Unit 6
Geology
Digital Components

GRADE 4

Core Knowledge Language Arts®

Core Knowledge®

Contents

Geology

Digital Components

Geography

the study of the characteristics of the earth's surface

Ecology

the study of relationships between living things and their environment

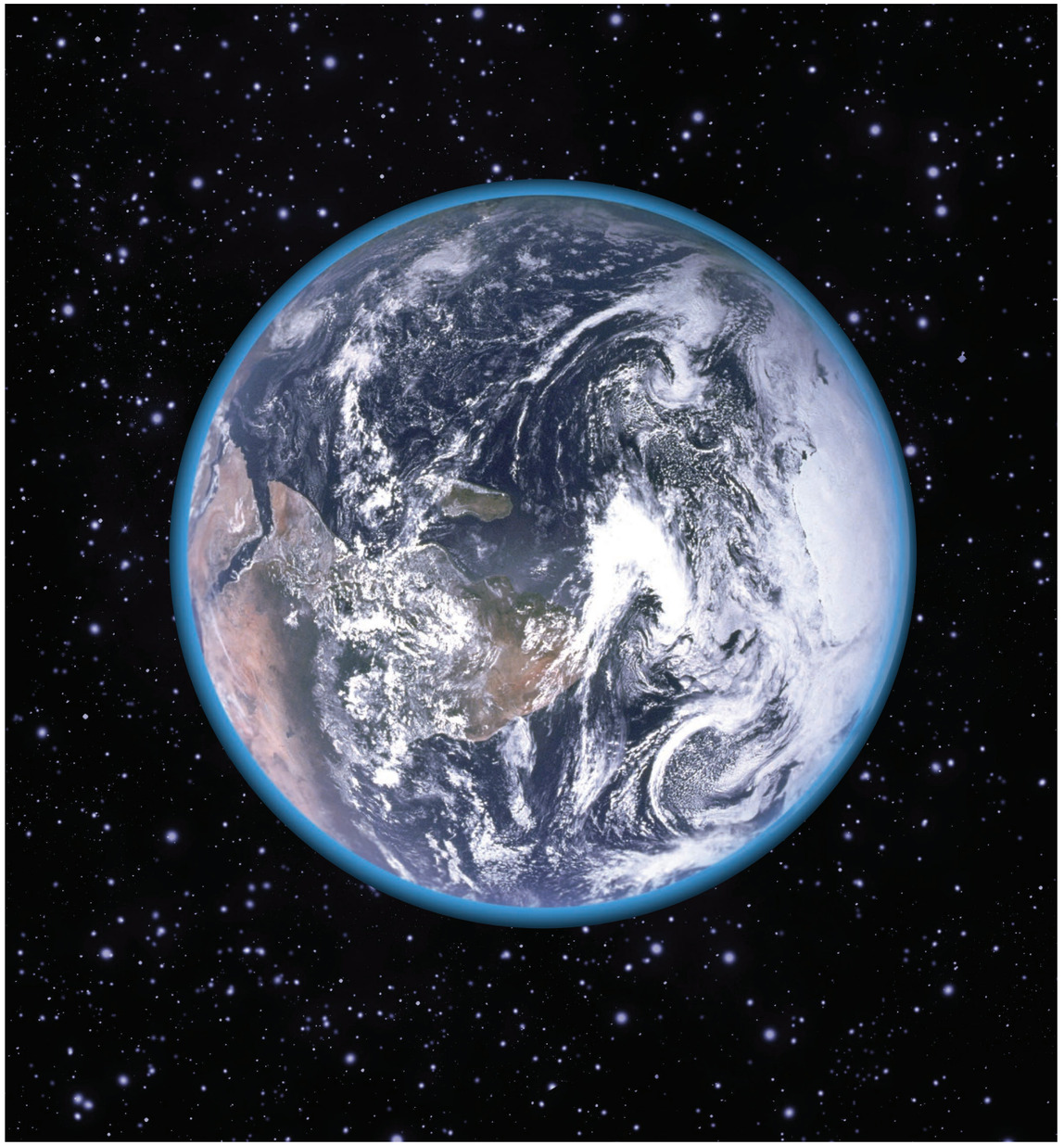
Archaeology

the study of past human life and activities by examining bones, tools, and other objects left behind

