Earth Science Unit

Instructional Unit Resource Guide
Based on Principles of Universal Design and Differentiated Instruction

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Authors’ Note

This unit is designed for 7th and 8th grade Science classes. It will be taught during the 3rd 6 weeks grading period. This unit will last for 6 weeks.

This unit is being designed due to 7th and 8th grade curriculum requiring all students to participate in a study of the earth science. We have discovered through our co-taught classes that our students with special needs tend to struggle with the reading and comprehension aspect of this requirement. We hope that this unit will allow ALL students to find successes. We hope that they will gain an understanding of what causes volcanoes and earthquakes, effects on the atmosphere, examples of earth changes, types of volcanoes, types of faults, layers of the earth, and understanding making web searches. Universal design has opened our eyes to all the resources available to allow ALL students access to the literature and information needed.

Special technology requirements are:

- LCD projector
- Computer lab or access to groups of computers
- IPOD Nanos, scanners (book will be scanned then made into a text to speech version and downloaded onto MP3)
- Smart boards
- Elmos
- Neo Laptops
- Flip Videos

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Standards

Students will meet the following standards in this unit:

Standards covered in Earthquake and Volcano unit (7th and 8th grades)

- 7.3.4 Explain how heat flow and movement of material within the Earth causes earthquakes and volcanic eruptions and creates mountains and ocean basins
- 7.3.6 Describe how gas and dust from large volcanoes can change the atmosphere
- 7.3.7 Give examples of some changes in the Earth's surface that are abrupt, such as earthquakes and volcanic eruptions, and some changes that happen very slowly, such as uplift and wearing down of mountains, and the action of glaciers.
- 7.7.2 Use different models to represent the same thing, noting that the kind of model and its complexity should depend on its purpose.
- 8.2.7 Participate in group discussions on scientific topics by restating or summarizing accurately what others have said, asking for clarification or elaboration, and expressing alternative positions. (Core Standard)
- 8.3.2 Explain that the slow movement of material within the Earth results from heat flowing out of the deep interior and the action of gravitational forces on regions of different density. (Core Standard)
- 8.3.3 Explain that the solid crust of Earth, including both the continents and the ocean basins, consists of separate plates that ride on a denser, hot, gradually deformable layer of earth. Understand that the crust sections move very slowly, pressing against one another in some places, pulling apart in other places. Further understand that ocean-floor plates may slide under continental plates, sinking deep into Earth, and that the surface layers of these plates may fold, forming mountain ranges. (Core Standard)
- 8.3.4 Explain that earthquakes often occur along the boundaries between colliding plates, and molten rock from below creates pressure that is released by volcanic eruptions, helping to build up mountains. Understand that under the ocean basins, molten rock may well up between separating plates to create new ocean floor. Further understand that volcanic activity along the ocean floor may form undersea mountains, which can thrust above the ocean's surface to become islands. (Core Standard)

For additional resources on the Indiana State Standards go to www.doe.state.in.us/
For additional resources on the National Standards go to http://www.ncte.org/about/over/standards/110846.htm
Planning for Academic Diversity

Before you begin planning your unit, consider the following types of scaffolds that should be built into your unit to support diverse learners:

For students that cannot read at grade level...
  Try text to speech http://www.readplease.com/
  Don Johnston’s Read out Loud
  Try http://www.wikipedia.com
  Try http://voicethread.com

If a student has difficulty comprehending the material...
  Try study aids
  Try http://www.flash-card.org/
  Try http://www.studystack.com

If students have difficulty mastering the vocabulary of the unit…
  Try a visual thesaurus http://www.visuwords.com
  Try http://dictionary.com
  Try http://www.flash-card.org/
  Try http://www.studystack.com

If you have students who have difficulty with handwriting, (either speed or accuracy), then...
  Consider dictation http://www.idictate.com
  Consider allowing students to type or word process using Neo Laptops.
  Consider allowing students to record oral response as mp3.
  Consider the use of the Smart Pen.

If you have students who need additional challenge, then...
  Search Google or TrackStar for enrichment activities
  Try http://www.windows.ucar.edu/tour/link=/earth/geology/quake_1.html&edu=elem
  Try http://inspiration.com
  Try http://kurzwiel3000.com (use for scanning documents)
  Try providing internet access

If your unit requires students to conduct research, you might want to use...
  Google Toolbar http://toolbar.google.com/
  Try http://livescribe.com – to allow for oral notetaking
Teacher Library

Briefly describe instructional resources that will be useful to teachers when preparing this unit for diverse learners.

4 Teachers

http://4teachers.org/

42Explore: Thematic Pathfinders

http://42explore.com/

Science topics include earth science, life science, physical science, and air/space science.

