

Unit: Reshaping the Earth

Instructional Unit Resource Guide

Based on Principles of Universal Design and Differentiated Instruction



Reshaping the Earth's Crust

Grade Level: 10 - 12

Focus: To understand the processes that reshape the Earth's crust.

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Message to the Reader / Teacher

In this unit project, students will investigate the following topics: Weathering, Erosion, River Systems, Groundwater, Glaciers and Erosion by Wind and Waves.

I have been teaching for 22 years. I started my career at a small high school in southern Indiana. I was one of 2 in the science department. I taught several different classes including Biology, Chemistry and Physics. I left that high school in 1998 to continue my career at Columbus East High School. At CEHS I have taught Earth Science, Physics and Food Science. This year my classes include 4- Earth Science classes and 2-Physics classes. The Earth Science classes consist of a wide variety of academic levels. The majority of the students are lower level academic students. I am not a technology expert by any means but I do try to incorporate as much variety, with technology, in my teaching as possible.

I designed this unit to allow students to use their own creative ways and methods to explore and investigate the topics covered in this unit. I hope that students will get a better understanding of the workings of the processes that reshape the Earth's crust.

This unit was taught during mid-February and early March, 2010. Twenty (20) days were used for this project. By doing this project, I hoped that students would understand the processes that shape the Earth's crust. By allowing them to use their own methods of research and presentation, I was hoping to get more "ownership" out of their learning process.

Any questions can be addressed to:

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Standards and Benchmarks

What standards will be met by teaching this unit?

ES.1.17 Describe the development and dynamics of climatic changes over time, such as the cycles of glaciation.

ES.1.19 Identify and discuss the effects of gravity on the waters of the Earth. Include both the flow of streams and the movements of tides. **(Core Standard)**

ES.1.20 Describe the relationship among ground water, surface water, and glacial systems. **(Core Standard)**

ES.1.21 Identify the various processes that are involved in the water cycle. **(Core Standard)**

ES.1.25 Investigate and discuss the origin of various landforms, such as mountains and rivers, and how they affect and are affected by human activities.

ES.1.26 Differentiate among the processes of weathering, erosion, transportation of materials, deposition, and soil formation. **(Core Standard)**

Resource Help

Include resources for locating state standards.

For example:

Developing Educational Standards: <http://www.edStandards.org/Standards.html>

MCREL: <http://www.mcrel.org/standards-benchmarks/>

Indiana Learning Standards: <http://www.doe.state.in.us/standards/>

ISTE – National Educational Technology Standards: <http://www.cnets.iste.org>

Planning Pyramid

What should students know?

Chapter 14: "Weathering and Erosion"

1. Identify 3 agents of mechanical weathering.
2. Compare mechanical and chemical weathering processes.
3. Describe 4 chemical reactions that decompose rock

Chapter 14: "Soil"

1. What is soil?
2. Explain how the composition of parent rock affects soil composition.
3. Describe the characteristic layers of mature residual soils

Chapter 14: "Erosion"

1. Define erosion, and list four agents of erosion
2. Identify four farming methods that conserve soil
3. Describe the three major landforms shaped by weathering and erosion.

Chapter 15: "River Systems"

"Water Cycle"

1. What are the 4 main parts to the water cycle?

"Stream Erosion"

1. Summarize how a river develops

"Stream Deposition"

1. Explain the two types of stream deposition
2. Describe one advantage and one disadvantage of living in a floodplain.
3. Identify three methods of flood control.

Chapter 16: "Ground Water"

"Water Beneath the Surface"

1. Identify properties of aquifers that affect the flow of groundwater.
2. OHT- Porosity and Permeability
3. Describe the water table and its relationship to the land surface.

"Groundwater and Chemical Weathering"

1. Explain how caverns and sinkholes form.
2. Identify two features of karst topography.
3. Extra Credit- Describe a cave or cavern that is found in Indiana or surrounding states.

Chapter 17: "Glaciers"

"Glaciers: Moving Ice"

1. Compare two main types of glaciers
2. Explain two process by which glaciers move
3. Describe three features of glaciers

"Glacial Erosion and Deposition"

1. Describe the landscape features that are produced by glacial erosion.
2. Name and describe five features formed by glacial deposition.

