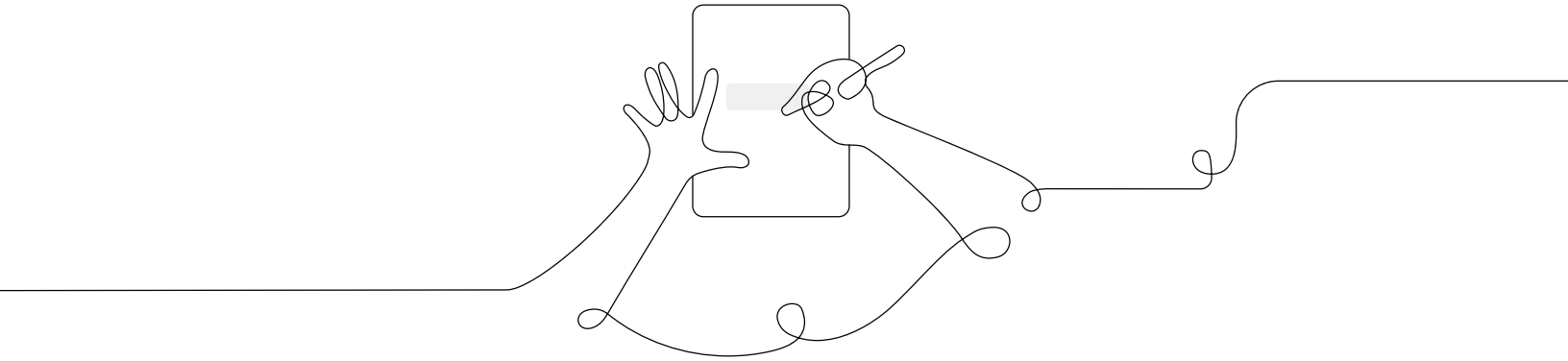
Amplify Science

Participant Notebook

Assessment System

Grade 4



Assessment System

Agenda

Introduction

- Framing

Assessment System

- Overview

Progress Build

- Analysis
- Group Work Time

Assessments

- Pre-UnitAssessments
- Formative Assessments
- End of Unit Assesment

Model Lesson

Planning

Closing

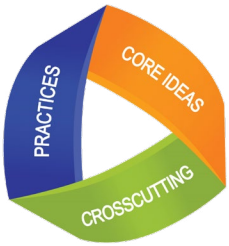
Demo account for your workshop:

URL: **learning.amplify.com** (Log in with Google)

Temporary username: _____ **@pd.tryamplify.net**

Password: _____

Three dimensional learning reference



3-D learning engages students in using scientific and engineering practices and applying crosscutting concepts as tools to develop understanding of and solve challenging problems related to disciplinary core ideas.

Science and Engineering Practices

1. **Asking Questions and Defining Problems**
2. **Developing and Using Models**
3. **Planning and Carrying Out Investigations**
4. **Analyzing and Interpreting Data**
5. **Using Mathematics and Computational Thinking**
6. **Constructing Explanations and Designing Solutions**
7. **Engaging in Argument from Evidence**
8. **Obtaining, Evaluating, and Communicating Information**

Disciplinary Core Ideas

Earth and Space Sciences:
- Earth's Place in the Universe
- Earth's Systems
- Earth and Human Activity

Life Sciences:
- From Molecules to Organisms
- Ecosystems
- Heredity
- Biological Evolution

Physical Sciences:
- Matter and its Interactions
- Motion and Stability
- Energy and their Applications

Engineering, Technology and the Applications of Science:
- Engineering Design
- Links among Engineering Technology, Science and Society

Crosscutting Concepts

1. **Patterns**
2. **Cause and Effect**
3. **Scale, Proportion, and Quantity**
4. **Systems and System Models**
5. **Energy and Matter**
6. **Structure and Function**
7. **Stability and Change**

Reflection

Use the provided spaces as a place for reflection throughout the session.