Geology

the study of the earth's characteristics, what it is made of, and the forces and processes that shape and change it

EARTH IMAGE CARD



PURPOSE FOR READING

Listen and read to learn how people's observations over time led to our modern understanding of what the earth is made of and how it has changed.

THE BIG QUESTION

How did people's understanding of what was happening on Earth's surface change over time?

EVIDENCE COLLECTOR'S CHART

Chapter #	What is the cause?	What evidence is there?	Letter
	At some point, Pangaea broke apart and the pieces slowly moved apart over a long period of time.		
	Tectonic plates move very slowly due to the heat and pressure in Earth's mantle.		
	Material in the mantle moves beneath stuck rocks at a fault, causing pressure to build over time and then suddenly release as the rocks break and slip past each other, shaking the ground.		

EVIDENCE COLLECTOR'S CHART

Chapter #	What is the cause?	What evidence is there?	Letter
	Tremendous pressure and heat in the mantle force magma in a chamber below Earth's crust to move upward through a crack in Earth's surface.		
	Rocks are created, destroyed, and recreated in a never-ending cycle.		
	Over time, weathering breaks rocks into smaller pieces and erosion moves these pieces to new locations.		

EVIDENCE COLLECTOR'S CHART

Chapter #	What is the cause?	What evidence is there?	Letter
	Tectonic plates subduct underneath one another and move up and down against each other, and magma pushes up into the crust.		
	Tectonic plates interact to create seafloor spreading and underwater subduction zones.		

PURPOSE FOR READING

Read to learn how new evidence led geologists to develop the theory of plate tectonics.

THE BIG QUESTION

How do tectonic plates and Earth's layers interact to change the surface of the earth?

Commas

A **comma** is a punctuation mark used to separate words or numbers in dates and addresses, as well as to separate a series of words in a sentence.

Suffixes

A **suffix** is a syllable or syllables placed at the end of a root word to change the word's meaning and/or to form a different word.

PURPOSE FOR READING

Read to closely examine the author's words, sentences, and literary devices for a deeper understanding of how Earth's tectonic plates and layers interact to change the surface of the earth.

THE BIG QUESTION

How do tectonic plates and Earth's layers interact to change the surface of the earth?

PURPOSE FOR READING

Read to understand how earthquakes occur and how they are connected to other natural forces.

THE BIG QUESTION

What happens beneath Earth's surface to cause earthquakes?

Q: What was THAT?

A: An earthquake!

Earthquakes are caused by tectonic plates moving!

Q: What are tectonic plates?

A: Tectonic plates are HUGE sections of Earth's crust.

Q: Why do tectonic plates move?

A: The plates fit tightly together, but can move because of heat and pressure from the slowly moving material in the mantle underneath them.

Q: How does tectonic plate movement cause an earthquake?

A: When tectonic plates move, they take huge blocks of rock with them. Sometimes, these blocks can get stuck against each other along a fault. Even though the blocks are stuck, the material in the mantle below keeps moving, causing pressure to build. When enough pressure builds, the stuck blocks slip past one another, releasing energy that causes the ground to shake.

Q: Can we stop an earthquake?

A: No.

PURPOSE FOR READING

Read to learn more about what causes earthquakes and what happens as a result of them.

THE BIG QUESTION

What happens beneath Earth's surface to cause earthquakes?

PURPOSE FOR READING

Read to learn about volcanoes and how they relate to tectonic plate boundaries.

THE BIG QUESTION

How do scientists determine where volcanoes might develop?

Commas

A **comma** is a punctuation mark used to separate words or numbers in dates and addresses, as well as to separate a series of words in a sentence.

