**Connecting to the Next Generation Science Standards (NGSS Lead States 2013):**

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| *Begin by identifying the standard that represents the central purpose of your article’s theme (most manuscripts address only one standard). Include a hyperlink to the standard from the* [*NGSS website*](https://www.nextgenscience.org/)*.* MS-ESS2: Earth Systems <https://www.nextgenscience.org/pe/ms-ess2-2-earths-systems>*Include the following text in all NGSS tables:* The chart below makes one set of connections between the instruction outlined in this article and the NGSS. Other valid connections are likely; however, space restrictions prevent us from listing all possibilities. The materials, lessons, and activities outlined in the article are just one step toward reaching the performance expectations listed below.  |
| **Dimensions** | **Classroom Connections** |
| **Science and Engineering Practices**  |  |
| **Analyzing and Interpreting Data** * Use graphical displays (e.g. maps, charts, graphs, and/or tables) or large data sets to identify temporal and spatial relationships

**Constructing Explanations*** Apply scientific ideas, principles, and/or evidence to construct, revise and/or se an explanation for real-world phenomena, examples, or event

*All wording in this column must be verbatim from NGSS and include the element level correlations found in* [*Appendix F – Science and Engineering Practices in the NGSS*](https://www.nextgenscience.org/sites/default/files/resource/files/Appendix%20F%20%20Science%20and%20Engineering%20Practices%20in%20the%20NGSS%20-%20FINAL%20060513.pdf)*. Although other SEPs may be evident, use only those that are best supported.* | * Students analyze fossil data to reconstruct Pangaea and analyze and correlate earthquake, volcanic, topographic, and geochronology data to infer movements of Earth’s lithospheric plates.
* Students construct an initial and revised model to explain (a) why Connecticut’s landmass (present-day North America) shifted position resulting in a change from a tropical to temperature, climate, and (b) how the topography of Connecticut changed due to plate collisions and spreading apart.

*Describe what students are doing that illustrates how each SEP has been addressed within the manuscript at the element level; the connections can not be inferred. Although other connections may be explained in the manuscript, include only those that are most germane.* |
| **Disciplinary Core Ideas**ESS2.B: Plate Tectonics and Large-Scale System Interactions* Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth’s plates have moved great distances, collided, and spread apart.

ESS1.C: The History of Planet Earth* Tectonic processes continually generate new ocean sea floor at ridges and destroy old seafloor at trenches.

ESS2.A: Earth’s Materials and Systems * All Earth processes are the result of energy flowing and matter cycling within and among the planet’s systems. This energy is derived from the sun and Earth’s hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth’s materials and living organisms.

*All wording in this column must be verbatim from* [*NGSS*](https://www.nextgenscience.org/) *(DCI arrangement). Note: most manuscripts will have only one DCI listed. If your manuscript includes an engineering investigation, there should be an engineering DCI along with a science DCI in this section.*  | * Students use and analyze patterns of geoscience spatial data such as fossils evidence as well as earthquake and topographic data and relate this evidence to the movements of earth’s lithospheric plates.
* Students calculate the rate of plate motion, specifically using the age of oceanic crust by how far it is from a spreading center and then recognize that ocean rock progressively becomes older the further it is from the spreading center.
* Students describe what drives the movement of lithospheric plates, which is based on internal convection currents of fluid rock material within the Earth’s core and how that affects plate movement over large temporal and spatial scales.

*Describe what students are doing that illustrate how each DCI has been addressed within the manuscript. This should be clearly described in the manuscript, not inferred. Although other connections may be explained in the manuscript, include only those that are most germane.* |
| **Crosscutting Concepts** |  |
| **Patterns** * Graphs, charts, and images can be used to identify patterns in data

**Stability and Change*** Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and processes at different scales, including the atomic scale.

*All wording in this column must be verbatim from NGSS and include the element level correlations found in* [*Appendix G – Crosscutting Concepts in the NGSS*](https://www.nextgenscience.org/sites/default/files/Appendix%20G%20-%20Crosscutting%20Concepts%20FINAL%20edited%204.10.13.pdf)*. Although other CCs may be evident, use only those that are best supported.* | * Students qualitatively infer movements of Earth’s lithospheric plates based on geoscience spatial data as well as quantitatively calculating the rate of motion of lithospheric plates.
* Students understand the movements of Earth’s lithospheric plates change over longer periods of time as plate collide and spread apart create new topographical features such as mountains and oceanic trenches.

*Describe what students are doing that illustrates how each CCC has been addressed within the manuscript at the element level; the connections can not be inferred. Although other connections may be explained in the manuscript, include only those that are most germane.* |
| *Building Towards* Performance ExpectationMS-ESS2-3. Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. [Clarification Statement: Emphasis is on how processes change Earth’s surface at time and spatial scales that can be large (such as slow plate motions or the uplift of large mountain ranges) or small (such as rapid landslides or microscopic geochemical reactions), and how many geoscience processes (such as earthquakes, volcanoes, and meteor impacts) usually behave gradually but are punctuated by catastrophic events. Examples of geoscience processes include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.]*Choose the most appropriate Performance Expectation (PE) supported through student engagement with the DCIs, SEPs, and CCs listed. Include the Clarification Statement and Assessment Boundary.* |

Connections to the *Common Core State Standards* (NGAC and CCSSO 2010)

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| ELA*Include any* [*ELA CCSS*](http://www.corestandards.org/ELA-Literacy/) *connections that are strongly evident in the manuscript* |
| Mathematics*Include any* [*Mathematics CCSS*](http://www.corestandards.org/Math/) *connections that are strongly evident in the manuscript* |