On The Move

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2008 - 2009 IDEA CATALOG OF EXCELLENCE

PROGRAM OVERVIEW

This program is designed to give students a deeper understanding of how slow processes, as well as rapid processes change the Earth’s surface. Students will learn that the surface of the Earth is in a continuous state of change as waves, weather, and shifts of the land constantly change and produce many new features. These discoveries will be made through the use of technology, media, and exciting, hands-on activities and experiments. For example, in one activity, students will bake puzzle pieces that represent the 7 continents. Using these pieces, students will discover that the continents were once connected, forming the mega-continent Pangaea. Over time, continents drifted apart. After coming to a realization that the continents are still moving, students will make a map of how the world may look in the future. They will then defend their prediction.

In another activity, students will also use graham crackers (which represent Earth’s plates) and chocolate pudding (which represents Earth’s mantle) to better understand how mountains and earthquakes are formed. The time line for this project is 3 weeks. Continental drift is not usually taught at the beginning of 3rd grade; however, through the use of technology and experiments, students are able to grasp this concept quickly. They are excited to complete each project. They look forward to participating in group discussions. Parents have told me they are impressed with their child’s understanding of continental drift, and they too are learning though conversations with their child.

At the end of the program, students will gain an understanding of how the world constantly changes over time. Students will be assessed on their ability to predict how the world may look in the future. They will make 3 maps. The first map will show the placement of continents in the past. The second map will show the current placements of the continents. The third map shows the placement of the continents in the future. Students will defend their predictions during a whole group discussion of the maps. A rubric will be used to assess students’ understanding of continental drift through their maps.

This unit was implemented in a 3rd grade class of 18 students, with reading abilities ranging from pre-primer to 3.0. However, it can be adapted to any grade level, 3rd and above. The program is done whole group, with small group pullouts, and paired readings. Students will work cooperatively to complete projects. This project can be implemented in different class levels by selecting a more challenging text or using more technology integration for a deeper understanding.

This project will be completed inside a standard classroom. The equipment used included a projector, listening center, computers with internet connections, television/VCR/DVD. Students will use the internet to communicate with scientist. They will have the opportunity to ask questions and engage in discussion about continental drift.

OVERALL VALUE

This is a wonderful introduction to geology. Students get to “bake the 7 continents”, manipulate the puzzle pieces to form the mega-continent, Pangaea, and discover how the continents drifted to their current locations. Students will learn, “What caused the mountains? Why did the continents move? And How do continents move?” Then students can make their own prediction as to where the continents may be in the future.

Students learn that we are constantly “On the Move.” Any teacher who wants their students to gain a better understanding of processes that shape the Earth, will want to implement this lesson!

LESSON PLAN TITLES

- Pangaea Puzzle Making Activity
- Pangaea Book Study
- On the Move
- Web Quest
- Drifting Continents

MATERIALS

Materials for each lesson are listed with each lesson plan. Overall materials budget including pricing and vendors follows the lesson plans.

ABOUT THE DEVELOPER

Laquindra Dunlap has a M.S. in Elementary Reading with a Focus in Literacy from Walden University, and a B.S. in Elementary Education from Florida A&M University. She has taught in the Florida public school system for 5 years. She is currently teaching at Lewis Anna Woodbury Elementary in Fort Meade.
On The Move
Laquindra Dunlap
Lesson Plan No 1: Pangaea Puzzle Making Activity

SUBJECTS COVERED
Geology, Reading, Art

GRADES
Two - Five

OBJECTIVES
Students will...
- demonstrate how the earth's land masses were once one huge land mass known as Pangaea.
- fit continents together forming one large land mass.

SUNSHINE STATE STANDARDS
Standard 1: The student recognizes that processes in the lithosphere, atmosphere, hydrosphere, and biosphere interact to shape the Earth.
SC.D.1.2.4. knows that the surface of the Earth is in a continuous state of change as waves, weather, and shifts of the land constantly change and produce many new features.
SC.D.1.2.S. knows that some changes in the Earth's surface are due to slow processes and some changes are due to rapid processes.