A **comma** is also used to indicate that a pause is needed in a sentence. When used with quotation marks, a comma helps to set off a quotation from the rest of a sentence and indicates that a pause is needed.

Quotation Marks

Quotation marks are punctuation marks used to show exactly what a person says or has said (dialogue). They are also used when copying the exact words from a written text.

PURPOSE FOR READING

Read to understand the significance of volcano myths and how they were used in early civilizations to explain volcanoes and volcanic activity.

THE BIG QUESTION

How do volcano myths help explain volcanic activity?

Volcano

Description

A volcano is a hill or mountain that forms over a crack in Earth's crust from which lava erupts.

Location

Volcanoes occur all over the world, particularly along tectonic plate boundaries and above hotspots.

Types of Volcanoes

There are three types of volcanoes:

- active
- dormant
- extinct

An active volcano has erupted in the past 10,000 years and is likely to erupt again. A dormant volcano is considered active but has not erupted for a very long time—several hundred years, for example. An extinct volcano has not erupted for at least 10,000 years. An extinct volcano no longer has a chamber full of magma beneath it, so it is not expected to erupt again.

Additional Information

Volcanoes can be creative forces. They can add new land to our planet and bring minerals from deep inside the earth to the surface. Volcanoes can also be dangerous and destructive. They can fill the air with poisonous gases and hot ash. They can also release rivers of lava that destroy everything in their path. Volcanoes can add things to Earth's surface but can also destroy things on Earth's surface.

References

The Changing Earth (2014)

WIKI ENTRY RUBRIC				
	Exemplary	**Strong**	**Developing**	**Beginning**
Introduction	Initial section(s) provide accurate, general information related to location and type of volcano	Initial section(s) provide accurate information related to either location or type of volcano, but not both	Initial section(s) provide information loosely related to location and/or type of volcano	Initial section(s) lack information related to location and type of volcano
Body	Additional sections provide increasingly specific information about the volcano	Additional sections provide more information about the volcano	Additional sections provide some information about the volcano	Additional sections provide little to no information about the volcano
Conclusion	A final statement provides a thought-provoking summative or closing reflection about the volcano	A final statement provides a summative or closing reflection about the volcano	The summative or closing nature of the final statement is unclear	No final statement is provided
Structure of the Piece	All sentences in sections are presented logically	Most sentences in sections are presented logically	Some sentences in sections are presented logically	Connections between sentences in sections are confusing
	All information has been paraphrased	Most information has been paraphrased	Some information has been paraphrased	Little information has been paraphrased
You may correct capitalization, punctuation, and grammar errors while you are revising. However, if you create a final copy of your writing to publish, you will use an editing checklist to address those types of mistakes after you revise.				

WIKI ENTRY EDITING CHECKLIST	
Wiki Entry Editing Checklist	**After checking for each type of edit, place a check here.**
Meaning (It sounds right when I read it aloud.)	
• All my sentences have a subject and predicate.	
• I included all the words I wanted to write.	
• I took out repeated words or information.	
• I have checked how long my sentences are and split run-on sentences into two.	
• I have used nouns and adjectives correctly.	
Format	
• The volcano name is the title at the top.	
• Each section of the entry has a heading.	
• Indenting is not used.	
• If lists are included, they are bulleted or numbered.	
• There is a reference list at the end in the appropriate format.	
Capitals	
• I began each sentence with a capital letter.	
• I used capital letters for all proper nouns.	
• I used capital letters for all words in titles or headings.	
Spelling	
• I have checked the spelling for any words I was unsure of or my teacher marked.	
Punctuation	
• I read my writing piece aloud to check for commas at pauses and periods, question marks, and exclamation points at the ends of my sentences.	
• I used commas and quotation marks in places where they belong.	
• The titles in my reference list are underlined or in italics.	

