



Moving and Shaking

6th Grade

Duration

Pre-Visit: 40 minutes

Museum Visit: 60 minutes

Post Visit: 50 minutes

Location

Age of Mammals Hall

Supplies

- Worksheet
- Pencil
- Clipboard (optional)
- “Global Processes”
(*video file*)

Standards

[NGSS](#)

ESS1.C, ESS2.A, ESS2.B,
ESS3.B

[S+E Practices](#)

(1), 2, 3, 4, 7, 8

[CCSS ELA](#)

W.1.a.b.c.d.e, W.2, W.4,
W.7

[CA State](#)

ELA Writing Applications
2.0, 2.2.a.b.c.d

Science 1.a

Vocabulary

Migration · Plate tectonics ·
Pleistocene Era · Land
bridge · Isthmus · Adapta-
tion · Climate change

Concepts

- Plate tectonics are the reason for major geologic features and events

Objectives

- Students will understand evidence for plate tectonics including the fit of the continents; the location of earthquakes, volcanoes, and mid-ocean ridges; and the distribution of fossils, rock types, and ancient climatic zones.
- Students will write expository compositions.

Outline

1. In one classroom session before visiting the Museum, review vocabulary and show students “Global Processes” (video). Discuss the global effects of plate tectonics.
2. During a trip to the Museum explore the Age of Mammals hall, where students record effects of plate tectonics and share their findings in groups.
3. Back in the classroom, students will create a multi-paragraph essay exploring their findings.

Pre-Visit

In your classroom, print and distribute the vocabulary list to review together.

Next, show students the video “Age of Mammals—Global Processes” available on the NHMLA YouTube channel at www.youtube.com/NHMLA. (The specific video link is <http://youtu.be/ApsCGttW2Us>)

Using the vocabulary, lead a discussion about what students observed on the video using the following questions as prompts to help guide the discussion:

- In what ways has the land changed over time?
(*size, shape, placement, relationship to equator*)
- What might be some ways the land changes affected mammals?
(*migration, relationship to environment, food sources*)
- How were weather patterns affected? Did this lead to changes in climate?
(*long term climate change such as ice ages*)

As a group, continue the discussion, brainstorming the potential global effects of plate tectonics. Record group responses, these will be revisited after your visit to the Natural History Museum. Some conclusions might include:

- Climate change leads to new habitats
- New habitats lead to mammal adaptations
- Mammal adaptations lead to changes in species and possible extinction

Museum Visit

Distribute the graphic organizer (Effects of Plate Tectonics) during the Museum visit. In the Age of Mammals Hall, show students the “Global Processes” video projected in the exhibit as a refresher on plate tectonics. Then divide the students into pairs and have them explore the hall to record effects of plate tectonics using their graphic organizer. Pairs should focus on two areas of the exhibit:

- Challenges for Mammals
- Adapting to Grasslands

Students share their findings in groups of 4 and create summary statements.

Post-Visit

As a class, revisit the initial brainstorm and take some time to add findings and revise based on the field trip experience. Then, ask students to choose three effects of plate tectonics and write a multi-paragraph essay exploring their findings. Each student may use their summary statements to create a topic sentence for their expository paper.

Variations & Extensions

- Look at Charles Knight paintings of ancient ecosystems on Rotunda Mezzanine for additional inspiration (adjacent to Age of Mammals hall).

Vocabulary

Review and become familiar with these terms prior to visiting the Natural History Museum!