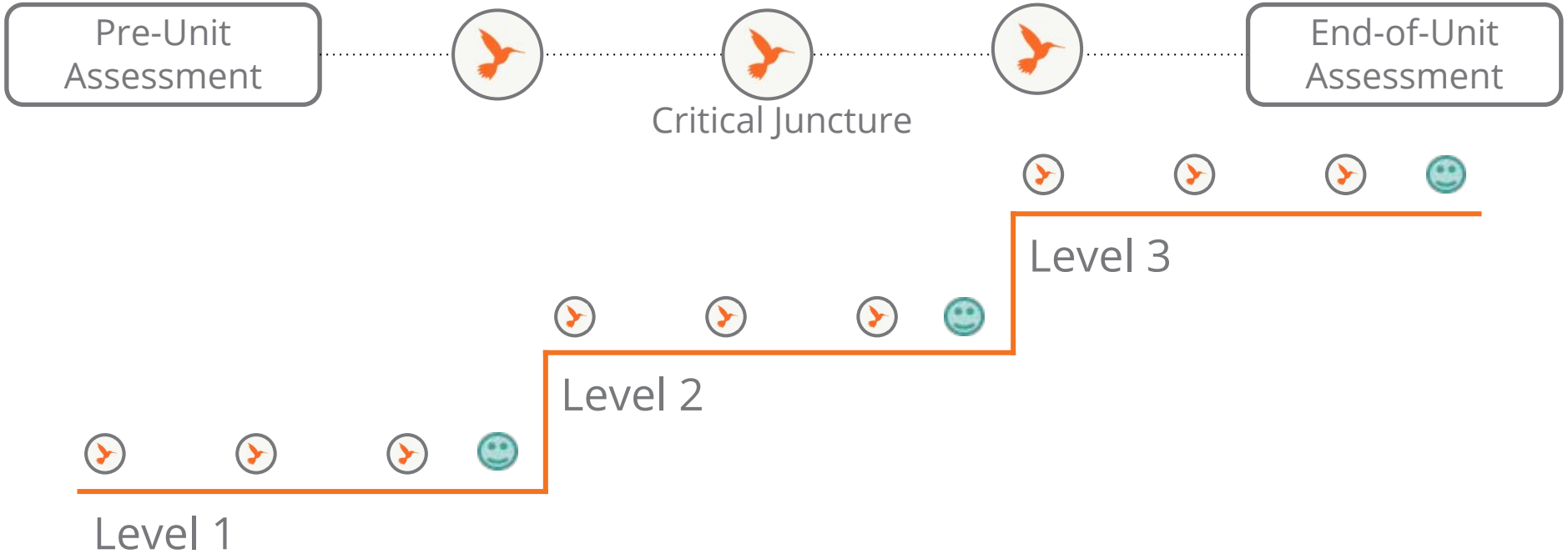
Session goals and student outcomes

What Connect the workshop goal(s) to an outcome you envision for your students.	Why Reflect on why you want this outcome for your students.	How How will your students achieve the outcome? Reflect on what you learned during the workshop that will impact student outcomes.

Triangle – Circle – Square reflection

△	
○	
□	

K-5 Assessment System



Assessment System reference (grades 2-5)

Assessment type	Description	Student experience	Teacher resources
Pre-Unit Assessment	Formative, 3-D performance assessment meant to gauge students' initial understanding and pre-conceptions about core ideas in the unit	• Pre-Unit Writing copymaster (available in Digital Resources)	• Assessment Guide (available in Digital Resources)
End-of-Unit Assessment	Summative, 3-D performance assessment to evaluate students' understanding of core ideas in the Progress Build	• End-of-Unit Writing copymaster, Versions A and B (available in Digital Resources) • For select units, End-of-Unit Writing Part 2 (available in Digital Resources or the Investigation Notebook)	• Rubric and Possible Responses in Assessment Guide (available in Digital Resources)
Critical Juncture Assessments	Embedded formative assessments for assessing students' progress along the Progress Build	• Written task in the Investigation Notebook • For written explanation and argumentation-based tasks, scaffolded version of assessment provided as a copymaster (available in Digital Resources)	• Full text of assessment includes "Assess Understanding" section and "Tailor Instruction" suggestions accessible in Instructional Guide by clicking the hummingbird icon • All Critical Juncture Assessments are included in Reference: Embedded Formative Assessments (available in the Unit Guide) • Possible Responses accessible in Instructional Guide by clicking the Possible Responses tab • For written explanation and argumentation-based tasks, Rubrics and Possible Responses in Assessment Guide (available in Digital Resources)
On-the-Fly Assessments	Embedded formative assessments for noting students' progress with one or more of the following: science disciplinary core ideas, science and engineering practices, crosscutting concepts, sense-making strategies, and collaborative science work	• Activities are embedded into existing instructional activities, leveraged for assessment opportunities. Artifacts can include discussion, use of a digital tool, notebook pages, etc.	• Full text of assessment includes what to "Look for" and "Now What?" instructional suggestions accessible in Instructional Guide by clicking the hummingbird icon • All On-the-Fly Assessments are included in Reference: Embedded Formative Assessments (available in the Unit Guide)

Assessment System reference (grades 2-5) cont.

