

A quick guide for observing classroom content and practice

In **grade 2**, instructional time should focus on seven core ideas:

### ESS

1. Earth's Place in the Universe
2. Earth's Systems

### LS

2. Ecosystems: Interactions, Energy, and Dynamics
4. Biological Evolution: Unity and Diversity

### PS

1. Matter and Its Interactions
3. Energy

### ETS

1. Engineering Design

In a **2<sup>nd</sup> grade science** class you should observe students engaged with at least one science concept and practice:

## 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

## Science Concepts

### Earth & Space Science (ESS1, ESS2)

- Comparing multiple solutions to prevent changes in the land
- Mapping types and shapes of landforms and bodies of water
- Using information to explain where water is found and that it may be liquid or solid
- Observing the influence of wind and water on landforms

### Life Science (LS2, LS4)

- Developing models of what animals and plants need to meet their needs
- Using texts and media to compare living things in an area and in different types of geographic areas

### Physical Science (PS1, PS3)

- Describing and classifying materials by observable properties
- Determining which materials are best suited for a certain purpose
- Analyzing material properties when an object is cut into smaller chunks
- Constructing an argument that some changes to materials can be reversed and some cannot
- Experimenting to show the effects of friction on the temperature of objects rubbed together

### Technology/Engineering (ETS1)

- Analyzing data to compare two designs for the same problem

## 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](http://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.

**STE What to Look For** The example below features three Indicators from the [Standards of Effective Practice](#). These Indicators are just a sampling from the full set of Standards and were chosen because they create a sequence: the educator plans a lesson that sets clear and high **expectations**, the educator then delivers high quality instruction, and finally the educator uses a variety of **assessments** to see if students understand the material or if re-teaching is necessary. This example highlights teacher and student behaviors aligned to the three Indicators that you can expect to see in a rigorous 2<sup>nd</sup>-grade science classroom.

**Expectations**  
(Standard II, Indicator D) Plans and implements lessons that set clear and high expectations and also make knowledge accessible for all students.

**What is the teacher doing?**

- Communicating the learning objectives for the lesson orally and visually in student-friendly terms
- Focusing attention on newly learned scientific language (e.g. linguistic complexity, conventions, and vocabulary)
- Supporting inquiry about what evidence is relevant to a scientific question

**What are the students doing?**

- Persisting when engaging with meaningful scientific tasks.
- Using information from observations to construct an evidence based account for natural phenomena
- Identifying common features and differences between a model and the real object

**Instruction**  
(Standard II, Indicator A) Uses instructional practices that reflect high expectations regarding content and quality of effort and work; engage all students; and are personalized to accommodate diverse learning styles, needs, interests, and levels of readiness.

**What is the teacher doing?**

- Designing lessons that support successful cooperation in culturally sensitive ways
- Providing opportunities for students to communicate their scientific ideas and thinking with each other
- Providing resources that support the collection and recording of results

**What are the students doing?**

- Asking questions that can be answered by observations
- Discussing scientific ideas with other students
- Using counting and numbers to identify and describe patterns

**Assessment**  
(Standard I, Indicator B) Uses a variety of informal and formal methods of assessments to measure student learning, growth, and understanding to develop differentiated and enhanced learning experiences and improve future instruction.

**What is the teacher doing?**

- Using multiple formative approaches to assess student learning (e.g., classroom conversation, completion of investigation)
- Conducting frequent checks for student understanding and adjusting instruction accordingly
- Providing exemplars of work (e.g. historical examples, student work)

**What are the students doing?**

- Responding to teacher feedback to improve their work
- Engaging in challenging learning tasks regardless of learning needs (e.g., linguistic background, disability, academic gifts)
- With guidance, planning and conducting an investigation collaboratively with peers