

Get the Drift?

Mark Bailey and Sharon Bolan, WCVE

Overview

Topic: Plate Tectonics. This lesson will introduce students to the concept of plate tectonics. Using video and Internet resources, students will discover and explain the process of plate tectonics including information about continental drift, Pangaea, and important scientists who played a role in theory development.

Time Allotment

2 - 90 minute blocks

Subject Matter

Science
Technology

Learning Objectives

Students will be able to:

- Define and explain plate tectonics.
- Define and explain continental drift.
- Identify scientists involved in the theory of continental drift.
- Analyze past changes of the earth, predict future changes, create a map of the future changes.
- Orally explain to listeners a key component of plate tectonics.

(This lesson addresses Va. SOL Earth Science(ES).1, ES.8, ES.10; English 9.2; Computer Technology 8.5, 12.4)

Media Components

Geography Skills: #12, Problem Solving Views of the Earth

Materials

Materials for the classroom:

- 1 or more large world maps
- 1 or more globes
- Blackboard or Chart paper to record responses to questions
- Questions for Oral Presentations (see attached)

Materials each group of three students will need for the Introductory Activity:

- small puzzle (purchased or homemade)

Materials each group of two students will need for the Learning Activities, Culminating Activities, and Assessment Activities.

- WebQuest Resource Sheet OR WebQuest Direction Sheet (see attachments)
- Computer with Internet Access (at least one computer for every 2 students)
- crayons or colored pencils
- Glue
- One 12 X 18 sheet of blue construction paper



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- scissors
- Criteria sheet for oral reports (see attached)

Prep for Teachers

The teacher should preview and cue the video as indicated in the Learning Activities section. If the teacher is not using TrackStar/WebQuest Maker, each Internet site could be book-marked for easier access. A list of the WebQuest websites and questions can be found at the end of the lesson. The teacher should access the TrackStar WebQuest (<http://trackstar.hprtec.org> Track ID 105755) prior to the class to ensure that all websites are active.

Day One

Introductory Activity

1. The teacher should divide the students into small groups of three. Give each group a puzzle. Say, "Each group has a puzzle to put together. I'm going to allow you five minutes to put the puzzle together. Get ready, go!" Allow five minutes to pass. Ask students to stop working and to look at the pieces they have put together.

2. Ask, "What features in the puzzle told you that those pieces belonged together?" (*color, size, shape*) Say, "Today we are going to learn about a very large puzzle that has been worked on for millions of years. What puzzle do you think I'm talking about?" (*student answers*) Yes, I'm talking about the puzzle that is called earth. You will hear the terms plate tectonics, continental drift, and Pangaea. By the end of the lesson, you will be able to define and explain these terms. Let's get started."

Learning Activities

1. Provide students with a **FOCUS FOR MEDIA INTERACTION**: Say, "We are going to watch a video clip from *Geography Skills #12*, Problem Solving without the sound. You will see a picture of

two continents. Be able to discuss a striking similarity between the two continents." **START** Geography Skills #12 Problem Solving with the **SOUND OFF** when the narrator says, "Let's compare the shapes..." and when a picture of the world appears. **PAUSE** when the continents have been cut and South America and Africa are shown alone on the screen. Ask, "What two continents appear here?" (*South America and Africa*) Ask, "What similarity do you notice about these two continents?" (*they appear to fit together as in a puzzle*)

2. **REWIND** to the same video segment and turn the **SOUND ON**. **FOCUS**: Say, "Let's watch and listen to the same clip. This time, be able to tell me who discovered the patterns in the continents, and what he realized he would have to find out if he was going to prove his theory. **START** the video. **STOP** when the narrator says "...set out to look for these match ups." Ask, "Who discovered these patterns in the continents?" (*Alfred Wegener*) Ask, "What else must Wegener find in order to prove his theory?" (*other match ups*) Ask, "What types of match ups do you think he might be talking about?" (*student answers*) **FOCUS**: Say, "Watch and see if any of your predictions are correct?" **RESUME** the video. **STOP** after the narrator says "continental drift" and the words "continental drift" appear on the screen. Ask, "What match ups were mentioned in the video clip?" (*rocks, fossils*)

3. Say, "Now let's look a little more closely at Albert Wegener's theory of continental drift." **FOCUS**: Say, "Watch this clip from *Views of the Earth* and be able to tell me specifically what types of match ups were found." **START** *Views of the Earth* when the narrator says, "...for centuries, people have noticed the similarities..." and when you see two round portions of the world map. **STOP** after the fish scene and when the narrator says, "...both continents." Ask, "Specifically, what match ups did Wegener find?" (*rock formations, paths of prehistoric glaciers, seams of coal, sequences of rocks with matching layers, mountain ranges, identical fossils, and identical living species of fish from both continents*) Record responses on chart paper or on the blackboard. Say, "That was a lot of information! Let's listen to the clip again and make sure we recorded all of the responses."

