What can COSEE NOW do to help you achieve broader impacts with your research?

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June 4, 2012

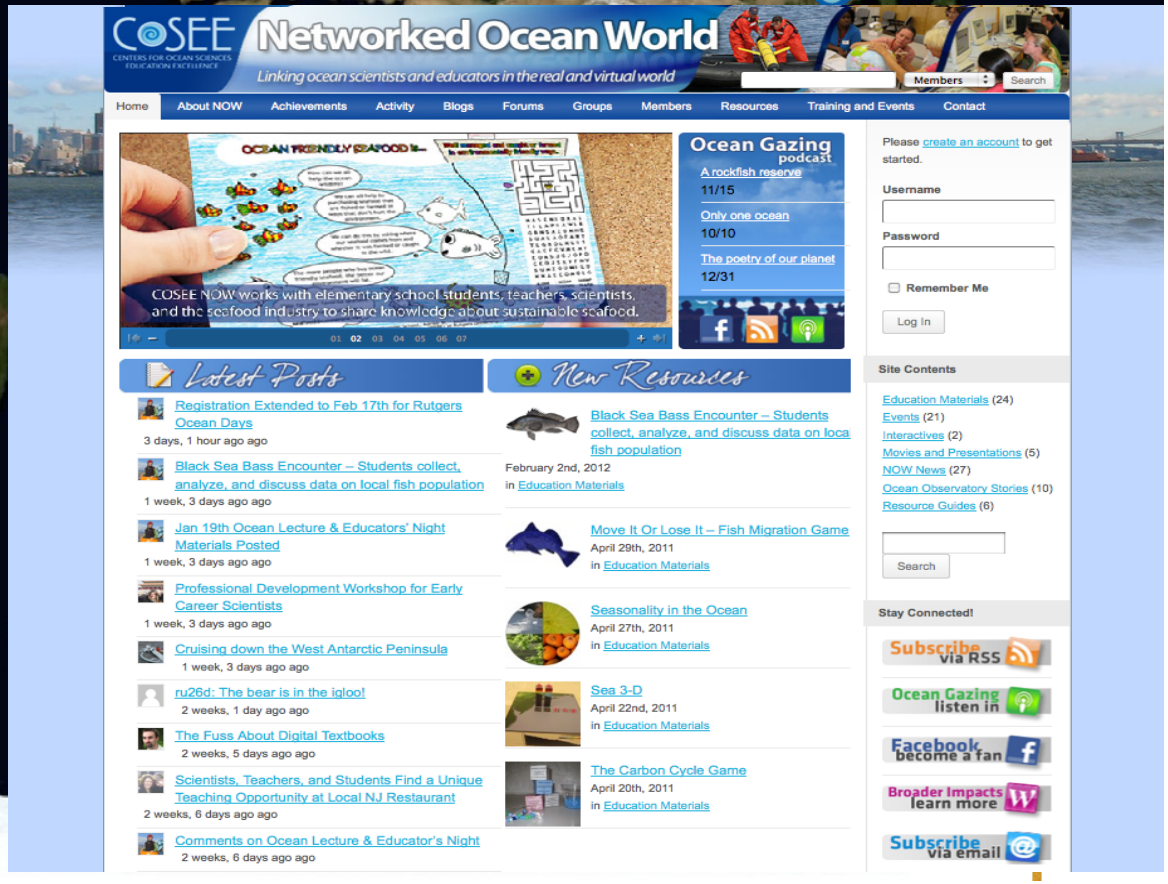
Talk Outline

- Intro to Broader Impacts
- Broader Impacts Wizard
- Supporting materials
- Questions

COSEE – Networked Ocean World (NOW)

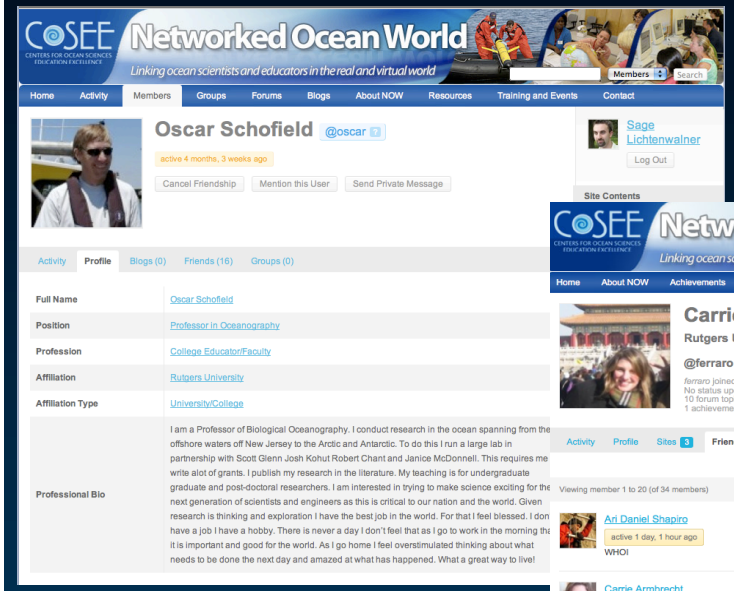
Lead Institutions

- Rutgers
- WHOI
- VIMS
- Liberty Science Center
- U. of South Florida
- Monterey Peninsula College
- Word Craft

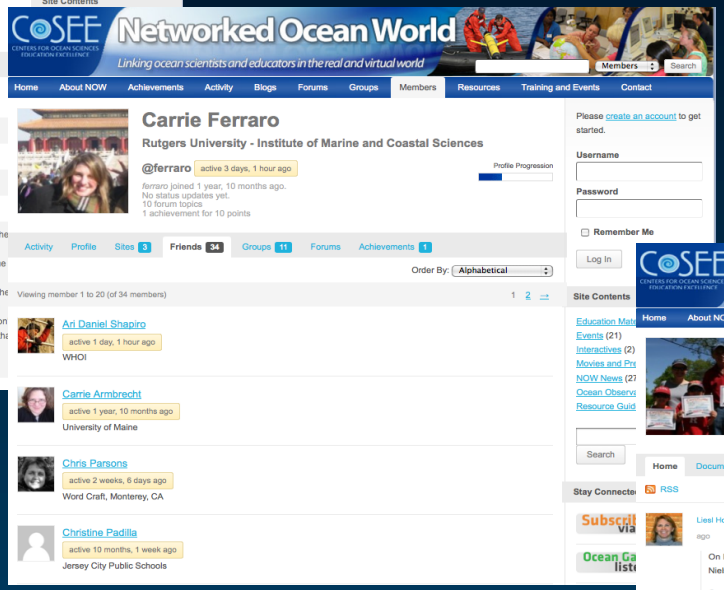


http://coseenow.net

Online Collaboration Tools



Member Profiles



"Friending" Capabilities

Topical Workgroups & Blogs

Broader Impact Wizard

What is Criterion II or Broader Impacts?

In 1997, NSF attempted to diversify and enrich science research and education in the USA through the Broader Impacts Criterion (BIC), also known as "Criterion Two" or the "Second Criterion"

Why are you interested in Broadening your Impact?

