

University of Alaska Anchorage  
School of Education  
3211 Providence Drive  
Anchorage, Alaska 99508-8269

ED 581  
Professional Learning in Science Education:  
Project Learning Tree and the Global Climate

Summer 2022  
1 Credit, Graded P/NP

**Course Sponsor:** Alaska Geographic, Murie Science and Learning Center, Denali National Park

**Instructors:** Molly Gillespie and David Arnold

**Educational Resource:** Paula Davis

**Primary Grading Instructor:** David Arnold

**Facilitating Instructor:** Jessica Brillhart

**Contact Information Address:** Alaska Geographic, Murie Science and Learning Center, P.O. Box 136, Denali Park, AK 99755

**Telephone:** (907) 683-6432

**Email address:** [courses@alaskageographic.org](mailto:courses@alaskageographic.org)

**Course Meeting Information**

**Location:** Murie Science and Learning Center, Denali National Park & Preserve entrance

**Start and End Date:** July 25-28, 2022

**Class Day(s) & Time(s):** July 25, 2022 2:30pm through July 28, 2022 9am, continuous residential course

**Final Project Due:** Final day of course

**Course Description:** In order to understand human impacts on the global climate system, it is necessary to not only be aware of the drivers of atmospheric variation over time, but to also comprehend historical variation as the context from which to view modern human contributions. Much of the evidence of historical variation

over the past 120,000 years is conspicuously evident within the landscapes of Denali National Park and Preserve, and in addition to a paleoclimatic overview, this will constitute one of the primary focal points of this course. With a deeper understanding of our global climate, participants will experience hands-on activities from Project Learning Tree that address our current climate and change, and the significance of forests and trees in modern day issues. Throughout the workshop, participants will be immersed in outdoor teaching and learning techniques and will receive PLT's multi-disciplinary *Explore Your Environment K-8 Activity Guide* and an understanding on how to use it within their educational setting.

**Intended Audience:** Teachers and other interested educators

**Enrollment Restrictions:** None

**Course Prerequisite/Co-requisites:** None

**Course Design:**

- a. Requires 15 contact hours and approximately 30 hours of engaged learning.
- b. Does not apply to any UAA certificate or degree program.
- c. No UAA lab and/or materials fees beyond standard charges.
- d. This Murie Science and Learning Center course will be entirely field-based. Learning will be achieved through lectures, group discussions, field observations, and field activities. This course is based upon the collegial sharing, collaboration, and support of the participants and facilitator as a community of learners. Course activities will include common readings and group discussions, collective learning processes, peer coaching/mentoring, and reflective practices.

**Instructional Goals and Defined Outcomes:**

RESEARCH BASED THEORY/PRINCIPLES/PRACTICES/TRENDS (CONTENT)

1.0 Instructional Goal:

Introduce the national environmental education organization, Project Learning Tree (PLT) to participants, including PLT's network, resources and materials by using PLT's new, NGSS correlated guide, *Explore Your Environment: K-8 Activity Guide* to engage in place-based teaching practices, outdoor learning experiences, while exploring the concepts of climate change and environmental literacy.

Defined Outcomes:

- 1.1 Participants will examine the Project Learning Tree curriculum and be able to describe key elements of the *Explore Your Environment: K-8 Activity Guide*, and the relevance of the material to their personal teaching goals and practices.

- 1.2 Participants will learn best practices for outdoor teaching and learning methods and understand the benefits of place-based learning.
- 1.3 Participants will understand the three dimensions of science instruction.
- 1.4 Participants will become familiar with the activities from the curriculum that address the global climate and environmental literacy.

## 2.0 Instructional Goal

Introduce participants to the modern global climate system, the historical variations of atmospheric change, and the drivers of such change over the past 120,000 years that are evident in Denali National Park and Preserve.

### Defined Outcomes

- 2.1 Participants will demonstrate an understanding of the global climate system by exploring evidence of atmospheric change of the past.
- 2.2 Participants will demonstrate an understanding of the global climate, evidence of change, and human impact on climate.
- 2.3 Participants will use their knowledge to describe how they can use place-based learning experiences and field investigations in their classroom or educational setting to address complex issues.

## THEORY INTO PRACTICE (APPLICATION)

### 3.0 Instructional Goal:

Engage participants in field investigations, selected activities that address global climate, place-based outdoor learning experiences, and use nature journals as an approach to engaging in scientific thinking

### Defined Outcomes:

- 3.1 Participants will practice and apply outdoor teaching and learning techniques and demonstrate an understanding of using PLT materials to support field investigations and outdoor learning with their audience.
- 3.2 Participants will gain knowledge of how to teach natural journaling and describe how they will use nature journals to enhance their learner's experience with the natural world.
- 3.3 Participants will describe how they will integrate their experiences and the global climate activities into their teaching or educational setting.