VOLCANO GRAPHIC ORGANIZER	
Take Notes on a Volcano	
Name of the Volcano	
Location of the Volcano	
Type of Volcano; Date of Last Eruption	
Description of Volcano or of Last Eruption	
Other Facts	

References for Volcano Wiki Entry		
Title	**Date**	**Source (Book or Web Address)**

PURPOSE FOR READING

Read to learn about three classes of rocks and how the rock cycle changes them.

THE BIG QUESTION

How can changes in rocks over time be explained by the rock cycle?

PURPOSE FOR READING

Read to closely examine the author's words, sentences, and literary devices for a deeper understanding of different rock classes and the rock cycle.

THE BIG QUESTION

How can changes in rocks over time be explained by the rock cycle?

PURPOSE FOR READING

Read to learn how the powerful forces of weathering and erosion reshape Earth's surface.

THE BIG QUESTION

How do weathering and erosion continually reshape Earth's surface?

PURPOSE FOR READING

Read to closely examine the author's words, sentences, and literary devices for a deeper understanding of how weathering and erosion reshape Earth's surface.

THE BIG QUESTION

How do weathering and erosion continually reshape Earth's surface?

ADJECTIVES CHART

Article	Adjective(s)					Noun
	General → Specific					
	Opinion/ Observation	Physical Description (size, shape, age, color)	Material	Origin	Purpose	

