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# **Remote Learning in Elementary Science & Technology/Engineering**

Using remote learning, additional challenges arise in maintaining student learning in science and technology/engineering and supporting opportunities for collaborative sense-making and design work for students. This document outlines an example of an instructional sequence that may help educators to plan and facilitate coherent learning opportunities that support two-way communication between teacher and student and between students, and can be implemented over a flexible timeline.

We recommended that during remote learning, educators focus on those standards that are the most [critical pre-requisites](http://www.doe.mass.edu/covid19/learn-at-home/secondary-prerequisite.docx) for success in the next grade.

**Remote Learning: Top Tips**

1. **Align** to the MA Curriculum Framework standards. Students should engage in the [science and engineering practices](http://www.doe.mass.edu/frameworks/scitech/2016-04/AppendixI.pdf) to make sense of [grade-appropriate content](http://www.doe.mass.edu/frameworks/search/).
2. **Keep it simple.** Prioritize learning experiences that are simple to explain and to organize, and that students can complete with less adult support.
3. **Make it engaging**. Prioritize topics and tasks that will interest students. Consider how to build upon students’ home languages, experiences, and identities, within learning experiences and over time.
4. **Attend to access and equity.** Provide all academic, language, and social-emotional supports that students normally need or receive to the extent possible. Provide multiple modes of access and response to academic work, including for students who lack access to technology.
5. **Provide pacing and structure.** Each week, provide students a structure for the week and a plan for how much time they should spend on various activities and tasks.

***Planning considerations:***

1. Start by adapting activities in your curricular materials for engaging remote learning. Select thematic (e.g., seasons, weather, habitats, shadows, states of matter) multi-day lessons and learning opportunities that may connect to the context of students’ home lives (e.g., connecting science and engineering projects to activities like cooking, fixing things, gardening or other outside activities).
2. Consider possible integration with other content areas… are there ways students might engage around a science and technology/engineering topic, and support their time on writing, reading, and math?
3. Prepare scaffolds, accommodations, modifications, and/or language supports for students who typically need these supports in science and technology/engineering.

***Facilitating remote learning:***

1. Instruct students to make observations (via videos, live web-cameras, photographs, outdoor experiences, etc.) of the selected science topic or engineering problem through drawing and writing, and to ask questions about those observations. Have students submit and share their initial observations (noticings) and questions (wonderings) with you and other students.
   * Online approaches: Observe video demos/simulations; host a video chat for students to observe and discuss together; shared online docs for students to record their thinking or as a space for students to post pictures of their work; students create individual posts and responses.
   * Offline approaches: explore the outdoor environment, students record in [science notebooks](https://www.amnh.org/explore/ology/genetics/keeping-a-field-journal), provide a call-in number for students to leave voice messages, questions, or feedback.
2. Have students create an initial drawing (or model) about what they *think* is happening of the selected topic and share with you and other students. If working on an engineering problem, have students suggest a possible solution through drawing or writing. Make sure to save these to have students revisit these at the end.
   * Include student choice among multiple modes of representation and with varying access to technology to increase engagement and accessibility.
3. Based on students’ questions and ideas, and existing curricular resources, support students to do further investigation to learn more about the topic or improve their design. Depending on the topic and students’ age, this will vary.
   * Online approaches: additional videos and/or readings, [online simulations](https://phet.colorado.edu/)
   * Offline approaches: guided outside exploration and observations, simple experiments done with objects in the house
4. Have students communicate the new information they learned about the topic to you and the class. Engage students in a discussion (in synchronous or asynchronous ways) of how that additional information changes their initial models or initial designs. Provide some guidance and support during this time as students try to make new sense of what they are learning.

* Online approaches: Host a real-time video chat, shared online documents, guided questions/prompts to push student thinking
* Offline approaches: Students record in journal/notebook. Provide a call-in number for students to leave voice messages, questions, or feedback.

1. Have students revise their drawings/models or engineering designs and communicate to you (orally or in writing) the science or engineering concepts they learned.

*Additional Resources*

* Suite of science education resources to [continue the learning remotely](http://stemteachingtools.org/news/2020/guidance-for-supporting-science-learning-during-covid-19) during school closures (for teachers, families, and sample learning menus);  [NSTA’s Daily Dos - Sensemaking Tasks](https://www.nsta.org/dailydo/) that teachers and families can use to engage students in authentic, relevant science learning