

A quick guide for observing classroom content and practice

In grade 4, instructional time should focus on eight core ideas:

ESS

1. Earth's Place in the Universe
2. Earth's Systems
3. Earth and Human Activity

LS

1. From Molecules to Organisms: Structures and Processes

PS

3. Energy
4. Waves and their Applications in Technologies for Information Transfer

ETS

1. Engineering Design
3. Technological Systems

In a 4th grade science class you should observe students engaged with at least one science concept and practice:

Science Concepts

Earth & Space Science (ESS1, ESS2, ESS3)

- Explaining that erosion and deposition over time result in rock and landscape formations
- Collecting data showing that Earth's matter is broken down and moved
- Interpreting maps to describe patterns of land formations, volcanoes, and earthquakes
- Obtaining information about human use of renewable and nonrenewable energy resources
- Evaluating a design solution to reduce impact of natural disasters

Life Science (LS1)

- Constructing an argument that plants and animals have structures that support key life functions

Physical Science (PS3, PS4)

- Explaining the relationship of an object's speed to its energy
- Observing energy transfer
- Predicting changes in energy when objects collide
- Refining a device that converts motion into electrical, light, or sound energy
- Using a model to show wave patterns
- Describing how reflection of light allows objects to be seen
- Comparing ways to send information through a coded pattern

Technology/Engineering (ETS1, ETS3)

- Testing and redesigning a prototype
- Evaluating design features when developing a model for a problem
- Recognizing that technology is any modification to fulfill a need or want
- Describe that technological devices are made of interrelated parts

Science and Engineering Practices

- Asking questions and defining problems
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics and computational thinking
- Constructing explanations and designing solutions
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

NOTES

Comments on the Science and Engineering Practices:

- For a list of specific skills, see the *Science and Engineering Practices Progression Matrix* (www.doe.mass.edu/stem/review.html).
- Practices are skills **students** are expected to learn and do; standards focus on some but not all skills associated with a practice.



Science and Technology/Engineering What to Look For Guide

The practices below, which are aligned to the MA Model Teacher Rubric, should be evident in planning and instruction. Any particular lesson will demonstrate some of the practices, not all. For each lesson, artifacts or observables might include: lesson plan, tasks and assessments, teacher instruction, student discussion and behavior, or student work.

Standard I: Curriculum, Planning, and Assessment (I-A, I-B)

- The lesson focuses on grade-level standard(s).
- The lesson integrates science and engineering practice(s) with core idea(s) to support development of skills and conceptual understanding.
- The lesson engages students in making sense of relevant phenomena or solving relevant problems (through firsthand experiences or representations).
- The lesson intentionally relates new learning to students' prior skills and knowledge.
- The lesson provides grade-appropriate connection(s) to Literacy and/or Mathematics standards.
- The lesson includes opportunities to monitor learning throughout the lesson (such as through questioning or student performance assessments).

Standard II: Teaching all Students (II-A)

- The teacher actively engages students in authentic scenarios that provide opportunities to make sense of phenomena or design solutions.
- The teacher promotes use of evidence and provides time for students to communicate, clarify, justify, and represent their thinking about the lesson content.
- The teacher uses variation in students' ideas and strategies to strengthen other students' understanding.
- The teacher addresses student variability and diverse needs (including English language learners and students with disabilities) to ensure equitable access to the lesson and achievement of the standard(s).
- The teacher references student work and discussion to summarize the practices and core ideas learned.

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