REWIND and **PLAY** again. Ask, “Did we miss any match ups?”(*record remaining responses*)

4. FOCUS: Say, “Wegener believed that at one time all the continents were one large landmass. Listen to this next segment to find out what he called this landmass and what happened to it over many years.” **RESUME** the video and **STOP** after the landmasses have moved and the narrator says, “...where they are today.” Ask, “What was the name of this landmass?”(*Pangaea*) Ask, “What happened to it?”(*It separated and drifted apart.*)

5. The teacher should divide students into groups of two. Students can also work individually if preferred. Give each student a WebQuest Direction Sheet. (attached) If the students are **NOT** using TrackStar, each student needs the WebQuest Resource Sheet. Say, “Using these videos, we have discovered some interesting information about Plate Tectonics. We are now going to move to the lab and complete a WebQuest to explore more in depth information about this topic. You have the rest of the class period to complete the WebQuest. When you have completed the WebQuest give it to me for safe keeping. We will use it again tomorrow.”

6. The teacher should escort the students to the computer lab. All students should be monitored to make sure that they are on task and are able to access the URLs necessary to complete the WebQuest. The teacher should allow students to use color pencils or crayons to enhance the look of their pictures for WebSite #8.

Day Two

Culminating Activity

1. Say, “Yesterday, we learned through video and through a WebQuest about plate tectonics, continental drift, and scientists who played a role in the development of these theories. Today, we are going to use this information to construct a map of what the world might have looked like millions of years ago.”

2. The students should get back into the groups that

they were assigned to for the Learning Activities. The teacher should give each student a copy of the Panagea sheet, a piece of 12 X 18 blue construction paper, and return their WebQuest sheets. The teacher should instruct students to identify each continent, color the continents, and cut them out. Arrange the continents on the construction paper in the way they may have looked millions of years ago, and carefully glue them to the paper. Say, “Make your maps as attractive as possible because you will be using them in an Assessment Activity.” Allow 20 - 25 minutes for the activity.

Assessment

Assessment Activity 1

Say, “Students, for the remaining time in class, you will be preparing and presenting information dealing with plate tectonics. From the box, you will draw one folded piece of paper. Using your WebQuest notes, you will have five minutes to prepare a detailed answer to the question. You will then be called upon to present and describe your Pangaea maps and the answer to the drawn question.” The teacher should allow each group to draw a question and begin development of the answer.

Assessment Activity 2

Students will write a letter to the principal about the concepts of plate tectonics, continental drifts, and describe at least one scientist who had some influence on developing these theories.

Cross-Curricular Extensions

English:

- Students could further research important people who developed theories of plate tectonics and report their findings.
- Students could research and report on other theories (valid or invalid) about the development of the earth.

Math: Using yearly change information provided by the teacher, students can calculate rate of change in future years. For example: North America drifts the same amount each year. In ten years it has drifted three feet. How many inches will it drift in 20 years? In 50 years? In 100 years?

Technology:

- The students could research other websites that contain valuable and useful information about plate tectonics and create a class WebQuest using TrackStar.
- The students could create a video newscast describing the events of plate tectonics.

History: Research how continental drift affected the Blue Ridge Mountains.

Community Connections

Students could invite a paleontologist to discuss fossil discoveries.

About the Authors

Sharon Bolan

Currently the Library Media Specialist at Central Senior High School in Lunenburg County, this is Sharon's sixth year as an NTTI Master Teacher. Sharon holds a Bachelor of Science in Early Childhood Education for grades K-8, and is also certified to teach reading for grades K-12. Her commitment to technology education has earned Sharon the respect and appreciation of her colleagues – and it was this commitment that earned Sharon WCVE's *2002 NTTI Technology in Education Award*.

