

Broadening participation in STEM, supporting the academic success of all students, and facilitating students' professional pathways are essential to the success of geoscience programs. The SAGE 2YC: Faculty as Change Agents project has developed materials for faculty professional development workshops, focused on evidence-based strategies to achieve these goals. The workshop materials include presentations, reference materials, and planning documents outlining such details as the goals and timing for each element of the workshop sessions.

These workshop materials were **designed using principles for effective faculty professional development**, as outlined on our complementary web page on effective workshop design (linked from the page of workshop materials).

All of the workshop materials on our website have been incorporated into professional development workshops as part of the SAGE 2YC project, and subsequently utilized by faculty Change Agents in their regional workshops.

SAGE 2YC materials for faculty professional development workshops are available on our project website, for you to adopt or adapt



https://serc.carleton.edu/sage2yc/workshop_materials.html

Carol J. Ormand, SERC, Carleton College
John McDaris, SERC, Carleton College
R. Heather Macdonald, College of William and Mary
Eric Baer, Highline College
Norlene Emerson, University of Wisconsin - Platteville
Jan Hodder, University of Oregon



Materials for Faculty Development Workshops

The materials on this page were developed by the SAGE 2YC: Faculty as Change Agents project team or in collaboration with our team for the workshops run by the project. We envision these materials being used by and for faculty in professional development workshops, in parallel with our *effective workshop design*. We expect they will be useful to people leading professional development workshops for faculty members, departments, and programs. We hope that these materials will be adopted or adapted, and that they will also be useful as models for developing presentations and session plans for faculty professional development on other topics.

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Broadening Participation in the Geosciences / STEM

Broadening participation in STEM (science, technology, engineering, and mathematics), and particularly in the geosciences, is one of the primary goals of the SAGE 2YC project. The geosciences are among the least diverse fields in the STEM disciplines (e.g. *Isattoun and Laine, 2007* and *Solter, 2017*). We need to *diversify the geoscience workforce*, both to strengthen the geoscience workforce and for the benefit of our society as a whole. Faculty members can lead the way, especially when they understand the challenges and the solutions surrounding issues of diversity, equity, and inclusion in STEM.

Diversity in action: Broadening participation through strategies for inclusion

This workshop session is designed to deepen faculty members' knowledge of evidence-based strategies for inclusion. In particular, our goals are for participants to:

- Learn about the research on issues of broadening participation;
- Explore strategies to design an inclusive classroom and geoscience program; and
- Develop ideas for implementation of inclusion strategies in their work.

The strategies highlighted in these materials are applicable across all STEM disciplines. A few of the materials refer to examples in geoscience, but could easily be adapted to other STEM fields. The workshop session is designed to take half a day and includes a think-pair-share discussion of three scenarios, a presentation of research data, a gallery walk with posters highlighting evidence-based inclusive teaching practices, small group discussions, and individual action planning. [Session details and materials >](#)

Supporting students' sense of belonging

This workshop session is designed to familiarize faculty members with the research literature on sense of belonging. In particular, at the end of the session, participants will:

- Be able to define "belonging uncertainty" and describe how it undermines student academic success;
- Know about several key strategies for fostering students' sense of belonging; and
- Have a plan to implement at least one new strategy to foster students' sense of belonging in one or more courses.

The strategies highlighted in these materials are applicable across all STEM disciplines. The workshop session is designed to take at least 1.5 hours, but could easily be expanded to encourage deeper exploration of the research literature. The session consists of a writing reflection, a presentation of key research findings, a think-pair-share activity about a well-intentioned but counterproductive intervention, and a jigsaw exploration of excerpts from research articles. [Session details and materials >](#)

Building students' science identity

This workshop session is designed to highlight strategies for infusing career information into our geoscience courses and for building our students' abilities to see themselves as future scientists. In particular, the goals of the session are to:

- Infuse career information in class, on-line, and outside of class;
- Develop our students' awareness of the breadth of careers in geoscience; and
- Help our students to identify as scientists.

The strategies highlighted in these materials are applicable across all STEM disciplines. We borrowed the idea of using "scientist spotlights" from biology education research (Spatnik et al., 2015). The session consists of a presentation highlighting the lack of diversity in the geosciences and the key elements of building a science identity, followed by a gallery walk to share ideas and strategies for infusing career information into our courses and programs. This session can also be used to support *Facilitating Students' Professional Pathways*. [Session details and materials >](#)

Supporting the Academic Success of All Students

Students enrolled at two-year colleges have a wide range of personal goals and academic preparation. Providing them with the skills and habits of mind they will need to succeed is challenging but possible and there are a number of strategies to do so.

Support student success in your teaching

This workshop session is designed to help faculty learn about effective ways to (re)design their courses and use active learning techniques to stimulate greater student learning. The goals of this session are to:

- Introduce participants to the principles of Backwards Design;
- Expose participants to several different active learning strategies and develop plans for implementing them in their courses;
- Introduce participants to various assessment strategies they can use in their courses.

The strategies highlighted in these materials are applicable across all STEM disciplines. Backwards Design and Active Learning are highly effective ways of improving student learning regardless of what subject area is involved. The session consists of presentation slides for the whole session, a scenario discussion activity, a jigsaw activity on a set of posters describing active learning strategies, and time for reflection. [Session details and materials >](#)

Facilitating Students' Professional Pathways

Some geoscience careers only require a two-year degree. Others require bachelor's or other advanced degrees. There are many career pathways open to students at two-year colleges either directly or through transferring to a four-year institution. Faculty at two-year colleges can play an important role in helping students follow their own path.

Building Pathways for Success: Supporting Student Transfer from Two-Year Colleges to Four-Year Colleges and Universities

This workshop session is designed to help participants with strategies and approaches for bridging the gap between two-year and four-year ocean science programs. The goals of the session are to:

- Explore promising practices and share strategies for supporting transfer students in their pathways from their first geoscience course at a community college to graduation from a four-year college or university;
- Share and learn from others, increasing communication and collaboration of those interested in building pathways to success for transfer students;
- Develop individual or team action plans and get feedback from other participants.

The session was offered at an Ocean Sciences meeting but the topics are relevant across all STEM disciplines. The session consists of scenario discussions, a gallery walk activity, small group work sessions, and active discussion. [Session details and materials >](#)



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