

A quick guide for observing classroom content and practice

In **High School Biology**, instructional time should focus on four core ideas:

### LS1.

From Molecules to Organisms: Structures and Processes

### LS2.

Ecosystems: Interactions, Energy, and Dynamics

### LS3.

Heredity: Inheritance and Variation of traits

### LS4.

Biological Evolution: Unity and Diversity

In a **High School Biology** 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

### Molecules to Organisms (LS1)

- Using a model to explain the process for building proteins within a cell and the important roles of DNA and RNA communication in regulating cell function.
- Describing the principle structures and functions of the human body systems.
- Using evidence to show how the human body uses both positive and negative feedback mechanisms to maintain a stable internal environment within cells.
- Explaining the life cycle of a cell in multicellular organisms.
- Using a model to explain how plants and other photosynthesizing organisms convert light energy into chemical energy.
- Understanding that large carbon molecules, necessary for life, are primarily composed of six elements.
- Using a model to illustrate the ability of live organisms to convert food into energy.

### Ecosystems: Interactions, Energy, and Dynamics (LS2)

- Analyzing data to explain how living and nonliving factors affect an area's ability to support life.
- Using math to explain that living and non-living factors affect populations and species within an environment.
- Describing the constant flow of energy throughout an ecosystem and explain how energy affects the individuals living in the environment.

### Ecosystems: Interactions, Energy, and Dynamics (LS2) continued

- Illustrating the cycling of the carbon molecule throughout the environment.
- Using data to explain how an area which includes living and non-living components, will tend to resist change.
- Analyzing the effects of human activities on living organisms and ecosystem health.

### Heredity: Inheritance and Variation of Traits (LS3)

- Using a model to show how DNA passes genetic information from parents to offspring.
- Explaining with evidence that genetic variations in an organism may come from new combinations of genes.
- Apply probability to simulate the passing of gene combinations from a parent organism to their offspring.
- Using scientific information to illustrate how genetic and environmental factors can affect the traits of individuals.

### Biological Evolution: Unity and Diversity (LS4)

- Using scientific evidence to demonstrate biological evolution.
- Constructing an explanation of Darwin's Theory of Natural Selection.
- Communicating the differences between viruses and bacteria.
- Using models to explain how changes in an environment may result in the modifications of organisms.

## NOTES

**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 High School Biology 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.					
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<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.					
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<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.					
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