

Assessment Overview

“How will I know if my students ‘get it,’ and how can I assess their learning?”

What kind of assessments does *PhD Science*® include?

Our teacher-writers have developed comprehensive assessments for *PhD Science* (available in English and Spanish) with those questions in mind. Both formative and summative assessment types provide three-dimensional insights. Teachers are supported in instruction with just-in-time notes, next steps, and scoring guides.

Formative Assessments

Formative Assessments evaluate student progress in knowledge and skills development aligned with lesson objectives.

Check for Understanding

Use evidence to construct an explanation (SEP.6) for how sensory substructures relate to specialized functions (CC.6), allowing animals to sense each type of information (LS1.D).

EVIDENCE	NEXT STEPS
<p>Look and listen for the following ideas in students' responses:</p> <ul style="list-style-type: none"> How the type of information is sensed by the sensory structure (LS1.D) An explanation (SEP.6) of how the function of the sensory structure and substructure (CC.6) is specialized for that type of information (LS1.D) 	<p>If students need support to make connections between the sensory structure, sensory information, and how the shape of the sensory structure is related to its function, consider using questions such as the following:</p> <ul style="list-style-type: none"> How might having bigger or smaller ears affect an animal's ability to sense information? What might happen if you had more or fewer taste buds?

LAND 5 to 10 minutes

Students debrief their learning and navigate to the next lesson part by identifying what they need to explore next about the anchor phenomenon.

5. Distill students' conceptual understanding of sensory structures and their functions.

Ask students to reflect on the Phenomenon Question **How do other animals sense information differently than humans?** Ask questions such as the following to support students' thinking.

- What did you notice about how an animal's structure relates to the structure's function?
- How does the shape of the sensory structure or number of sensory receptors affect the sense?
- Why do animals have different types of sensory receptors?

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Level K | Module 1 | Lesson 1 | Part 1

How does the weather today compare with the weather in the picture? ☺

Would your tent be more helpful on a day like today or on a day like the one shown in the picture? Why do you think that? ☺

Circulate and listen as pairs discuss and explain their thinking. Encourage students to use a nonverbal signal to agree or disagree with their partners' statement and to explain why they agree or disagree.

Pre-Assessment

Describe and compare (CC.3) the effects of different weather conditions (ESS2.D).

EVIDENCE	NEXT STEPS
<p>Listen for indications of the following in students' responses:</p> <ul style="list-style-type: none"> Students describe today's local weather by using terms related to rain, cloud cover, or sunlight (ESS2.D). Students use relative scales to compare weather conditions, such as warmer and colder, wetter and drier, or more and less windy/windier (CC.3). 	<p>Students are not yet expected to describe the weather accurately or to demonstrate an understanding of relative scales. If students have difficulty explaining why their tent would help more in today's weather or the weather shown in the photograph, consider taking the class outside to experience and describe the current weather. Ask students to compare how they feel when they are outside with how they would feel if they were in the weather shown in the photograph.</p> <p>Student responses may reveal misconceptions about how different parts of weather relate. For example, students may expect that it is always cool when the weather is rainy or always warm when the weather is sunny. Over the next several lessons, students will develop an understanding of how to describe and record the weather. Make note of students who express misconceptions, and check in with those students again at the end of Concept 1.</p>

Language Support

Students will encounter the term compare throughout the module. Providing the Spanish cognate *comparar* may be helpful. Discuss different forms of the word compare, such as compares, compared, and comparing, and explain that to compare means to look closely at two or more things to see what is the same and what is different about them.

Teacher Note

If today's local weather is similar to the weather shown in the photograph of the tent, consider displaying a second photograph that shows a tent set up in different weather conditions (e.g., on a sunny day). Then ask questions such as these: 'Would your tent be more helpful on a day like the one shown in the first picture or the second? Why do you think so?'

A **Pre-Assessment** sets a baseline in the first lesson of each module, while a **Check for Understanding** at key points monitors student progress toward learning targets. These assessments provide educators with evidence and guidance for next steps.




Additional assessment opportunities are captured in student **Science Logbooks**.

Summative Assessments

Summative assessments allow students to demonstrate their understanding throughout each module.

Conceptual Checkpoints assess deep comprehension of core ideas, skills, and knowledge related to Disciplinary Core Ideas, Science and Engineering Practices, and Crosscutting Concepts. A scoring guide aids teachers in evaluation.



Application of Concepts
LESSON 8 SCIENCE CHALLENGE


Task | Science Challenge
Phenomenon Question | Can elephants understand information from the vibrations they feel?

OVERVIEW

Previously we explored how vibrations in the ground travel in ways similar to how water waves travel. We observed water waves to identify wave properties and applied our new understanding to compare how different sound waves in the air travel to elephants. We wondered how elephants receive and process information for ground vibrations and sound waves.

