

Ashland University
Dwight Schar College of Education
Lesson Plan Form

Teacher Name: Mackenzie A. Hall

Date: TBD

General Info.	Subject	Earth Science – Plate Interactions
	Grade	8
	Learner Profile	All students are eighth graders. All 90 students are between the ages of 13 and 15. I teach four sections of Grade 8 Science. Section one has 23 (12 female: 11 male) students, section two 26 students (16 female: 10 male), section three has 24 students (12 female: 12 male), and section four has 17 students (8 female: 9 male). Six students have an IEP. All students with an IEP receive testing accommodations that include extended time and read aloud services. Eight students have a 504 plan. All 504 plans include preferential seating accommodations. Three of students with a 504 plan receive extended time and read aloud services during testing. Zero students are English language learners. Zero students are identified as gifted. Ten and a half percent of students at Avon Middle School are considered economically disadvantaged, and 12.3% of students are considered racial minorities. A multiple intelligence test given at the beginning of the school year revealed that students learn and engage with content in a multitude of ways. There are no serious behavior issues in any of the classes I teach.

Target	Common Core or Academic Content Standards	Physical world maps, cross sections, models (virtual or 3D) and data must be used to identify plate boundaries, movement at the boundary and the resulting feature or event. The relationship between heat from Earth’s core, convection in the magma and plate movement should be explored. World distribution of tectonic activity of possible interest should be investigated (e.g., Ring of Fire, San Andreas Fault, Mid-Atlantic Ridge, Mariana Trench, Hawaiian Islands, New Madrid Fault System). Volcanic activity, earthquakes, tsunamis, geysers, hot springs, faults, oceanic vents, island arcs, hot spots and rift valleys should all be included in the identification of plates and plate boundaries. Plate boundary identification (converging, diverging, transform) must be based on the resulting features or events. The focus must be on the cause of plate movement, the type and direction of plate movement and the result of the plate movement, not on memorizing plate names.
	Objectives, Goals or Essential Questions	Students will be able to describe the geological processes that have shaped the Earth since its origin, draw conclusions about geological characteristics of Earth’s surface and interior based on direct observation, measurement and analysis of historic events, make predictions about future geological events, and explain why geological events, like volcanoes and earthquakes, occur. <u>Essential Questions</u> <ul style="list-style-type: none"> - What are the unique features of different plate boundaries? - What causes tectonic plates to move? - What is the difference between continental crust and oceanic crust? - How fast do the plates move?
	Prior Learning	Students have participated in several Google Earth explorations at this point in the Plate Tectonics unit. The Seafloor Spreading GE Exploration taught students how to navigate GE and introduced volcanic activity along mid-ocean ridges. Students have also been studying convection currents in the Earth’s mantle. The movement of magma in the asthenosphere has been demonstrated with lava lamps, air-poppers and lab activities. Students have made observations that have linked convection currents to volcanic activity. In the previous lesson students examined the benefits and hazards of volcanic eruptions. Students also examined the different types of material that enter the air above and flow down the slopes of volcanoes. The 79 CE eruption of Mount Vesuvius was studied during the lesson. During the lesson students made observations that allowed them to analyze the impact of this eruption on human civilizations near the volcano. In this lesson students will expand their knowledge of volcanoes by exploring three examples of different types of volcanoes. Students will be

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	<p>completing this activity independently, so it is imperative that they have an appropriate GE skill set. The other GE activities have prepared them for this technology independence.</p>
Post Learning	<p>Students will be able to identify different types of plates boundaries based on Earth surface features. This lesson also provides another opportunity for students to practice using valuable observation tools in Google Earth. This is the culmination of all of the Google Earth explorations. Students will put all of the information they have learned thus far in the Plate Tectonics unit to summarize the theory of plate tectonics</p>

