

Educational Resources from *Phenomenon Science Education*
Student Proficiency Goals for Performance Expectation **HS-LS1-2**



Information about Performance Expectation HS-LS1-2

Performance Expectation HS-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.

Assessment Limits.

Assessment does not include interactions and functions at the molecular or chemical reaction level.

Science and Engineering Practice (Developing and Using Models)

- Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system.

Disciplinary Core Idea (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.

Crosscutting Concept (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.

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SEP (Developing and Using Models):

- Students use evidence to identify and assign roles for the components that are required for their models.
- Students use evidence to identify the processes their models are required to illustrate.
- Students develop models capable of addressing phenomena related to the hierarchical organization of interacting systems in multicellular organisms.
- Students develop models capable of illustrating the interactions between systems that provide specific functions in multicellular organisms.
- Students use their evidence-based models to illustrate the organization and interactions between the systems under study.

DCI (LS1.A Structure and Function):

- Students know that multicellular organisms are organized into a hierarchical structure of interreacting systems.
- Students know that each system in a multicellular organism is made up of parts.
- Students know that each system in a multicellular organism is part of a larger system.
- Students know that systems in multicellular organisms work together to provide specific functions.

CCC (Systems and System Models):

- Students use detailed examinations of specific functions within multicellular organisms to support their models of interactions among systems within those organisms.
- Students use detailed examinations of the structures of systems within multicellular organisms to support their models of the hierarchical organizations among systems within those organisms.
- Students consider the flows of information, energy, and/or matter through the hierarchical organizations of interacting systems to illustrate specific functions.
- Students consider how information, energy, and/or matter flow through organism systems at different scales.
- Students consider how to simulate the interactions of hierarchical organism systems with their models.