## REFLECTION ON THEORY INTO PRACTICE (REFLECTION)

### 4.0 Instructional Goal:

Engage participants in scientific practices, discussions, reflective journaling and informal sharing about science instruction and how to incorporate gained knowledge and experience into their classrooms.

Defined Outcomes:

- 4.1 Participants will understand scientific practices including making scientific arguments with the claim-evidence-reasoning writing strategy.
- 4.2 Participants will understand how to plan an investigation into complex issues such as climate change.
- 4.2 Participants will review and reflect upon phenomenon based learning and the three dimensions of science instruction. Participants will complete a journal, reflecting on how the information can be shared with their students.

RELATIONSHIP TO STANDARDS

5.0 Instructional Goal:

Familiarize participants with science content standards addressed by the strategies and concepts presented, while highlighting PLT's connection to three-dimensional science instruction and the Science Standards of Alaska (SSAs).

Defined Outcomes:

- 5.1 Participants will identify the Science-Content standards applicable to their classroom.
- 5.2 Participants will be able to describe how PLT's activities can be used as phenomenon based learning tools in correlation with SSAs.
- 5.3 Participants will understand PLT's curriculum connections as multi-disciplinary and learn how to connect to ELA, Math and Social Studies.

**Writing Style Requirements:**

Participants' writing will reflect the clarity, conciseness, and creativity expected of post-baccalaureate certificated educators.

**Attendance and Make-up Policy:**

Participants are expected to actively and collegially participate in all classes as a contributing member of a learning community. Attendance at every session is mandatory.

**Course Assignments, Assessment of Learning, and Grading System:**

Course grading will be Pass/No Pass based upon the following:

- a. Participation 50%  
Participants will be expected to actively and collegially participate in discussions, activities, and other process experiences during the seminar.
- b. Final Project - Journal completion 50%  
Participants will complete journal assignments to be turned in to instructor on the last day of class. Assignments will include thoughtful reflection based upon seminar experience and an application plan of how participants will integrate issues and content discussed into their own classroom setting.

## Quality of Work

### Grade of “Pass”

Passing work includes all components of the assignment and meets proficient criteria. It is focused, developed, supported, logical, and acceptable work with minimal errors. Work of this quality indicates understanding of key concepts and knowledge base.

### Grade of “No Pass”

Work graded “No Pass” may lack key criteria/components of the task and show little or no evidence of conceptual understanding or knowledge utilization. Work may also show minimal or no organization/development and/or clear focus (may be difficult to follow) and may contain numerous errors. This grade indicates minimal or no knowledge or concept development. It may also mean that work was not attempted.

## Course Calendar/Schedule:

Day 1	2:00 p.m. - 2:30 p.m.	Greeting and check at the lobby of Murie Science and Learning Center
	2:30 p.m. – 4:30 p.m.	Introductions and exploration of front country <ul style="list-style-type: none"><li>○ Understanding past evidence of glaciation</li></ul>
	4:30 p.m. – 6:30 p.m.	Travel to MSLC Field Camp at Teklanika and settle in
	6:30 p.m.	Dinner
Day 2	9:00 a.m. – 5:00 p.m.	Understanding the Global Climate and Forest Ecology <ul style="list-style-type: none"><li>○ Forest Ecology and Climatic Variations<ul style="list-style-type: none"><li>○ Understand the Boreal Forest as response to interglacial warming period</li><li>○ Explore and understand succession of the Boreal Forest</li><li>○ Explore and understand permafrost and the relationship to the Boreal Forest</li><li>○ Explore and learn about plants and animals of the Boreal Forest</li></ul></li></ul>
	6:00 p.m. – 8:00 p.m.	Dinner and evening discussions <ul style="list-style-type: none"><li>○ Open question and answer period to understand complex issues</li></ul>
Day 3	9:00 a.m. – 5:00 p.m.	Introduction to PLT <ul style="list-style-type: none"><li>○ Explore PLT’s <i>Explore Your Environment K-8 Activity Guide</i> and <i>Global Climate</i> activities</li><li>○ Engage in nature journaling activities and place-based teaching techniques</li><li>○ Identify applicable science content standards addressed by course content</li></ul>

- Teacher study group to discuss the day's activities and how the information can be shared with students

6:00 p.m. – 8:00 p.m. Dinner and Course wrap up

Day 4            9:00 a.m.                    Depart Teklanika/MSLC Field Camp

**Final Project Due:**    last day of course

**Course Texts, Readings, Handouts, and Library Reserve:**

**Pre-course Readings:**

Alaska Department of Fish & Game. (2013). *Alaska Natural Resource and Environmental Literacy Plan*. Harper, Patty and Manning, Elizabeth (editors). Retrieved from <https://www.anroe.net/programs-workshops/environmental-literacy/> (read introduction)