Delivery	Introduction or Hook	<p>This lesson will be conducted in a computer lab. All students have been previously assigned to a computer in the lab. When students enter the lab they will be instructed to login to their computer and to their Google Apps for Education account (which has been setup by the school district for student use). Students will locate, download and open the Google Earth Plate Interactions file.</p> <p>An instruction packet has been provided for each student. When all students have accessed the file I will give a brief overview of the assignment.</p>
	Activities/ Procedures	<p><u>Plate Interactions Google Earth Exploration</u> The Plate Interactions Google Earth Exploration will be completed independently by each student. Students will use the Plate Interactions Exploration instruction sheet to navigate the GE file. Students will make observations and draw conclusions in their Student Field Journal. The exploration is entirely student-led. I will monitor student progress and provide support on an as needed basis. During the exploration I will move about the room checking for understanding and helping students navigate GE.</p> <p><u>Small Group/ Whole Class Discussion</u> At the conclusion of the lesson I will engage students in a whole class discussion about all of the evidence that supports the theory of plate tectonics. Students will use observations from their all of their Google Earth explorations to make contributions to the discussion. I will encourage students to talk to their group members about each discussion question before we discuss as a whole class. I will have students look at the mystery plate boundaries so that they can determine what type of boundary they are observing. Students will be required to support their claims with evidence they collected during the exploration.</p>
	Differentiation	<p><u>Learning Style</u> In order to meet the unique needs of students with various learning preferences, a repertoire of instructional strategies will be used during this lesson. Multiple instructional modalities will be used to target kinesthetic, auditory, visual, and interpersonal learners.</p> <p><u>Teacher-led Scaffolding</u> The Google Earth Plate Interactions Exploration activity is inquiry-based and supported by technology. Because students will be working independently, I will be able to scaffold instruction for students on an as-needed basis. More accomplished learners will be able to move at their own pace; developing learners will receive the support they need in order to successfully participate in the exploration.</p> <p><u>IEPs</u> This lesson requires very little in terms of student IEP accommodations. Several students will require more instruction in order to make appropriate observations, but those students are in an instructional period when I have an in-class intervention specialist and educational aide. The intervention specialist and educational aide will work directly with students who need extra assistance. I will provide additional support when necessary. Several students require subtle cues to stay on task. Because I will be traveling about the room during the lesson I will be able to provide this accommodation as I interact with students.</p>

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Learning Conditions	The materials for this activity will be used in an appropriate way by all students. A multitude of teaching strategies will be employed in order to meet the needs of all students. Students will be active participants in the lesson. At the beginning of the lesson I will review the expectations for Google Earth explorations, focusing specifically on the appropriate use of technology and personal responsibility to complete the task in a timely manner. All classroom and computer lab rules will be followed and enforced.
	<p>Academic Language Used</p> <p><u>Content Vocabulary</u> Volcano, earthquake, convergent boundary, divergent boundary, transform boundary, volcanic island arc, folding (mountain building), GPS monument, oceanic crust, continental crust, convection, asthenosphere, lithosphere, plate, radioactive decay, subduction, subduction zone, rift valley</p> <p><u>Academic Vocabulary</u> Claims/ Evidence/ Reasoning model, analyze, geospatial technology, inquiry, GigaPan Image, rate of movement</p>

Assessment	<p>Formative Assessment</p> <p><u>Google Earth Plate Interactions Exploration</u> During the lesson I will travel around the computer lab checking for understanding. I will ask students questions and steer their thinking in the right direction if necessary.</p> <p><u>Small Group/ Whole Class Discussion</u> The small group and whole class discussions will be student-led. Students will discuss their findings from the Google Earth exploration. As a class, students will refine their ideas about different types of plate boundaries and discuss any observations that they found interesting or confusing. During this time I will check for understanding and elaborate on concepts if student descriptions show evidence of gaps in comprehension.</p>
	<p>Summative Assessment</p> <p>After the Google Earth Plate Interactions exploration I will engage students in a discussion about the different types of plate boundaries (convergent, divergent and transform). I will give students the opportunity to talk about what they learned and use their responses to gauge overall comprehension of plate interactions. I will then adjust future lessons to ensure the learning objectives have been met.</p> <p>A more comprehensive summative assessment will be assigned at the conclusion of the plate tectonics unit. Several questions will be geared toward the content learned in the Google Earth Plate Interactions Exploration.</p>

Materials	Technology	<ul style="list-style-type: none"> - Computer lab (one-to-one computer access for every student) - Teacher Computer connected to Projector/ TV - Google Earth program
	Links/Media	<ul style="list-style-type: none"> - Plate Interactions Google Earth File
	Resources	<ul style="list-style-type: none"> - Plate Interactions Instruction Packet (one per student) - Plate Interactions Student Field Journal (one per student)

Reflection	Content	
	Delivery	
	Overall	