Word	Definition
Migration	Animals travelling long distances in search of a new habitat. The cause for the migration may be local climate, local availability of food, or the season of the year. (Example: birds fly south for the winter.)
Plate tectonics	The movement of the earth's crust and uppermost mantle. These plates move in relation to one another at one of three types of plate boundaries: <u>convergent</u> boundaries, <u>divergent</u> boundaries, and <u>transform</u> boundaries. Earthquakes and volcanoes are results of plate movement.
Pleistocene Era	The period of time from 2.5 million to 12,000 years <u>Before Present</u> (BP). During the Pleistocene Era, there were multiple ice ages and temperatures reached both record highs and lows.
Land Bridge	An <u>isthmus</u> or wider land connection between continents, which allows <u>land animals</u> and <u>plants</u> to cross over and <u>colonize</u> new lands. Land bridges can be created when <u>sea levels</u> fall, exposing shallow, previously submerged sections of <u>continental shelf</u> ; or when new land is created by convergent <u>plate tectonics</u> ; or occasionally when the sea floor rises after an <u>ice age</u> . (Example: the <u>Bering land bridge</u> , which intermittently connected Asia with North America as sea levels rose and fell during the ice ages of the Pleistocene.)
Isthmus	A narrow strip of land connecting two larger land areas usually with water on either side.
Adaptation	Adaptation is the evolutionary process whereby a population becomes better suited to its <u>habitat</u> . This process takes place over many generations and can be related to forces such as climate change or habitat loss. For example, the adaptation of horses' teeth to the grinding of grass, or their ability to run fast and escape predators.
Climate change	The warming or cooling of Earth's climate. Human impact on the earth is currently causing more extreme and rapid changes in temperature.



Effects of Plate Tectonics

Use the graphic organizer below to record the many effects of plate tectonics has on land masses, mammals, and climate as described in the *Challenges for Mammals and Adapting to Grasslands* areas of the exhibits. Look everywhere for information, including text, visuals, timelines and figures. At the bottom, summarize discoveries in 3-5 summary statements.

Challenges for Mammals

Adapting to Grasslands:

Summary Statements

Expository Essay Rubric

	4	3	2	1	Score
Ideas	The essay is informative with a clear focus and at least 3 specific details and extremely supportive examples for each detail.	The focus of the essay needs to be clearer and more supportive details and examples are needed.	The topic is not clearly explained, and details and examples are not clearly supportive of the topic.	The topic is undefined.	
Organization	The introductory paragraph includes a thesis statement that clearly states the topic. Each body paragraph begins with a clear topic sentence and includes transitions. The essay ends with a uniquely summative conclusion paragraph.	The introductory paragraph includes a thesis statement that states the topic. Each body paragraph begins with a topic sentence and includes transitions. The essay ends with a summative conclusion paragraph.	The introductory paragraph includes an unclear thesis statement. Each body paragraph may begin with a topic sentence and may include transitions. The essay ends with a conclusion paragraph.	The introductory paragraph does not include a thesis statement. Each paragraph may begin with a topic sentence and may include transitions. The essay may end with a conclusion paragraph.	
Voice	The writer's voice is clearly knowledgeable of and passionate for the topic.	The writer's voice is knowledgeable of and may be passionate for the topic.	The writer's voice is somewhat knowledgeable.	The writer's voice is undetectable.	
Word Choice	Specific nouns, action verbs, and visual descriptors (adj and adv) make the essay clear, informative, and enjoyable to read.	Some nouns, action verbs, and visual descriptors (adj and adv) are specific.	Too many general nouns and descriptors are used. Verbs are passive.	Word choice is unclear or inaccurate.	
Sentence Fluency	The writing includes a variety of sentence types. Multiple evidence of at least 2 out of the 4 sentence types is present in the writing. The sentences flow smoothly and are enjoyable to read.	The writing includes a variety of sentence types. Evidence of at least 2 out of the 4 sentence types is present in the writing. Most sentences flow smoothly, but some may be short and choppy.	The writing does not include a variety of sentence types. Evidence of only 1 sentence type is present in the writing. 1-3 fragments or run-on sentences may be present. Many short, choppy sentences need to be rewritten.	The writing does not include a variety of sentence types. There are many fragments and run-on sentences throughout the writing.	
Conventions	The essay includes no more than 4 conventional errors in the following categories: capitalization, punctuation, spelling, and usage.	The essay includes no more than 7 conventional errors in the following categories: capitalization, punctuation, spelling, and usage.	The essay includes no more than 9 conventional errors in the following categories: capitalization, punctuation, spelling, and usage.	The essay includes more than 9 conventional errors in the following categories: capitalization, punctuation, spelling, and usage.	