WHAT TO LOOK FOR

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 <u>and</u> 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 <u>Standards of Effective Practice.</u> 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.

Expectations (Standard II, Indicator E)

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?
•Creating culturally responsive lessons that engage and sustain student attention	•Identifying a lesson's standards or objectives and how they connect to unit goals
•Asking students to apply scientific knowledge and ideas when engaging with real-world problems	•Using information from observations to construct an evidence based account for natural phenomena
•Modeling the development of complex, testable models	•Evaluating the reasoning behind currently accepted explanations or solutions

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	•Evaluating questions and arguments (e.g., to determine whether they are testable and relevant)
•Highlighting culturally appropriate and effective negotiation skills they observe in students	•Using both linear and nonlinear functions to find patterns in data
•Creating activities that require sophisticated analysis (such as finding an equation) to find patterns	•Using detailed statistical analysis or models that can evaluate data sets for consistency

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?
•Using multiple formative approaches to assess student learning (e.g., mid-unit quiz, completion of investigation)	•Reflecting on how they are progressing toward goals
•Providing opportunities for students to conduct investigations that test models	•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)	•Using exemplars to inform their work