

Course Title:

Ecosystem Interactions-Finding the Balance: (A Natural History Immersion Experience along the Gunnison River)

Instructor: Tim Blesse –Teacher Programs Coordinator, Denver Museum of Nature & Science

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Course Description:

Immerse yourself for 3 days in the wild and secluded beauty of the Gunnison River Canyon as you float westward from near Delta Colorado accompanied by a teacher-trainer and naturalist from the Denver Museum of Nature and Science.

Explore the interactions that occur every day in nature. See how human activity, past and present, has continuously impacted these interactions.

Use your experience to:

- Connect your students to their environment in a way that creates an “essential nature literacy” that promotes both cognitive development and responsible citizenship.
- Gain important introductory background knowledge about topics in your science and social studies curricula including: resource management, ecology, geology, western history and astronomy.

No prerequisites required

Course Syllabus of Activities:**Day 1- Full Day Museum Workshop Experience (Saturday June 10, 2017)**

TIME	ACTIVITY	LOCATION	INSTRUCTOR
7:30-8:10 am	Introductions, Registration, Breakfast & Welcome	Studio 106	Tim Blesse
8:10- 9:45 am	Water-A Global Story (Geodome Presentation) <i>See Description Below</i>	Gates Planetarium	KaChun Yu PhD and Bob Raynolds PhD
9:45-10:00 am	Break	Planetarium	
10:00-10:45	Course Requirements/ Overview Tour of Education Collections & Loan Process	Studio 106 /Education Collection Facility	Tim Blesse
10:45-11:15 pm	Citizen Science- History and How to Get Started <i>See Description Below</i>	Studio 106	Katie Wolfson M.A.
11:15-12:00	Citizen Science- Choosing Your Project and Lesson Planning	Studio 106	Katie Wolfson M.A.
12:00- 12:30	Working Lunch	Studio 106/Boetcher Nature Plaza	Tim Blesse

12:30- 1:30	Introduction to Ecosystem Interactions <i>See Description Below</i>	Studio 106 & Wildlife Exhibit Area	Tim Blesse
1:30-2:30	(For New Teachers) Introduction to Nature Journaling <i>See Description Below</i>	Studio 106	Katie Wolfson M.A.
	(For Returning Teachers) Scientific Explanation Writing <i>See Description Below</i>	Edge of the Wild Exhibit	Tim Blesse
2:30-3:30pm	Predator-Prey & Wolf Reintroduction	Studio 106	Susan Ware PhD

Water-A Global Story (Geodome Presentation)

Description: Using the immersive imaging technology of Gates Planetarium, experience a one hour three dimensional journey through space and across the earth’s surface to better understand the uniqueness, origins, distribution and critical importance of our planet’s most valuable natural resource- water. Plunge into a national conversation about local and global water issues using the immersive technology of Gates Planetarium. Typically planetariums are used to study space, but their interactive visualization capabilities are also ideal for a discussion about earth systems and environmental science. Geologist Dr. Bob Reynolds and space scientist Dr. Ka Chun Yu explain the planetary processes that affect water supplies around the world and in the American West.

Citizen Science: History & How to Get Started

Description: Join environmental educator and Museum off-site programs coordinator Katie Wolfson for an introduction to a field of science that directly involves teachers and students in current scientific research through volunteer collaboration with professional scientists. No formal scientific background is required! This session will explain the historical origins of citizen science and introduce teachers to on-line resources for getting involved. Learn how to choose the project that is perfect for your specific teaching situation. Learn how to give your students a “hands-on” experience that furthers the advancement of science using an authentic learning experience.

Introduction to Ecosystem Interactions

Description: Join long-time classroom educator and museum teacher professional development coordinator Tim Blesse in a review of the natural interactions occurring in Colorado Ecosystems that allow those ecosystems to maintain homeostasis (predator-prey, competition, symbiosis, energy relationships etc.) Participate in games that can help your students deepen their understanding of these interactions by collecting, analyzing and interpreting data.

Scientific Explanation Writing (Edge of the Wild Exhibit)

Practice a scaffolding structure that you can use to help your students develop stronger scientific explanations using the Claim-Evidence and Reasoning framework. As a group you will investigate one of four population changes occurring in Colorado’s wildlife populations. Then you will collect different forms of evidence from the “Edge of the Wild Exhibit” and use it to

make a claim about what might be causing the population change. Finally, you will use reasoning and justification to string the evidence together in a way that supports your group's claim. This activity is designed to get you and your students thinking more deeply about the ways that humans are interacting with, impacting, and disrupting Colorado's ecosystems (invasive species, water redistribution, CO2 emissions, predator removal etc.).

