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 5th 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

#### 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 provide energy and nutrients for life processes

#### 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

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 5th-grade science classroom.

<table>
<thead>
<tr>
<th>Expectations</th>
<th>Plans and implements lessons that set clear and high expectations and also make knowledge accessible for all students.</th>
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| **What is the teacher doing?** | *Asking students to apply scientific knowledge and ideas when engaging with real-world problems*  
*Focusing attention on scientific language (e.g., linguistic complexity, conventions, and vocabulary)*  
*Showing students how to use models to explain phenomena and generate evidence* |
| **What are the students doing?** | *Persisting when engaging with meaningful scientific tasks*  
*Applying scientific knowledge when explaining natural phenomena or real world problems*  
*Identifying limitations of a model* |

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<tr>
<th>Instruction</th>
<th>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.</th>
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| **What is the teacher doing?** | *Highlighting when students draw explicitly upon class content during discussions with peers*  
*Modeling ways of using computation and analysis to find patterns in observations*  
*Providing resources that support the comparison of students' results* |
| **What are the students doing?** | *Asking questions that can be answered by investigations and predicting answers based on patterns*  
*Using computation and mathematical analysis to find patterns*  
*Comparing data collected by different groups to discuss similarities and differences in their findings* |

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<tr>
<th>Assessment</th>
<th>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.</th>
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| **What is the teacher doing?** | *Providing concrete strategies to respond to feedback (e.g., emphasizing importance of recorded observations)*  
*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?** | *Demonstrating learning in multiple ways (e.g., classroom conversation, completion of investigation)*  
*Engaging in challenging learning tasks regardless of learning needs (e.g., linguistic background, disability, academic gifts)*  
*Using exemplars to inform their work* |