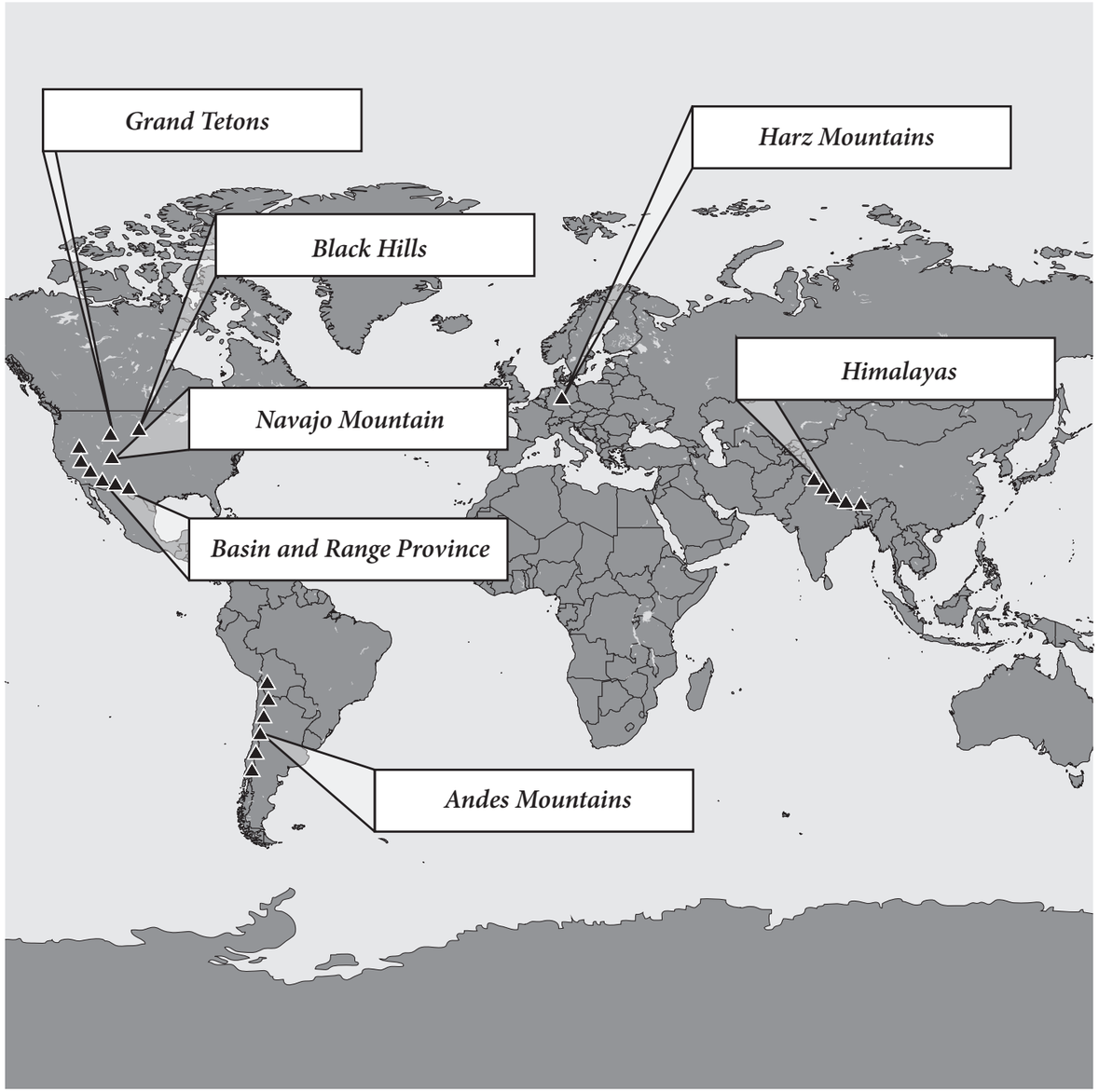
PURPOSE FOR READING

Read to understand how tectonic plates interact to form different types of mountains.

THE BIG QUESTION

How do the movements and forces of tectonic plates build mountains?

WORLD MAP


Grand Tetons
Harz Mountains
Black Hills
Himalayas
Navajo Mountain
Basin and Range Province
Andes Mountains

DESCRIPTIVE PARAGRAPH EXAMPLE

My name is Leah Lava, and I feel as hot as the sun! That's probably because I'm lava shooting down the side of an active volcano. I hear a deep rumble behind me as rocks and debris spew out of the mountain, and I wonder if the plume is still reaching toward the blackening sky like an opening umbrella. As soon as I feel the air touch me, I begin to cool down. Thank goodness! It was getting awfully hot. As I cool, I harden, forming igneous rock. After all that hot activity, I like feeling wind blow across me and rain rinse my body. Sometimes I get uncomfortable in the scorching sun or the freezing cold, but I feel calm listening to the birds chirping around me and tasting the water that trickles over me.

PURPOSE FOR READING

Read to discover how geological features on the seafloor are formed and how they affect the ocean life around them.

THE BIG QUESTION

How does the movement of tectonic plates shape and change the seafloor?

GEOLOGY RIDDLE

This word is the most important tool,

Difficult to find, challenging to rule.

It comes in many shapes and sizes

And is often full of surprises.

It’s the one thing scientists need to uncover.

It’s the key to what they hope to discover.

PURPOSE FOR READING

Read to better understand unique characteristics of geological features on the seafloor.

THE BIG QUESTION

How does the movement of tectonic plates shape and change the seafloor?

For Students

The Earth/General Information

Extreme Earth Records, by Seymour Simon (Chronicle Books, 2012) ISBN 978-1452107851

Janice VanCleave's Earth Science for Every Kid: 101 Easy Experiments that Really Work, by Janice VanCleave (Wiley, 1991) ISBN 978-0471530107

Earthquakes

Earthquakes, by Seymour Simon (HarperCollins, 2006) ISBN 978-0060877156

Earthquakes (A True Book), by Ker Than (Children's Press, 2009) ISBN 978-0531168820

Earthquakes (Let's-Read-and-Find-Out Science, Stage 2), by Franklin M. Branley (HarperCollins, 2005) ISBN 978-0064451888

Earthquakes and Tsunamis, by Patricia O'Brien (Teaching and Learning Company, 2009) ISBN 978-1573105422

Earthquakes and Volcanoes FYI: For Your Information, by Melissa Stewart (HarperCollins, 2008) ISBN 978-0060899516

Inside Earthquakes, by Melissa Stewart (Sterling Children's Books, 2011) ISBN 978-1402781636