MATERIALS
- 2 cups of flour
- hot pad
- acrylic paints
- 2 cups of table salt
- rolling pin
- scissors
- cookie sheet
- 1 TBSP dry wallpaper paste
- pencil
- large bowl
- oven
- dull knife
- 2 cups of water
- tracing paper
- spoon
- paint brush

DIRECTIONS
1. Print a Pangaea puzzle pattern.
2. Cut the pieces apart.
3. Mix flour, salt, and wallpaper paste in the bowl. Add water 1 cup of water, then mix. Slowly add the rest of the water to make a firm dough.
4. When the dough is a bit sticky, dump it onto a floured surface/table. Knead for about 5 minutes. (if the dough gets too dry, add a tiny bit of water; too sticky, add a tiny bit of flour).
5. Roll the kneaded dough onto a lightly floured surface/table until it is 1/4” inch thick all over.
6. Place one pattern piece on the dough. Carefully cut the dough around the pattern piece.
7. Peel off the tracing paper pattern. Lift up the cutout dough and place it on a cookie sheet.
8. Repeat steps 6 and 7 for the remaining Pangaea puzzle pieces.
9. Heat oven to 170˚ F. Place cookie sheet with dough pieces into oven for 1 hour.
10. After an hour, turn the oven up to 200˚ F and dry the dough for 30 minutes more.
11. After 30 minutes, turn the oven up to 250˚ F and dry the dough for another 30 minutes.
12. Let the puzzle pieces cool for 30 minutes, and then tap one piece to see if it sounds hollow. If it does, it's completely dry.
13. Paint the pieces with the acrylic paints and let the paint dry.
14. When paint has dried, allow students to put the puzzle together.
15. Have students look at a globe and predict how the continents moved to their current positions. In which direction did they travel?

EVALUATION/ASSESSMENT
Listen to students share their predictions (journal writing, peer partners, group discussion). Accept any reasonable response.

★★★
SUBJECTS COVERED
Geology, Reading, Art

GRADES
Two - Five

OBJECTIVES
✓ Students will learn that the earth's surface consists of different sized plates that move in response to movements in the mantle. Major geological events such as earthquakes, volcanic eruptions, and mountain building result from these plate motions.

SUNSHINE STATE STANDARDS
Standard 1: The student recognizes that processes in the lithosphere, atmosphere, hydrosphere, and biosphere interact to shape the Earth.
5C.D.1.2.4. knows that the surface of the Earth is in a continuous state of change as waves, weather, and shifts of the land constantly change and produce many new features.
5C.D.1.2.5. knows that some changes in the Earth's surface are due to slow processes and some changes are due to rapid processes.

MATERIALS
• KWL chart
• Book - Plate Tectonics

DIRECTIONS
1. Have students work in groups to create a KWL chart. Record what they know about plate tectonics.
2. Introducing the Book-draw attention to the front cover and the back cover.
3. Have students revisit the KWL chart, adding what they would like to know about plate tectonics.
4. Have students work with a partner to read the book. As students read, have them write a summary of each chapter. (For struggling readers, it may be helpful to have them read in a small group with the teacher. It may also be helpful to record the book on tape and put in the listening center).
5. After reading the book, have students complete the KWL chart by recording what they learned about plate tectonics.

EVALUATION/ASSESSMENT
You may grade the KWL chart using the attached rubric.
**SUBJECTS COVERED**
Geology, Reading, Art

**GRADES**
Two - Five

**OBJECTIVES**
Students will...

✔ be able to understand that continental plates drift and this affects the layers of the earth.

✔ learn how continents slide across the mantle of the earth.

**SUNSHINE STATE STANDARDS**
Standard 1: The student recognizes that processes in the lithosphere, atmosphere, hydrosphere, and biosphere interact to shape the Earth.

