

County Implementation Award Program (CIAP) Math and Science Lesson

Unit Title: Earth Science, Earth systems
Lesson Title: Patterns in the Earth
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Grade Level: 4 th grade
Time Frame: 2-5 days
<p>Targeted Standard(s):</p> <p>Science: 4-ESS2-2 Earth's Systems</p> <p>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.]</p> <p>4.MD.A.2 Mathematics:</p> <p>Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.</p>
<p>Short Description of Targeted Phenomenon: Share with students the animated video of the Marianas Trench. https://www.youtube.com/watch?v=JkeglSqQMyQ As they watch the video, have them record what they notice and wonder.</p> <p>Students will be working collaboratively to analyze data from major mountain ranges as well as ocean trenches. They will graph the data together to interpret different trends.</p>
<p style="text-align: center;">Three Dimensions of NGSS</p> <p>Science & Engineering Practice/s (SEP):</p> <p><u>Analyzing and Interpreting Data</u></p> <ul style="list-style-type: none"> Analyze and interpret data to make sense of phenomena using logical reasoning. <p>Crosscutting Concept/s (CCC):</p> <p><u>Patterns</u></p> <ul style="list-style-type: none"> Patterns can be used as evidence to support an explanation. <p>Disciplinary Core Idea/s (DCI):</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.

Language Supports: Vocabulary charts, guided images (images that help connect the content), anchor charts (ex: Volcanoes, trenches, plate tectonics)	
Materials Needed: Laptops, World Maps, Chart Paper, Graph Paper, Pencil Paper, and Markers	
Objective(s): Students will be able to: <ol style="list-style-type: none"> 1. Point out areas indicated by the teacher on the world map. 2. Analyze and interpret data from maps to describe patterns of Earth’s features using maps from the NSTA: maps link. 	
How Math and Science concepts/skills/practices were integrated in this lesson: Math and Science are integrated throughout the lesson because the students are analyzing data that is collected from a wide variety of Earth systems. As the students are analyzing the data, they are looking for patterns they see.	
Possible Challenges /Misconceptions: Students not being able to interpret the data correctly or differently than other students.	
Formative Assessment: Think, Pair, Share: The students will partner up with an elbow partner to discuss what patterns they notice in the classroom or school.	
Lesson Opening	
Teacher Actions Show a series of pictures dealing with earthquakes, plate tectonics, landforms, ocean trenches, major mountain chains, and volcanos. - Ask students to share what they know about the images presented to them. Ask the students what they notice about the images and what they wonder about the images they are seeing.	Student Actions The students will talk within their groups about what they see in the images presented and present them.
Lesson Introduction	
Teacher Actions Getting students ready - teacher introduces the task and makes sure students understand what they are trying to accomplish, but not how they are supposed to do it.	Student Actions Students are sitting at their desk collaborating with the other students in the group.
Body of Lesson	
Teacher Actions	Student Actions

<p>Students must be given opportunities to grapple with the content. Students are actively engaged in the construction of knowledge o Vocabulary and notation are introduced in context and as needed</p> <p>In your groups you will be comparing 3 well known volcanoes, three well known trenches, and three different mountain ranges around the world. Then you and your group will collect the data and use that to plot the altitude and or depth of each of these items on a chart that you will create with your group it on a chart. While looking at the data for each I want you to pay special attention to any patterns you may see. What is similar and different?</p> <p>Students will listen to directions on how they will compare and contrast the sizes of volcanoes, trenches, and mountain ranges in relation to each other in the world.</p>	<p>Students will create graphs that reflect patterns shown in a variety of Earth’s systems.</p>
<p>Lesson Closure</p>	
<p>Teacher Actions</p> <p>Wrapping Up - teacher facilitates group discussion, helps students share their work/progress, helps students make connections, and ensures that big ideas are brought forward</p> <p>Teacher lead class discussion where students will compare and contrast the locations of Earth’s systems and where they see patterns. Some of the patterns that they may notice will be the location of the landforms, volcanoes and mountain ranges could be in the same area, oceans, and continents.</p> <p>Students working on content - teacher observes students, monitors their progress, and provides clarification as necessary</p> <p>Teacher will check into individual groups as they collaborate on their data sheets.</p>	<p>Student Actions</p> <p>Students will present accurate data based on their observations of patterns in Earth’s systems.</p>
<p>Summative Assessment: Students will present their findings in a group oral presentation with the other students in their class.</p>	
<p>Other Teaching Resources:</p>	

<https://thewonderofscience.com/phenomenal/>
<http://www.nextgenscience.org/pe/4-ess2-2-earths-systems>

Lab Safety:

If available, it would be a good idea for the students to use the STEAM lab if one is available at their site. Also, teachers can enlist help from the STEAM assistants or STEAM content specialist to help guide the students.

Extensions (if any): To assist students in making sense of the patterns in location/formation of various land forms, share with students a map of 100 years of earthquakes. Ask them to see if they notice any patterns. Have students make sense of these patterns by investigating locations of other landforms such as volcanic activity and mountain ranges.

<https://www.smithsonianmag.com/smart-news/100-years-of-earthquakes-on-one-gorgeous-map-192727/>