- Involvement in public outreach is intrinsically rewarding
- Increase number of graduate students interested in your research field
- Concerned by reports of science literacy in the U.S.
- It is a required portion of many research proposals
- Other

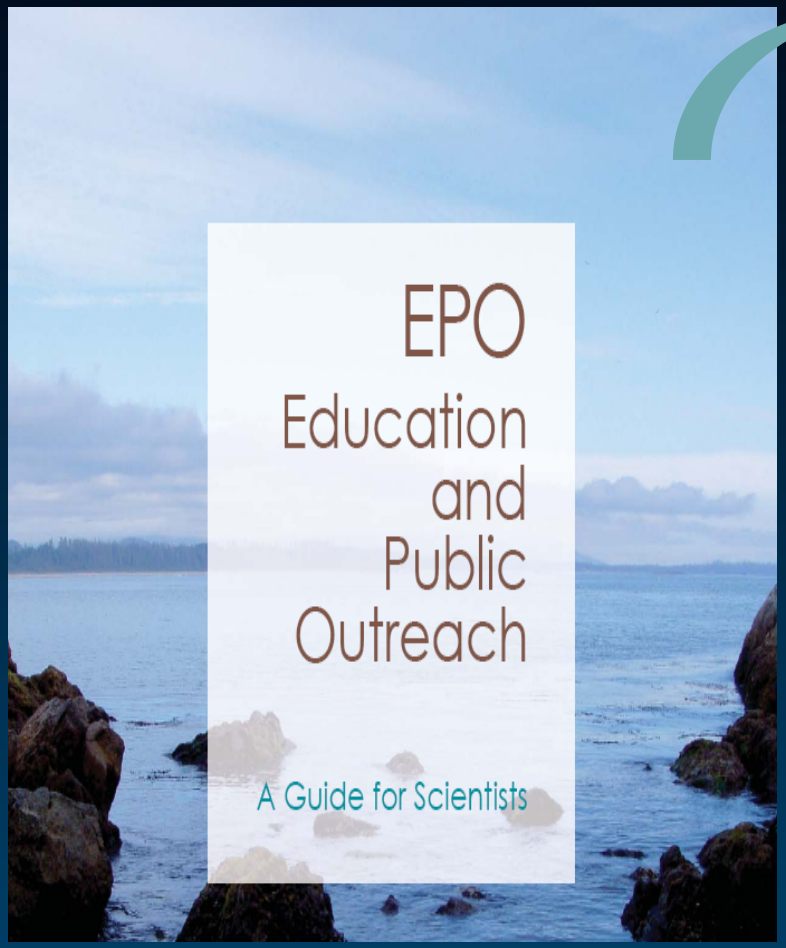
Have you submitted a proposal with a broader impacts statement?

Please raise your hand

Who did you go to or would you go to for help with this statement?

- No one in particular
- Another scientist
- Education or communication specialist
- Professional organization
- Online search/website
- Other places/people

Background

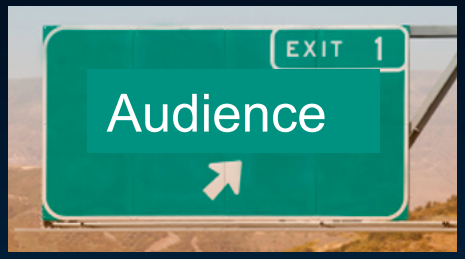


Evolved into COSEE NOW's recommendations for success:

1) Develop Core objectives (who and why).
2) Connection with an "educational partner". (i.e. Do not reinvent the wheel.)
3) Relate what you are doing to the educational literature.
4) Develop an evaluation plan.
5) Budget for your proposed work.

5 Steps to Broader Impact Success

1: Audience



2: Budget

3: Activity

4: BI Project Description

5: Evaluation

COSEE BI Wizard

Sign In

Ocean Scientist Broader Impact Wizard

Brought to you by COSEE NOW

After viewing the video, please choose one of the following:

Login

Already have an account? Continue where you left off.

Create a new account

Create an account to save your work and retrieve it later.

Or continue as a Guest

Preview the wizard as a guest user. You will not be able to save your responses without logging in first.

COSEE NOW created the **Broader Impact Wizard** to help you develop a broader impact statement that will satisfy NSF Criterion II and fulfill your interest in communicating your science. The quick and easy five-step process will produce an outline of important points to include in your BI statement and will help frame discussions with your BI partners.

For more information about the wizard and an introduction to constructing effective broader impact projects, please view the video.

COSEE BI Wizard

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http://coseenow.net/wizard

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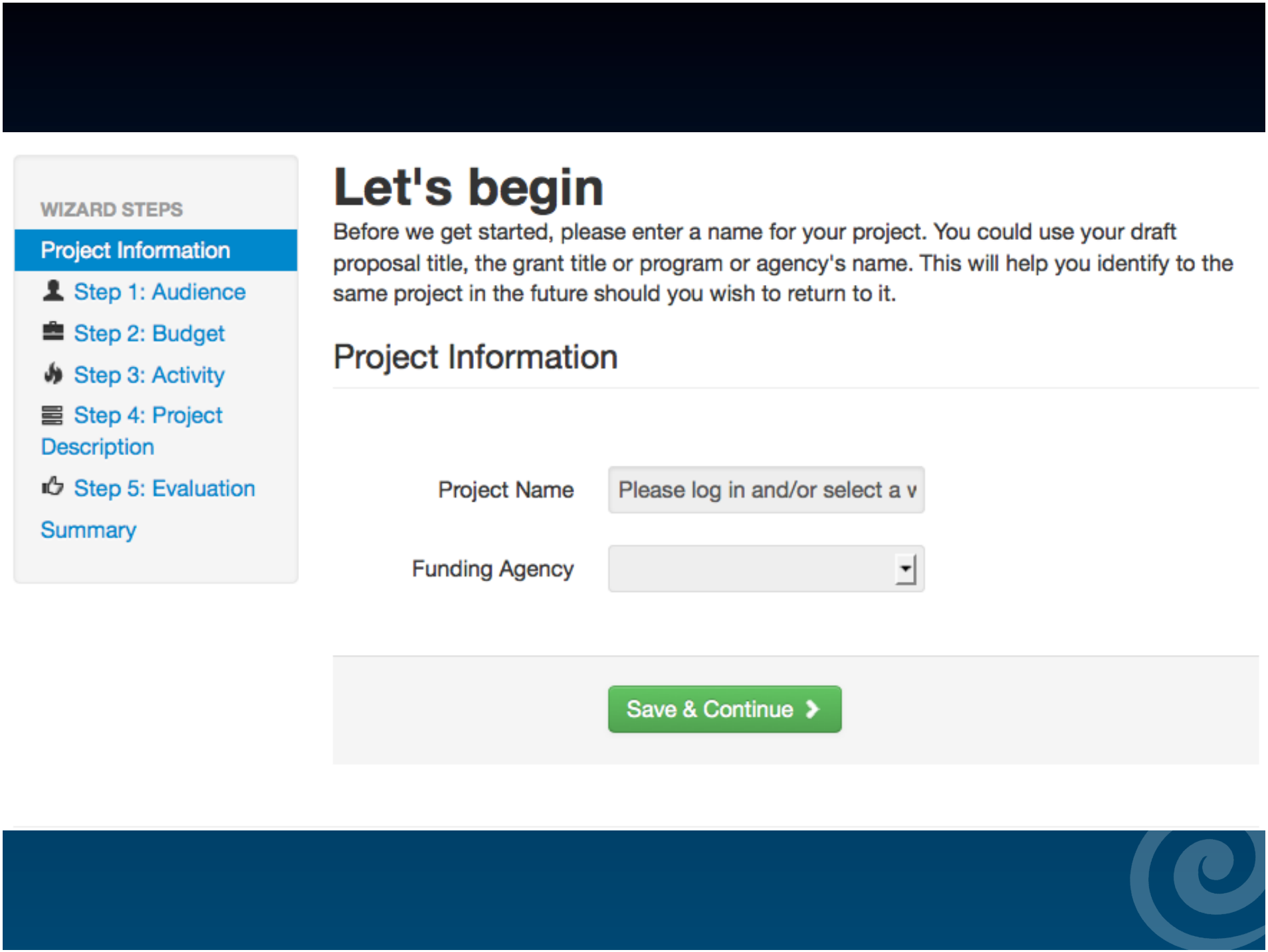
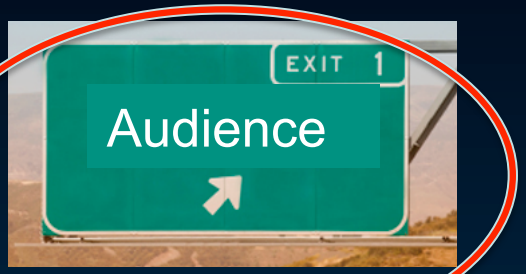