SC.D.1.2.4. knows that the surface of the Earth is in a continuous state of change as waves, weather, and shifts of the land constantly change and produce many new features.

SC.D.1.2.5. knows that some changes in the Earth's surface are due to slow processes and some changes are due to rapid processes.

**MATERIALS**
• Chocolate Frosting (preferably with chocolate chips in it)
• Chocolate Graham Crackers
• Plates or wax paper
• Popsicle sticks
• (Students sit in cooperative learning groups)

**DIRECTIONS**
1. Ask students “What is a continent? How do they move?”

2. Give each student a popsicle stick, a sheet of wax paper or paper plate with some chocolate frosting in the middle and 1 full chocolate graham cracker, which students will split in half.

3. Lead students to discover that the pudding represents the mantle of the earth - since it is “gushy, thick, and black.” The chocolate chips in the frosting represent big boulders. Each half of their full graham cracker represents a separate continent.

4. Tell students to use the popsicle stick to spread the frosting around the wax paper or paper plate.

5. Then have students place each graham cracker half on top of the frosting keeping in mind that they represent continents that were once one big piece of land.

6. Have the students move the crackers back and forth and then sideways. Have students make observations during this stage.

7. Have students push the crackers together with more force. Have students make observations and share with their group members.

8. Lead students to discover how and why land crushes into each other, how earthquakes are formed by “rifts,” and how mountains are created.

**EVALUATION/ASSESSMENT**
You may wish to assess students comments made during the activity and the discussion.

★★★
SUBJECTS COVERED
Geology, Reading, Art

GRADES
Two - Five

OBJECTIVES
✓ Students will learn that the earth's surface consists of different sized plates that move in response to movements in the mantle. Major geological events such as earthquakes, volcanic eruptions, and mountain building result from these plate motions.

SUNSHINE STATE STANDARDS
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SC.D.1.2.S. knows that some changes in the Earth's surface are due to slow processes and some changes are due to rapid processes.

MATERIALS
Computer with internet access

DIRECTIONS
1. Students will log on to: enchantedlearning.com.
2. Students will complete work with a partner to complete an interactive quiz about plate tectonics, a quiz about Continental drift and plate tectonics, and label the outer layers of the Earth.

EVALUATION/ASSESSMENT
You may wish to use the quiz as a test grade.
SUBJECTS COVERED
Geology, Reading, Art

GRADES
Two - Five

OBJECTIVES
✓ Students will demonstrate how the earth’s land masses were once one huge land mass known as Pangaea.
✓ Students will fit continents together forming one large land mass.
✓ Students will describe the processes that cause plate movement.
✓ Students will predict how the Earth will look in the future.

SUNSHINE STATE STANDARDS
Standard 1: The student recognizes that processes in the lithosphere, atmosphere, hydrosphere, and biosphere interact to shape the Earth
SC.D.1.2.4. knows that the surface of the Earth is in a continuous state of change as waves, weather, and shifts of the land constantly change and produce many new features.
SC.D.1.2.5. knows that some changes in the Earth’s surface are due to slow processes and some changes are due to rapid processes.

MATERIALS
• Video - from http://www.cosmeo.com/videoTitle.cfm?guidAssetId=5b6930fd-13bc-45de-971c-718b0c1bd378UnitedStreaming.com
• Pangaea Cut Out Sheet
• scissors
• markers/colored pencils
• atlases
• blue construction paper

DIRECTIONS
1. Students will view the Video Continents Adrift: An Introduction to Continental Drift
2. Students should take notes to discuss after viewing the video.
3. Students will be given 3 sets of cutouts of the continents.
4. Have students label the continents.
5. With set 1, students will fit the pieces together to form Pangaea.
6. With set 2, students will place the continents in their current position.
7. With set 3, students will place the continents where they think they may be in years to come.
8. Students then glue the all 3 sets onto blue construction paper, labeling set 1 “past” set 2 “present” and set 3 “future”.
9. Students will present their maps to the class, and explain their prediction for the “future” map.

