Lesson Topic: Seafloor Spreading and Subduction

Objective:
Students will be able to:

1. Demonstrate that movement of the seafloor causes it to continually change.
2. Explain that seafloor movement is a cyclical process.
3. Understand the basic structure and composition of the seafloor.
4. Explain the relationship between seafloor age and position relative to a mid ocean ridge.

Time Required: 85 minutes

Materials Needed:

- Teacher computer with internet access
- Projector/Smartboard
- 1 computer/laptop/iPad per student with internet access
- 4 student desks
- 12 feet of bulletin board paper
- Seafloor Structure handout (attached)

Teacher Preparation:

- Assign a Legends of Learning Instructional Quick Play playlist for the day(s) you will be teaching the lesson.
    - Instructional - Middle School - Seafloor Spreading and Subduction
- Assign a Legends of Learning Content Review Quick Play playlist for the day(s) you will be teaching the lesson.
    - Content Review - Middle School - Seafloor Spreading and Subduction
- Setup the Engage portion of the lesson before class arrives.
    - Cut the bulletin board paper into two 6 foot pieces
    - Line the four desks up in a row.
    - Place each sheet between the middle of the center two desks (example)
        - Have only a few inches of the paper showing when the class enters.

Engage (10 minutes):

1. Demonstrate basic seafloor spreading with the class using the bulletin board paper and desk setup.
2. Explain to the students what they see here is a model of the seafloor and what takes place at a mid ocean ridge.
3. Have two students slowly pull the paper away from one another (example)
4. Ask: What does the paper represent? Where do you think it is coming from?
    a. *New crust (seafloor) creation. It is coming from a volcano that is creating lava that hardens into the sea floor.*
5. When the students have pulled enough paper to reach the outer desks, have them pull the paper between the outer desk and the inner desk.
6. Ask: What is happening to the seafloor? Where do you think it is going?
    a. *It is sinking back in (subduction). The crust returns to the mantle.*

7. Explain to students that this is a very slow process. Today they will be learning about the structure of the seafloor and the cyclical nature of its creation.

Explore (40 minutes):

1. Have your students sign in to Legends of Learning. Instruct students to complete the Instructional playlist.
2. As students complete the assigned game, students should fill out the Seafloor Structure handout. Students will be completing the first side of the handout with this game.
3. Assist students as needed during game play, pause playlist if you need to address content or questions to the entire class.

Explain (20 minutes):

1. Review answers to the Seafloor Structure handout by filling in the diagrams on board or using Smartboard.
    a. Explain that seafloor spreading and movement is a cyclical process because it is constantly being created and destroyed. Refer back to the demonstration that you performed during the Engage portion of the lesson to demonstrate this.

Elaborate (5 minutes):

1. Explain to the students that the idea of seafloor spreading is a relatively new idea and wasn't discovered until the 1940's.
2. Show students the video clip: Sea Floor Spreading with Bill Nye
3. Ask: What technologies did scientists use to discover seafloor spreading?
    a. *Sonar (depth sounder), core samples,*
4. Ask: How high is the mid-ocean ridge compared to the rest of the ocean floor?
    a. *"Mountains" with deep caves and trenches. Extremely high peaks that were once active volcanoes.*
5. Ask: What types of scientists help discover seafloor spreading and did they discover it during a science experiment?
    a. *Geologist. Discovered during the war.*

Evaluate (10 minutes):

1. Have your students sign in to Legends of Learning. Instruct students to complete the Content Review playlist.
2. Analyze student results to determine what concepts need to be a focus for reteaching.

Additional Lesson Strategies:

- To use Legends for additional instruction, create a custom playlist with an instructional game and pre and post assessment.
- To use Legends for a quick formative assessment, create a 5-question assessment in a playlist.
- To use Legends for a student-directed experience, create a targeted freeplay playlist.