I Survived #5: I Survived the San Francisco Earthquake, 1906 (Scholastic, 2012) ISBN 978-0545206990

Minerals, Rocks, and Fossils

Best Book of Fossils, Rocks, and Minerals, by Chris Pellant (Kingfisher, 2000) ISBN 978-0753452745

Everybody Needs a Rock (For the Junior Rockhound), by Byrd Baylor (Aladdin, 1985) ISBN 978-1416953975

Find Out About Rocks and Minerals: With 23 Projects and More Than 350 Photographs, by Jack Challoner (Armadillo, 2013) ISBN 978-1843227472

Geology Rocks! 50 Hands-On Activities to Explore the Earth, by Cindy Blobaum (Williamson, 1999) ISBN 978-1885593290

If You Find a Rock, by Peggy Christian (HMH Books for Young Readers, 2008) ISBN 978-0152063542

Let's Go Rock Collecting (Let's-Read-And-Find-Out Science, Stage 2), by Roma Gans (HarperCollins, 1997) ISBN 978-0064451703

National Geographic Kids Everything Rocks and Minerals, by Steve Tomecek (National Geographic Children's Books, 2011) ISBN 978-1426307683

National Geographic Readers: Rocks and Minerals, by Kathleen Weidner Zoehfeld (National Geographic Children's Books, 2012) ISBN 978-1426310386

Rocks and Minerals (Eyewitness Books), by Dr. R.F. Symes (DK CHILDREN, 2008) ISBN 978-0756637774

Rocks and Minerals (Eye Wonder), by Caroline Bingham (DK CHILDREN, 2004) ISBN 978-0789497604

Rocks and Minerals: A Gem of a Book, by Simon Basher and Dan Green (Kingfisher, 2009) ISBN 978-0753463147

Rocks: Hard, Soft, Smooth, and Rough (Amazing Science), by Natalie M. Rosinsky (Picture Window Books, 2002) ISBN 978-1404803343

Rocks in His Head, by Carol Otis Hurst (Greenwillow Books, 2001) ISBN 978-0060294038

Smithsonian Handbooks: Rocks and Minerals, Chris Pellant (DK ADULT, 2002) ISBN 978-0789491060

Smithsonian Handbooks: Gemstones, by Cally Hall (DK ADULT, 2002) ISBN 978-0789489852

Sticker Encyclopedia: Rocks and Minerals, (DK Publishing, 2010) ISBN 978-0756671426

The Complete Illustrated Guide To Minerals, Rocks & Fossils Of The World, by John Farndon and Steve Parker (Southwater, 2012) ISBN 978-1780192314

The Rock Factory: The Story About the Rock Cycle, by Jacqui Bailey (Picture Window Books, 2006) ISBN 978-1404819979

Tsunamis

Escaping the Giant Wave, by Peg Kehret (Aladdin Paperbacks, 2004) ISBN 978-0689852732

High Tide in Hawaii, by Mary Pope Osborne (Random House, 2003) ISBN 978-0375806162

How Does an Earthquake Become a Tsunami?, by Linda Tagliaferro (Raintree, 2009) ISBN 978-1410934543

Magic Tree House Fact Tracker #15: Tsunamis and Other Natural Disasters: A Nonfiction Companion to Magic Tree House #28: High Tide in Hawaii, by Mary Pope Osborne and Natalie Pope Boyce (Random House, 2007) ISBN 978-0375932212

I Survived #8: I Survived the Japanese Tsunami, 2011 (Scholastic, 2013) ISBN 978-0545459372

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How Does a Volcano Become an Island?, by Linda Tagliaferro (Raintree, 2009) ISBN 978-1410934550

Inside Volcanoes, by Melissa Stewart (Sterling, 2011) ISBN 978-1402781643

The Krakatau Eruption (A True Book), by Peter Benoit (Children's Press, 2011) ISBN 978-0531206287

