Washington Office of Superintendent of
PUBLIC INSTRUCTION

Considerations for K–12 Science Education

Social Emotional Support:

Science education promotes student engagement and well-being.

- CASEL's SEL Roadmap for Reopening School includes four SEL Critical Practices:
  - Take time to cultivate and deepen relationships, build partnerships, and plan for social emotional learning (SEL)
  - Design opportunities where adults can connect, heal, and build their capacity to support students
  - Create safe, supportive, and equitable learning environments that promote all students' social and emotional development
  - Use data as an opportunity to share power, deepen relationships, and continuously improve support for students, families, and staff.
- Keep equity in focus.
  - Equity goes beyond access and representation. It means honoring the cultures of our students, accommodating the histories of past and present traumas, providing the necessary resources and rigor, and helping students be a determining factor in forwarding their own learning goals (Council of State Science Supervisors, 2020).

Relevance:

Science education is an essential part of a K–12 education.

- Science education explicitly seeks to develop critical soft-skills in students that carry over into other disciplines as well as preparing them for success in life. These include, problem-solving, analyzing data to make informed decisions, collaboration and communication, and engaging in civil discourse to reach consensus thinking based on evidence.

Excerpt from *Taking Science to School: Learning and Teaching Science in Grades K–8*.

> "In the modern world, some knowledge of science is essential for everyone. It is the opinion of this committee that science should be as nonnegotiable a part of basic education as are language arts and mathematics. It is important to teach science because of the following:
> - Science is a significant part of human culture and represents one of the pinnacles of human thinking capacity.
> - It provides a laboratory of common experience for development of language, logic, and problem-solving skills in the classroom.
> - A democracy demands that its citizens make personal and community decisions about issues in which scientific information plays a fundamental role, and they hence need a knowledge of science as well as an understanding of scientific methodology.
> - For some students, it will become a lifelong vocation or avocation.
> - The nation is dependent on the technical and scientific abilities of its citizens for its economic competitiveness and national needs." *(*National Research Council. 2007, p. 34).

Integration of Science Standards:

Plan for curriculum and instruction thoughtfully.

- Effective instruction in science has students engaged in making sense of the world around them, asking questions, exploring and investigating ideas, and collaboratively creating authentic products that demonstrate standards-based learning.
- Work from an asset mind-set using project-based learning and other innovative instructional strategies to fold in concepts from the prior school year while simultaneously moving forward with current grade level learning.
- Bundle science standards into a storyline and use essential questions to guide lesson and unit development.
- Integrate science learning with other content areas to increase student interest and relevance.
- Incorporate Universal Design for Learning principles in lesson development.

Assessment:

Assessment should be an integrated part of classroom teaching and learning with the goal of supporting the development of grade-level practices.

- Use formative assessment practices to understand students' levels skills and knowledge, scaffold learning, and inform instruction (Council of State Science Supervisors, 2020).
- Help students to become confident in self-assessment and to identify actions they can take to increase their understanding and confidence in engaging in the science and engineering practices.
- Use open ended tasks paired with rubrics that support analysis of student progress towards learning goals to elicit student thinking.
- Learn how to fine-tune assessment practices by adapting strategies for online or blended learning.

Special Considerations for Science:

Safety and well-being are high priorities for all science instruction especially when learning environments can be different from the school classroom or laboratory.

- For in-school learning follow your guidance from your local or state Department of Health. District Risk Management and Safety staff should have the most current information regarding the cleaning of laboratory stations, proper protocols for safe distancing, and use of protective equipment.
- Ensure the continued interweaving of social-emotional supports for students into science learning.
- Design virtual learning using the science and engineering practices to provide students with opportunities to explore science concepts by asking questions, analyzing data, constructing scientific arguments from evidence, writing explanations, and communicating their findings through group discussions with their peers.
- Emphasize that science learning is student-centered and consistently engages students in the practices of science and engineering. During elementary years, science learning provides the interest and curiosity spark that drives authentic and sincere student engagement in reading, writing, speaking, and listening as well as providing an opportunity for authentic application of math as a sense-making tool.
- Instruction should facilitate collaborative sense-making – a critical component of understanding phenomena and solving problems – in ways that honor student interest and identity.
- Focus on high-quality, three-dimensional learning implementing instructional strategies best suited to the learning environment.

Resources:

National Research Council. 2007. Taking Science to School: Learning and Teaching Science in Grades K–8. Washington, DC: The National Academies Press. https://doi.org/10.17226/11625.