

# Social-Emotional Learning and Science

## Issue

Social and emotional learning (SEL) is not often taught explicitly by teachers to students, yet attending to students' SEL needs is critical to student learning and assisting them with dealing with emotional needs & traumatic experiences. SEL is important beyond the current crisis and is central to science learning envisioned in the Next Generation Science Standards (NGSS).

## Background

Social and emotional learning is the process through which children and adults acquire and effectively apply the knowledge, attitudes, and skills necessary to:

- understand and manage emotions,
- set and achieve positive goals,
- feel and show empathy for others,
- establish and maintain positive relationships,
- and make responsible decisions.

### ***(Collaborative for Academic, Social, and Emotional Learning, 2020)***

High-quality teaching and learning in schools rely heavily on the interconnectedness of academics, social skills and interactions, and emotional competencies. Integrating 21st-century skills in classroom experiences includes communication, collaboration, critical thinking, and creativity. To effectively address these skills, educators must attend to the five competencies of SEL, as described by the Collaborative for Academic, Social, and Emotional Learning (CASEL): self-awareness, self-management, responsible decision making, relationship skills, and social awareness. Research shows that purposeful and explicit SEL not only improves achievement[...], but it also increases prosocial behaviors (such as kindness, sharing, and empathy), improves student attitudes toward school, and reduces depression and stress among students (**Durlak et al., 2011**). In addition to immediate and short-term gains in the academic setting, studies show that the development of social and emotional competence in children have a strong correlation to adult outcomes, including participation and success in higher education, long-term employment, better mental health, and reduced criminal activity and substance use (**Jones, Greenberg, & Crowley, 2015**).

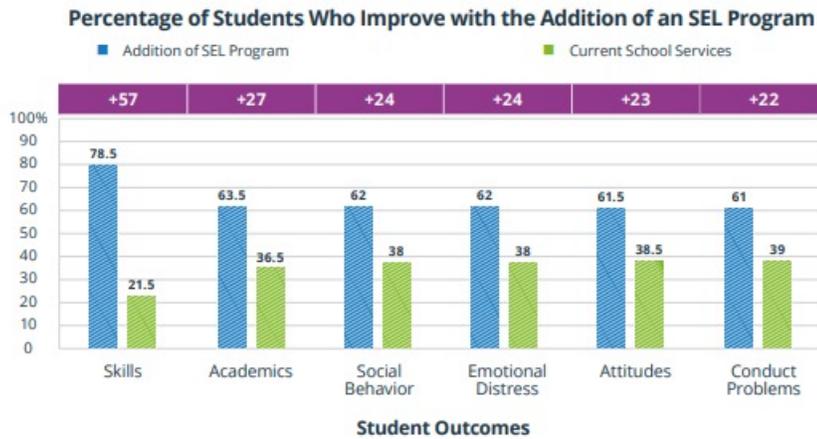


## Position Statement

Approved by the  
CASE Board of Directors  
January 20, 2022



*High-quality teaching and learning in schools rely heavily on the interconnectedness of academics, social skills and interactions, and emotional competencies. Integrating 21st-century skills in classroom experiences includes communication, collaboration, critical thinking, and creativity.*



This chart shows the percentage of students who would benefit from their participation in an SEL program compared to not doing an SEL program but instead continuing with a school's current curricula and programming (Rosenthal & Rubin, 2003). Source: CASEL's *The Practical Benefits of an SEL Program*.

### SEL and Trauma

Social and emotional knowledge can also help students become more resilient in the face of trauma. Trauma is “a response to an experience that is so stressful that it overwhelms an individual's capacity to cope” (Zacarian et al., 2017). While trauma is defined by the person experiencing it (**Gulbrandson, 2018**), studies indicate that one in three U.S. children under 18 has experienced adverse childhood events which may produce trauma (**U.S. Department of Health & Human Services, 2019**). Social and emotional skills, such as understanding and managing emotions, can help people cope with trauma. Five important trauma-informed SEL practices include: creating predictable routines, building strong and supportive relationships, empowering students' agency, supporting the development of self-regulation skills, and providing opportunities to explore individual and community identities (**Trauma-Informed SEL Toolkit**).

### SEL and Equity

While social and emotional knowledge, attitudes, and skills will help all students achieve success in their lives, SEL alone will not necessarily improve educational inequities and racist policies. To address these issues, social and emotional learning can be focused on promoting equity and anti-racism. For example, by learning more about their peers in a safe classroom environment, students may develop greater empathy for each other and build positive relationships with students from diverse cultures and backgrounds. In these discussions, race should not be hidden but should be examined and unpacked (**Transforming Education, 2020; CASEL Equity & SEL**). This must be done very tactfully and requires trust, empathy, and good facilitation. A key challenge with SEL focused on equity and anti-racism is that it requires teachers to be well-versed in racial literacy and confident in fostering discussions of race and racism with their students (**Kohli et al., 2017**). Professional learning will be needed to help teachers deepen their racial literacy and ability to facilitate these discussions.

### SEL and Science

Social and emotional learning is best taught within the context of academic learning, not separate from it. It is not an add-on to science education but is essential to good science education. The Science and Engineering Practices in the Next Generation Science Standards require the kinds of skills fostered by SEL. For example, the revision of models and explanations asks learners to have the self-awareness to reflect on and monitor their learning and understanding. These practices also involve self-management, the hard work of building understanding over time. Argumentation and engineering design are community processes where a group shares and challenges evidence and comes to common solutions and understandings. This requires social awareness and relationship skills. The whole science and engineering process requires responsible decision-making at every stage.

