

A quick guide for observing classroom content and practice

In **grade 5**, instructional time should focus on nine 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
2. Ecosystems: Interactions, Energy, and Dynamics

### PS

1. Matter and Its Interactions
2. Motion and Stability: Forces and Interaction
3. Energy

### ETS

3. Technological Systems

In a **5<sup>th</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, ESS3)

- Constructing an argument about the sun's appearance
- Using models to explain Earth's relationship to the sun, moon and stars
- Using a model to explain the cycling of water on Earth
- Graphing the locations and relative amounts of fresh and saltwater
- Obtaining information about human's impact on the environment
- Testing, and proposing a change to, a water filter design

### Life Science (LS1, LS2)

- Asking scientific questions about how plants obtain materials to live and grow
- Developing a model to describe movement of matter in the environment
- Comparing the effectiveness of composter designs

### Physical Science (PS1, PS2, PS3)

- Using a model of matter to explain phase changes
- Measuring conservation of matter
- Observing and measuring substances to describe characteristic properties
- Experimenting to see if mixing substances creates a new substance
- Supporting an argument that gravity is directed towards Earth's center
- Describing that the food animals digest provides energy and nutrients for life processes

### Engineering (ETS3)

- Using drawings to show the relationships between parts of a device
- Communicating about changes to improve technologies and the development of new technologies that fulfill a want or need

## 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 5<sup>th</sup> grade science classroom.

<b>Expectations</b> (Standard II, Indicator D)	Plans and implements lessons that set clear and high expectations and also make knowledge accessible for all students.	
<b>What is the teacher doing?</b>	<ul style="list-style-type: none"> <li>•Asking students to apply scientific knowledge and ideas when engaging with real-world problems</li> <li>•Focusing attention on scientific language (e.g., linguistic complexity, conventions, and vocabulary)</li> <li>•Showing students how to use models to explain phenomena and generate evidence</li> </ul>	<b>What are the students doing?</b>
	<ul style="list-style-type: none"> <li>•Persisting when engaging with meaningful scientific tasks</li> <li>•Applying scientific knowledge when explaining natural phenomena or real world problems</li> <li>•Identifying limitations of a model</li> </ul>	

<b>Instruction</b> (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.	
<b>What is the teacher doing?</b>	<ul style="list-style-type: none"> <li>•Highlighting when students draw explicitly upon class content during discussions with peers</li> <li>•Modeling ways of using computation and analysis to find patterns in observations</li> <li>•Providing resources that support the comparison of students' results</li> </ul>	<b>What are the students doing?</b>
	<ul style="list-style-type: none"> <li>•Asking questions that can be answered by investigations and predicting answers based on patterns</li> <li>•Using computation and mathematical analysis to find patterns</li> <li>•Comparing data collected by different groups to discuss similarities and differences in their findings</li> </ul>	

<b>Assessment</b> (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.	
<b>What is the teacher doing?</b>	<ul style="list-style-type: none"> <li>•Providing concrete strategies to respond to feedback (e.g., emphasizing importance of recorded observations)</li> <li>•Conducting frequent checks for student understanding and adjusting instruction accordingly</li> <li>•Providing exemplars of work (e.g. historical examples, student work)</li> </ul>	<b>What are the students doing?</b>
	<ul style="list-style-type: none"> <li>•Demonstrating learning in multiple ways (e.g., classroom conversation, completion of investigation)</li> <li>•Engaging in challenging learning tasks regardless of learning needs (e.g., linguistic background, disability, academic gifts)</li> <li>•Using exemplars to inform their work</li> </ul>	