.

Writing

9 **Use the conversation from Task 8 to fill out the applicant evaluation form.**

Evaluation

Applicant: Gary Pierce

Applicant's education: _____

Applicant's qualities: _____

_____

_____

Do you recommend hiring this applicant? Y / N

Why or why not? _____

_____

_____

Glossary

absolute dating [N-UNCOUNT-U7] **Absolute dating** is the process of determining the age of something, often by measuring how a particular substance within it has changed or decayed.

acre [N-COUNT-U9] An **acre** is an imperial unit of area equal to 43,560 square feet, or about 0.40 hectares.

add [V-T-U11] To **add** a quantity to another quantity is to increase it by that amount.

age [N-COUNT-U6] An **age** is the number of years that something has existed.

ago [ADV-U6] If something happened an amount of time **ago**, it happened that long before the present.

amount [N-COUNT-U10] An **amount** is a physical quantity of a substance.

analytical [ADJ-U2] If someone is **analytical**, he or she examines things very carefully in order to get more information about them or solve a problem.

ancient [ADJ-U6] If something is **ancient**, it occurred or existed many years before the present.

area [N-COUNT-U9] An **area** is a measurement of the amount of space covering a surface.

astronomy [N-UNCOUNT-U1] **Astronomy** is the study of planets, stars, and other bodies in the universe.

atmosphere [N-COUNT-U4] The **atmosphere** is the thin layer of air around the Earth.

bar graph [N-COUNT- U14] A **bar graph** is a graph that displays data in a series of sections, the lengths of which correspond to their values.

base unit [N-COUNT-U10] A **base unit** is one of seven standard SI units that is the foundation of other SI units.

biology [N-UNCOUNT-U1] **Biology** is the study of life forms.

biosphere [N-COUNT-U4] The **biosphere** is all of the living organisms on the Earth.

broad [ADJ-U2] If something is **broad**, it includes many factors or ideas.

BYA [N-COUNT-U6] **BYA** (billion years ago) is a unit that measures the amount of time before the present that something occurred, and is expressed in terms of billions of years.

canyon [N-COUNT-U5] A **canyon** is a very deep valley that often has a river or stream running along the bottom.

carbon-14 dating [N-UNCOUNT-U7] **Carbon-14 dating** is an absolute dating method that measures the decay of carbon isotopes in a fossil.

celestial body [N-COUNT-U3] A **celestial body** is a large object, such as a star or planet, that exists in astronomical space.

Celsius [ADJ-U9] If a measurement is **Celsius**, is uses the temperature scale in which water boils at 100 degrees and freezes at 0 degrees.

centimeter [N-COUNT-U8] A **centimeter** is a metric unit of length equal to 1/100 of a meter or about 0.39 inches.

chemistry [N-UNCOUNT-U1] **Chemistry** is the study of how different substances change and interact with each other.

climb [V-I-U15] To **climb** is to increase at a steady rate.

collision [N-COUNT-U3] A **collision** is an event in which two things traveling in different directions or at different speeds strike each other.

column [N-COUNT-U14] A **column** is a group of boxes that extends from the top to the bottom of a table or chart.

convert [V-T-U8] To **convert** something is to change it into a different form or system.

core [N-COUNT-U4] The **core** is the center part of the Earth that is very hot.

correlation [N-UNCOUNT-U7] **Correlation** is the process of comparing samples from different areas to confirm the period of time that they represent.