Chapter 18: "Erosion by Wind and Waves"

"Wind Erosion"

1. Describe two ways that wind erodes land.
2. Compare the two types of wind deposits
3. Describe four types of Dunes

"Wave Erosion"

1. Compare the formation of six features produced by wave erosion.
2. How do barrier islands form?

Some students will know:

- Two processes by which glaciers move
- Five features formed by glacial deposition
- Features of karst topography
- Three methods of flood control

Most students will know:

- Agents of erosion
- A farming method that will conserve soil
- An agent of chemical weathering
- One advantage and one disadvantage of living on a floodplain

All students will know:

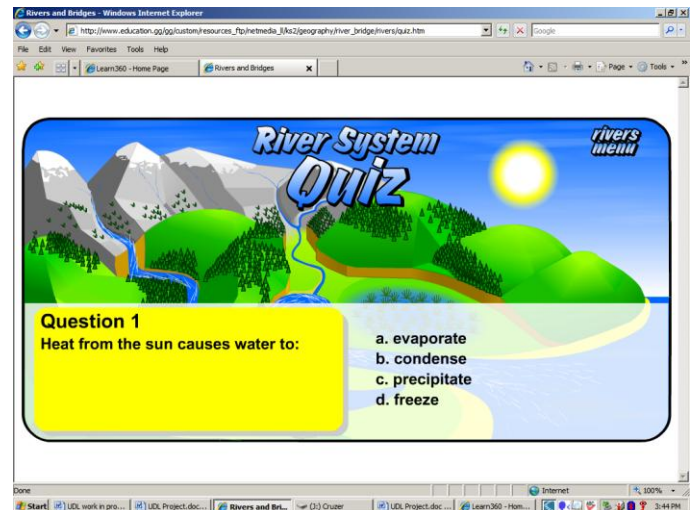
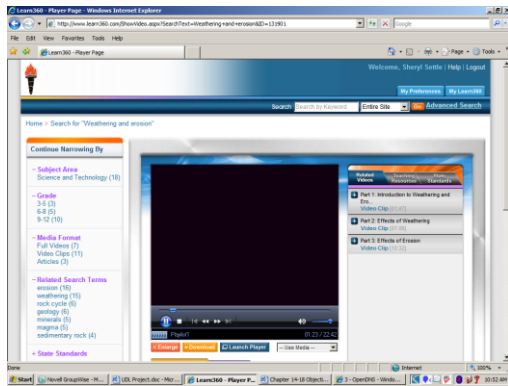
- An agent of mechanical weathering
- The main parts of the Water Cycle
- An agents of erosion
- Definition of soil

Teacher Library

What materials and resources will be useful for teachers?

I used interactive websites and Learn360 videos to help the students understand the materials.

Learn360 is a leading interactive media-on-demand service designed specifically for the K-12 educational market, providing quality content across all curriculum areas. Using the latest technologies, Learn360 enables educators to enhance the learning experiences of all students through the delivery of exceptional content from top educational publishers. Quickly and easily select the perfect media to support rich, unforgettable lessons across the curriculum to actively engage students. Learn360 contains the industries most up to date collection of standards based videos, video clips and audio programs. You will also find an image library, audio and video speeches, encyclopedia articles and a very popular collection of newsreels.



The interactive website took the students on an informational tour of the water cycle and a river system. Then they are allowed to use their new knowledge to apply it to the parts of each system. The students can then take a quiz on each topic to check their new knowledge.

For example:

http://www.education.gg/gg/custom/resources_ftp/netmedia_11/ks2/geography/rivers_bridge/rivers/index.htm

Possible resources for locating instructional materials:

4 Teachers: <http://4teachers.org/>

42Explore: Thematic Pathfinders: <http://42explore.com/>

Blue Web 'n: <http://www.kn.pacbell.com/wired/bluewebn/>

Google: <http://www.google.com>

Kathy Schrock's Guide for Educators: <http://school.discovery.com/schrockguide/>

TrackStar: <http://trackstar.4teachers.org/trackstar/>

Thinkfinity: <http://www.thinkfinity.org>

WebQuest Project at San Diego State University: <http://webquest.sdsu.edu/>

Learner Activities

What materials and resources will be useful for engaging students in meaningful learning activities?

