OREGON DEPARTMENT OF EDUCATION

WELL - ROUNDED ACCESS PROGRAM

Cultivating Identity & Belonging in STEAM

THIS RESOURCE PROVIDES EDUCATIORS:

- ✓ Strategies to implement in their schools
- ✓ Questions to ask to better frame practices and programming
- ✓ Instructional resources

STEAM IDENTITY

Developing a STEAM identity is transformative for students, fostering self-efficacy through active participation in STEAM-related fields. Students who develop a solid STEAM identity are more likely to pursue advanced learning, whether through academic degrees or technical certifications (Cohen et al., 2021; Dou et al., 2019; Maltese & Tai 2011; Tai et al., 2006), fostering a mindset of continuous growth and adaptability in an ever-evolving job market (Stets et al., 2017; Venville et al., 2013). However, historically, many student groups have been excluded from STEAM spaces, and have had inequitable access to deep and challenging learning material and experiences within school.

SCHOOL STRATEGIES

There are various strategies schools can apply to to help students see themselves as belonging in the STEAM classroom:

- Foster a truly collaborative classroom culture where all students can take learning risks. Group projects that emphasize teamwork and interdisciplinary learning enable students to see how their unique strengths contribute to success.
- Give students choice in their learning. Not only does this increase student efficacy and engagement, but it can ensure that your curriculum is relevant and engaging over time. To simplify planning, it's helpful to get student input on their interests and questions, and then provide a few options to choose from.
- Let students authentically contribute with their work. This could look like designing a watering system for the school garden, creating campaigns for beach clean up, or designing tiny homes and learning about how to build them to help provide affordable housing.
- Connect students with STEAM professionals, including those who reflect the identities and lived experiences of your students. These role models help demystify STEAM careers and demonstrate that success in these fields is attainable for all students, across a variety of backgrounds.
- Students bring diverse linguistic backgrounds, cultural perspectives, and communication styles to the classroom, which may shape how they engage with the material. To better understand their perspectives, avoid making value judgements based on their initial questions or comments. Instead, encourage deeper discussion by asking, "Can you tell me more about that?" This simple approach can foster connection, belonging, and contribute to meaningful conversations and insights.
- Invite guest speakers, host career fairs, and arrange field trips to local tech companies or research facilities to further inspire and solidify students' aspirations.
- Make sure STEAM courses and opportunities are provided to all students - not just certain classes or student groups. Ensure that students are not consistently pulled out of STEAM learning opportunities for other programming. STEAM education is a core part of the learning experiences and works best when integrated into the curriculum to enrich problem-solving, creativity, and critical thinking across all subjects.

- When providing feedback on student-driven STEAM projects, it's important to highlight strengths—what they did well, the ideas they explored, and the creativity they showed. Focusing on their growth and successes helps build confidence and encourages deeper learning.

- Oregon's Transformative SEL Framework & Standards emphasize understanding oneself within the community and society, aiming to build skills for addressing inequities and fostering positive change. Center in these standards and practices to create inclusive STEAM learning environments where students and adults feel affirmed, develop agency and collaborate to improve society.

FRAMING QUESTIONS TO ENCOURAGE STEAM IDENTITY[1]

Frame your thinking to encourage the development of STEAM identity for all of your students by asking:

- Whose knowledge, practices, and resources are valued in your classroom environment, and how can you ensure that all students' gifts and identities are represented? How might the inclusion of diverse forms of knowledge and values significantly inform your instructional and curriculum choices?

- How does your classroom environment bring in the contexts, cultures, languages, and practices that are part of your larger community, so students can begin to see the different ways they can contribute?

- How do learners see, hear, and feel themselves and their interests reflected in the routines and instructional practices utilized in your classroom?

- How do the design, tools, equipment, and organization of your classroom work for your learners?

ARTS INTEGRATION FOCUS: ARTS AND IDENTITY

When students create, perform, and reflect through the arts, they develop confidence, pride, and a deeper understanding of their own identity. Artistic expression fosters agency, self-awareness, and a sense of belonging—empowering learners to see themselves as creators, collaborators, and innovators. Connection to diverse artists and inventors also helps students imagine future paths that reflect their interests and lived experiences.

For an example of the role of arts education for identity development, explore this inspiring lesson on Black American Inventors by Oregon artist Heather Pearl: Inventions in Action Lesson – OER Commons

INSTRUCTIONAL RESOURCES TO SUPPORT STEAM IDENTITY AND STUDENT VOICE FOR ALL STUDENTS

These Teaching Tools help provide more information about STEAM identity:

- How can science instruction leverage and develop student interests? Short answer: In so many different ways!

- Teaching STEM in ways that respect and build upon Indigenous Peoples' rights

In addition, this research brief provides more information about how to define and measure STEM Identity and interest.

- NSTA's Defining and Measuring STEM Identity and Interest in STEM Learning: Connected Science Learning October - December 2019 [Volume 1, Issue 12]

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1 Adapted from Castek, J., Schira Hagerman, M., and Woodard, R. (Eds). (2019). Principles for Equity-centered design of STEAM learning-through-making. Tucson: University of Arizona. Retrieved from https://circlcenter.org/wp-content/uploads/2019/10/Castek-STEAM-Learning-Making-Whitepaper.pdf