



# 2018 Bighorn Basin Educator Workshop

*supported the NASA Pennsylvania Space Grant Consortium*

Pennsylvania State University - University Park

GEOSC 497 [undergraduate]  
Course number: 8761  
Course ID: 020528

GEOSC 597 [graduate]  
Course number: 8762  
Course ID: 020630

## **Description**

The Bighorn Basin Teacher Workshop [GEOSC 497/597] is a one week course in introductory field geology and paleontology with special emphasis on a portion of the Mesozoic and early Cenozoic era sedimentary rock and fossil deposits of the Bighorn Basin in Wyoming and Montana. Through daily field excursions and evening classroom sessions, students will be introduced to and employ various modern field techniques used by geologists and paleontologists to study the depositional and structural history of the region, paleoenvironmental change through time, and discover first-hand the fossils that characterize the fauna and flora of these time periods. At geological sites we will investigate faults, identify and characterize rocks, and learn how to use tools (compass, hand lens, GPS) to collect detailed data. We will combine our observations and datasets to interpret the geologic history of a portion of the Bighorn Basin. At paleontological sites we will explain and demonstrate the methods and processes involved in a paleontological expedition. Participants will then participate in a hands on excavation, prospecting for, discovering, and identifying fossilized remains of plants and animals on the ground surface. In this course, students will experience and participate in the entire scientific process and will be fully-involved team members in collecting and processing geological and paleontological data. A summative project will pair current teachers (in-service) with teachers in training (pre-service) and together they will be tasked with developing the framework for a standard-aligned, K-12 module or lesson plan that utilizes and translates concepts from the course.

## Instructors

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## Learning Objectives

Students will learn how to collect and interpret paleontological and geological data. Students will also gain an appreciation for how geological and paleontological data - incomplete on their own - complement each other and together provide a more robust dataset for addressing research questions.

## Goals of the Bighorn Basin Educator Workshop

- Encourage individual and group learning; provide students the experience of being part of a cohort of educators with similar interests and different experience levels.
- Expose students to geological concepts in the field to reinforce the scaling and deep time of earth science questions.
- Introduce students to field paleontology data-collection techniques, including prospecting, fossil identification, and "jacketing," or fossil excavation.
- Apply the geological and paleontological evidence to form hypotheses about ancient ecosystems.
- Challenge students to translate their field experience into practical standard aligned classroom activities that can be shared with other educators.

## Assessments and Grading Policy

There are no formal exams or assessments in this course. However, you will be expected to participate and remain engaged in the course throughout the week and your grade will reflect this. Unexpected illness is understandable and will be accommodated accordingly.

## Weather and Physical Preparedness

- Weather is generally hot (80-90 degrees F) and dry during the day when we are hiking and working in the field. Nights cool off nicely and can get down to freezing temperatures.
- Daily activities include hiking off trail on loose, uneven, and sometimes steep terrain. You should be confident in your ability to safely traverse the terrain. Please contact instructors if you have concerns, or would like more information.

## Course Schedule

Sunday, August 5th

- (am/pm) Arrival and travel to YBRA from BIL airport; getting settled into cabins
- (6pm) Dinner and introductions
- (evening) A brief introduction to the geology and paleontology of western USA

Monday, August 6th

- (all day) Interpreting past environments using the rock record at Elk Basin
- (evening) Introduction to geologic mapping and tools of the trade

Tuesday, August 7th

- (all day) Geologic mapping at Elk Basin
- (evening) Beartooth highway overlook at sunset

Wednesday, August 8th

- (all day) Fossil exploration of the Morrison Formation at the Mother's Day Site
- (evening) Paleontology of the Bighorn Basin

Thursday, August 9th

- (all day) Fossil exploration of the Morrison Formation (Suuwassee Area)
- (evening) Discussion of assignment and brainstorming session

Friday, August 10th

- (am) Lesson design work period
- (lunch) Optional trip to Red Lodge (12-2pm)
- (pm) Presentation of lesson ideas, sharing, and discussion
- (evening) Campfire

Saturday, August 11th

- Departure

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## PSU Policies and Statements