Assessment type	Description	Student experience	Teacher resources
Student Self-Assessments	Opportunity for students to reflect on whether they understand or don't yet understand the core concepts from the unit	• Reflection prompts in the Investigation Notebook • Provided at or near the end of each chapter	• Information about Student Self-Assessments in Reference: Assessment System (available in the Unit Guide) • Teacher Support notes accessible in Instructional Guide by clicking the Teacher Support tab
Investigation Assessments	Summative, 3-D performance assessment to evaluate students' performance of the science and engineering practices of Planning and Carrying Out Investigations and Analyzing and Interpreting Data, as well as their application of disciplinary core ideas and crosscutting concepts	• Prompts for planning investigation and recording results in the Investigation Notebook or a copymaster or copymaster (available in Digital Resources) • Materials (physical or digital) for conducting investigation	• Rubrics and Possible Responses in Assessment Guide (available in Digital Resources) • Possible Responses also accessible in Instructional Guide by clicking the Possible Responses tab
Portfolio Assessments	Opportunity for students to compile and reflect on key work products collected at the end of each unit. Final portfolio compilation occurs at the end of the school year and allows students to select and reflect on work products which they feel best demonstrate their growth in understanding throughout the year	• Compilation of work products (written explanations and/or arguments, models) that show growth over the course of the year • Reflection on chosen work products • Rubrics for evaluating work products (available in Program Guide → *Assessments* → *Additional Assessment Resources*)	• Assessment Rubrics (available in Program Guide → *Assessments* → *Additional Assessment Resources*) • Guidance for communicating to parents about student progress (available in Program Guide → *Assessments* → *Additional Assessment Resources*)

Progress Build

A Progress Build describes the way in which students' explanations of the central phenomena should develop and deepen over the course of a unit. It is an important tool in understanding the design of the unit and in supporting students' learning. A Progress Build organizes the sequence of instruction, defines the focus of the assessments, and grounds inferences about students' understanding of the content, specifically at each of the Critical Juncture Assessments found throughout the unit. A Critical Juncture Assessment guides the instruction designed to address specific gaps in students' understanding. This document will serve as an overview of the *Vision and Light* Progress Build. Since the Progress Build is an increasingly complex yet integrated explanation, we represent it below by including the new ideas for each level in bold.

In the *Vision and Light* unit, students will learn to construct scientific explanations about how animals use vision and other senses to survive in their environment.

Prior knowledge (preconceptions): Students are expected to have had many everyday experiences using their senses to see, smell, hear, taste, and touch. Students are likely to understand that animals need to find food and avoid being eaten to survive in their environment. While these ideas are not necessary for students to participate fully in the unit, having exposure to them will prepare students well for what they will be learning.

Progress Build Level 1: Animals use senses to learn about their environment.

Animals have sensory structures that allow them to learn about their environment by getting information from it. Learning about the environment helps animals survive.

Progress Build Level 2: Light allows objects in an environment to become visible to the eye.

Animals have sensory structures that allow them to learn about their environment by getting information from it. Learning about the environment helps animals survive. **In order for an animal to get visual information about an object in its environment, light from a source needs to get to the object, reflect off it, and get to the animal's eye with information about the object.**

Progress Build Level 3: Light receptors in the eye respond to light and the brain forms an image.

Animals have sensory structures that allow them to learn about their environment by getting information from it. Learning about the environment helps animals survive. In order for an animal to get visual information about an object in its environment, light from a source needs to get to the object, reflect off it, and get to the animal's eye with information about the object. **After light from the object enters the animal's eye, it hits the light receptors in the eye that respond to the light. The light receptors then send the information about the object from the light to the brain, which processes the information to form an image of the object. Then the brain compares this image to memories to decide which action to take.**

Progress Build Level 4: Different animals have light receptors with different sensitivities to light.