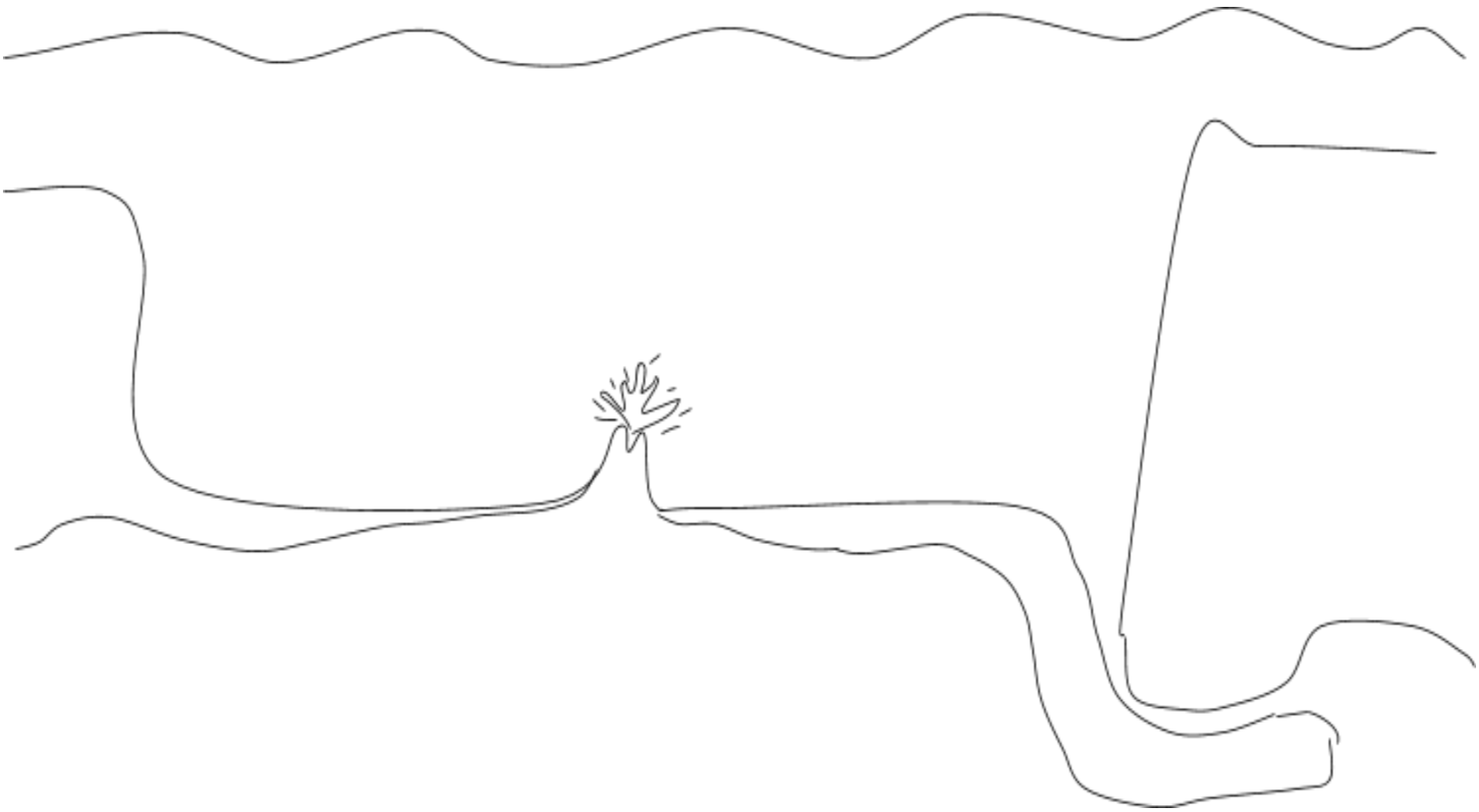
- Encourage students to play on their own at home in Legends of Learning: Awakening for a student-driven experience including avatars, battling, and quests all centered around topics they are covering in class.

Seafloor Structure

Name / Pd: _____

Directions: While playing the first game in Legends of Learning, fill in the diagram below.

Label the following:
abyssal plane, mid ocean ridge, volcano, younger seafloor crust (2 spots), older seafloor crust (2 spots), tectonic plates, use arrows to indicate the direction the plates are moving (3 total), trench, subduction.



1. Starting with the mid ocean ridge; explain how the formation and destruction of the seafloor is a cyclical process.