WIZARD STEPS
Project Information
Step 1: Audience
Step 2: Budget
Step 3: Activity
Step 4: Project Description
Step 5: Evaluation
Summary
Let's begin
Before we get started, please enter a name for your project. You could use your draft proposal title, the grant title or program or agency's name. This will help you identify to the same project in the future should you wish to return to it.
Project Information
Project Name
Please log in and/or select a v
Funding Agency
Save & Continue

5 Steps to Broader Impact Success

1: Audience



2: Budget

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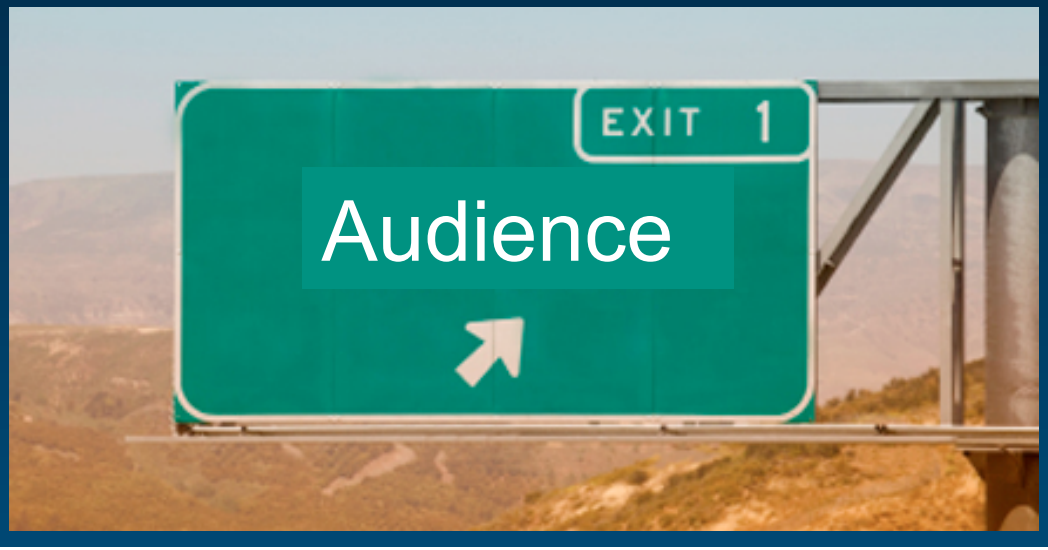
4: BI Project Description

5: Evaluation

Step 1: Audience

"To begin with the end in mind means to start with a clear understanding of your destination." – Stephen Covey



Step 1a: Audience

WIZARD STEPS

- Project Information
- Step 1: Audience
- Step 2: Budget
- Step 3: Activity
- Step 4: Project Description
- Step 5: Evaluation
- Summary

Step 1a: Audience

Similar to selecting a scientific journal to publish your research, it's important to consider an appropriate audience for your BI efforts. Beginning the BI activity development process with the audience in mind will help frame your thinking and determine the potential partners required to accomplish your goals.

To avoid a common pitfall, we encourage you to work through the wizard focusing on one audience at a time. If you would like to incorporate multiple audiences into your efforts, we recommend going through the wizard once for each audience and then integrating the wizard reports into a single plan.

There are many audience options for you to consider. When deciding which audience to work with, you should contemplate the benefits of the proposed BI activity to society. Listed below are descriptions of audiences scientists commonly address with their BI efforts. After reviewing the options, please *select an audience of interest* from the "Audience" drop down menu at the bottom of the page.

For additional information on the importance of focusing on a specific audience, as well as key audiences to work with, check out the video.

Step 1a: Audience

Government

Higher Education

Industry

K-12 Students

K-12 Teachers

Science Interested Public

Underrepresented / Underserved Populations

Who is this audience?

This audience is defined as policy makers at both the local and national level, including congressman, senators, coastal managers, and political affiliates (staffers). Please note when dealing with this audience that it is not a major focus of COSEE NOW. Therefore, after proceeding through the wizard, we recommend that you consult with agencies such as Coastal States Organization (http://www.coastalstates.org/), your local National Estuarine Research Reserve System (http://www.nerrs.noaa.gov/), or AAAS (http://www.aaas.org/) for help with your broader impact projects.

Why is it important to work with this audience?

* Demonstrate the linkage between discovery and societal benefit by providing specific examples and explanations regarding the potential application of research and education
* Integrate research into broader programs and activities of national interest
* Provide information for policy formulation by Federal, State or local agencies

Please choose an audience to work with

Note that you may only focus on one audience as you proceed through the wizard. However, you may go back to change this audience at any point. If you would like to incorporate multiple audiences into your efforts, we recommend going through the wizard once for each audience and then combining the results.

Later on in the wizard, we will provide suggested activities you can consider to reach your audience.

Government

Which audiences are you most interested in working with?

- K-12 Students
- K-12 Teachers
- Higher Education
- Underrepresented/Underserved populations
- Government
- Industry
- Other

Step 1b: Audience Relevance

WIZARD STEPS

Project Information

Step 1: Audience

Step 2: Budget

Step 3: Activity

Step 4: Project Description

Step 5: Evaluation

Summary

PROJECT INFORMATION

Project: Test1

Audience: Government

Step 1b: Audience Relevance

Now that you have selected a potential audience, please take a moment to think about how your science might be relevant to this audience.

The following slideshow can help you think about ways to deconstruct your science in order to identify the most relevant elements for a particular audience.

Then, broadly outline in the box below how your science could be relevant to this audience.

My science is relevant to this audience because...

Step 1b: Audience Relevance

WIZARD STEPS

Project Information

Step 1: Audience

Step 2: Budget

Step 3: Activity

Step 4: Project Description

Step 5: Evaluation

Summary

PROJECT INFORMATION

Project: Test1

Audience: Government

Step 1b: Audi ce Relevance

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The f wing slideshow can help you think about ways to deconstruct your science in order to id fy the most relevant el ents for a particular audience.

Then, broadly ou in the box below how your science could be relevant to this au ce.

My science is relevant to this audience because...

Step 1c: Audience

WIZARD STEPS

Project Information

Step 1: Audience

Step 2: Budget

Step 3: Activity

Step 4: Project Description

Step 5: Evaluation

Summary

PROJECT INFORMATION

Project: Test1
Audience: Higher Education

Step 1c: Audience Venue

Based upon your audience selection, the following is a list of potential venues and/or mechanisms by which you can deliver your message to this audience. Select a venue and proceed on to the next step of the wizard.

Please choose a venue you would like to work in.

- ○ Classroom
- ◉ Multimedia (Websites, Podcasts, Print)
- ○ Outside of the Classroom

Description:
Scientists develop or provide guidance on content for undergraduate and graduate students that is conveyed through websites, podcasts, books, newspapers, or CDs

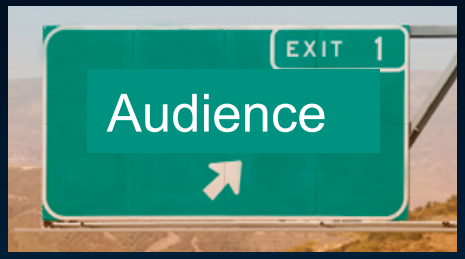
Benefits of working in this Venue:
Larger audience, deeper understanding

Challenges working in this venue:
Need to market products to reach the target audience

Later on in the wizard, we will provide suggested activities you can consider to reach your audience.