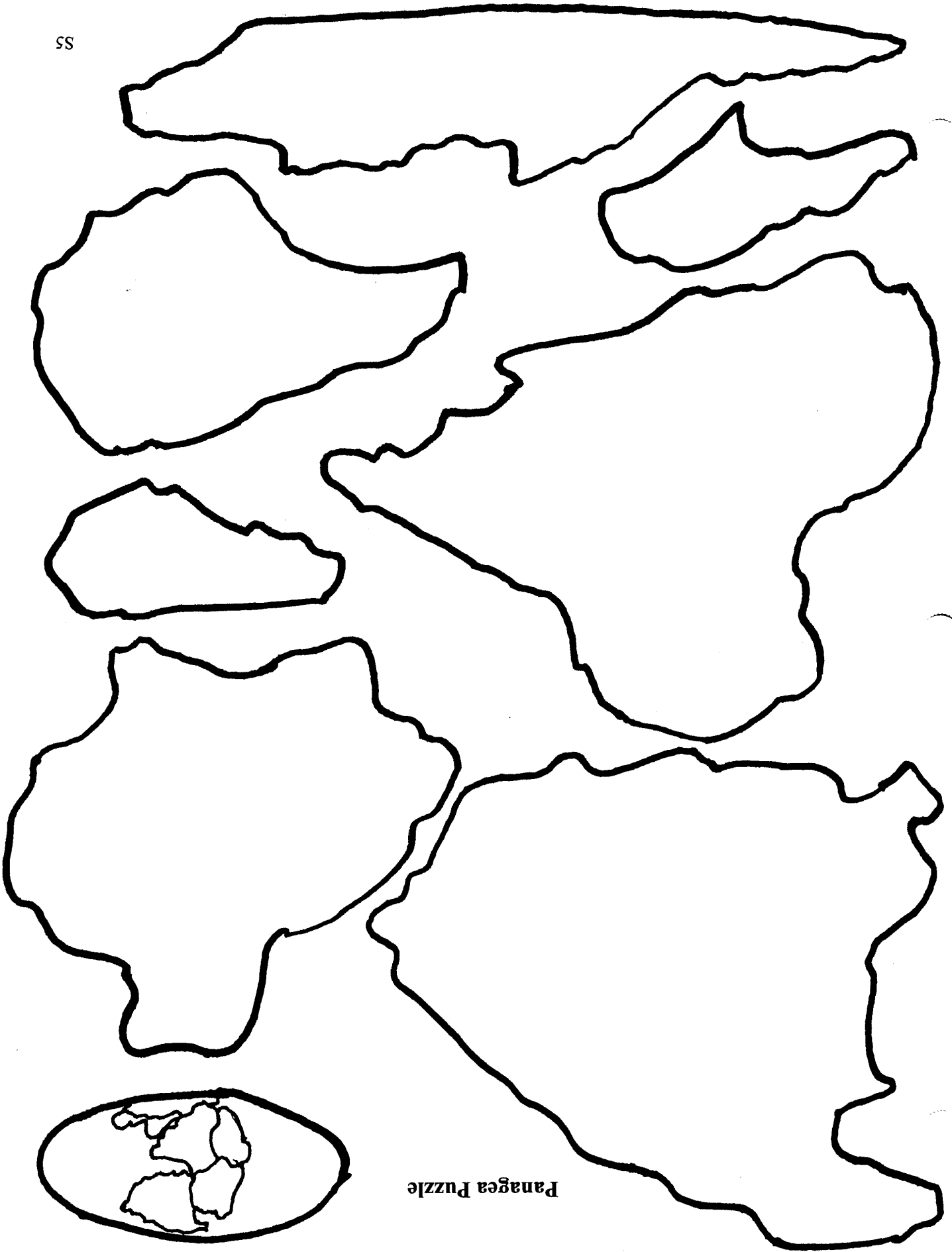
Currently working towards her Masters in Library Science at Longwood University, Sharon's free time is spent reading, fishing, gardening, and spending time with her family – which includes her husband Jack and two sons...six-year-old Hunter, and a very active one-year-old Levi. The canine members of their household include Sam, a Chocolate Lab and a Cocker Spaniel named Fido.

Mark Bailey

Mark Bailey is an outdoors loving science teacher from Lunenburg County, Virginia. He received his Bachelors Degree in Environmental Science, with a minor in Biology, from Virginia Tech in 1997 and is currently teaching science at Central High School, where he once was a student. Mark had the privilege of working with black bears immediately after college and has been fascinated by them ever since. One of Mark's favorite pastimes is baseball, and he spends a lot of his free time coaching the high school team and a summer league team. His favorite quote is "No Excuses".