I introduced the project to the students so they would know what the objectives were and I gave them some ideas as to how they could present their project. I told the students that they could use other means to present their project but had to be accepted by me first. I had some original ideas, such as using a tri-fold boards, power points, booklets, binders and some wanted to do a combination of one or more.

I had the students work in the library a couple days a week and we also worked in the classroom using textbooks the other days of the assigned time for the project. I also showed Learn360 videos throughout the project time on unit topics that included: “Weathering and Erosion”, “The Science of Soil”, “Groundwater”, “Glaciers and Glaciation” & “Winds on our Earth”. Students were to take notes over these videos to add to their project.

The students also had worksheets that had 4 – 5 questions and a diagram that covered some of the objectives. The answers to the worksheets were posted on the computer in a shared drive that the students could check their answers. These were also to be put into their project.

Some possible resources for locating instructional materials are:

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

Eduscapes: <http://eduscapes.com>

Yahooligans: <http://yahooligans.yahoo.com/>

KidsClick: [http://sunsite.berkeley.edu/KidsClick!//](http://sunsite.berkeley.edu/KidsClick!/)

Assessment

What materials and resources will be useful for assessing student knowledge and skills?

- The following is a copy of the rubrics used for the project grading. Each objective, OHT and video notes were worth 5 points each.
- At the end of the project the students took a group collaborative test using their completed projects.

Chapter 14: Weathering and Erosion “Weathering Processes”

1. Identify 3 agents of mechanical weathering. _____
2. Compare mechanical and chemical weathering processes. _____
3. Describe 4 chemical reactions that decompose rock _____
4. OHT- Chemical Weathering _____
5. Video Notes- “Weathering and erosion” _____

Chapter 14: “Soil”

4. What is soil? _____
5. Explain how the composition of parent rock affects soil composition _____
6. Describe the characteristic layers of mature residual soils _____
7. OHT- Soil Horizons of Residual Soils _____
8. Video Notes- “Science of Soil” _____

Chapter 14: “Erosion”

4. Define erosion, and list four agents of erosion _____
5. Identify four farming methods that conserve soil _____
6. Describe the three major landforms shaped by weathering and erosion. _____

Chapter 15: River Systems

“Water Cycle”

2. What are the 4 main parts to the water cycle? _____
3. OHT- Water Cycle _____
4. Water Cycle Website interaction*** _____
5. http://www.education.gg/gg/custom/resources_ftp/netmedia_ll/ks2/geography/river_bridge/rivers/index.htm _____

“Stream Erosion”

2. Summarize how a river develops _____
3. River Parts Website Interaction _____
4. *http://www.education.gg/gg/custom/resources_ftp/netmedia_ll/ks2/geography/river_bridge/rivers/index.htm _____
5. OHT- Stream Gradient and Channel Erosion _____

“Stream Deposition”

4. Explain the two types of stream deposition _____
5. Describe one advantage and one disadvantage of living in a floodplain. _____
6. Identify three methods of flood control. _____

Chapter 16: "Ground Water"

"Water Beneath the Surface"

- 4. Identify properties of aquifers that affect the flow of groundwater. _____
- 5. OHT- Porosity and Permeability _____
- 6. Describe the water table & its relationship to the land surface. _____
- 7. OHT- Topography and the Water Table _____
- 8. Video: Ground Water _____

"Groundwater and Chemical Weathering"

- 4. Explain how caverns and sinkholes form. _____
- 5. Identify two features of karst topography. _____
- 6. *Extra Credit- Describe a cave or cavern that is found in Indiana or surrounding states. (10 pts possible)

Chapter 17: "Glaciers"

"Glaciers: Moving Ice"

- 4. Compare two main types of glaciers _____
- 5. Explain two process by which glaciers move _____
- 6. Describe three features of glaciers _____
- 7. OHT- Landforms created by Glacier Erosion _____
- 8. Video Notes- "Glaciers and Glaciation" _____

"Glacial Erosion and Deposition"

- 3. Describe the landscape features that are produced by glacial erosion. _____
- 4. Name and describe five features formed by glacial deposition. _____
- 5. OHT- Features of Glacial Deposition. _____

Chapter 18: "Erosion by Wind and Waves"