EVALUATION/ASSESSMENT
See Rubric

★ ★ ★
# Materials Budget

<table>
<thead>
<tr>
<th>SUPPLIER</th>
<th>ITEM DESCRIPTION</th>
<th>COST</th>
<th>QUANTITY</th>
<th>TOTAL COST</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.amazon.com">www.amazon.com</a></td>
<td>The KidHaven Science Library – Plate Tectonics</td>
<td>(used) 5.99</td>
<td>20</td>
<td>119.80</td>
</tr>
<tr>
<td></td>
<td>(The KidHaven Science Library) (Board Book)</td>
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<td></td>
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<tr>
<td></td>
<td>by Linda George (Author)</td>
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<tr>
<td></td>
<td>Universal Wheat Wallpaper Paste</td>
<td>3.36</td>
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<td>3.36</td>
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<tr>
<td><a href="http://www.orientaltrading.com">www.orientaltrading.com</a></td>
<td>Beginner Tracing Paper Pads</td>
<td>2.50</td>
<td>2</td>
<td>5.00</td>
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<tr>
<td></td>
<td>Classic 6-Pc. Acrylics Paint Set</td>
<td>27.00</td>
<td>1</td>
<td>27.00</td>
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<tr>
<td></td>
<td>Blue Construction Paper - 50 sheets</td>
<td>.88</td>
<td></td>
<td>.88</td>
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<tr>
<td>Target</td>
<td>Rolling Pin</td>
<td>4.49</td>
<td>1</td>
<td>4.49</td>
</tr>
<tr>
<td>Wal-Mart</td>
<td>Graham Crackers</td>
<td>2.50</td>
<td>2</td>
<td>5.00</td>
</tr>
<tr>
<td></td>
<td>Pudding - Pack of 4</td>
<td>1.00</td>
<td>5</td>
<td>5.00</td>
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</tbody>
</table>

**Subtotal** $170.53  
**Tax if applicable**  
**Shipping if applicable** $20.00  
**TOTAL BUDGET AMOUNT** $190.53

Teacher’s Name: Laquindra Dunlap  
School: Lewis Anna Woodbury Elem.
“On the Move” – A Study of Continental Drift – Helpful Research Links

Tectonic Plates and Alfred Wegner
http://www.tqnyc.org/NYCO40622/tectonicplates.html

Alfred Wegner Biography
http://www.ucmp.berkeley.edu/history/wegener.html

Color-Coded Continents
http://wrgis.wr.usgs.gov/docs/usgsnps/pltec/scplseqai.html

What on Earth Is Plate Tectonics?

Understanding Plate Motions

Plate Tectonics
http://scign.jpl.nasa.gov/learn/plate.htm

On the Move
http://kids.earth.nasa.gov/archive/pangaea/

Discovering Plate Boundaries
http://www.geophysics.rice.edu/plateboundary/TGpart1_notes.pdf

This Dynamic Earth: The Story of Plate Tectonics

Student Sheet – Pangaea Cut Outs
# On The Move
Laquindra Dunlap

## Rubric

**Student / Program Assessment Rubric Template**

<table>
<thead>
<tr>
<th>Name:</th>
<th>Project/Program Title: On the Move</th>
<th>Date:</th>
</tr>
</thead>
</table>

