

A quick guide for observing classroom content and practice

In an 7<sup>th</sup> grade science class you should observe students engaged with at least one science concept and practice:

In grade 7, instructional time should focus on eight core ideas:

**ESS**  
 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**  
 2. Motion and Stability: Forces and Interactions  
 3. Energy

**ETS**  
 1. Engineering Design  
 3. Technological Systems

### Science Concepts

#### Earth & Space Science (ESS2, ESS3)

- Explaining how Earth's surface has changed over different scales
- Developing a model of the sun and Earth's gravity in the water cycle
- Using data to explain that Earth's resources are unevenly distributed
- Communicating how past geologic events are used to make predictions
- Constructing an argument about human activities and technologies on consumption of resources

#### Life Science (LS1, LS3)

- Developing an argument that body systems interact for life functions
- Explaining how animal behaviors and plant structures lead to reproduction
- Interpreting data about available resources and organism populations
- Describing the relationship between organisms across ecosystems
- Developing a model to describe the cycling of matter in an ecosystem
- Analyzing data about disruptions to an ecosystem and population shifts
- Evaluating designs to protect an ecosystem
- Explaining biodiversity and resource availability within an ecosystem
- Constructing a model of a food web

#### Physical Science (PS2, PS3)

- Describing the effects of electric charges on electric forces
- Presenting evidence of fields
- Interpreting data on the relationship of kinetic energy, mass, and speed
- Developing a model of the relative position and energy of objects
- Creating a device to control thermal energy transfer
- Investigating relationships involved in energy transfer
- Providing evidence linking changes in motion to energy transfer
- Modeling energy transfer mechanisms  
Relating kinetic and potential energy

#### Technology/Engineering (ETS1, ETS3)

- Evaluating competing solutions to a problem and modeling the solutions
- Testing to optimize a solution
- Constructing a prototype
- Explaining a communication system
- Comparing benefits and drawbacks of various communication systems
- Researching transportation systems
- Explaining how components of a structural system work together
- Using systems engineering to model components of technology systems

### 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

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.



## 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)<sup>2</sup>

- 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.

#### NOTES