"Wind Erosion"

- 4. Describe two ways that wind erodes land. _____
- 5. Compare the two types of wind deposits _____
- 6. Describe four types of Dunes _____
- 7. OHT- Types of Dunes _____
- 8. Video notes- "Winds on our Earth" _____

"Wave Erosion"

- 3. Compare the formation of 6 features produced by wave erosion. _____
- 4. OHT- Wave Erosion and Landforms _____
- 5. How do barrier islands form? _____

Grading Rubrics:

5 points each for the 48 points for the project:	_____	/240
Cover Page	_____	/5
Grade sheet included:	_____	/5
Table of Contents:	_____	/5
Correct Order:	_____	/5
Neatness: 1 2 3 4 5 6 7 8 9 10	_____	/10
Participation points (3 pts per day = 15 days)	_____	/45
Eye Appeal: 1 2 3 4 5 6 7 8 9 10	_____	/10
Material bound properly (displayed)	_____	/10

TOTAL POINTS for PROJECT: _____/335

*****Website interactions (what goes in project):**

- **do both interactions involving the water cycle and print off.**
- **On the River interaction, write out the definitions of the terms.**
- **Take the River Quiz and print off when completed.**

Possible resources for locating assessment materials:

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

Rubrics, Rubric Maker: http://teachers.teach-nology.com/web_tools/rubrics

RubiStar: <http://rubistar.4teachers.org>

Electronic Quizzes: <http://www.funbrain.com>
<http://quiz.4teachers.org/>
<http://school.discovery.com/quizcenter/quizcenter.html>

Authoring Software: <http://www.inspiration.com> (Kidspiration/Inspiration)
http://www.edhelper.com/teachers/graphic_organizer.htm

Test Taking Software: <http://www.quia.com>

Modifications: Planning for Academic Diversity

LEARNING BARRIER	POSSIBLE SOLUTIONS	WEB RESOURCES
Student cannot read at grade level.	<ul style="list-style-type: none"> • Adjust text using the Microsoft auto summarize to provide multiple levels of complexity • Provide text paired with graphics using Picture It Software. • Provide text-to-speech options such as Kurzweil or Read Please • Provide text in audio file format for MP3 players/iPod. • Provide graphic organizers • Provide access to SOLO software • Provide text paired with graphics using Picture It Software or Board Maker Picture Symbols • Reading Pens • Provide graphic representations of synonyms and antonyms 	www.readplease.com www.bensguide.gpo.gov www.windows.ucar.edu www.inspiration.com
Student has difficulty comprehending the material.	<ul style="list-style-type: none"> • Provide text paired with graphics using Picture It Software or Board Maker Picture Symbols • Reading Pens • Provide graphic representations of synonyms and antonyms 	www.visualthesauras.com www.visuwords.com
Student has difficulty mastering the vocabulary of the unit.	<ul style="list-style-type: none"> • Provide text paired with graphics using Picture It Software or Board Maker Picture Symbols • Reading Pens • Provide graphic representations of synonyms and antonyms 	www.visualthesauras.com www.visuwords.com
Student has difficulty with handwriting (speed or accuracy).	<ul style="list-style-type: none"> • Provide word prediction programs, such as WriteOutloud or Co:Writer • Allow access to computer or word processing, such as Dana Smarts • Provide access to SOLO software 	www.donjohnston.com
Student has difficulty with calculating activities.	<ul style="list-style-type: none"> • Provide student with calculating tools, such as calculators, websites, and math manipulatives 	http://nlvm.usu.edu www.webmath.com

<p>Student needs help with conducting research.</p>	<ul style="list-style-type: none"> • Provide starting points using student friendly search engines • Provide access to SOLO software 	<p>www.google.com www.aresearchguide.com www.ipl.org/div/aplus/ www.archives.gov www.loc.gov www.googleearth.com</p>
<p>Student needs the instructional material in a language other than English.</p>	<ul style="list-style-type: none"> • Let students use a language translating tool. 	<p>www.babelfish.ahavista.com</p>
<p>Student needs additional challenge.</p>	<ul style="list-style-type: none"> • Provide students with review and recall, using on-line quizzes to test knowledge. 	<p>www.quizstar.com</p>