Predator-Prey & Wolf Reintroduction

Join researcher and museum instructor Dr. Sue Ware in a mini-workshop exploring some of the research and legislative implications involving Colorado's predator-prey relationships. Learn more about wolf re-introductions to the greater Yellowstone ecosystem from a researcher who is currently involved.

Day 2-4- River Field Course (Saturday June 16-18, 2017)

DAY 2: Gunnison River Immersion Experience: (Friday June 16) - Put-In

- Morning: interpretation along and at stops during river travel (2 hrs)
- Afternoon: Wildlife Walk/Nature Journaling (2 hrs)
- Evening: Historical Storytelling & Song: Nature's Villains & Defenders (2hrs)

DAY 3: Gunnison River Immersion Experience Layover Day at Dominguez Canyon (Saturday June 17)

- Morning: Birdwatching for Beginning Birders (2 hrs)
- Midday: Hike to upper Dominguez Canyon- Find and Journal about ecosystem interactions(2 hrs)
- Late: Stream Studies-Assessing Stream Health using Macroinvertebrates (2hrs)
- Evening: Stargazing Program (Astronomy) (2 hrs)

DAY 4: Gunnison River Immersion Experience- Take-Out Day (Sunday June 18)

- Morning to Midday- interpretation along and at stops during river travel (2 hrs)

Classroom Implementation Component: (Due by September 30)

- Teachers will be required to introduce Citizen Science to students and submit: a) lesson plan b) assessment results & c) student work samples

Course Goals:

Teacher participants will:

- A. Use citizen science and field experience to facilitate contact between their students and the natural environment in a way that creates "essential nature literacy" that promotes cognitive development, connectedness to the natural world and responsible citizenship.
- B. Explain conservation issues related to water management, invasive species, predator elimination, energy use, and climate change currently effecting Colorado's natural ecosystems.

- C. Gain important background knowledge about topics included in their science and social studies curricula. This background knowledge will provide them with local examples of a number of K-12 topics including:
- **ECOSYSTEMS & BIOMES:** Experience the interconnectedness of biotic and abiotic factors by examining their interactions.
 - **ADAPTATIONS:** Closely observe the structure and behaviors of organisms that allows them to survive and reproduce in their natural environment.
 - **ENVIRONMENTAL POLICY:** Observe directly the ways that government agencies and policy of public lands effects the ecosystems.
 - **GEOLOGY:** Identify rocks and Read the rock record of geologic history.
 - **ASTRONOMY-** Read the night sky and hear its stories.

Optional Course Credit:

1.5 Graduate Level Semester Credits from the Colorado School of Mines Office of Special Programs and Continuing Education are available for K-12 teachers. These credits may be applied toward state teaching re-licensure.

Grades:

Note: Although attendance, at the above activities, by participants who are not enrolled in the course for credit will be optional. Successful completion and credit for teachers enrolled for credit requires that they be in attendance and actively participate in **100%** of the activities occurring during the 4 face-to-face days and submission of the follow-up classroom implementation component

Course Credit Calculation:

DAY 1: Full Day Workshop Experience: (Saturday June 10, 2017, 8:00AM-3:30PM)
(See schedule above)

- LECTURE HOURS: 7

DAY 2: Gunnison River Immersion Experience: (Friday June 16)
(See above for Activities)

- LECTURE HOURS: 6

DAY 3: Gunnison River Immersion Experience Layover Day (Saturday June 17)
(See above for Activities)

- LECTURE HOURS: 8

DAY 4 Gunnison River Immersion Experience (Sunday June 18)
(See above for Activities)

- LECTURE HOURS: 2

Classroom Implementation Component: (Due by September 30)
See above for Description

- LAB HOURS: 4

TOTAL LECTURE HOURS: 23 (23 contact lecture hours / 15 hours per credit = 1.53 credit)

TOTAL LAB HOURS: 4 (4 contact lab hours / 25 hours per credit = 0.16)

TOTAL CREDITS FOR THIS COURSE= 1.5 credit hours (1.53 + 0.16 = 1.69 rounded to 1.5)