

Shutterfly Photo Story Lesson Plan

Subject: Science – Next Generation Science Standards

Grade level: 4

Lesson Title: Tectonic Plates and Continental Drift

Common Core/State Curriculum Standards:

NGSS.4-ESS2-2 Earth’s Systems

Students who demonstrate understanding can:

NGSS.4-ESS2-2 Analyze and interpret data from maps to describe patterns of Earth’s features.

[Clarification Statement: Maps can include topographic maps of Earth’s land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes.]

Science & Engineering Practices:	Disciplinary Core Ideas:	Crosscutting Concepts:
<p>Analyzing and Interpreting Data Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.</p> <ul style="list-style-type: none"> Analyze and interpret data to make sense of phenomena using logical reasoning. (4-ESS2-2) 	<p>ESS2.B: Plate Tectonics and Large-Scale System Interactions</p> <ul style="list-style-type: none"> The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features areas of Earth. (4-ESS2-2) 	<p>Patterns</p> <ul style="list-style-type: none"> Patterns can be used as evidence to support an explanation. (4-ESS2-2)

Common Core State Standards Connections:

• **English Language Arts Standards – Reading – Informational Text – Grade 4**

Integration of Knowledge and Ideas

CCSS-ELA-Literacy.RI.4.7 Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

• **English Language Arts Standards – Writing – Grade 4**

Research to Build and Present Knowledge

CCSS-ELA-Literacy.W.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic.

- **Mathematics – Grade 4 – Measurement & Data**

Solve problems involving measurement and conversion of measurements.

CCSS.Math.Content.4.MD.A.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

ISTE NETS for Students:

2. Communication and Collaboration:

Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. Students will:

- b. communicate information and ideas effectively to multiple audiences using a variety of media and formats.

Learning Objectives:

- Students will recognize the role of plate tectonics in causing continental drift and shaping Earth’s surface.
- Students will analyze the movements of Earth’s plates in the past and predict the future of Earth’s surface.
- Students will make and record observations.

Students Learning Targets:

- As a result of this lesson, students will be able to use science processes and thinking skills.
- As a result of this lesson, students will manifest scientific attitudes and interests.
- As a result of this lesson, students will understand science concepts and principles.
- As a result of this lesson, students will communicate effectively using science language and reasoning.
- By creating their own published storybook, students will learn to communicate ideas and information to specific audiences, as well as strengthen their familiarity with the writing process.

Instructional Strategies:

- Discussion (small/large group) – class discussions on the writing process
- Direct instruction - providing foundational information for the lesson
- Cooperative learning – collaboration on storyboards, peer review/editing
- Independent practice – creation of a book about the patterns of Earth’s features using the Photo Story iPad App

How Students Will Use Shutterfly Photo Story:

Students will create a Photo Story book demonstrating their understanding of the history of continental drift to understand Earth’s constant transformation.

Required Materials/Lesson Length:

Materials:

- Plate tectonic and continental drift -related library books
- Sentence strips for word cards
- iPads with Photo Story App
- Internet access

Lesson Length: Two to Three Weeks working in school and at home

- Create a personal dictionary of unfamiliar words: 1 hour in class/homework
- Brainstorm/Outline plate tectonics and continental drift report ideas: 2 hours in class/homework
- Draft: 1-2 hours in class/homework
- Editing/Revision: 1-2 hours in class/homework
- Images – Photos/Illustrations: 1-2 hours/homework
- Compilation: 3-4 hours

Resources:

Web:

- Map of California: <http://geology.com/state-map/california.shtml>
- Information on Maps: <http://www.usgs.gov/>
- Ocean Maps: <http://www.nationalgeographic.com/xpeditions/lessons/03/g35/seasgis35.html>
- <http://www.platetectonics.com/oceanfloors/index.asp>

Procedures/Activities: *(What will the teacher and students do?) (Prior Knowledge. Opening Activity, Step-by-Step Learning Activities, Closure, Post-Instruction Reflection)*

Opening Activities:

- Explain to students that they will be scientists as they study tectonic plates and continental drift.
- Briefly define tectonic plates and continental drift and explain the role of tectonic plates in continental drift.
- Display a map of the modern world and highlight how the continents can fit together like pieces of a puzzle.
- For example: California exists on two geographic plates; its intense topography is a result of the interactions between these plates, which produce earthquakes and volcanic ranges. California's diverse geography includes mountain ranges: the Coastal Range on the west side of the state and the Sierra Nevadas on the east, and the centrally located San Joaquin Rivers flow to the delta. The Mojave Desert occupies a large area in the southeast corner of the state.
- Throughout the lesson, students will have an opportunity to create a science storybook about tectonic plates and continental drift using an iPad and the Shutterfly Photo Story app.
- Show some examples of science storybooks.

Learning Activities:

- Have students record their findings in their classroom journals.
- Using a blank map of today's plates, have students correctly label the plates on the map. Also label some of the major cities in the world: Los Angeles, London, Beijing, Buenos Aires, etc.
- Have students place historical plate maps in chronological order.
- Ask students what patterns they noticed when placing the maps in order? Could that help us predict the Earth's surface in the future?
- How will the movement of the plates affect the surface of the Earth in the future?
- What do the students think Earth will look like in 50 million years?
- Using their knowledge about plate movements, have students draw a map in Photo Story of what they believe Earth's surface will look like in 250 million years.
- Based on their research, have students create their Photo Story book about tectonic plates and continental drift.

Closure:

Students will present their multimedia Shutterfly Photo Story books about tectonic plates and continental drift to their class and share their Photo Story book with their parents. As a culminating activity, each student will receive a published and printed copy of his or her Shutterfly Photo Story book. Printed copies of the students' books will be shared in their classroom and school libraries.

Reflection:

Discuss with students how well they rate their knowledge of tectonic plates and continental drift. How did they enjoy creating their book about the patterns of the Earth's features? What was their favorite activity?

Differentiation:

Additional differentiation will be determined after formative assessment.

- Invite students to read their tectonic plates and continental drift books to peer reading buddies with the assistance of parent volunteers.

Special Education/ESL Accommodations & Modifications:

- Have students work closely with an adult during the writing process.
- Pairing students while researching tectonic plates and continental drift would benefit students who have difficulty with visual interpretation of data.
- Write vocabulary about the Earth's features on the board and read words aloud. Vocabulary words can also be visually demonstrated using an illustration or action and redefined in very simplistic terms.
- Have students create their tectonic plates and continental drift books collaboratively, rather than independently.

Extensions:

- If mountain ranges can form where plates are colliding, what would you hypothesize might occur where plates are separating? Apply your hypothesis to identify locations on a world map where plates might be separating (both oceanic and continental lithospheric plate divergence zones can be identified on the map).
- Ask students to write a short descriptive essay describing the geological changes to the earth presented in this lesson in sequence without requiring specific period names or dates. Students may also be asked to write a compare/contrast essay after learning about geological events that occur quickly (landslide, avalanche, volcano, earthquake), comparing and contrasting changes that occur quickly with those that take millions of years to occur.

Assessment:

- Teacher observations
- Classroom work participation
- Completed Photo Story book about tectonic plates and continental drift
- Have students complete this journal entry: The tectonic plates and continental drift project was (easy) (okay) (hard) for me because ... (Circle one)