5 Steps to Broader Impact Success

1: Audience



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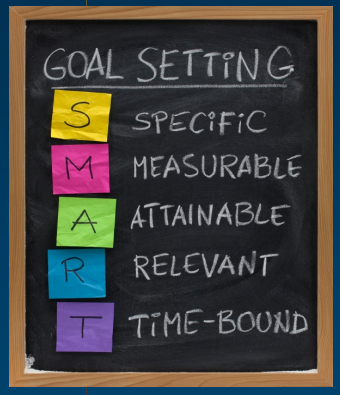
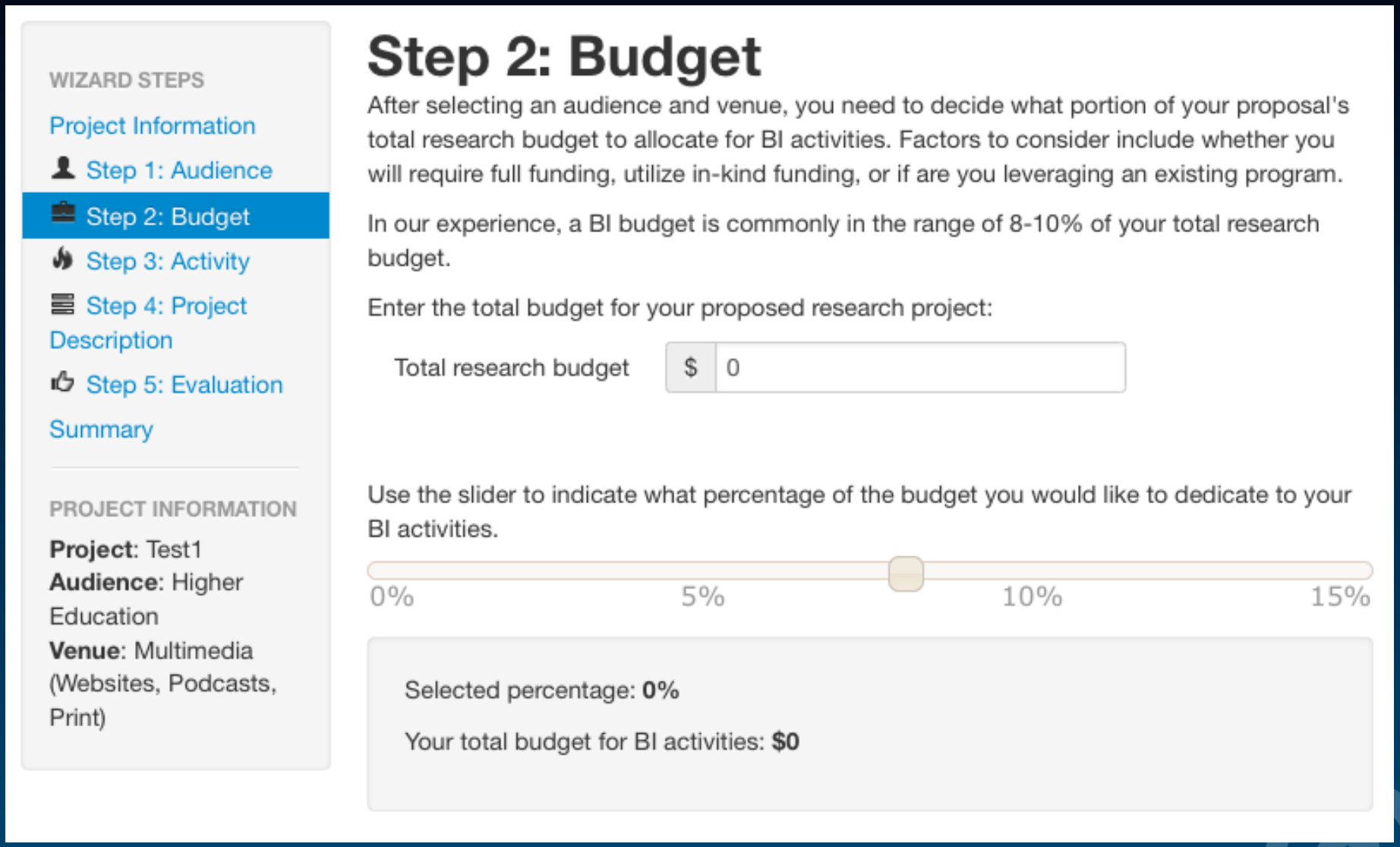


5: Evaluation

Step 2: Budget



5 Steps to Broader Impact Success

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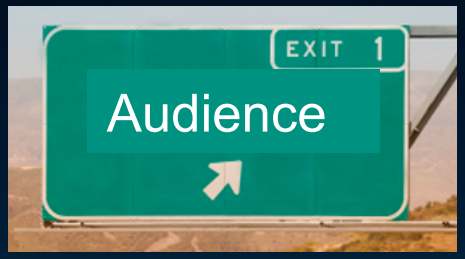

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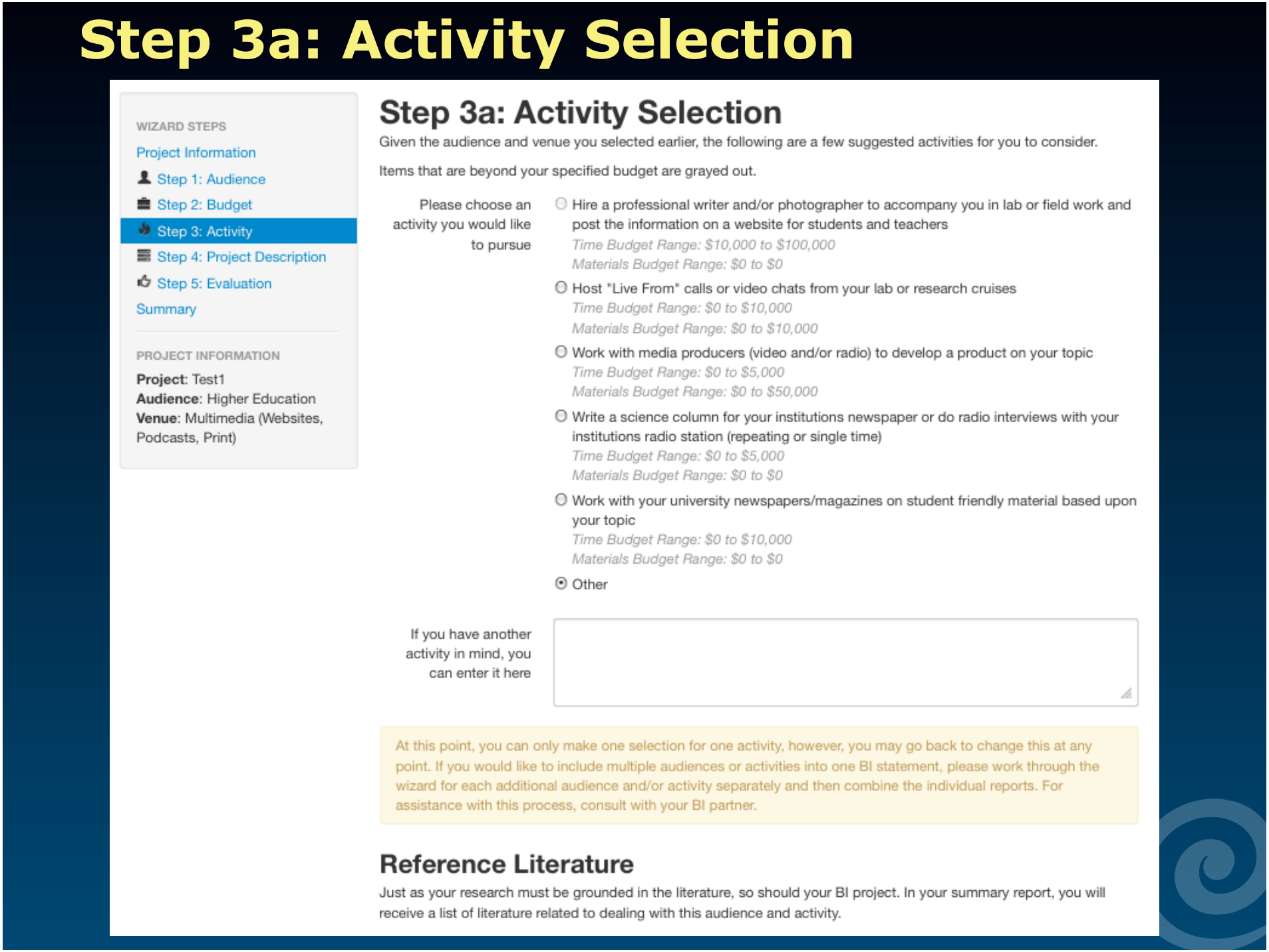
3: Activity

