SOUTH CAROLINA
DEPARTMENT OF EDUCATION

Anatomy and Physiology Performance Targets

for the
South Carolina College- and Career-Ready Science Standards 2021

For use 2025-2026

July 2025

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Contents

Purpose and Use

Science is a way of understanding the physical universe using observation and experimentation to explain natural phenomena. Science also refers to an organized body of knowledge that includes core ideas to the disciplines and common themes that bridge the disciplines. As science educators we must take a 3-dimensional approach in facilitating student learning. By addressing content, science and engineering practices and crosscutting concepts, students can have relevant and evidence-based instruction that can help solve current and future problems.

This document is intended as a guide for discerning and describing features of students and their work who have met the stated Performance Expectation (PE). The information in this document is intended to support instruction and classroom assessment on the major body systems and their interactions. This is not a curriculum or a means to limit instruction in the classroom. Although each PE states a dedicated Science and Engineering Practice (SEP) and Crosscutting Concept (CCC), students will need to use the whole range of SEPs and CCCs to achieve success by the end of instruction.

Teachers have the flexibility to enrich student learning as best fits the needs and interests of their student population. Anatomy & Physiology is not assessed by the End of Course Examination Program. The PEs aligned to the course Anatomy & Physiology are:

- B-LS1-2
- B-LS1-3

Three-dimensional science learning requires discipline specific communication skills. This means that effective science learning occurs when students are expected to speak, listen, read, and write in ways that are appropriate to science. With each Performance Target, there are question/sentence stems and terminology to support student discourse about phenomena to help teachers facilitate the acquisition of science discourse. Teaching words or concepts in isolation or prior to experiences that give context (frontloading) deprives students of sense-making opportunities that lead to a greater depth of conceptual understanding. The terms and stems in this section are intended to provide a baseline for teachers, neither list is exhaustive nor complete.

In addition to the doing (SEP), thinking (CCC), and learning of science knowledge (Disciplinary Core Ideas) outlined here, students will also require a working knowledge of grade-level appropriate tools and techniques of science. Students should know and recognize how scientists and engineers use these tools and techniques, not just identify them. Students should be able to use these tools to gather data, describe how these tools gather data, and/or interpret data sampled from them. Students will need to understand and apply the conventions of scientific notation when working with extremely large or small quantities of measurement and their calculations.

Document Updates

July 2025

- All Performance Expectation statements have been reformatted to call out each of the dimensions as follows:
    - Science and Engineering Practice – **bold**
    - Crosscutting Concept – *italicize*
    - Disciplinary Core Idea – regular
- The watermark from previous versions of this resource has been replaced with the wording “For use 2025-2026” on the title page and in the footer. This change was made to improve accessibility of this resource.
- Because scientific notation is no longer an expectation of the math standards, the following statement was added to the purpose and use page to support the teaching and understanding of scientific notation: “Students will need to understand and apply the conventions of scientific notation when working with extremely large or small quantities of measurement and their calculations.”

June 2024

- Updated watermark to 2024-2025.
- Adjusted formatting and grammar.

LS1 – From Molecules to Organisms: Structures and Processes

B-LS1-2. Develop and use a model to illustrate the hierarchical organization of *interacting systems* that provide specific functions within multicellular organisms.

Clarification Statement: Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to neural stimuli. An example of an interacting system could be an artery depending on the proper function of elastic tissue and smooth muscle to regulate and deliver the proper amount of blood within the circulatory system.
State Assessment Boundary: Assessment does not include interactions and functions at the molecular or chemical reaction level.

Science and Engineering Practices	Disciplinary Core Ideas	*Crosscutting Concepts*
Developing and Using Models Modeling in 9-12 builds on K-8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system.	**LS1.A: Structure and Function** Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level.	**Systems and System Models** Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales.

