Supporting Students' Science Learning During COVID-19 School Closures

What is the issue?

As schools close their doors as part of public health measures to limit the spread of COVID-19, educators are faced with how to support the diverse needs of all learners when students are not in school. States and districts should consider:

- unequal access to technology;
- diverse affective/emotional responses to home lives and the pandemic;
- responsibilities learners hold as part of their homes and communities;
- access to safe and supportive learning spaces; and
- access to peers and/or adults to support learning and sense-making.

This guide recognizes that solutions will not be – nor should be – "school as usual," simply delivered in a virtual environment. Instead, this resource was developed by members of the Council of State Science Supervisors to provide guidance around how to support student science learning during these unique circumstances.

Why it Matters

State science leaders may be asked how districts, schools, and teachers can support learning while students are home. Even with the urgency of timelines for decision-making, state science leaders will be asked to navigate a range of possibilities, including moving to virtual classrooms, sharing lists of activities and resources, and considering trade-offs districts and schools are making around instructional decisions during school closures.

Things to Consider

- **The physical and emotional well-being of students, educators, families, and communities are the priority at this time**. The COVID-19 pandemic is impacting our communities. Health and healing during this crisis should be prioritized. An initial reaction may be to "fill the day" with academic activities, but state leaders should consider how they can ensure conversations and next steps focus on supporting meaningful, purposeful learning while prioritizing social-emotional and health needs.

- **Leveraging the assets of home-based learning, rather than trying to recreate school, can provide meaningful science learning experiences that connect to students' home lives, interests, and identities.** Trying to support school-like learning in a home setting may frustrate teachers, students, and families. Educators should consider how to give students agency to pursue science learning that is relevant to them via resources that are available at home and with meaningful family engagement as possible.

- **What makes sense in this context may not be best practices normally.** One tension to navigate is that the available options for learning during sudden school closures might not be consistent with best practices for teaching and learning science. State leaders may find themselves making recommendations that would otherwise make them uncomfortable in an effort to be practical and humane. Educators should consider how to make the best of difficult circumstances and be clear about how recommendations during school closures in response to the pandemic compare to teaching and learning with students in the classroom.

- **Efforts will need to adapt as this situation unfolds.** It is still unclear in many states how long schools will remain closed. Current thinking is largely focused on planning for two-three week school closures, and solutions during a short closure may need to be revisited if closures extend further into the school year.

- **State science leaders must take into account layers of priorities and directives**. Districts, schools, and teachers may be receiving guidance or input from national, state, and local governments, state and local school districts, employee unions, parent groups, and community organizations. State science leaders should be mindful of sending messages that provide clarity and support, and that honor the difficulty of the situation.

- **Given the wide range of opportunities learners will have, grading of work should be approached with caution.** Many students will not have consistent access to digital devices or the internet at home, or they may have to share devices with others in the household. Visiting public spaces to complete technology-based assignments may not be an option. Further, students may have competing demands on their time. Learning at home should be valued as an opportunity to extend student thinking. Grading of work that requires resources that are not available to all students can deepen inequities.

Features of Supportive Resources

Consider how materials or approaches you are suggesting can be used to:

- Support **flexible scheduling and limited technology access**.
- Engage students in **meaningful science explorations, investigations, and/or sense-making**.
- Encourage students to engage in **activities that already happen in their homes with materials that families already have** (especially so families do not need to purchase additional supplies).
- Help students make **explicit connections to their interests and identities**.
- **Invite family members to be a partner** in students' learning
- Provide students with **choices for how they engage, what they investigate, or how they demonstrate learning**.
- Support students in **self-reflection** related to content and process to support their science learning.
- **Exercise sensitivity** when referencing the current pandemic as a possible phenomenon to investigate.

Learning experiences should look more like…	Learning experiences should look less like…
Flexible goals and structures for learning - **extended time** for learning and reflection - use of **commonly available materials** - **purposeful selection of learning targets** - allowing students to **explore their interests** - **meaningful, manageable tasks and projects** - **opportunities to learn without the use of devices or the internet**	**An attempt to recreate school at home** - assuming a **strict "school day" schedule** - **requiring special materials** (e.g., lab or materials not commonly found at home) - pacing with the **planned scope and sequence** - assigning **readings** to stay "caught up" - packet of **worksheets and busy-work** - all learning experiences happen **virtually**
Purposeful teacher-student interactions - **optional** opportunities to connect with teachers and peers **virtually and at a variety of times** - teachers providing **coaching, feedback, and encouragement** - encouraging **students to engage in learning and reflection with their families and communities** - encouraging **self-reflection** on what students learn and how they learn it	**Teacher-centered instruction** - virtual lectures/classes that all students **synchronously** attend - teachers **delivering information and assignments** - teacher instruction and feedback as the **primary mode** of facilitating learning
Authentic science learning in the home setting - **connecting science phenomena and problems to household activities,** like cooking, fixing things, or gardening - asking students to **identify relevant problems** in their lives and **engage in design cycles** to address them - allowing students to **deeply explore phenomena or problems of interest** through investigation to build understanding and practice over time	**Assignments to "get through" content** - **emphasizing memorizing science content** or "checking off" tasks on lists - asking students to **solve contrived or hypothetical problems**, or complete design projects that **value form over function** - trying to cover content through a volume of activities or skipping from topic to topic

For examples of what it might look like to engage students in learning experiences that reflect these attributes, check out this sample 3rd grade learning menu developed by our colleague in Oklahoma or these sample activities shared by NGSS Phenomena. Add your own ideas to a sample learning menu here.

Attending to Equity

- **Ensure that learning recommendations are not limited by access to technology.** Student learning should not be solely dependent on access to devices and the internet. Encourage approaches that can be pursued without technology and/or asynchronously to set students up for success.

- **Recognize that students and family members may be available to play different roles in learning when at home.** Students and families may need to juggle home, caretaking, school, and work responsibilities. Consider a menu of options for science learning experiences that allow for different types and levels of engagement.

- **Students in poverty and students in special populations may be especially vulnerable during this time.** Families in poverty may be experiencing several of the considerations described above, along with additional concerns including regular access to meals, utilities, health services, or shelter. Undocumented students and students receiving special education services may face particular challenges in accessing resources that they need. Encourage educators to prioritize the physical, mental, and emotional well-being of all students.

- **Science learning recommendations should leverage student interest, identity, and agency as assets.** Equitable learning experiences should be both responsive to the current need as well as meaningful to the learners experiencing them.

Recommended Actions You Take

- Network resources available within your state and across the country and make them easily available to districts and educators in your state. Share high-quality examples of district supports and guidance, educational resources, and/or learning experiences that attend to science learning while foregrounding equity.

- Help districts and educators consider priorities and trade-offs related to science teaching and learning during this time. Rather than providing a list of every available resource and activity, help educators make purposeful, equitable decisions about how they leverage those resources to support students' home learning, including how to support educators and classrooms at different stages of shifting toward three-dimensional instruction as well as helping students and families support home-based learning during this time.

- Spotlight resources that engage student interest and identity; invite families to be part of student science learning; support student agency in learning; engage students in coherent experiences; and prioritize meaningful science learning in the absence of technology. See these Sample Learning Menus as examples of the kinds of activities that one could highlight.

- Share resources and strategies that districts and educators can consider as part of their immediate moves to support learners, as well as strategies to explore in the event that school closures extend beyond 2–3 weeks.

- Extend compassion to those you interact with during high-stress times, including yourself. Be mindful of the unseen personal lives of your colleagues and networks, as well as the factors that enter personal- and professional- decision-making of which you may be unaware.