4: BI Project Description

5: Evaluation

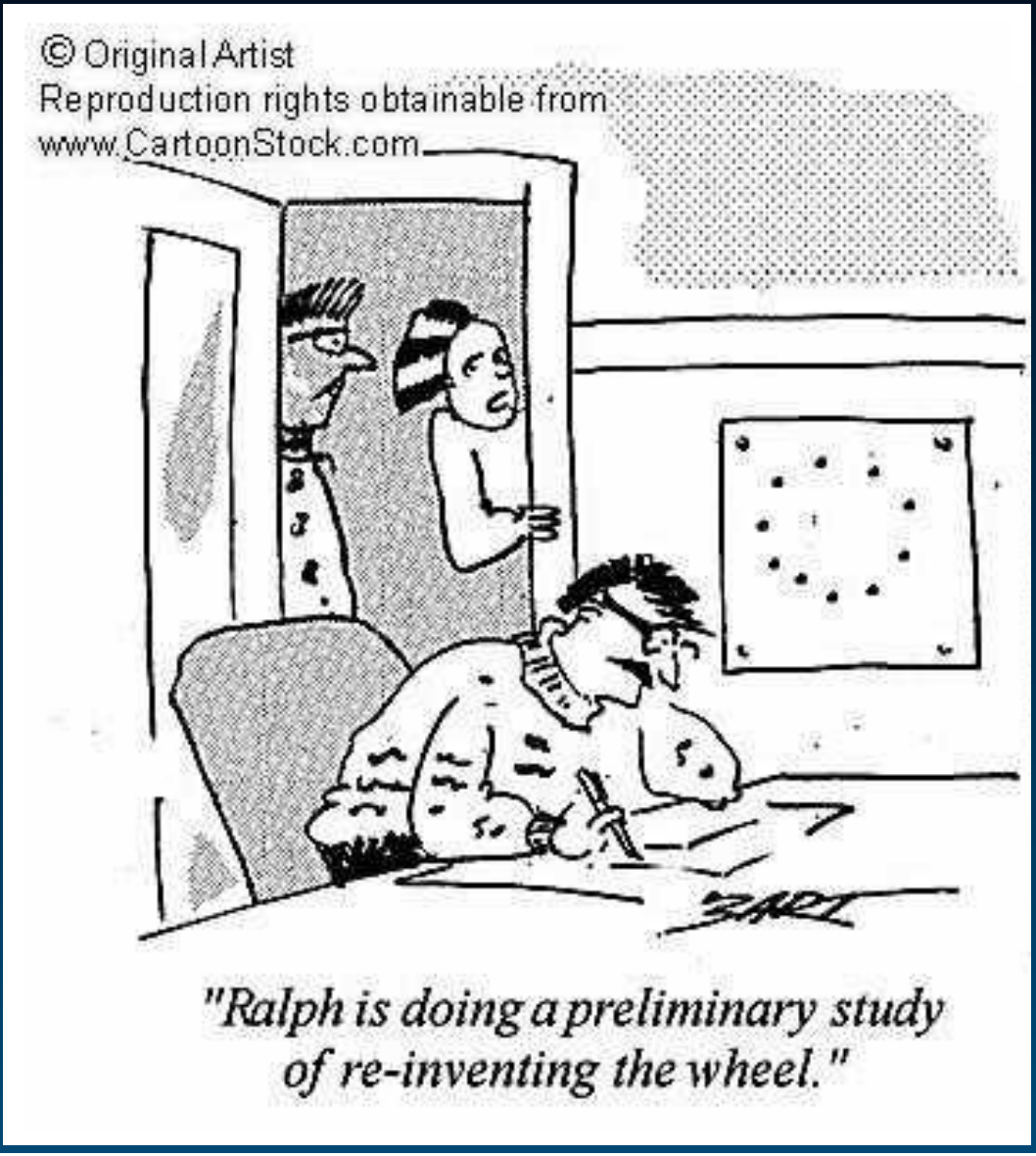
Step 3a: Activity Selection



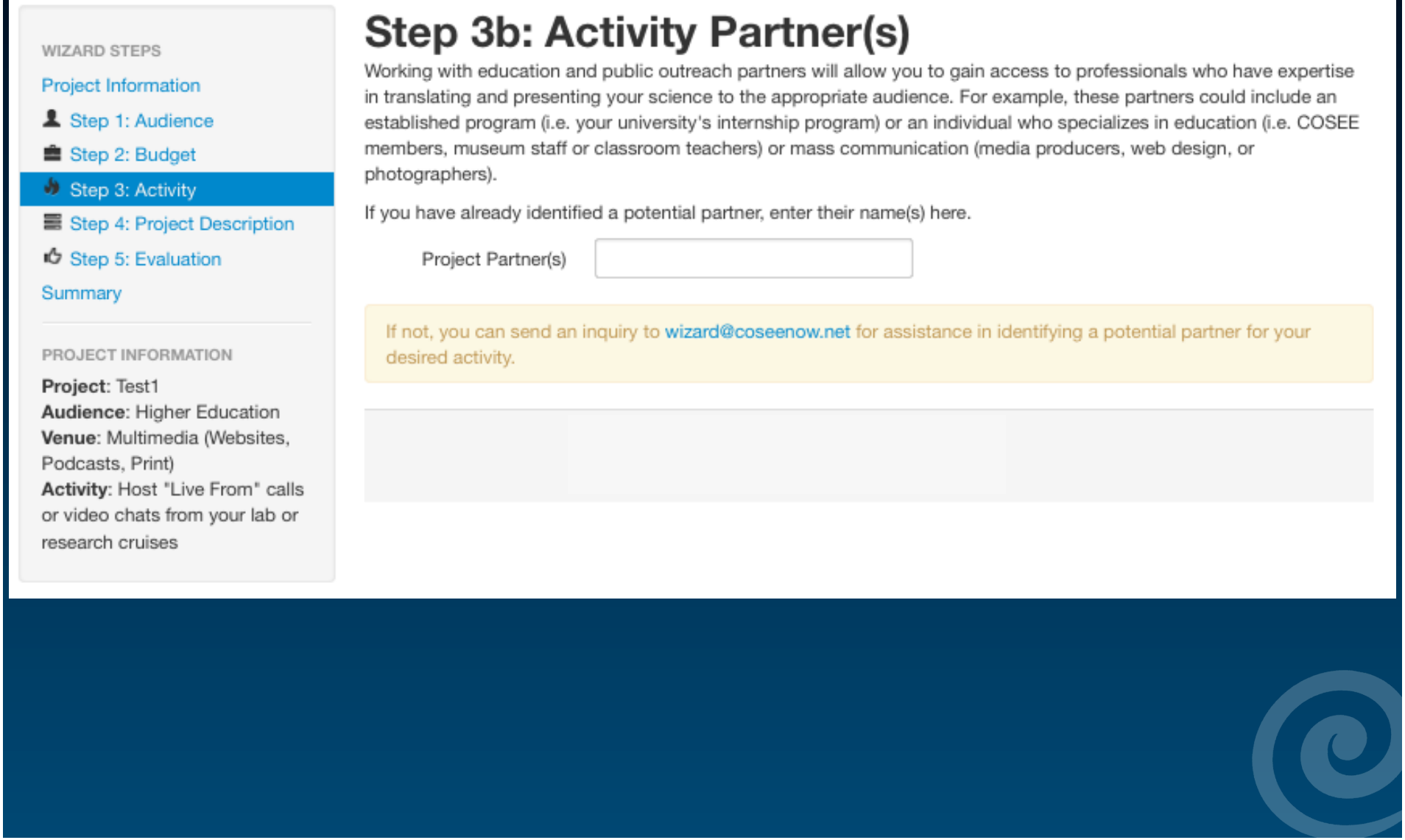
What type of education and outreach activities have you been involved with?

