# 8th GRADE LEARNING EXPEDITION TOPICS

*Teachers are invited to sign up for Learning Expeditions in a sequence that makes sense for their individual classes.*

*The Orientation Expedition is recommended as the first field visit of the year to give students a sense of expectations and to practice learning in the outdoors. If a class does not sign up for an Orientation Expedition, the morning of the first day will be an orientation, with the afternoon's topic adapted to fit into a shorter period of time.*

*Schools are encouraged to sign on for at least four Learning Expeditions, and as many as all ten. Four gives some degree of regularity to the Expedition days, allowing students to build upon what they have learned and not see the outing as a disconnected "field trip." We hope you can join us for all 9!*

## FALL LEARNING EXPEDITIONS

- **Orientation to Muddy Sneakers and Field Study Introduction** – Students will learn basic safety procedures, including what to do in case of lightning, how to use the bathroom in the woods in a safe and low-impact way, how to use a compass, and how to evaluate the weather for oncoming conditions. The Orientation Expedition focuses on getting students into the mode of being field scientists. Students will learn the methodology for creating hypotheses that can be answered through scientific investigations (1.01), test experimental procedures, analyze variables (1.04), and collect and analyze evidence (1.05). Students will also begin to practice using mathematics to gather, organize, and present quantitative data resulting from a scientific investigation. Some time will also be spend today with students making general observations of the plant and animal life around them, as well as discussing the cultural history of the place they are visiting.

- **Properties of Water (3.01, 3.02)** – Students will study water as a universal solvent, its properties of cohesion and adhesion, polarity, density and buoyancy, and specific heat by conducting studies in streams and lakes.

- **Our Local Hydrosphere (3.02, 3.05):** Students will be field scientists for the day – analyzing water temperature, dissolved oxygen, pH, nitrates, turbidity, and bio-indicators. They will record their data and draw conclusions about patterns in water quality. Students will also examine maps of the local area, studying the French Broad River Basin, or other watershed to which they belong, and make connections about where their water comes from. Today will also include a discussion of how humans affect the quality of the Earth's water.

- **Water, Pollution, and Humans' Role in the Mix (3.07)** – Students will continue their study of water composition, deepening their ability to test water quality for pollutants. They will extend this fieldwork to form theories on how human actions over time may have played a role in water quality issues. Today's activities will include determining the effects a chemical has on a living organism including exposure, potency, dose, and resultant concentration of chemical in the organism. Students will discuss point and non-point pollution and possible effects of excess nutrients in NC waters.

**EXPEDITIONS AVAILABLE IN FALL OR SPRING**

**Geology and the Hills Around Us (5.01) –** Students will use topographic maps, compasses, aerial photographs, GPS units, ground truthing, and orienterring skills to orient themselves on the trail. They will observe rock formations and landforms to form an understanding of the Law of Superposition and unconformity. Students will study geologic charts to create a map of the area around them several hundred, several thousand, and several million years ago. They will also discuss changes in the land over time – including development, resource management, and land use issues (5.05).

**Evolutionary Theory and Biological Adaptations in Nature (5.02)** – Students will study plants and form hypotheses involving their biological, geological, and technological adaptations. Students will "create" futuristic plants that have evolved to adapt to current environmental conditions. Part of today's discussion will focus on evaluating evidence for climate change (5.01).

**SPRING LEARNING EXPEDITIONS**

- **Chemistry in Nature (4.01)** – Students will identify different chemical elements in the natural world they explore today. The periodic table will come alive as they look for evidence of several elements' presence in the settings around them. Students will be able to explain how the periodic table is a model for classifying elements and identifying the properties of elements (4.03). Students will analyze soil, biomass, and water to illustrate chemical and physical changes within a system, including temperature, volume, mass, precipitate, and gas production. They will evaluate evidence that elements combine in a multitude of ways to produce compounds that account for all living and non-living substances (4.02). Today's activities will also include a discussion of the law of conservation of matter (4.07).

- **Microbiology in the Woods (7.02) and Cell Theory (6.01, 6.02, and 6.03)**– Students will study slices of downed trees to reconstruct the life of the tree. They will identify

potential bacteria, parasites, contagions, mutagens, and environmental hazards that affected the tree during its lifetime. Students will then tell their own life stories in the form of tree rings. Students will take cellular samples from plants and water organisms and will conduct microscopic investigations, generally back in the classroom, that allow them to compare cellular function and structure. Students will analyze in particular protists euglena, amoeba, paramecium, and volvox.

- **Field Study Culmination** – This Expedition is designed as a review for students who have participated in Muddy Sneakers throughout the academic year. Students will revisit the topics they have studied, playing games and producing artwork and poems to summarize some of the concepts they have studied. Using their own field journals, students will come up with questions that include key concepts they have studied during the year. These questions will be used as the foundation of the group's review. Students will also design outdoor outings for their families as a way of continuing their connection with the outdoors, and will serve active roles in navigation and leadership today, building on skills they have learned all year.

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We hope Muddy Sneakers shows you and your students the joy of learning outside!
We aim to make learning fun, real, and applicable –
enhancing the classroom experience for students and teachers alike.
***Thank you for working with us.***