### Academic Integrity

This course follows the [www.ems.psu.edu/undergraduate/academic-advising/forms-and-procedures/academic-integrity](http://www.ems.psu.edu/undergraduate/academic-advising/forms-and-procedures/academic-integrity). Penn State defines academic integrity as "the pursuit of scholarly activity in an open, honest and responsible manner." Academic integrity includes "a commitment not to engage in or tolerate acts of falsification, misrepresentation, or deception." In particular, the University defines plagiarism as "the fabrication of information and citations; submitting other's work from professional journals, books, articles, and papers; submission of other student's papers, lab results or project reports and representing the work as one's own." Penalties for violations of academic integrity may include course failure. To learn more, see Penn State's "[Plagiarism Tutorial for Students](#)."

### Course Copyright

All course materials students receive or to which students have online access are protected by copyright laws. Students may use course materials and make copies for their own use as needed, but unauthorized distribution and/or uploading of materials without the instructor's express permission is strictly prohibited. University Policy AD 40, the University Policy Recording of Classroom Activities and Note Taking Services addresses this issue. Students who engage in the unauthorized distribution of copyrighted materials may be held in violation of the University's Code of Conduct, and/or liable under Federal and State laws. For example, uploading completed labs, homework, or other assignments to any study site constitutes a violation of this policy.

### Accommodations for Students with Disabilities

Penn State welcomes students with disabilities into the University's educational programs. Every Penn State campus has an office for students with disabilities. The [Student Disability Resources \(SDR\) website](#) provides contact information for every Penn State campus. For further information, please visit the [Student Disability Resources website](#). In order to receive consideration for reasonable accommodations, you must contact the [appropriate disability services office](#) at the campus where you are officially enrolled, participate in an intake interview, and provide documentation. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with an accommodation letter. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. You must follow this process for every semester that you request accommodations.

### Counseling and Psychological Services

Many students at Penn State face personal challenges or have psychological needs that may interfere with their academic progress, social development, or emotional wellbeing. The university offers a variety of confidential services to help you through difficult times, including individual and group counseling, crisis intervention, consultations, online chats, and mental health screenings. These services are provided by staff who welcome all students and embrace a philosophy respectful of clients' cultural and religious backgrounds, and sensitive to differences in race, ability, gender identity and sexual orientation. Services include the following:

[Counseling and Psychological Services at University Park \(CAPS\)](#): 814-863-0395

Counseling and Psychological Services at [Commonwealth Campuses](#).

Penn State Crisis Line (24 hours/7 days/week): 877-229-6400

Crisis Text Line (24 hours/7 days/week): Text LIONS to 741741

## Diversity, Inclusion, and Respect

Penn State is “committed to creating an educational environment which is free from intolerance directed toward individuals or groups and strives to create and maintain an environment that fosters respect for others” as stated in Policy AD29 Statement on Intolerance. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment and to interact with civility.

## Mandated Reporting Statement

Penn State’s policies require me, as a faculty member, to share information about incidents of sex-based discrimination and harassment (discrimination, harassment, sexual harassment, sexual misconduct, dating violence, domestic violence, stalking, and retaliation) with Penn State’s Title IX coordinator or deputy coordinators, regardless of whether the incidents are stated to me in person or shared by students as part of their coursework. For more information regarding the University’s policies and procedures for responding to reports of sexual or gender-based harassment or misconduct, please visit Penn State’s [Office of Sexual Misconduct and Prevention & Response](#) website. Additionally, I am required to make a report on any reasonable suspicion of child abuse in accordance with the [Pennsylvania Child Protective Services Law](#).

## Safety

In the case of an emergency, we will follow the College of Earth and Mineral Sciences Critical Incident Plan ([http://www.ems.psu.edu/sites/default/files/page/cip\\_march2016.pdf](http://www.ems.psu.edu/sites/default/files/page/cip_march2016.pdf)).

## Military Personnel

Veterans and currently serving military personnel and/or spouses with unique circumstances (e.g., upcoming deployments, drill/duty requirements, disabilities, VA appointments, etc.) are welcome and encouraged to communicate these, in advance if possible, to the instructor in the case that special arrangements need to be made.



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Space Grant Consortium

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Yellowstone Bighorn  
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