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Main Points

- Describe how to begin thinking about integrating research with education outreach
- Provide examples of research projects that include education outreach

Research to Education Outreach

- Activity needs to be authentic, not contrived
- Should be something that the PI is enthusiastic about doing
- Reflect the PI's disciplinary and educational interests
- Fit with institutional context and mission
- Respond to a need or interest

Purpose of the Educational Activity

- ... to demonstrate relevance of scientific research
- How can the PI accomplish that using his/her research as a basis?
- How will the PI measure the impact or outcomes?
- How will the PI use the results?

Intended Audience

- K-12 (students or teachers? What grade level?)
- Public (still need to consider age, level of education)
- Formal or informal?
- Underrepresented groups and cultural considerations

Activity Setting

- Formal
 - Schools
 - Science camps
 - Museum or science center
 - Library
- Informal
 - Parks (city, county, etc)
 - Trails (e.g., urban bike and pedestrian paths)
 - Market

Logistics

- How many people?
- Who is traveling? Where? How?
- Day activity or residential?
- Timing: summer v. academic year; growing season, etc.
- Special clearances, equipment, or training
- Activities involving human subjects, animals, biohazards, etc.

Potential Costs

- Travel For PI, grad/undergrad students, teachers, students, trainers, etc
- Materials and supplies (e.g., for experiments)
- Stipends for participants (esp. teachers)
- Subsistence, if people will have to live on campus or at a field camp, etc
- CEUs or graduate education credit for teachers
- Stipends/assistantships and cost of education for grad and undergrad students

Example 1: PI Erica Rosenblum

- **Research Goal:** to apply an integrative genes-to-ecosystem approach to studying the multidimensional nature of adaptation and speciation in White Sands lizards.
- **Education Goal:** to communicate evolutionary concepts focusing on “Evolution in Action” —clear examples of evolutionary change over short, observable timescales. The white lizards at White Sands provide a compelling, accessible example of evolution and represent a tremendous opportunity for public outreach and education.

Example 1: Activities

Activities

- White Sands Science Week
 - “Lizard Camp” for elementary students
 - White Sands Institute for teachers and rangers
 - White Sands Symposium for researchers
 - Bilingual materials for public

Outcome: Integration of research and education, combined with dissemination and outreach, will increase scientific literacy and demystify evolutionary concepts for the public.

Example 2: PI Elowyn Yager

- **Research goal:** improve understanding of flow and sediment transport in steep channels at the fundamental level of the interaction between flow turbulence and sediment motion.
- **Education goal:** use the framework of sediment transport and river restoration to educate the public and graduate, undergraduate, and K-12 students on the importance of water resources and functioning stream ecosystems.

Example 2: Activities

Activities

- Water Camps for middle, high school and teacher education,
- Classroom projects in the Boise area that use expertise gained in the Water Camps, and
- Women in Science camp within the MOSS program.

Outcomes

Increase K-12 students' knowledge on river processes and restoration.

Encourage young women to enter careers in science, mathematics, and engineering

Example 3: PI Gosz

- **Project Goals:** to understand the dynamic couplings between human and natural systems as influenced by cultural variations and multijurisdictional governance, and to develop a process of integrating science with decision making and policy implementation.
- **Education Goal:** Build future interdisciplinary intellectual capacity through an education and engagement program that involves current and future partners and stakeholders.

Example 3: Activities

Activities

- **Secondary school STEM/Sustainability programming** work with existing university programs to bring STEM content to grades 8-12 through active programming in the classroom and field settings.
- **In-service STEM/Sustainability teacher professional development:** work with university programs in professional development to inform teachers about the research and results of the program.

Outcomes strengthen the linkage between research results, teacher knowledge, and student learning

Example 4: PI Eigenbrode

Project Goal: Establish an Integrated Cooperative Agricultural Project among three Land Grant universities and the USDA Agricultural Research Service to increase the capacity of Inland Pacific Northwest cereal production systems to adapt to and mitigate climate change. (5 research goals)

Education Goal: Introduce innovative agricultural approaches to climate change mitigation and adaptation into K-12 schools.

Example 4: Activities

Activities:

- Develop resources for teachers based on research results
- Expand existing dual enrollment courses for high school students
- Provide professional development opportunities for teachers and field trips for children
- Create an online sustainable agriculture and climate change course for teachers.

Outcome: to prepare citizens and professionals for climate related challenges and defining agriculture's role in providing food, energy and ecosystem services.