- Teacher professional development workshops
- Public lectures
- Classroom visitations/presentations
- Participated in mentorship programs
- Worked with a science center
- Collaborated with a member of industry
- Offered research or expertise to support a law or bill

Don’t reinvent the wheel -- leverage existing infrastructure and relationships



Step 3b: Activity Partner(s)



5 Steps to Broader Impact Success

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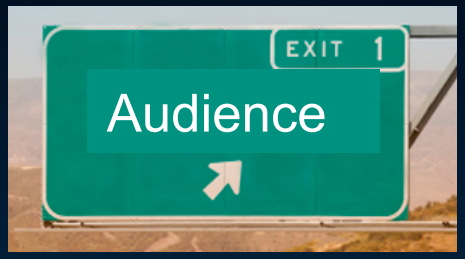

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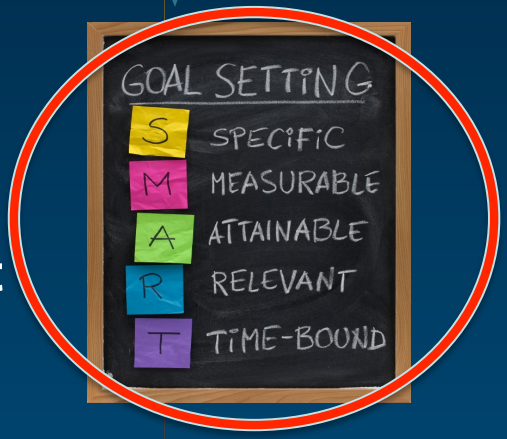


5: Evaluation

Step 4: BI Project Description

WIZARD STEPS

Project Information

Step 1: Audience

Step 2: Budget

Step 3: Activity

Step 4: Project Description

Step 5: Evaluation

Summary

PROJECT INFORMATION

Project: Test1
Audience: Higher Education
Venue: Multimedia (Websites, Podcasts, Print)
Activity: Host "Live From" calls or video chats from your lab or research cruises

Step 4: BI Project Description

Think about what success will look like and how you will demonstrate success in your BI project. Then, use this information to answer the question below.

SMART Goals & Objectives

As you develop your goals, objectives and tasks, try to make them *SMART*. A SMART objective is:

Specific | Measurable | Audience-based | Relevant | Time-bound

Describes an action, behavior, outcome, or achievement that is observable. (e.g., follow Department of Ecology's protocol in determining the ordinary high water mark; volunteer in community shoreline cleanups; incorporate educational materials on aquatic invasive species).

Action words also serve to group the objectives into specific learning domains.

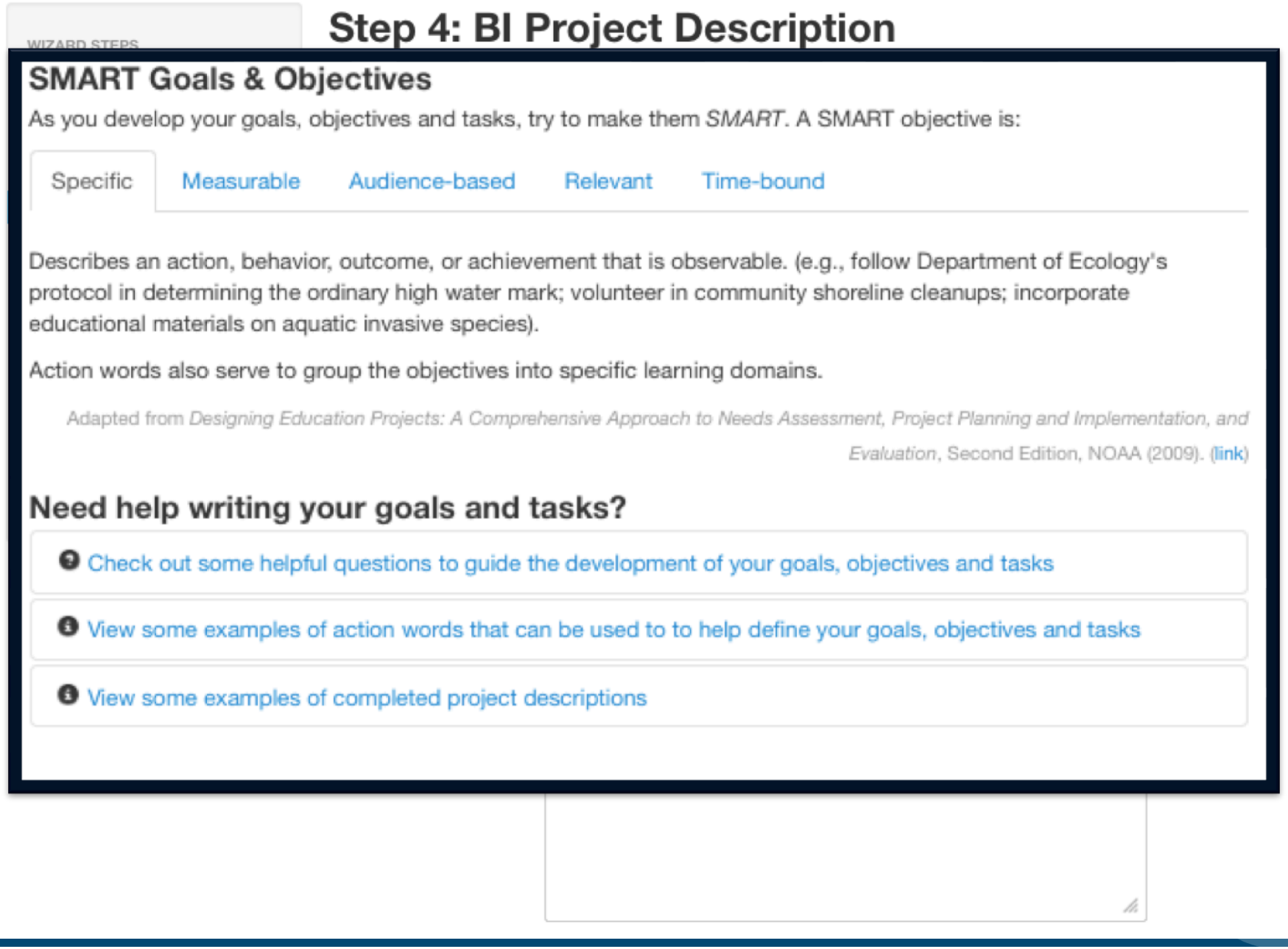
Adapted from Designing Education Projects: A Comprehensive Approach to Needs Assessment, Project Planning and Implementation, and Evaluation, Second Edition, NOAA (2009). (link)

Need help writing your goals and tasks?