Animals have sensory structures that allow them to learn about their environment by getting information from it. Learning about the environment helps animals survive. In order for an animal to get visual information about an object in its environment, light from a source needs to get to the object, reflect off it, and get to the animal's eye with information about the object. After light from the object enters the animal's eye, it hits the light receptors in the eye that

respond to the light. The light receptors then send the information about the object from the light to the brain, which processes the information to form an image of the object. Then the brain compares this image to memories to decide which action to take. **The amount of light that the light receptors need in order for the brain to form a clear image is different for different kinds of animals. This is because different kinds of animals have light receptors that are sensitive to different amounts of light. If there is too much or too little light for the type of light receptors an animal has, its brain cannot form a clear image.**

Progress Build Analysis

Directions:

1. Open the Progress Build document in the Planning for the Unit section of the Unit Guide.
2. **START WITH THE BOX AT THE BOTTOM OF THIS PAGE,** and summarize each Progress Build level. Feel free to draw if that's more helpful.
3. In between the provided boxes, reflect on how the ideas build from one level to the next by answering the two questions given.

Level 3

What new ideas are added in level 3?

How do those new ideas build on and connect to level 2?

Level 2

What new ideas are added in level 2?

How do those new ideas build on and connect to level 1?

Level 1

Level 0 (preconceptions/prior knowledge)

Lesson 1.2, Activity 3

On-the-Fly Assessment 1: External Structures and Function

Look for: This is students' first opportunity to demonstrate their understanding of how animals have sensory structures that perform various functions that help them get information from their environment. As students discuss with their partners in response to each picture of sensory structure in the slideshow, listen for their identification of each body part, as well as the description of its structure and how it relates to its function. For example, a student might say that the ears they see on the slide are pointy and they stick out from the animal's head, which helps the ears capture sound coming from the animal's environment.

Now what? Focus students' attention on the general concept of how something's structure, or shape, is related to its function. To give students more experience with this idea, offer more examples of objects that students encounter in their everyday lives, such as a spoon or backpack. Ask targeted questions about how the shape of these objects make them well suited to serving their particular function. Ask students to consider whether the object would still serve the same function if it had a different shape. For example, ask students how the structure of a spoon makes it well suited for eating cereal. Then, to further their thinking about the relationship between shape and function, ask them why they wouldn't eat cereal with a differently shaped utensil, such as a fork or knife. Have students come up with their own examples of everyday objects with unique structures that are related to particular functions.

Amplify Science sample assessment data collection tool

Grade :
Lesson ____

Look for 1:

Look for 2:

Student Name	Look for 1	Look for 2	Notes

Lesson 1.4, Activity 1

Critical Juncture Assessment 1: Writing About How Animals Use Senses

Assess understanding: The purpose of this Critical Juncture is to assess students' understanding of how animals use senses to get information about their environment. At this point in the unit, students should be able to demonstrate their understanding that scent and sound carry information from the environment and that animals have sensory structures, such as a nose and ears, to receive that information. Students should be able to make the connection that being able to receive such information is necessary to fulfill the animal's various needs for survival. Students should be able to identify the different ways in which animals gather information about their environment using different sensory structures. In their responses, look for students to demonstrate this understanding by connecting sensory structures (e.g., nose) to the information they get from the environment (e.g., scents).

Tailor instruction: If students are not yet understanding the various senses that an animal might use to get information about its environment, have them act out what it would be like for the animals in the videos they watched earlier to not be able to use their sensory structures to get information. For example, for the antelope, have students cover their ears in order to not hear well. For the raccoon, have students not be able to use their hands. Without the functions of those structures, have students try to get information about something in the environment (e.g., the classroom) using other senses. Ask students questions such as *What kinds of information are you able to get without this function?* and *What other senses are you using and what structures are helping you get the information?* This could serve as a review of the senses and the structures that are responsible for them. Alternatively, you can lead a discussion to review each sense—what it does and what structures are involved.

