Massachusetts Curriculum Framework | SCIENCE | 6

WHAT TO LOOK FOR

A quick guide for observing classroom content and practice

In **grade 6**, instructional time should focus on nine core ideas:

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

LS
1. From Molecules to Organisms: Structures and Processes
4. Biological Evolution: Unity and Diversity

PS
1. Matter and its Interactions
2. Motion and Stability: Forces and Interactions
4. Waves and their Applications in Technologies for Information Transfer

ETS
1. Engineering Design
2. Materials, Tools, and Manufacturing

In a **6th 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)

- Developing and using a model to explain the causes of lunar phases
- Analyzing rock layers and fossils to determine relatives ages
- Illustrating that the Earth and solar system are parts of the Milky Way
- Interpreting maps to provide evidence of Earth's plate movement

Life Science (LS1, LS4)

- Providing evidence that organisms are made of cells
- Developing a model to show how parts of cells contribute to functions
- Using fossils to infer patterns of environmental change
- Constructing an argument of evolutionary relationships among fossilized and modern organisms

Physical Science (PS1, PS2, PS4)

- Experimenting with chemical reactions and thermal energy
- Using particulate models of matter to explain density
- Experimenting with mixtures
- Making claims about gravity
- Using diagrams to explain waves
- Showing that waves are reflected, absorbed, or transmitted
- Supporting the claim that digitized signals can transmit information

Technology/Engineering (ETS1, ETS2)

- Defining a problem with precision
- Visually representing solutions and applying scale and proportion
- Communicating a design solution
- Analyzing and comparing properties of different materials
- Selecting appropriate material for a design task
- Choosing and safely using appropriate tools for a prototype

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.

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 6th 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?	What are the students doing?
• Communicating a lesson's objectives and their connections to unit essential questions and goals.	•Persisting when engaging with meaningful scientific tasks
•Asking students to use multiple sources of evidence in explanations	•Using information from observations to construct an evidence based account for natural phenomena
•Showing students how to revise models to predict and explain science phenomena	•Constructing explanations using multiple sources of evidence

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?	What are the students doing?
•Providing opportunities for students to communicate ideas, ask questions, and make their thinking visible in writing and speaking	•Asking questions that can be answered by investigation and predicting answers based on patterns
•Modeling ways of using computation and analysis to find patterns in observations	•Drawing explicitly upon content they have learned in class in conversations with peers
•Modeling how to distinguish between causation and correlation in data	•Using mathematical skills to find patterns in large data sets

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?	What are the students doing?
•Providing students with feedback aligned to long-term goals	•Demonstrating learning in multiple ways (e.g., mid-unit quiz, completion of investigation)
•Conducting frequent checks for student understanding and adjusting instruction accordingly	•Engaging in challenging learning tasks regardless of learning needs (e.g., linguistic background, disability, academic gifts)
•Providing exemplars of work (e.g. historical examples, student work)	•Conducting investigations with multiple controlled variables and considering the accuracy of the data or the methods