- acid rain (see 'water')
- Agent Orange (see 'disaster, catastrophe, & calamity')
- airplanes (see 'flight')
- animals (see 'creatures of the night', 'prairies', 'trees and forests', and 'wolves')
- animal homes
- animal tracks
- ants
- armadillo (see 'creatures of the night')
- astronomy
- balloons (see also 'bubbles')
- bats (see also 'caves' & 'creatures of the night')
- bees
- beaver (see 'creatures of the night')
- bees (see also 'insects')
- birds (see also 'creatures of the night')
- brain (see also 'respiratory system' and 'skeletal system')
- bridge building
- bubbles
- butterflies (see also 'insects')
- caves
- Challenger disaster (see 'disaster, catastrophe, & calamity')
- Chernobyl nuclear disaster (see 'disaster, catastrophe, & calamity')
- climate change (see 'global warming')
Google
  http://www.google.com
Kathy Schrock’s Guide for Educators
  http://school.discovery.com/schrockguide/
Thinkfinity
  http://www.thinkfinity.org
Try http://www.valdosta.edu/~jnunderwood/topic.html
Try http://library.thinkquest.org/17457/english.html
Try http://www.learner.org/interactive/volcanoes
Try http://www.eduplace.com/science/hmsc/5/c/organizer/unit_5c.html
Try http://www.iris.edu/gifs/animations/faults.htm
Try http://www.video.nationalgeographic.com/video/player/environment/

Try http://streaming.discoveryeducation.com

Try http://science.pppst.com/volcanoes.html

Try http://gk12.uark.edu/lessons/Volcanoes.ppt

Try http://hs-staffserver_stjames.k12.mn.us/.../powerpoint.../volcanoes/Volcanoes.htm
Content Accessibility

The UDL principle of multiple means of representation is an important design principle for creating accessible and engaging instruction. The following resources will be provided to ensure that diverse students have access to the instructional content presented in this unit.

Text-based content:
Holt Science & Technology Text book

Web page content:
Use of Read-out loud software to make websites more accessible.
Use of text-to-speech software to drag and drop web page text.

Audio supports for text:
Textbook on CD, Textbook on IPOD, teachers reading textbook to students, Text-to-speech, Online textbook Don Johnston’s Read out loud

Audio content:
Closed-captioning for any DVDs used, Assistive Listening Devices, computerized speech recognition software

Video-based content:
Try http://video.nationalgeographic.com/video/player/environment
Try http://streaming.discoveryeducation.com/

Simplified language:
http://www.simplifiedenglish.net/

Concept Map (Graphic Organizer):
Try http://worksheets.teach-nology.com/science/volcano/
Try http://www.eduplace.com/science/hmsc/5/c/organizer/unit_5c.html
Try http://www.enchantedlearning.com/subjects/volcano/

Vocabulary support:
Try a visual thesaurus http://www.visuwords.com
Try http://dictionary.com
Try http://www.flash-card.org/
Try http://www.studystack.com
Learner Activities

The UDL principle of multiple means of engagement is an important design principle for creating meaningful learning activities. The following materials will be used to engage diverse learners in the subject matter of this unit.

Try Cool Spots 4 Kids
http://www.4kids.org/coolspots/

Try Eduscapes
http://eduscapes.com/

Try Yahooligans
http://trackstar.hprtec.org/

Try Thinkfinity
http://www.thinkfinity.org/

Try http://www.quia.com/cb/207054.html

Try http://library.thinkquest.org/17457/english.html

Try http://www.learner.org/interactive/volcanoes

Try http://www.fema.gov/kids/volcano.htm

Try http://www.flash-card.org/

Try http://www.studystack.com
Assessment

The UDL principle of multiple means of expression is an important design principle for assessment. The following materials and resources will be useful for assessing student knowledge, skills, and application of their learning.

Some possible organizers for this page:

Do they know it? (Declarative knowledge)
Small group activity (see attached)
Students will choose one of the following projects (interview a type of volcano or type of fault, build a volcano, build a model of a fault, build an earthquake resistant building, create a powerpoint presentation on a topic related to volcanoes or earthquakes, give an oral presentation or video taped presentation).

Can they do it? (skills)
Based on completion of note cards (word, book definition, definition in own words, picture) we will know if they comprehend vocabulary.
Based on performance in review activity (smartboard Jeopardy) we will know if they comprehend the topics. Can also try http://www.alleghany.k12.va.us/ and go to ITRT instructional resources.

Application (near transfer/far transfer)
Students will be able to use the skills they gain in the small group activity for future work with groups.
Students will be able to use the skills they gain from working with powerpoint on future projects.
Students will be able to use the researching skills that they will gain through this unit on future projects.

Grading guidelines
Students will be grade with both formal and informal assessments. Rubrics will be used to grade the students’ projects.

Rubric Tools
http://www.teach-nology.com/web_tools/rubrics/
http://rubistar.4teachers.org

Scoring Guide for Student Projects
http://www.ncrtec.org/tl/sgsp/index.html

Electronic Quiz Author Tools
Quia http://www.quia.com
Hot Potatoes http://hotpot.uvic.ca/
Small Group Activity
Separate students into groups of 4. Assign each group one of the following topics:
Stratovolcanoes, cinder cone volcanoes, shield volcanoes, plate boundaries and faults, seismic waves,
earthquake measurement, physical structure of Earth, lava and magma.

Each group needs to complete the following for their topic:
1. Define and use vocab words
2. Provide notes
3. Design a demonstration (and be able to explain what you are showing)
4. Make a mini-poster (to help in presenting-can contain pictures, outline of presentation,
vocab. Words, etc)

Work should be divided evenly among the students in the group (each student’s name
should go by the numbered items they are responsible for, so it is known who is doing
what). Each group will present their information and do their demonstration for the class-
either by having a round robin format (present several times to different groups of students)
or to the entire class. Class members who view presentations are responsible for
taking/filling in notes on each topic as presentations are given.

*can use document camera to project mini-poster up on screen for whole class presentation
*can record group presentations using document camera (?) or flip camera