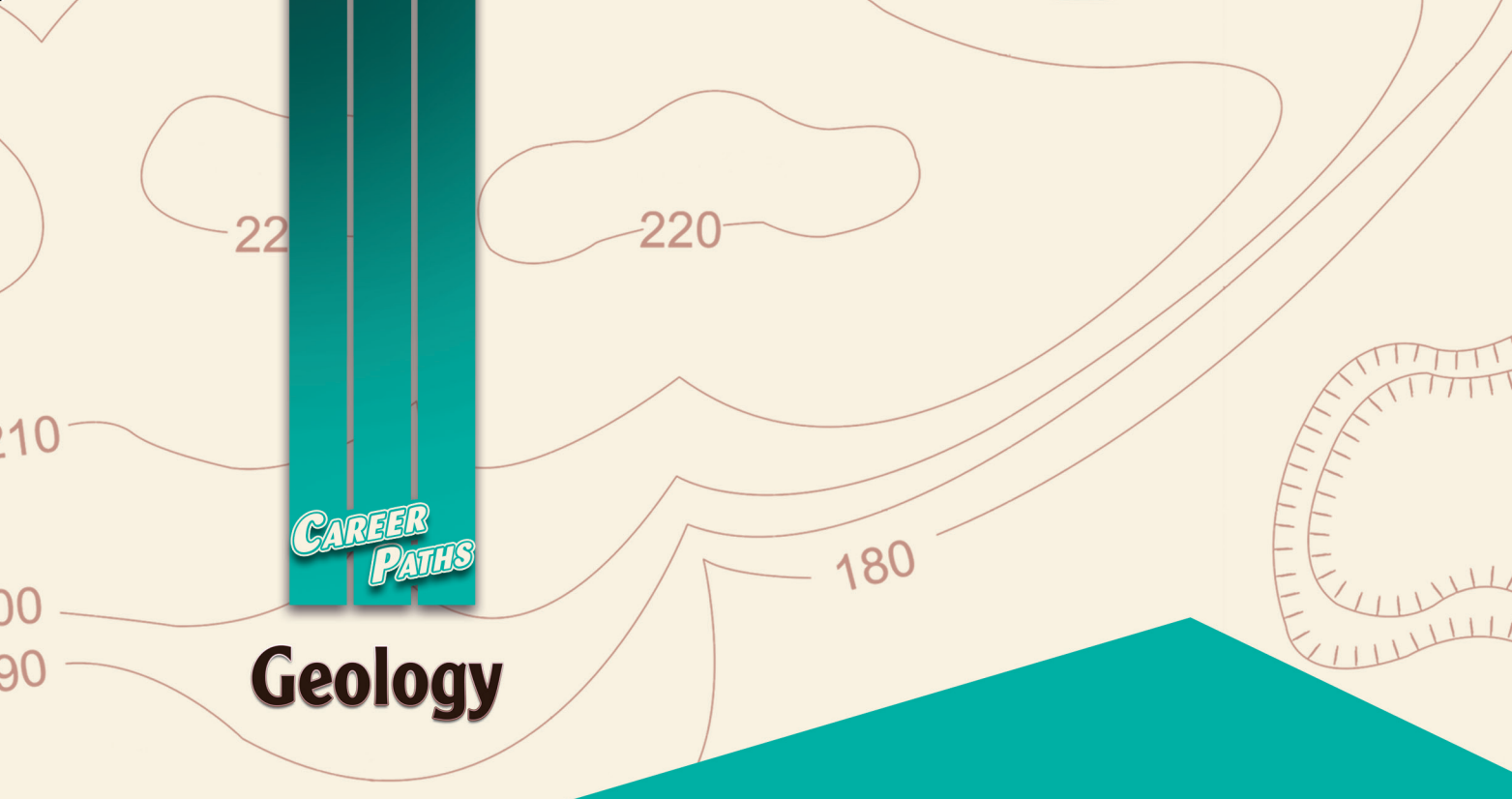
creative [ADJ-U2] If someone is **creative**, he or she is able to think of new or unusual ideas and solutions.

critical thinker [N-COUNT-U2] A **critical thinker** is someone who can analyze something in a logical manner and draw reasonable, complex conclusions as a result.

crust [N-COUNT-U4] The **crust** is the surface of the Earth, made up of rock and soil.

cubed [ADJ-U12] If a quantity is **cubed**, it is multiplied by itself two times, or raised to the power of three.

decay [V-I-U7] To **decay** is to break apart and eventually no longer be part of something, and is the process that living things undergo after they die.



Career Paths: Geology is a new educational source for Geology industry professionals who want to improve their English communication in a work environment. Incorporating career-specific vocabulary and contexts, each unit offers step-by-step instruction that immerses students in the four key language components: reading, listening, speaking, and writing. ***Career Paths: Geology*** addresses topics including the history of the Earth, landforms, rock formation, the hydrologic cycle, and plate tectonics.

The series is organized into three levels of difficulty and offers a minimum of 400 vocabulary terms and phrases. Every unit includes a test of reading comprehension, vocabulary, and listening skills, and leads students through written and oral production.

Included Features:

- A variety of realistic reading passages
- Career-specific dialogues
- 45 reading and listening comprehension checks
- Over 400 vocabulary terms and phrases
- Guided speaking and writing exercises
- Complete glossary of terms and phrases

The **Teacher's Guide** contains detailed lesson plans, a full answer key and audio scripts.

The **audio CDs** (downloadable) contain all recorded material.

Sarah Hendrickson has B.S. in Earth Science with a concentration in Earth surface processes. She is currently completing her thesis for an M.S. in Hydrology at the New Mexico Institute of Mining and Technology. There, she is a research and teaching assistant in the field of chemistry. Her educational background also includes biology and environmental science.

Express DigiBooks

The **Digital** version of the book contains subject specific videos, instant feedback on all tasks and progress monitoring reports.

Express Publishing

ISBN 978-1-3992-0089-9