Plate Tectonics Tour – SOS Explorer (SOSx) Name: _____
Secondary Students' Exploration – teacher version

Instructions:

- Click on the Plate Tectonics Tour icon in the lower left corner of SOS Explorer (SOSx) to begin.
- Look for the text below in *italics* to match the text in the SOSx tour and an (*). Then, answer the question/prompt that follows on this worksheet below.
- Make sure to interact and think about the questions that are asked in SOSx during the tour. Questions here, in this worksheet, are deeper thought questions or summaries of the information that is presented to you in the tour.
- During the tour you can press Play or Enter key to move to the next slide, but you cannot go backward.

1. Blue Marble – *Have you ever wondered why the Earth's surface looks the way it does? Rotate the sphere around and then zoom in using the scroll wheel on your mouse to take a closer look at some different examples of geologic features what you can see in this view of Earth.*

- Name a few of the examples of geologic features that you see.
  This might include: Mid-ocean ridges, mountain ranges, deep ocean trenches, and islands.

- What do you think may have caused the formation of these? If you don't know, take a guess.
  Any answer, good guess will do. Earth's geologic features are formed by tectonic plates (pieces of Earth's crust) that move around: collide, diverge and most past one another.

2. Layer - Volcanoes – *This animation depicts an oceanic plate subducting, sliding under, another plate forming volcanoes. The west coast of South America is a good example of this type of boundary.*

- Instructions: Close the textbox and/or video pop-up in order to search the dataset for another good example of a subduction plate boundary – one where an oceanic plate moves under another plate forming volcanoes.

- Where is your example? (If you're not sure, try clicking on some of the volcanoes to find out the country or area where they occur.)
  Some might include: Indonesia, Japan, Philippines, Singapore, Central American countries, U.S., Aleutian Islands, Russia

3. Plate Tectonic Boundaries, Volcanoes, Earthquakes 2011 – *Now we've added a layer showing where tectonic plates meet. Earthquakes and volcanoes most often occur at these boundaries, but some don't. Choose a few volcanoes and earthquakes that don't happen at a boundary and discuss possible reasons why they might exist.*

- Yellowstone, in Wyoming is an example of a volcano that is not at a plate boundary. Mouse over the icons in that area until you find the Yellowstone icon, click on it, read the description.

- When was the last time Yellowstone had a magmatic eruption?
  During the Pleistocene – about 70,000 years ago
- Feel free to click around in some of the other resources connected to the description. Is there anything else you found that is interesting? Give one example.

4. Layer – Tectonic Plate Boundaries, Age of Seafloor – *We know that earthquakes and volcanoes most often occur at plate boundaries. Adding on, we also know that where plates diverge (move apart) new crust is formed and where plates converge (move together) old crust is recycled. Using this dataset as a reference, give an example of each and include the approximate age.*

- Find the oldest seafloor on the Earth. What's the age? Where is it? What type of boundary is there?
  Approximately 280 million years old, in the Mediterranean Sea, next to a convergent plate and a couple of transform ones.

- Find an example of the youngest seafloor on the Earth. Where is it? What type of boundary is there?
  There are many examples of new seafloor, that are less than a million years old, they are mostly near the middle of oceans as well as in the south Pacific ocean west of Central America and are next to divergent plate boundaries.

5. Blue Marble, Summary – *Take a moment and summarize what you have learned about the effects of the Earth's changing surface.*

- Put in your own words what you learned in this Tour.

- Extension Question: What causes the formation of mid-oceanic ridges? We touched on this indirectly. Load Age of Seafloor dataset, using the datasets button, to answer this. Then, do external research to learn more.
  When tectonic plates move apart (diverge), magma from the mantle under the surface bubbles up and fills the gap, this lava accumulates into long mid-oceanic ridges. This is also the formation of new seafloor.