Capps, D., McLane, S., and Chang, L. 2020. *Denali National Park and Preserve Geology Road Guide (3rd ed.)*. National Park Service, Denali National Park and Preserve, Denali Park, Alaska. Retrieved from [https://www.researchgate.net/publication/305281789\\_Denali\\_National\\_Park\\_Preserve\\_Geology\\_Road\\_Guide](https://www.researchgate.net/publication/305281789_Denali_National_Park_Preserve_Geology_Road_Guide) (read pages 7-8)

National Research Council, the National Science Teachers Association, the American Association for the Advancement of Science, and Achieve. (2013) *Using Phenomena in NGSS-Designed Lessons and Units*. Retrieved from: <https://www.nextgenscience.org/sites/default/files/Using%20Phenomena%20in%20NGSS.pdf>

**Required Text/Materials:**

Project Learning Tree. (2021). *Explore Your Environment: K-8 Activity Guide*. Washington, D.C.: Sustainable Forestry Initiative. (Will be provided.)

**Suggested Text/Material:**

Alaska Department of Fish & Game. (2001). *Alaska Ecology Cards*. Anchorage, Alaska. Alaska Department of Fish & Game. Free download available from: <https://www.adfg.alaska.gov/index.cfm?adfg=curricula.awc>

Grabinski, Z. & H. R. McFarland. (2020). *Alaska's Changing Wildfire Environment* [outreach booklet]. Alaska Fire Science Consortium, International Arctic Research Center, University of Alaska Fairbanks. Retrieved from: [https://www.frames.gov/documents/alaska/docs/AlaskasChangingWildfireEnvironment\(1\).pdf](https://www.frames.gov/documents/alaska/docs/AlaskasChangingWildfireEnvironment(1).pdf)

Laws, John Muir and Lygren, Emilie. (2020). *How to Teach Nature Journaling*. Berkeley, CA: Heyday.

Pratt, Verna. (1993). *Wildflowers of Denali National Park*. Alaskakrafts, INC.

USDA US Forest Service. (2009). *Common Trees of Alaska*. US Forest Service, Alaska Region.

Supplemental information can be found in the following sources:

### **Content References:**

North American Association for Environmental Education. (2021). *Environmental education materials: Guidelines for excellence*. Washington, D.C. Retrieved from: <https://naaee.org/eepr/resources/environmental-education-materials>

North American Association for Environmental Education. (2021). *K-12 Environmental education: Guidelines for excellence*. Washington, D.C. Retrieved from: <https://naaee.org/eepr/resources/k-12-environmental-education-guidelines>

Regents of the University of California, Berkeley. (2020). *NGSS Science and Engineering Practices in Outdoor Science Programs*. NAAEE Conference Presentation. beetlesproject.org. Retrieved from <http://beetlesproject.org/cms/wp-content/uploads/2021/03/Website-Copy-of-NGSS-Science-Engineering-Practices-in-Outdoor-Science-Programs.pdf>

Regents of the University of California, Berkeley. (2021). [Beetles Project: Science and Teaching for Field Educators](#). Lawrence Hall of Science.

### **Standards References:**

Alaska Comprehensive Center. (2012). *Guide to Implementing the Alaska Cultural Standards for Educators*. Juneau, AK: Alaska Department of Education and Early Development. Retrieved from: <https://education.alaska.gov/standards/cultural> and <https://www.asdn.org/wp-content/uploads/Implementing-AK-cultural-standards-1.pdf>

Alaska Native Knowledge Network. (1998). *Alaska standards for culturally responsive schools*. Fairbanks, AK: University of Alaska Press. Retrieved from: <http://www.ankn.uaf.edu/publications/culturalstandards.pdf>

National Research Council, the National Science Teachers Association, the American Association for the Advancement of Science, and Achieve. (2013). *The next generation science standards*. Retrieved from <http://www.nextgenscience.org/next-generation-science-standards>.