In this lesson we design and carry out an investigation to test whether we can use our sense of touch to tell the difference between two different vibration signals. We collect and analyze data for patterns and connect our findings to how elephants receive and process information. We wonder how elephants' sensory structure compare to ours.

Later we will learn that elephants have specialized touch sensory structures in their feet and trunk. We will explore how information travels to their brain and how they change their behavior in response to information from their environment.



Application of Concepts
LESSON 7 ENGINEERING CHALLENGE

Task | Engineering Challenge
Phenomenon Question | How can we help archaeologists feel cooler when they work?

OVERVIEW

Previously we developed an understanding of the warming effect of sunlight.

In this lesson we apply our knowledge of the warming effect of sunlight to solve a problem during an Engineering Challenge. We start by identifying a problem and wondering how we could help archaeologists feel cooler when they work. Using the engineering design process, we build a model of a shelter that would protect archaeologists working at a dig site from the warming effects of sunlight. We conclude that shelters are designed for many purposes, including protection from weather.

Later we analyze weather data to determine whether we notice patterns.

Performance Descriptors

Part 1: **Define the problem (SEP.1)** archaeologists feeling too warm (CC.3) in the sunlight (PS.3.B).

Part 2: **Record observations (SEP.4)** of a roof structure that could function (CC.6) to provide shade (ETS1.A) when sunlight warms the Earth's surface too much (PS.3.B).

Part 3: **Describe how the shape and stability of a structure (CC.4)** will help to solve the problem (SEP.1) of sunlight warming a dig site (PS.3.B).

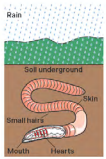
Part 4: **Record observations (SEP.4)** to determine how well the shape and stability of a structure function (CC.4) to block the sunlight (PS.3.B).

Part 5: **Redefine the problem (SEP.1)**, and then describe how the solution could help (ETS1.A) an archaeologist feel cooler (CC.3) while working outside in the sunlight (PS.3.B).

Lesson 4 Module 3

END-OF-MODULE ASSESSMENT

1. Observe the diagram. Read the chart.



Structure	Function
Skin	Contains receptors for light, touch, and vibrations
Mouth	Takes in food
Hearts	Pump blood to the head
Small hairs	Grip the soil to help the worm move forward

Circle the structure earthworms **most likely** use to sense raindrops hitting the ground.

Level 4 Module 3

LESSON 3 CONCEPTUAL CHECKPOINT SCORING GUIDE

Score each student's Conceptual Checkpoint. The Scoring Guidance column identifies the correct response for each item and includes information about how to determine a student's score. The Points Available column indicates the total number of points available for each item. Use the Score column to record a student's points for each item.

Name: _____ Date: _____


ITEM	SCORING GUIDANCE
1	Choice 1 is incorrect. The desert chameleon uses its skin, not its tail, to sense temperature. Choice 2 is correct. Choice 3 is incorrect. The desert chameleon uses its skin, not its eyes, to sense temperature changes. Choice 4 is incorrect. The desert chameleon uses its skin, not its tongue, to sense temperature changes. A correct response is worth 1 point.
2	Choice 1 is incorrect. In the photographs, the desert chameleons do not use their legs, 6 to get water. They use these structures to lift their body off the sand to cool down. Choice 2 is correct. Choice 3 is incorrect. In the photographs, the desert chameleons do not use their legs, 6 to heat for food. They use these structures to lift their body off the sand to cool down. Choice 4 is incorrect. In the photographs, the desert chameleons do not use their legs, 6 to avoid predators. They use these structures to lift their body off the sand to cool down. A correct response is worth 1 point.

Level 4 Module 3


LESSON 3 CONCEPTUAL CHECKPOINT

1. Observe the photographs of desert chameleons.

Morning



Afternoon



Circle a word to complete the sentence.

The desert chameleon uses its _____ to keep its body at a safe temperature.

- tail
- skin
- eyes

Science and Engineering Challenges

illustrate how conceptual knowledge applies to real-world scenarios. Performance Checkpoints allow teachers to assess student performance using the three dimensions.

End-of-Module Assessments conclude each module, providing students an opportunity to showcase their knowledge and skills transfer. A helpful Scoring Guide and Three-dimensional Alignment Map are available to teachers.

Digital Assessments

PhD Science offers digitally enhanced assessments, including Conceptual Checkpoints and End-of-Module Assessments, alongside the blackline masters. Teachers can assign assessments to individuals, groups, or entire classes, enhancing flexibility. Robust, visual reports provide educators with insights into student progress, facilitating quick identification of individual needs.

