Features of High-Quality STEAM Instruction (for Teachers and Instructional Leaders)

While no two programs will look the same, high-quality K–5 STEAM programs often contain all of the following 10 features. These features are fundamental aspects and components that each K–5 STEAM program will share. This list, not given in order of importance, is to be used alongside the K–5 STEAM Guidance document. The K–5 STEAM Guidance document provides important definitions and considerations for creating or reviewing new or existing STEAM experiences. Each feature contains a primary goal statement followed by clarifying explanations that can be used to enhance and develop a high-quality program.

Features

➢ *Students are engaged in rich open-ended tasks or problems*

- The teacher and/or students should identify a project or problem that is connected to students' interests, identities, experiences, and matters of concern to their communities. Students should practice analysis, critique, and critical thinking to examine and understand the complexities of the problem from multiple perspectives.
- Experiences should include open-and-careful observations, critical-and-divergent thinking, evaluation, improvements, and innovations that focus on the process of moving towards the end result more than the product or outcome.
- Experiences should include active, hands-on learning that allows students to engage in play and creative risk-taking.

➢ *Student voice and choice are prioritized in the planning and selection of STEAM experiences*

- Students have developmentally appropriate and rigorous opportunities to drive the focus of inquiry to ensure their unique perspectives shape inclusive and impactful curricula.
- Listen closely to the questions students pose and their wonderment to help determine STEAM experiences.
- Educators co-create with students to develop instruction that is inclusive of and reflects the voices, thoughts, and ideas of students.

➢ *Students explore connections between at least two STEAM content areas to gain greater understanding in both*

- Know your "why" and be clear about the reason and impact of a STEAM learning experience–how can an integrated STEAM experience help students increase or deepen learning?
- Select STEAM as an teaching approach when it is a good fit for learning; avoid forcing connections between content areas that may lead to surface-level or even misleading experiences.
- STEAM experiences must include the arts.
- Refer to the content area definitions in the STEM vs. STEAM section of the K–5 STEAM Guidance document.
- Students are engaged in the practices and processes (STEAM practices) of the content areas.

➢ *Learning experiences are aligned to Minnesota Academic Standards*

- Identify, and center standards and benchmarks from each of the content areas involved.
- Assess student understanding in multiple content areas aligned to the addressed standards or benchmarks when appropriate.
- Consider whether the STEAM learning experience is delivering standards-aligned learning, or if it is purely a supplemental learning experience. For example, an elementary school with a visual arts specialist providing standards-based learning would approach this differently from a school where the elementary generalists are responsible for teaching art standards in their self-contained classroom–the opportunities for integration and the need for addressing arts standards would be different in these two cases.

➢ *Building-wide collaboration is prioritized*

- Prioritize collaboration with and between different specialists and teachers when developing STEAM learning experiences—including co-planning, consultation, co-teaching, assessing, etc.
- When engaging with other teachers, be mindful of different teachers' varying capacity to collaborate—especially specialist teachers. For example, if there is a single music teacher in the building, they may only be able to collaborate with a few teachers per year. Have a conversation about what collaboration could look like—what is doable and realistic for each person.

➢ *Students develop 21st century skills*

- STEAM experiences should provide opportunities for students to develop 21st century skills–collaboration, creativity, critical thinking, and communication.
- Consider expanding on 21st century skills by incorporating Durable Skills.

➢ *STEAM experiences are developed in partnership with the community*

- Build partnerships with community organizations to tie projects to real-world community issues.
- Build relationships with students' families to connect learning to relevant issues in the community.
- Bring in community arts organizations, STEM organizations/companies, and local artists to bring authenticity to the STEAM experience.

➢ *Instructional strategies that support interdisciplinary learning for every student are used*

- Include instructional/pedagogical strategies from multiple content areas.
- Use Universal Design for Learning Guidelines to ensure access for all students.
- Use culturally responsive pedagogy.
- Include differentiated and scaffolded approaches.

➢ *Measures are taken to ensure safety*

- Make sure safety policies and practices are aligned to the Career and Technical Education (CTE) Safety Guidance.

➢ *Learning experiences are connected to future career paths*

- Align career awareness and exploration to the Career Development in CTE Programs.
- Connect career exploration to the Career Clusters in CTE Framework.

Additional Resources

- K-5 STEAM Guidance
- Features of High-Quality STEAM Programs (for School and District Leaders)
- STEM/STEAM Practices Sort Activity
- FAQ

References

"Arts Integration Continuum." Turnaround Arts, John F. Kennedy Center for the Performing Arts

"Arts Integration." Perpich Center for Arts Education. https://perpich.mn.gov/professional-development/arts-education-resources/arts-integration/

Day, Kelly J. and Carol O'Donnell. "Teaching About Real-World, Transdisciplinary Problems and Phenomena through Convergence Education." Smithsonian Education. July 25, 2022. https://www.smithsonianmag.com/blogs/smithsonian-education/2022/07/25/teaching-about-real-world-transdisciplinary-problems-and-phenomena-through-convergence-education/

Hirsch, Amanda. "Transdisciplinary and interdisciplinary approaches." Center for Innovative Teaching and Learning. November 17, 2020. https://citl.news.niu.edu/2020/11/17/transdisciplinary-interdisciplinary/

"STEM Integration in K–12 Education." The National Academies of Sciences, Engineering, and Medicine. YouTube. March 6, 2014. Educational video. 3:30. https://youtu.be/AlPJ48simtE?si=ha9zgymTZeFaGkKJ

"What is STEAM Education?" Institute for Arts Integration and STEAM. https://artsintegration.com/what-is-steam-education-in-k-12-schools/

Inspiration provided by Georgia's Elementary STEM/STEAM Continuum, Nevada's STEM Framework, Ohio's Model for STEM and STEAM Schools, South Carolina's STEAM Implementation Continuum, Tennessee's STEM/STEAM Designation Guidebook, Wisconsin's STEM Reflection Tool, and the Minnesota Department of Education's Career and Technical Education STEM Framework.