- Check out some helpful questions to guide the development of your goals, objectives and tasks
- View some examples of action words that can be used to to help define your goals, objectives and tasks
- View some examples of completed project descriptions

Please describe your Broader Impact project, including goals and tasks

Step 4: BI Project Description



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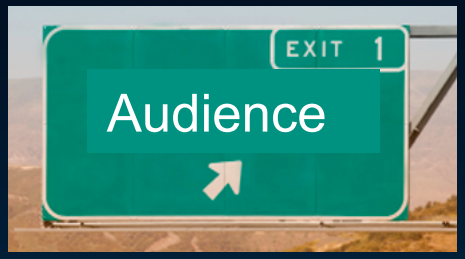

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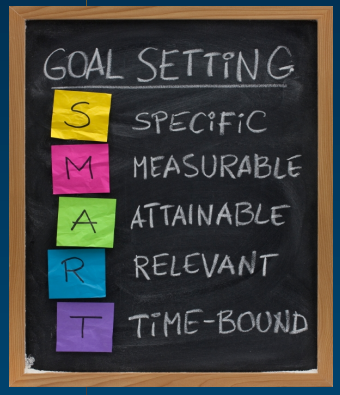

5: Evaluation

Step 5: Evaluation

WIZARD STEPS

Project Information

Step 1: Audience

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Step 5: Evaluation

Summary

PROJECT INFORMATION

Project: Test1
Audience: Higher Education
Venue: Multimedia (Websites, Podcasts, Print)
Activity: Host "Live From" calls or video chats from your lab or research cruises

Step 5a: Evaluation

Just as you collect data in your scientific research, you need to collect data on the efficacy of your BI project, which means you need to plan for a project evaluation. Depending on your needs and budget, an evaluation can be simple or sophisticated and you can do it on your own or hire a professional evaluator to help you. For your proposal, you will not need in depth detail about your evaluation plans but you should demonstrate that you have considered how you plan to evaluate the BI component of your project.

A project evaluation plan outlines how you will systematically collect data from your audience to address questions such as:

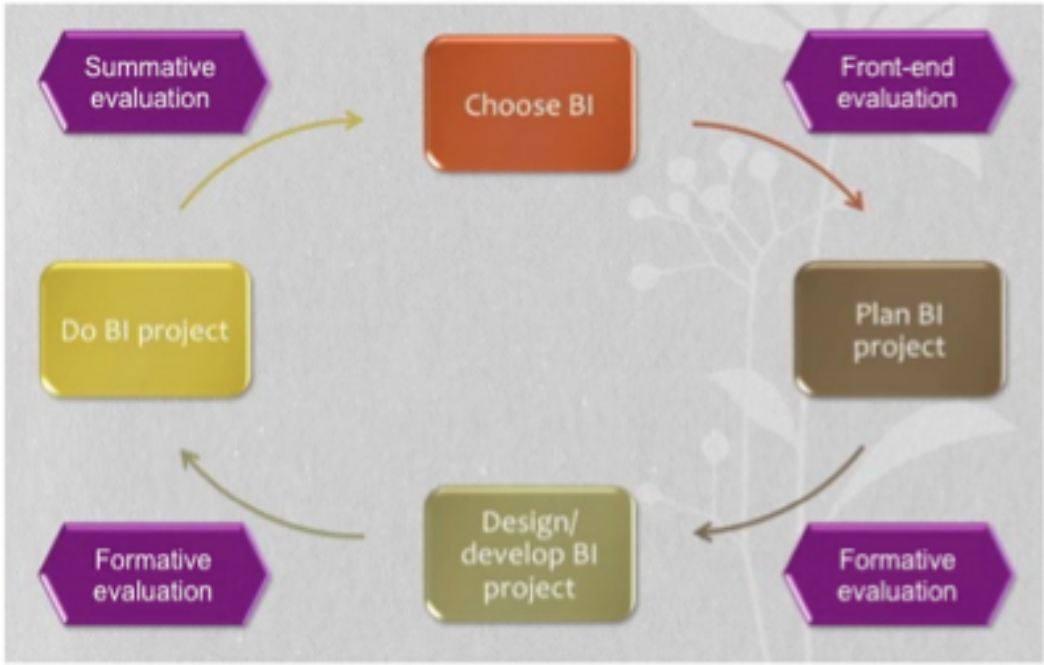
- Was this BI project successful? To what extent did the project meet stated goals and objectives?
- Was this BI project valuable to your audience? Were your BI activities appropriate for them?
- Did your audience change as a result of this BI project, and in what ways (i.e. knowledge, skills, or behavior)?

Your questions, audience, and where you are in the project planning/implementation process will determine what type of evaluation you will undertake. For most small projects, you will do only a summative evaluation, which helps determine if the project worked and its value to your audience. However, if you want to use data to inform your BI strategies, then you would do front end or formative evaluation. Front-end evaluation helps you get to know the audience and formative evaluation gives insight into whether what you are doing works for them.

Step 5: Evaluation

Evaluation Types

Check off the types of evaluation(s) that you will need to do for this project



- ☐ **Front-end/Needs Assessment**: Similar to a pre-test, it is done to determine what your audience wants, knows, needs and/or can do. This helps you get to know your audience and plan accordingly.
- ☐ **Formative evaluation**: Similar to a mid-term exam or regular quizzes, it is done throughout project design and implementation to help you improve your project as it progresses. This is especially useful with an audience you don't know well, when trying something new or improving an existing program or project.
- ☐ **Summative evaluation**: Similar to a final exam, it is done after implementing a project to document successes, failures and lessons learned. Using this information, you can report out to your funder the overall success of your BI project. (Usually required)

Step 5: Evaluation

WIZARD STEPS

Project Information

Step 1: Audience

Step 2: Budget

Step 3: Activity

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Summary

PROJECT INFORMATION

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Venue: Multimedia (Websites, Podcasts, Print)
Activity: Host "Live From" calls or video chats from your lab or research cruises

Step 5b: Evaluation

Your BI project evaluation plan should be clearly stated in your BI statement. Below are examples of BI evaluation statements that COSEE NOW members have used in proposals:

Example 1: An external evaluator will conduct a formative and summative evaluation of this project. Throughout the project we will measure students' knowledge of climate change and feelings about what they can do about it. Survey data collected will help inform decisions regarding improving the project for students and the final survey will determine how students have changed over time.

Example 2: To ensure that a correct and effective message is reaching this audience, this program will be evaluated by an external evaluator from COSEE NOW. The evaluator will perform a front-end evaluation (probably using interviews) at the beginning of the EPO project to determine the teachers' backgrounds and attitudes regarding climate change. At the end of the project the summative evaluation will focus on changes to teachers' attitudes and the impact of the project on their teaching.

Find an Evaluator

We recommend that you consult an experienced program evaluator to guide you through this process. If you need help finding an evaluator, check out the membership database of the American Evaluation Association.

Previous | Save & Continue

Broader Impact Plan for Report Example Modified May 31st, 2012

The following guidance will help you plan and draft your proposed Broader Impact project. You can share this initial plan with your potential partners.

Audience

I have chosen to work with **K-12 Teachers** because...