**Assessment for Presentation of Pangaea Maps: Past, Present, and Future**

<table>
<thead>
<tr>
<th>Evaluating Student Presentations</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organization</strong></td>
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<td></td>
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<tr>
<td>Audience cannot understand presentation because there is no sequence of information.</td>
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<tr>
<td>Audience has difficulty following presentation because students jump around.</td>
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<tr>
<td>Students present information in logical sequence which audience can follow.</td>
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<tr>
<td>Students present information in logical, interesting sequence which audience can follow.</td>
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<tr>
<td><strong>Subject Knowledge</strong></td>
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<tr>
<td>Students do not have grasp of information; students cannot answer questions about subject.</td>
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<tr>
<td>Students are uncomfortable with information and are able to answer only rudimentary questions.</td>
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<tr>
<td>Students are at ease with expected answers to all questions, but fail to elaborate.</td>
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<tr>
<td>Students demonstrate full knowledge by answering all class questions with explanations and elaboration.</td>
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<tr>
<td><strong>Graphics</strong></td>
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<td></td>
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<tr>
<td>Students use superfluous graphics or no graphics</td>
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<tr>
<td>Students occasionally use graphics that rarely support text and presentation.</td>
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<tr>
<td>Students' graphics relate to text and presentation.</td>
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<tr>
<td>Students' graphics explain and reinforce screen text and presentation.</td>
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<tr>
<td><strong>Mechanics</strong></td>
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<tr>
<td>Students' presentation has four or more spelling errors and/or grammatical errors.</td>
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<tr>
<td>Presentation has three misspellings and/or grammatical errors.</td>
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<tr>
<td>Presentation has no more than two misspellings and/or grammatical errors.</td>
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<tr>
<td>Presentation has no misspellings or grammatical errors.</td>
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<tr>
<td><strong>Eye Contact</strong></td>
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<tr>
<td>Students read all of report with no eye contact.</td>
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<tr>
<td>Students occasionally use eye contact, but they still read most of report.</td>
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<tr>
<td>Students maintain eye contact most of the time but frequently return to notes.</td>
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<tr>
<td>Students maintain eye contact with audience, seldom returning to notes.</td>
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<tr>
<td><strong>Elocution</strong></td>
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<tr>
<td>Students mumble, incorrectly pronounce terms, and speak too quietly.</td>
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<tr>
<td>Students' voices are low. Students incorrectly pronounce terms. Audience members have difficulty hearing presentation.</td>
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<tr>
<td>Students' voices are clear. Students pronounce most words correctly. Most audience members can hear presentation.</td>
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<tr>
<td>Students use clear voices; precise pronunciation of terms so that all audience members can hear.</td>
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</tr>
</tbody>
</table>

**Total Points: ________________________**

**Student / Program Assessment Rubric Template**

<table>
<thead>
<tr>
<th>Name:</th>
<th>Project/Program Title: On the Move</th>
<th>Date:</th>
</tr>
</thead>
</table>

**Assessment for KWL Chart**

<table>
<thead>
<tr>
<th>KWL Rubric</th>
<th>10</th>
<th>7</th>
<th>4</th>
<th>0</th>
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</thead>
<tbody>
<tr>
<td>3 things in the I Want to <strong>Know</strong></td>
<td>2 things in the I Want to <strong>Know</strong></td>
<td>1 thing in the I Want to <strong>Know</strong></td>
<td>No attempt</td>
<td></td>
</tr>
<tr>
<td>3 things in the What I <strong>Want to Know</strong></td>
<td>2 things in the What I <strong>Want to Know</strong></td>
<td>1 thing in the What I <strong>Want to Know</strong></td>
<td>No attempt</td>
<td></td>
</tr>
<tr>
<td>3 things in the I <strong>Learned</strong></td>
<td>2 things in the I <strong>Learned</strong></td>
<td>1 thing in the I <strong>Learned</strong></td>
<td>No attempt</td>
<td></td>
</tr>
</tbody>
</table>

**Total Points**

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2008 - 2009 IDEA CATALOG OF EXCELLENCE
### K W L (M o d i f i e d)

**What is the concept?**

<table>
<thead>
<tr>
<th>What I know about:</th>
<th>What I WANT to know or WONDER about or think I WILL learn:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>?</td>
</tr>
<tr>
<td>2.</td>
<td>?</td>
</tr>
<tr>
<td>3.</td>
<td>?</td>
</tr>
<tr>
<td>4.</td>
<td>?</td>
</tr>
</tbody>
</table>

**How I might FIND OUT about . . .**

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**What have I learned?**

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