The World's Most Amazing Volcanoes, by Anna Claybourne (Raintree, 2010) ISBN 978-1410937131

Volcano: The Eruption and Healing of Mount St. Helens, by Patricia Lauber (Simon & Schuster Books for Young Readers, 1993) ISBN 978-0689716799

Volcano! The Icelandic Eruption of 2010 and Other Hot, Smoky, Fierce, and Fiery Mountains, by Judith and Dennis Fradin (National Geographic Kids) ISBN 978-1426308154

Volcanoes (A True Book), by Elaine Landau (Children's Press, 2009) ISBN 978-0531168868

Volcanoes (Let's-Read-and-Find-Out Science, Stage 2), by Franklin M. Branley (HarperCollins, 2008) ISBN 978-006445189

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Volcanoes, by Seymour Simon (HarperCollins, 2006) ISBN 978-0060877170

Volcanoes and Earthquakes, by Susanna Van Rose (DK Publishing, 2008) ISBN 9780756637804

General Information

American Museum of Natural History Online Site for Kids
http://www.amnh.org/ology/

Discovery Presents: Plate Tectonics
http://dsc.discovery.com/tv-shows/discovery-presents/videos/understanding-volcanoes-plate-tectonics.htm

Earthquakes

Real-Time Earthquake Map
http://earthquake.usgs.gov/earthquakes/map/

The Virtual Museum of the City of San Francisco
www.sfmuseum.net/1906/ew8.html

USGS: Earthquakes for Kids
http://earthquake.usgs.gov/learn/kids/

Volcanoes

Discovery Photo Galleries: Pillars of Ash and Fountains of Fire: Volcanic Marvels Pictures
http://dsc.discovery.com/tv-shows/curiosity/topics/volcanic-marvels-pictures.htm

Discovery Presents: Lava Flow
http://dsc.discovery.com/tv-shows/discovery-presents/videos/understanding-volcanoes-lava-flow.htm

Discovery Presents: Pele: Goddess of Fire
http://dsc.discovery.com/tv-shows/discovery-presents/videos/understanding-volcanoes-pele-goddess-of-fire.htm

Discovery: Raging Planet: The Most Active Volcano on Earth
http://dsc.discovery.com/tv-shows/other-shows/videos/raging-planet-the-most-active-volcano-on-earth.htm

Discovery Presents: Underwater Volcanoes
http://dsc.discovery.com/tv-shows/discovery-presents/videos/understanding-volcanoes-underwater-volcanoes.htm

For Teachers

The Earth/General Information

Plate Tectonics, by Rebecca Johnson (Lerner Publications, 2005) ISBN 978-0822530565 (ages 11 and up)

Mapping the Deep: The Extraordinary Story of Ocean Science, by Robert Kunzig (Norton & Norton, 2000) ISBN 978-0393320633

Earthquakes

Earthquakes, Volcanoes, and Tsunamis: Projects and Principles for Beginning Geologists, by Matthys Levy and Mario Salvadori (Chicago Review Press, 2009) ISBN 978-1556528019

Volcanoes

The Year Without Summer: 1816 and the Volcano That Darkened the World and Changed History, by William Klingaman (St. Martin's, 2014) ISBN 978-1250042750

Earthquakes

National Geographic: Inside Earthquakes
http://video.nationalgeographic.com/video/inside-earthquake

Tsunamis

National Geographic: Tsunamis 101
http://video.nationalgeographic.com/video/101-videos/tsunami-101

Volcanoes

Discovery Presents: Lava Junkies
http://www.discovery.com/tv-shows/discovery-presents/videos/understanding-volcanoes-meet-the-lava-junkies.htm

Discovery Presents: Mt. Saint Helens
http://www.discovery.com/tv-shows/discovery-presents/videos/understanding-volcanoes-mt-saint-helens.htm

Discovery Presents: Images from Pompeii
http://www.discovery.com/tv-shows/discovery-presents/videos/understanding-volcanoes-images-from-pompeii.htm

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