

MS-LS1-8 From Molecules to Organisms: Structures and Processes

Students who demonstrate understanding can:

MS-LS1-8. Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. [Assessment Boundary: Assessment does not include mechanisms for the transmission of this information.]

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

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in 6-8 builds on K-5 experiences and progresses to evaluating the merit and validity of ideas and methods.</p> <ul style="list-style-type: none"> Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. 	<p>LS1.D: Information Processing</p> <ul style="list-style-type: none"> Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories. 	<p>Cause and Effect</p> <ul style="list-style-type: none"> Cause and effect relationships may be used to predict phenomena in natural systems.

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

1	Obtaining information
	<p>a Students gather and synthesize information from at least two sources (e.g., text, media, visual displays, data) about a phenomenon that includes the relationship between sensory receptors and the storage and usage of sensory information by organisms. Students gather information about:</p> <ul style="list-style-type: none"> i. Different types of sensory receptors and the types of inputs to which they respond (e.g., electromagnetic, mechanical, chemical stimuli). ii. Sensory information transmission along nerve cells from receptors to the brain. iii. Sensory information processing by the brain as: <ul style="list-style-type: none"> 1. Memories (i.e., stored information). 2. Immediate behavioral responses (i.e., immediate use).
	<p>b Students gather sufficient information to provide evidence that illustrates the causal relationships between information received by sensory receptors and behavior, both immediate and over longer time scales (e.g., a loud noise processed via auditory receptors may cause an animal to startle immediately or may be encoded as a memory, which can later be used to help the animal react appropriately in similar situations).</p>
2	Evaluating information
	<p>a Students evaluate the information based on:</p> <ul style="list-style-type: none"> i. The credibility, accuracy, and possible bias of each publication and the methods used to generate and collect the evidence. ii. The ability of the information to provide evidence that supports or does not support the idea that sensory receptors send signals to the brain, resulting in immediate behavioral changes or stored memories. iii. Whether the information is sufficient to allow prediction of the response of an organism to different stimuli based on cause and effect relationships between the responses of sensory receptors and behavioral responses.