

## HS-LS1-2

Students who demonstrate understanding can:

- 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 Boundary: Assessment does not include interactions and functions at the molecular or chemical reaction level.]

The performance expectation above was developed using the following elements from *A Framework for K-12 Science Education*:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p><b>Developing and Using Models</b> 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.</p> <ul style="list-style-type: none"> <li>Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system.</li> </ul>	<p><b>LS1.A: Structure and Function</b></p> <ul style="list-style-type: none"> <li>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.</li> </ul>	<p><b>Systems and System Models</b></p> <ul style="list-style-type: none"> <li>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.</li> </ul>

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

1	Components of the model						
	a Students develop a model in which they identify and describe the relevant parts (e.g., organ system, organs, and their component tissues) and processes (e.g., transport of fluids, motion) of body systems in multicellular organisms.						
2	Relationships						
	a In the model, students describe the relationships between components, including: <table border="1" style="margin-left: 20px;"> <tbody> <tr> <td>i.</td> <td>The functions of at least two major body systems in terms of contributions to overall function of an organism;</td> </tr> <tr> <td>ii.</td> <td>Ways the functions of two different systems affect one another; and</td> </tr> <tr> <td>iii.</td> <td>A system's function and how that relates both to the system's parts and to the overall function of the organism.</td> </tr> </tbody> </table>	i.	The functions of at least two major body systems in terms of contributions to overall function of an organism;	ii.	Ways the functions of two different systems affect one another; and	iii.	A system's function and how that relates both to the system's parts and to the overall function of the organism.
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iii.	A system's function and how that relates both to the system's parts and to the overall function of the organism.						
3	Connections						
	a Students use the model to illustrate how the interaction between systems provides specific functions in multicellular organisms.						
	b Students make a distinction between the accuracy of the model and actual body systems and functions it represents.						