Observable features of student performance by the end of the course:

1. **Components of the model**
    a. Students develop/use a model (conceptual, graphical, physical, etc.) and identify the relevant components of a complex animal or plant, including:
        i. cells,
        ii. tissues,
        iii. organs,
        iv. organ systems, which may include:
            1. cardiovascular/circulatory,
            2. digestive,
            3. endocrine,
            4. excretory,
            5. integumentary,
            6. lymphatic/immune,
            7. muscular,
            8. nervous,
            9. renal/urinary,
            10. reproductive,
            11. respiratory, and
            12. skeletal.
        v. organ system interactions, and
        vi. organism functions.
2. **Relationships**
    a. Students develop/use a model to describe the relationships between components, including:
        i. the functions of major body systems in terms of contribution to overall function of an organism,
        ii. ways the functions of different systems affect one another, and/or
        iii. a system's function and how that relates to both the system's parts and to the overall function of the organism.
3. **Connections**
    a. Students develop/use a model to demonstrate how the interaction between systems provides specific functions in multicellular organisms.
    b. Students identify limits of a model (for example: accuracy of the model and the actual body system).

B-LS1-2 Academic Language

Question/Sentence Stems

- The key components of the system are_______.
- In the system, ____________ and ____________ are shown in the model.
- In the system, __________ and _________ work together to________.
- In the system, ____________ and _____________ interact in ________________ way.

Terminology to Support Student Discourse about Phenomena

*Teaching words or concepts in isolation or prior to experiences that give context (frontloading) deprives students of sense-making opportunities that lead to a greater depth of conceptual understanding.

- cell
- function
- interaction
- negative feedback
- organ
- organ system
- organism
- positive feedback
- protein
- structure
- the relevant functions of cells, tissues, and organs for each studied system
- the relevant structures of cells, tissues, and organs for each studied system
- tissue

B-LS1-3. Plan and conduct an investigation to provide evidence that *feedback mechanisms* maintain homeostasis.

Clarification Statement: Examples of investigations could include heart rate response to exercise, stomata response to moisture and temperature, and root development in response to water levels.
State Assessment Boundary: Assessment does not include the cellular and chemical processes involved in the feedback mechanism.

Science and Engineering Practices	Disciplinary Core Ideas	*Crosscutting Concepts*
Planning and Carrying Out Investigations Planning and carrying out in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models. Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly.	**LS1.A: Structure and Function** Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system.	**Stability and Change** Feedback (negative or positive) can stabilize or destabilize a system.

Observable features of student performance by the end of the course:

1. **Identifying the phenomenon under investigation**
    a. Students identify the phenomenon under investigation involving the role of feedback mechanisms in maintaining homeostasis in complex organisms, particularly those of organs and organ systems.

2. **Identifying the evidence to address the purpose of the investigation**
    a. Students describe the data that will be collected and the evidence to be derived from the data, including:
        i. changes within a chosen range in the external environment of a living system and/or
        ii. responses of a living system that would stabilize and maintain the system's homeostasis, thus establishing the positive or negative feedback mechanism.
3. **Planning the investigation**
    a. Students determine and describe the experimental design, including:
        i. identifying variables and controls,
        ii. the experimental procedure,
        iii. the number of trials,
        iv. the necessary equipment, materials, and techniques, and/or
        v. how the data will be collected, including:
            1. how the change in environmental conditions is to be measured or identified,
            2. how the response of the living system will be measured or identified, including:
                a. the minimum number of different systems (and factors that affect them) that would allow for generalization of results, and
            3. how the stabilization or destabilization of the system's internal conditions will be measured or determined (data) and the derived evidence.
4. **Refining the experimental design**
    a. Students evaluate the investigation, including:
        i. assessing the accuracy and precision of the data collected,
        ii. limitations of the investigation, and/or
        iii. strength of the data.
    b. Students refine the investigation to provide more accurate, precise, and useful data.

B-LS1-3 Academic Language

Question/Sentence Stems

- In the investigation, the variable(s) that stay the same are _______.
- In the investigation, the variable(s) that change are _______.
- The things that are changing slowly in this system are _______.
- The _______(event) changed this system by _______.
- _______ was affected by the change of _______.
- _______ are causing this system to be unstable.

Terminology to Support Student Discourse about Phenomena

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- cell
- condition
- disease
- disorder
- dysfunction
- function
- interaction
- negative feedback
- organ
- organ system
- organism
- positive feedback
- protein
- structure
- the relevant functions of cells, tissues, and organs for each studied system
- the relevant structures of cells, tissues, and organs for each studied system
- tissue

References

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