Members of my audience often teach photosynthesis using on terrestrial plants. However, it is important for teachers to include phytoplankton when discussing photosynthesis because most of the oxygen in the atmosphere originally came from the activities of photosynthetic organisms in the ocean. Moreover, these primary producers are critical to aquatic food webs. They support entire communities of organisms, including the seafood that we eat, so it is important to understand them. In focusing on satellite images of sea surface temperature and primary production (chlorop concentrations), teachers will gain a greater understanding of where the majority of primary production is occurring and how physical fac phytoplankton communities.

It is important to work with this group to...

- Foster a scientifically literate population
- Enhance the future workforce
- Increase the ability to solve future challenges (i.e. energy, health, environment, and national security)
- Increase America's global competitiveness

Venue Benefits:

More contact time, deeper understanding, dedicated audience

Venue Challenges:

Needs to fit in with standards and testing (less flexibility), smaller audience

Activity

To work with this audience, I have chosen to Work on on- or offline research-based educational materials (curricula or lessons) focusing

Suggested Next Steps:

Partners

To further ensure the success of this project, I will work with experienced partners, including COSEE NOW. I have contacted and discussed this project with them and they have agreed to participate.

Objective

The following is my main objective for this activity

Broader Impacts Description
We will partner with Centers for Ocean Science Education Excellence Networked Ocean World (COSEE NOW) for the development and

Scientists input/ data

Helpful info on audience

Activity notes

Objectives Drafted in Wizard

Evaluation

To measure the success of this project, I will also perform the following assessments with the help of an external evaluator:

- **Formative evaluation**: Conducted throughout project design and development to guide improvements during piloting/prototyping of so
  new, or to improve an existing program or project.
- **Summative evaluation**: Conducted at the end to document successes, failures and lessons learned.

Budget

A good rule of thumb is that the BI component should be 5-10% of your total project budget. Of course, a more advanced BI plan will require a larger budget. Remember to include money for logistical support when running a program.

My budget for the broader impact activity will be approximately **$10,000**

The evaluation budget should be 10% of the broader impact portion of your budget, or about **$1,000**.

Final Notes

The steps that you have just completed cover this ground but as a reminder these are questions posed in all solicitations. Be sure to keep thes
mind when composing your broader impact statement.

- How well does the activity advance discovery and understanding while promoting teaching, training, and learning?
- How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)?
- To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships?
- Will the results be disseminated broadly to enhance scientific and technological understanding?
- What may be the benefits of the proposed activity to society?

Relevant Literature

For more information on how to meet the needs of the audience you selected, as well as related research on the activity you are planning on pursuing, we suggest reviewing the following references, as you may find some of these helpful to include in your proposal.

1) Bransford, J, Brown, A., and Cocking, R. (1999) *How People Learn: Brain, mind, experience, and school*. Washington, DC: National Academy Press.

Evidence from many branches of science has significantly added to our understanding of what it means to know, from the neural processes
during learning to the influence of culture on what people see and absorb. "How People Learn" examines these findings and their implications fo
what we teach, how we teach it, and how we assess what our children learn. The book uses exemplary teaching to illustrate how approaches based on what we now know result in in-depth learning. This new knowledge calls into question concepts and practices firmly entrenched in our current education system.

2) Wiggins, G.P. and McTighe, J. (2005) *Understanding by Design*. Alexandria, VA: ASCD.

What is understanding and how does it differ from knowledge? How can we determine the big ideas worth understanding? Why is understanding an important teaching goal, and how do we know when students have attained it? How can we create a rigorous and engaging curriculum that focuses on understanding and leads to improved student performance in today's high-stakes, standards-based environment? Authors Grant Wiggins and Jay McTighe answer these and many other questions in this second edition of Understanding by Design.

Evaluation Plan

Reminder about NSF criterion II

Literature review

Invitation

Please try out the wizard and send us your comments, including:

- time required to work through the wizard
- usability
- background information/support
- overall satisfaction with the tool,
- any other suggestions for improvement

Send your feedback to **wizard@coseenow.net**

Questions?

http://coseenow.net/wizard

Coming Soon: Supporting Materials

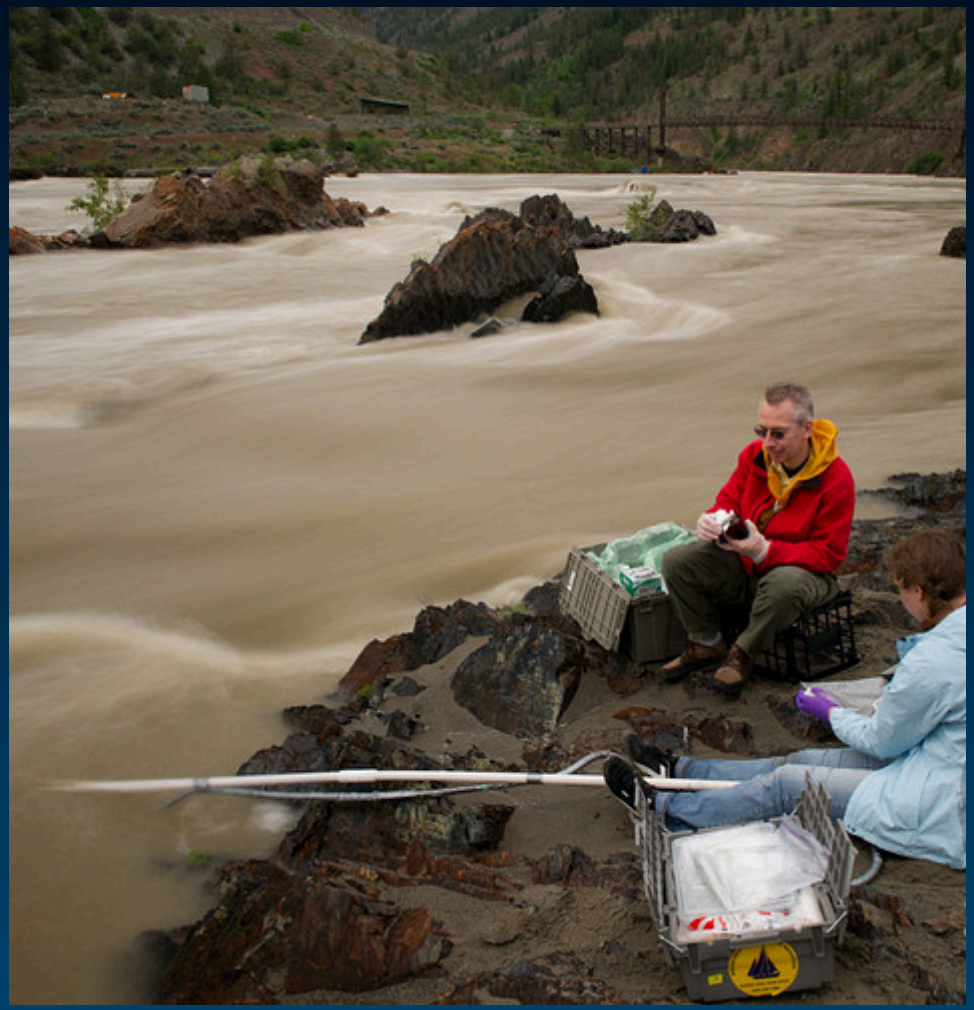
Pre-Award Materials

- EPO Guide
- NSF's Representative Activities
- References
- Evaluation Manuals

Post Award Materials

- Case studies
- Next Steps
- Additional funding for E&O activities
- Journals to publish the results of your work

Bernhard Peucker-Ehrenbrink



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- The "*BI Wizard*" provides a user interface that guides users through a series of well-defined steps necessary for the construction and implementation of a broader impact statement

Questions?

http://coseenow.net/wizard

Thank you!