Lesson Title	Plate Boundaries
Length of Lesson	One (50 minute) class period
Created By	Calista Guthrie
Subject	Earth Science
Grade Level	8th grade
State Standards	8th: (Inquiry), (Earth Science)
DOK Level	DOK 1, DOK 3
DOK Application	Draw, Identify, Name, Recognize, Differentiate, Investigate, Explain phenomena, compare
National Standards	5-8: A (Inquiry); D (Earth Science)
Graduate Research Element	Geologists study the Earth. They study it's structure and how it changes overtime. Coastal deltaic wetlands are located primarily at passive continental margins because subduction trenches at active boundaries prevent large deltas from forming.

Student Learning Goal:
MS 8th Grade:
1(d) Analyze evidence that is used to form explanations and draw conclusions. 1(g) Justify a scientist's need to revise conclusions after encountering new experimental evidence that does not match existing explanations. 1(h) Analyze different ideas. 4(b) Describe relationship between composition of and movement within the lithosphere.

National Science Education Standards of Content 5-8:
A: Inquiry: Think critically and logically to make the relationships between evidence and explanations. Understandings about scientific inquiry.
B: Physical Science: Heat moves in predictable ways, flowing from warmer objects to cooler ones.
D: Earth and Space Science: Structure of the Earth System. Earth's History.
F: Science in Personal and Social Perspectives: Natural Hazards
G: History and Nature of Science: Nature of Science

Materials Needed (supplies, hand-outs, resources):
PowerPoint (INSPIRE_Guthrie_09.15.12_BoundariesPPT), Notes sheet (INSPIRE_Guthrie_09.01.12_Notes), lab worksheet (INSPIRE_Guthrie_09.15.12_Lab), lab instructions (INSPIRE_Guthrie_09.15.12_LabInstructions), foam models of the different types of plate boundaries (INSPIRE_Guthrie_09.15.12_FoamModels).

Lesson Performance Task/Assessment:
This lesson builds on the student's prior knowledge of convection in the asthenosphere. Students will learn that tectonics is the accepted theory to explain supercontinent formation in Earth's history as well as the driver of earthquakes and volcanoes. Students

will learn that the theory of plate tectonics involves a balance of constructive and destructive forces that occur at plate boundaries. The different types of boundaries and the formations that are associated with these boundaries will be explained. An interactive map (see Resources/Teacher Notes) will be shown to lead into a discussion of the tectonic activity (volcanoes and earthquakes) that occurs at boundaries. It will be pointed out that these regions employ many geologist of a variety of concentrations due to the importance of predicting tectonic activity in order to prepare the public for disasters. After the PowerPoint is presented, students will get to use foam models to explore how plate boundaries work and then answer questions about the boundaries.

Lesson Relevance to Performance Task and Students:
Students will understand the importance of plate boundaries in that activity at boundaries is associated with disasters such as earthquakes and volcanoes. Students will use models to demonstrate movement along boundaries. The models will be labeled as a real world location of where that type of boundary can be found.

Anticipatory Set/Capture Interest:
The interactive map will be discussed followed by the BBC video on the East African Rift (see Teacher Resources)

Guided Practice:
Students will be given instructions on how the models work and will be guided through the activity. During the lab the instructor will walk around and guide students in using their models and answering the questions associated with them.

Independent Practice:
Students will be expected to stay on task and make their observations as they go through the lab. Though they will be working and discussing in pairs, they should make their own inferences based on their observations. Students will each have their own worksheet with questions to answer.

Remediation and/or Enrichment:
Remediation – Have students draw a diagram of each type of plate boundary with arrows indicating plate movement/

Enrichment- Have students choose a boundary or location to study specifically and write a report on tectonics in that region. It could be a paper on something specific like Mt. St. Helens or something as broad as the Ring of Fire.

Check(s) for Understanding:
Checks for understanding include successful completion of the worksheet and demonstration of conceptual understanding while using the models. A series of questions could be presented to students at the end of class (see Closure).

Closure:
Class will end with discussion on the locations that the students looked at and the hazards that people in these locations face. After briefly discussing this we will take a quick look at tectonic risk in our location (Mississippi) associated with the New Madrid.

Possible Alternate Subject Integrations:
Physical Science, Social Studies

Teacher Notes
Interactive Map:
http://education.nationalgeographic.com/education/mapping/interactive-map/?ar_a=1

East African Rift Video: