BCPS Field Trip Request ID # 8535

Trip Request By Kimberly Minter - HMS
Trip Name Falls of Ohio
Trip Date 09-20-2018
Approx. Pick-up Time 8:30AM
Return Date 09-20-2018
Approx. Return Time 1:30PM
Class/Group Discovery School
Student Count 100
Chaperone Count 10
Number of Vans/Buses 3
Common Carrier Miller
Cost to Students 15
How will you pay for students who cannot afford the fee?
Discovery funds

Place of Departure

Name: Hebron Middle School
Address: 3300 East Hebron Lane
City: Shepherdsville
State: KY

Destination

Name: Falls of the Ohio
Address: 201 W. Riverside Dr.
City: Clarksvllle
State: IN

Lesson Plans

The field trip to the Falls of the Ohio is in support of the Discovery Schoolâ€™s in-depth unit on Geology, Geologic History, biodiversity, species and extinction, and geologic change/Earth processes. While we have read, discussed, debated, and written extensively about the content matter in this Unit, Geology is one of those subject areas within science that lends itself to hands-on, in-person research and investigation, but only within the context of live fieldwork. Students cannot reasonably be expected to develop an appreciation for the breadth of biodiversity or extent of geologic time if they are unable to observe the fossil record and the empirical consequences of geologic change for themselves. Visiting the Falls of the Ohio will provide our students an unparalleled opportunity to observe, measure,

document, and analyze fossil evidence in support of*numerous* performance expectations and Disciplinary Core Ideas expressed by the Next Generation Science Standards, listed below. They will be provided first-hand experience at investigating real-world, valid scientific data under the supervision of experts in the field. Whatâ€™s more, it will provide interdisciplinary, cross-curricular connections to social studies standards as we learn about the role of the falls in the history and economic development of the city of Louisville.

Performance Expectations and Disciplinary Core Ideas that will be addressed by this field trip to the Falls of the Ohio:

MS-ESS1-4. Construct a scientific explanation based on **evidence from rock strata** for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history. [Clarification Statement: Emphasis is on **how analyses of rock formations** and**the fossils they contain** are used to establish relative ages of major events in Earthâ€™s history. [â€¦] Examples can include [â€¦] the evolution or extinction of particular living organisms.

MS-ESS2-2. Construct an explanation based on evidence for **how geoscience processes have changed Earth's surface** at varying time and spatial scales. [Examples of geoscience processes include**surface weathering** and **deposition by the movements of water** [â€¦.] Emphasis is on geoscience processes that shape **local geographic features**, where appropriate.]

MS-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.

DCI ESS2.C: **The Roles of Water in Earth's Surface Processes**: **Waterâ€™s movementsâ€”both on the land and undergroundâ€”cause weathering and erosion**, which change the landâ€™s surface featuresâ€¦

MS-ESS2-4. Develop a model to **describe the cycling of water** through Earth's systems driven by energy from the sun and the force of gravity.

MS-ESS3-1. Construct a scientific explanation based on evidence for how the uneven **distributions of Earth's [â€¦] groundwater resources** are the result of past and current geoscience processes. [Clarification Statement: Emphasis is on how these resources are limited and typically non-renewable, and how their distributions are significantly changing as a result of removal by humans.]

DCI ESS2.C: **The Roles of Water in Earth's Surface Processes: Water continually cycles** among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land.

Global movements of water and its changes in form are propelled by sunlight and gravity. (MS-ESS2-4)

ESS3.A: Natural Resources: Humans depend on Earthâ€™s land, ocean, atmosphere, and biosphere for many different resources. [â€¦] **fresh water** [â€¦]**resources are limited**, and many are not renewable or replaceable over human lifetimes. These resources are **distributed unevenly around the planet as a result of past geologic processes**. (MS-ESS3-1)

MS-ESS3-3. Apply scientific principles to design a**method for monitoring and minimizing a human impact on the environment**.* [Clarification Statement: Examples of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible, and designing and evaluating solutions that could reduce that impact. **Examples of human impacts can include water usage and pollution**.]

MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita **consumption of natural resources**impact Earth's systems. [Clarification Statement: Examples of evidence include grade-appropriate databases on human populations and the rates of consumption of food and natural resources (**such as freshwater**, mineral, and energy.)]

DCI ESS3.C: Human Impacts on Earth Systems:**Human activities have significantly altered the biosphere**, **sometimes damaging or destroying natural habitats** and causing the extinction of other species. (MS-ESS3-3)

Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. (MS-ESS3-3),(MS-ESS3-4)

MS-LS2-5. Evaluate competing **design solutions for maintaining biodiversity and ecosystem services**.* [Clarification Statement: Examples of ecosystem services could include **water purification**, nutrient recycling, **and prevention of soil erosion**. Examples of design solution constraints could include scientific, economic, and social considerations.]

DCI LS2.C: Ecosystem Dynamics, Functioning, and Resilience: Biodiversity describes the variety of species found in Earthâ€™s terrestrial and oceanic ecosystems. The completeness or integrity of an ecosystemâ€™s biodiversity is often used as a measure of its health. (MS-LS2-5)

LS4.D: Biodiversity and Humans: Changes in biodiversity can influence humansâ€™ resources, such as food, energy, and medicines, as well as ecosystem services that humans rely onâ€"for example, **water purification** and recycling. (secondary to MS-LS2-5)

MS-LS1-4. Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.

MS-LS4-1. Analyze and interpret data for **patterns in the fossil record** that document the **existence, diversity, extinction, and change of life forms throughout the history of life on Earth** under the assumption that natural laws operate today as in the past. [Clarification Statement: Emphasis is on finding patterns of changes in the level of complexity of

anatomical structures in organisms and the **chronological order of fossil appearance in the rock layers**.]

MS-LS4-2. Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern **and fossil organisms to infer evolutionary relationships.**

DCI LS4.A: Evidence of Common Ancestry and Diversity: The **collection of fossils and their placement in chronological order (e.g., through the location of the sedimentary layers** in which they are found or through radioactive dating) **is known as the fossil record**. **It documents the existence, diversity, extinction, and change of many life forms throughout the history of life on Earth**. (MS-LS4-1)

Anatomical similarities and differences between various organisms living today and between them and **organisms in the fossil record, enable the reconstruction of evolutionary history** and the inference of lines of evolutionary descent. (MS-LS4-2)

As you can see, no fewer than 20 individual Performance Expectations and Disciplinary Core Ideas will be supported by this first-hand observation of the fossil record and the changing geologic features available at the Falls. Students will return with a more fully developed understanding of the concepts weâ€™ve only been able to talk and read about in the abstract up to this point. They will be in possession of a richly developed schema based on personal experience that will prepare them will for more advanced level science classes in high school.