QUESTIONS FOR ORAL PRESENTATIONS

<p align="center">GIVE THE HISTORY OF THE THEORY OF CONTINENTAL DRIFT.</p>	<p align="center">WHAT IS PANGAEA? DESCRIBE HOW IT WAS FORMED.</p>	<p align="center">EXPLAIN THE THEORY OF PLATE TECTONICS.</p>
<p align="center">WHO IS ANTONIO SNIDER-PELLEGRINI & HOW WAS HE IMPORTANT IN THE DEVELOPMENT OF THE THEORY OF CONTINENTAL DRIFT?</p>	<p align="center">WHO IS F. B. TAYLOR & HOW WAS HE IMPORTANT IN THE DEVELOPMENT OF THE THEORY OF CONTINENTAL DRIFT?</p>	<p align="center">WHO IS ALFRED WEGENER AND WHY IS HE IMPORTANT IN THE PLATE TECTONIC THEORY?</p>
<p align="center">WHAT ARE SOME "CLUES TO THE MYSTERY" OF CONTINENTAL DRIFT?</p>	<p align="center">FROM THE VIDEO IN THE WEBQUEST, WILL THE CONTINENTS EVER COME TOGETHER AGAIN? WHY OR WHY NOT?</p>	<p align="center">WHO IS SIR FRANCIS BACON AND WHY WAS HE IMPORTANT IN THE THEORY OF CONTINENTAL DRIFT?</p>
<p align="center">WHO WAS EDWARD SEUSS AND WHY WAS HE IMPORTANT IN THE THEORY OF CONTINENTAL DRIFT?</p>	<p align="center">WHO WAS ALANDER DU TOIT AND HOW WAS HE IMPORTANT IN THE THEORY OF CONTINENTAL DRIFT?</p>	<p align="center">HOW WERE THE APPALACHIAN MOUNTAINS FORMED?</p>



Panagea Puzzle

WebQuest Direction Sheet

Step One: Launch the Internet using Internet Explorer or Netscape and type in the URL, <http://trackstar.hprtec.org>.

Step Two: In the Track ID type in the number 105755 and hit Enter on the keyboard.

Step Three: Choose "View in Frames" button.

Step Four: Read the directions at website #1 at the top of the screen. Record the answers to the questions in spaces provided below. You will be able to find the answers to the questions in the website.

Step Five: On the left hand side of the screen, choose #2. At the top of the screen follow the directions and answer the questions. Continue through the WebQuest until you complete all 11 websites.

Your Name: _____ **Your Partner's Name** _____

Website #1: <http://www.enchantedlearning.com/subjects/dinosaurs/glossary/Contdrift.shtml>

1. Who is Albert Wegener? _____
2. What is the name of the gigantic super continent , which existed 200 million years ago?

3. What does the term Pangaea mean? _____

Website #2: <http://library.thinkquest.org/3669/>

Explain the history of the continental drift. _____

Website #3: <http://webspinners.com/dlblanc/tectonic/pangea.shtml>

How did Pangaea form? _____

Website #4: <http://www.infoplease.com/ipa/A0001765.html>

What is the theory to plate tectonics? _____

Website #5: <http://whyfiles.org/094quake/5.html>

1. Who are Antonio Snider-Pellegrini, F. B. Taylor, Edward Seuss and Alander du toit?

2. How are each one important in the theory of continental drift? _____

WebQuest Resource Sheet

Your Name: _____ Your Partner's Name: _____

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Website #6: <http://kids.earth.nasa.gov/archive/pangea/index.html>

Who is Sir Francis Bacon, and why was he important in the theory of continental drift? _____

Website #7: <http://agcwww.bio.ns.ca/schools/EarthNet/english/geology/qa/plate/q7.html>

How were the Appalachian Mountains Formed? _____

Website #8: <http://pubs.usgs.gov/publications/text/historical.html>

Take a look at the continental changes in the past 225 million years. Draw a picture of how you think the Earth will look in another 100 million years. Use a separate sheet of paper.

Website #9: <http://www.yale.edu/ynhti/curriculum/units/1991/6/91.06.05.x.html>

What are some "Clues to the Mystery" of continental drift? _____

Website #10: <http://user.aol.com/bowermanb/tectonics.html>

Take the "Continental Drift Interactive Quiz. Play the "Pangaea Interactive Map Game".

Website #11: <http://www.uni-kassel.de/~roehring/mov3.gif>

Watch the video, and decide whether or not the continents will ever come together or not. Support your answer with information learned in this lesson. _____

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