## SEL and Instruction

The COVID-19 pandemic, physical closure of schools, and shift to distance learning gave teachers and schools awareness of the importance of social and emotional learning for students who were going through very challenging times. The pandemic led the state and districts to emphasize SEL. **CA Senate Bill 98** calls for LEAs to identify how they will monitor and support pupils and staff's mental health and social and emotional well-being during the school year.

SEL is part of instruction for all students as opposed to being an intervention for some. In schools using Multi-Tiered Systems of Support (MTSS), it would be considered a Tier 1 support. Challenges to implementing SEL instruction include covering the standards, staying on track with a pacing guide, teacher comfort, and skill level to provide SEL instruction and the absence of system-wide supports for intervention. Administrators play a crucial role in supporting SEL, providing PD, and giving time.

SEL is best implemented when adopted across the entire school. According to an **EDUtopia** article, there is a method to structuring effective SEL practices throughout the campus. It requires a full "integration into the ecology of the school" that then links to the "academics and other parts of the school routine." This suggests that one lesson, or set of lessons, cannot effectively address the SEL needs of students, teachers, and schools. To be most successful, SEL must become part of the "language, fiber, and culture of the school." Similarly, the **Collaborative for Academic, Social, and Emotional Learning (CASEL)** argues that SEL needs to be an integrated effort that is fully infused into the curriculum and not a stand-alone requirement. Rather than using a static standalone curriculum, CASEL suggests reviewing frameworks for teaching and modeling social-emotional competencies alongside your curriculum to consider seamless methods of integrating lessons.

## Position Statement

We advocate for the inclusion of SEL strategies and practices in science classrooms and their infusion into the science curriculum.

- SEL has been a key consideration of distance learning, but it needs to become part of everyday instruction and schoolwide practice(s) beyond the pandemic.
- An explicit goal of social and emotional learning should be to promote equity and anti-racism.
- Teachers will need professional learning and coaching to enhance their understanding and implementation of high-quality SEL instruction.
- SEL instruction should be cultivated at a site/district level to address local needs based on data rather than mandated by state legislation.
- SEL is best when teacher-driven and supported by schoolwide and district-level resources.
- We recognize that addressing SEL requires instructional time balanced with teaching science concepts and practices. SEL is not appropriate as a separate curriculum or content area. Therefore, instructional materials for science should include an integrated approach to SEL, for example, by providing structures and protocols for discussions and group work.

## References

1. Elias, M. J., (2014) Avoiding Common Mistakes When Implementing SEL.  
<https://www.edutopia.org/blog/avoiding-common-mistakes-when-implementing-sel-maurice-elias>
2. Collaborative for Academic, Social, and Emotional Learning (CASEL). Making a Shift to a Systemic Approach to SEL. (2019)  
<https://casel.org/wp-content/uploads/2019/09/SEL-Trends-6-09112019.pdf>
3. Collaborative for Academic, Social, and Emotional Learning (CASEL). SEL Frameworks – Practical Challenges and Opportunities. (2018)  
<https://measuringcel.casel.org/wp-content/uploads/2018/09/Frameworks-A.2.pdf>
4. Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The Impact of Enhancing Students' Social and Emotional Learning: A Meta-Analysis of School-Based Universal Interventions. *Child Development*, 82(1), 405–432.  
<https://doi.org/10.1111/j.1467-8624.2010.01564.x>
5. Jones, D. E., Greenberg, M., & Crowley, M. (2015). Early Social-Emotional Functioning and Public Health: The Relationship Between Kindergarten Social Competence and Future Wellness. *American Journal of Public Health*, 105(11), 2283–2290.  
<https://doi.org/10.2105/ajph.2015.302630>
6. Rosenthal, R., & Rubin, D. B. (2003). *r* equivalent: A simple effect size indicator. *Psychological Methods*, 8, 492-496.
7. Durlak, J., Mahoney, J., (2019). The Practical Benefits of an SEL Program  
<https://casel.s3.us-east-2.amazonaws.com/Practical-Benefits-of-SEL-Program.pdf>
8. Trauma-Informed SEL Toolkit:  
<https://transformingeducation.org/resources/trauma-informed-sel-toolkit/>
9. Zacarian, D., Alvarez-Ortiz, L., & Haynes, J. (2017). Teaching to strengths: Supporting students living with trauma, violence, and chronic stress.
10. Gulbrandson, K. (2018). Don't Miss These Connections Between SEL and Trauma-Informed Practice.  
<https://www.cfchildren.org/blog/2018/06/sel-and-trauma-informed-practice/>
11. U.S. Department of Health & Human Services (2019). New HRSA Data Show One in Three US Children Have Suffered an Adverse Childhood Experience.  
<https://www.hrsa.gov/about/news/press-releases/hrsa-data-national-survey-children-health>
12. Transforming Education (2020).  
[Head & Heart: An expanded approach to meeting students' needs as schools reopen.](https://www.transformingeducation.org/head-and-heart)
13. Collaborative for Academic, Social, and Emotional Learning (CASEL). Equity and SEL:  
<https://schoolguide.casel.org/what-is-sel/equity-and-sel/>
14. Kohli, R., Pizarro, M., & Nevarez, A. (2017). The “new racism” of K-12 schools: Centering critical research on racism. *Review of Research in Education*, 41, 182-202.