

Middle School Science Enrichment Offerings 2019-2020 Academic Year

Exploring Science in Nature: a Two-part Experiential Program for Middle School Students

Exploring Science in Nature (ESN) is a 4-hour, two-session science and nature education program for middle school students in which they learn about science topics and local habitats through hands-on activities in the classroom and field. Topics covered correlate to Colorado and national science education standards for each grade.

First, an educator visits each classroom for an hour-long lesson to introduce science concepts that prepare students for a field trip. The following week, your class visits the Durango Nature Center for a half-day field trip. Instructors guide small groups through a variety of habitats, engaging students with activities, science games, experiments, and guided explorations. These field trips solidify science standards and a sense of place through inquiry based learning in nature. The 6th grade program is offered in the winter season only.

ESN6: 6th Grade Program Overview (Winter Season)

“Watersheds in Winter”

In the Classroom: Students will use aerial photography and topographic maps to identify the Animas River Watershed and predict flow direction of runoff at various locations in the watershed. An investigation of Snow Water Equivalent will follow in which students will melt snow samples of varying densities to test predictions about the water volume contained in each. In groups, they will then create a water filter and analyze the effects of soil and rock on water from snowmelt as it infiltrates into the ground.

At Haviland Lake: Students will dig a snowpit and collect data to analyze the effects of air temperature, snow temperature gradient, snow crystal types, snowpack depth, and snow density on the volume of water contained in the season’s snowpack. The students will calculate the snow water equivalent of the current snowpack and assess how that value affects plants, animals, and humans in the SW Colorado region. We will hike and play games that help the students understand how the water cycle is at play in our watershed, specifically during winter.

Standard: Meets 9R Graduation Standards 3, 5

Performance Indicators:

Middle School 3.a Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

Middle School 5.c Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.

ESN7 / ESN8: 7th & 8th Grade Program Options Overview (Fall or Spring)

For 7th and 8th graders, SJMA and Trails 2000 are joining forces to foster an environmental responsibility and respect among middle school students by combining education, stewardship, and a deep connection to the outdoors. The lessons below follow the traditional SJMA model of a classroom lesson, followed by a half-day field trip; SJMA will work with Trails 2000 and the school to determine the site location for the field trip. The optimal time for the 7th grade program is fall season, and the optimal time for 8th graders, is in the spring, but we will work with your school as best as we can.

Option A: "Fragmentation and Biodiversity"

Aligned Performance Indicators: MS-LS2-1, MS-LS2-2, MS-LS2-5, MS-ESS3-3.

Learning Outcomes: Students should be able to describe different types of habitat fragmentation and understand how trails can positively affect habitat fragmentation.

Stewardship Component: Biodiversity surveys in existing trail systems to inform T2K data collection.

Summary: In the field, students will learn about habitat fragments (how an area can have multiple habitats) and island fragmentation. They will explore how trails affect these fragments and do biodiversity surveys around small areas where they will collect real data electronically. The classroom follow-up will consist of a problem solving activity in which students are given information about an area and are shown a map of their own data and then tasked with designing a trail plan.

Option B: "Geology and Soils"

Aligned Performance Indicators: MS-ESS2-2, MS-ESS3-1

Learning Outcomes: Students should be able to construct a geological time scale and relate different time periods to geological phenomenon and relate geology to layers in the soil. They should also understand which types of soil are better for trail building and how erosion affects both soil and trails.

Stewardship Component: Trail maintenance on eroded/damaged trail sections.

Summary: The classroom component will focus on the geological time scale and will go over some soil basics. In the field, students will look at different layers in the soil as they relate to geology, and do activities that synthesize the information with trail building and erosion.

Option C: “Human Impacts in Watersheds”

Aligned Performance Indicators:

MS-LS2-1, MS-LS2-2, MS-LS2-5, MS-ESS3-3

Learning Outcomes: Students should be able to assess deliberate and inadvertent human alterations of the nature center, discuss the deliberate and inadvertent impacts of land use, and use scientific methods to learn about streamflow, aquatic habitats, and erosion.

Stewardship Component: Students will do trail work to reduce runoff and erosion along trails.

Summary: Students rotate through three different lessons: discharge water quality monitoring, macroinvertebrate counting, and mini trail building and erosion testing.

Option D: “Energy Flow and Trophic Levels”

Aligned Performance Indicators:

MS-ESS2-1, MS-LS1-6, Middle School 3.b, Middle School 3.e

Learning Outcomes: Students will be able to provide evidence as to why there are more producers than consumers, and how important it is to monitor local producers. They will be able to explain why invasive species reduce food sources for higher trophic levels.

Stewardship Component: Invasive species removal on trails.

Summary: In this lesson, students will learn about trophic levels, and more specifically, how all communities are upheld through producers who convert the sun’s energy. Students will also learn how energy and matter is cycled throughout an ecosystem and about different invasive and native plant species.

ESN Pricing:

Our cost to provide this program is \$20/student, but we will continue to leverage half the cost, so that **it is only \$10/student for your school** (including supplying snowshoes for the 6th grade program).

ESN Mileage Fee:

A mileage fee of \$0.55/mile which is the 2019 Colorado AWD mileage reimbursement rate will be applied to programs outside Durango.

Scheduling:

For all programs, call Program Director Kiley Smith or email at kiley@sjma.org. We recommend that programs be scheduled at least 30 days prior to the start of the season in which you wish to do the program (Fall, Winter, or Spring). SJMA program seasons are listed below:

Fall Season--mid-September through mid-November

Winter Season--mid-January through mid-March

Spring Season--April through the end of May