State of Alaska Department of Education and Early Development. (2016). *Content and performance standards for Alaska students*. Juneau, AK: Author. Retrieved from: <https://education.alaska.gov/akstandards/standards/ContentStandards.pdf>

State of Alaska Department of Education and Early Development. (2019). *K-12 Science Standards for Alaska*. Juneau, AK. Author. Retrieved from:  
<https://education.alaska.gov/akstandards/science/science-standards-for-alaska.pdf?v=1>

State of Alaska Department of Education and Early Development. (2012). *Alaska English/Language Arts and Math Standards*. Juneau, AK: Author. Retrieved from:  
[https://education.alaska.gov/akstandards/standards/ELA\\_and\\_Math.pdf](https://education.alaska.gov/akstandards/standards/ELA_and_Math.pdf)

**Informed by the School of Education Vision, Mission, and Conceptual Framework:**

We believe that the preparation and support of professional educators is the shared responsibility of the University of Alaska Anchorage and our partners, and that our programs must evolve dynamically in response to unique community needs, research, and continuous program assessment. This PACE course is designed to meet a professional development need in response to our partner school districts and professional organizations. The course fits within the mission of the UAA School of Education as we encourage lifelong learning to meet the challenges of a rapidly changing world.

**Link to Alaska Educator Content and Performance Standards:**

This professional development is rooted in the fundamentals of Alaska's standards for teachers, administrators, and beginning teachers in Alaska's Administrative Code, 4 AAC 04.200. It is offered to encourage and support practicing educators attain, maintain, or surpass the standards for effectively preparing today's students for successful lives and productive careers. (<https://education.alaska.gov/standards/other-standards>)

**Learning Forward Standards for Professional Learning:**

This course is further informed by the Learning Forward Standards for Professional Learning which outline the "characteristics of professional learning that leads to effective teaching practices, supportive leadership, and improved student results." As explicit in the standards, "professional learning is for educators to develop the knowledge, skills, practices and dispositions they need to help student perform at a higher levels." (<https://standards.learningforward.org>)

**Course Policies:**

**Incomplete Grades**

**Due to the nature of this course, grades of incomplete will not be permitted.**

**ADA Policy**

The provision of equal opportunities for students who experience disabilities is a campus-wide responsibility and commitment. Disabilities Support Services (DSS) is the designated UAA department responsible for coordinating academic support services for students who experience disabilities. To access support services, students must contact DSS (786-4530 or 786-4536 TTY) and provide current disability documentation that supports the requested services. Disability support services are mandated by Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) of 1990. Additional information may be accessed at the DSS Office in RH 105 or on-line at [www.uaa.alaska.edu/dss](http://www.uaa.alaska.edu/dss).

**Academic Dishonesty Policy**

Academic integrity is a basic principle that requires all students to take credit only for the ideas and efforts that are their own. Cheating plagiarism, and other forms of academic dishonesty are defined as the submission of materials in assignments, exams, or other academic work that is based on sources prohibited by the faculty member. Academic dishonesty is defined further in

the “student Code of Conduct.” In addition to any adverse academic action that may result from the academically dishonest behavior, the University specifically reserves the right to address and sanction the conduct involved through student judicial review procedures and the Academic Dispute Resolution Procedure specified in the University catalog.

### **Professional and Ethical Behavior**

University of Alaska Anchorage School of Education students are expected to abide by the State of Alaska Code of Ethics of the Education Profession and professional teaching standards as they concern students, the public, and the profession. The standards, adopted by the Professional Teaching Practices Commission, govern all members of the teaching profession. A violation of the code of ethics and professional teaching standards are grounds for revocation or suspension of teaching certification.

### **Technology Integration**

University of Alaska Anchorage School of Education students are expected to (a) demonstrate sound understanding of technology operations and concepts; (b) plan and design effective learning environments and experiences supported by technology; (c) implement curriculum plans that include technology applications in methods and strategies to maximize student learning; (d) facilitate a variety of effective assessment and evaluation strategies; (e) use technology to enhance productivity and professional practice; and (f) understand the social, ethical, and human issues surrounding use of technology in PreK-12 schools and apply those principles in practice.

### **Course Safety and Risk**

This course is sponsored by Alaska Geographic and the Murie Science and Learning Center. The University of Alaska Anchorage provides the credit option for interested participants. This course takes place entirely outdoors and within a remote area of Alaska. Field courses, such as this, do have inherent risks. These risks will be outlined in the Alaska Geographic Acknowledgement of Risk form and by the course instructors. The Acknowledgement of Risk form will be provided at the time of registration and a signed copy is required in order to attend.

### **Non-Discrimination Policy**

The University of Alaska is an affirmative action/equal opportunity employer and educational institution. The University of Alaska does not discriminate on the basis of race, religion, color, national origin, citizenship, age, sex, physical or mental disability, status as a protected veteran, marital status, changes in marital status, pregnancy, childbirth or related medical conditions, parenthood, sexual orientation, gender identity, political affiliation or belief, genetic information, or other legally protected status. The University's commitment to nondiscrimination, including against sex discrimination, applies to students, employees, and applicants for admission and employment. Contact information, applicable laws, and complaint procedures are included on UA's statement of nondiscrimination available at [www.alaska.edu/nondiscrimination](http://www.alaska.edu/nondiscrimination).