Rubric 1: Assessing Students' Performance of the Practices of Constructing Explanations and Obtaining, Evaluating, and Communicating Information		
Criteria	**Description of level**	**Level**
Communicates information clearly Is the explanation written in a way that will allow the audience to understand it?	Questions to guide review of student writing: In assigning a level for this criterion, take into consideration the writing supports and expectations emphasized in your classroom. We suggest a score from 0–2, but you may adjust the scale according to your instructional priorities. Note that not all questions below may be relevant for your classroom, and/or you may choose to add your own. • Does the explanation begin with a topic sentence that briefly summarizes the explanation and answers the question? • If you ask, can the student describe how he tried to make his explanation appropriate to the audience (members of the Rain Forest Conservation Group)? • Is the explanation logically organized in an appropriate structure? • Does the explanation use appropriate science vocabulary from the unit (e.g., *light receptors, brain, process*)?	0–2

Rubric 2: Assessing Students' Understanding of Science Ideas Encountered in the Unit

This rubric applies to both the writing and the diagram on the End-of-Unit Writing: Explaining Why More Light Makes It Harder for a Tokay Gecko to See student sheet. Rubric 2 considers whether students' explanations (writings and diagrams) are consistent with the relevant science ideas that they have encountered in the unit. This rubric may be used summatively by tallying the points for each science idea demonstrated, as described below.

Rubric 2: Assessing Students' Understanding of Science Ideas Encountered in the Unit		
Criteria	**Questions to keep in mind**	**Score**
Grounded in evidence Is the explanation consistent with the relevant science ideas that students have experienced so far? (Note that students need not explicitly cite classroom examples or data, as long as their descriptions are consistent with the science ideas learned.)	Does the student show understanding that an animal sees when light from a source reflects off an object and enters the animal's eyes? (1 point) Evidence could include: • A diagram that shows the path of light from the highway lights or the moon, to the prey, to the gecko's eyes.	
	Does the student show understanding of how the eye and brain work together to allow animals to see? (1 point) Evidence could include: • An explanation describing that when a gecko sees, light goes into the eye where light receptors respond and send information to the brain, which processes the information to form an image.	
	Does the student show understanding that light receptors in the eye have different sensitivities, and therefore different animals are able to see well in different amounts of light? (1 point) Evidence could include: • An explanation describing that additional light from the new highway lights results in too much light for the type of receptors the gecko has. The brain can no longer form a clear image from the information the receptors are sending. Note: It's not important that students be able to name "high-sensitivity" light receptors. Rather, look for their understanding that different types of light receptors require different amounts of light in order for the brain to form a clear image.	
	Total (0–3)	

Rubric 3: Assessing Students' Understanding of the Crosscutting Concept of Structure and Function

This rubric is specific to the understanding demonstrated in students' scientific explanations (Part 2) of the End-of-Unit Writing: Explaining Why More Light Makes It Harder for a Tokay Gecko to See student sheet. Rubric 3 considers how well students are able to apply the crosscutting concept of Structure and Function to a specific phenomenon. This rubric may be used summatively by tallying the points for each application demonstrated, as described below.

Rubric 3: Assessing Students' Understanding of the Crosscutting Concept of Structure and Function		
Criteria	**Questions to keep in mind**	**Score**
Grounded in evidence Does the explanation include a description of structures with substructures that serve functions?	Does the explanation describe the structure of the eye and how it functions to get light information from the environment? (1 point)	
	Does the explanation describe light receptors as substructures of the eye and how they respond to light with the function of sending information to the brain? (1 point)	
	Total (0–2)	

Vision and Light Possible Student Responses

How does a Tokay gecko usually see? Why does more light at night make it hard for it to see?

Student Response #1

The Tokay gecko has high sensitivity receptors so it usually sees its prey at night when there is no light. When the highway lights were installed, the lights made it hard for the gecko to see its prey because its light receptors could not process the information from the light to form a clear image.

Student Response #2

1. The Tokay gecko usually sees well at night when there is a small amount of light. It is hard for the Tokay gecko to see well with the highway lights because there is too much light with them.

Student Response #3

When light gets to a Tokay gecko's eyes, the gecko's light receptors respond and send information to the brain. The brain processes this information to form an image. Since the highway lights have been installed, there is more light at night when there is usually very little natural light. This is too much light for the kind of light receptors that the gecko has. This makes it difficult for the gecko's brain to form a clear image and for the gecko to see well.

Name: _____ Date: _____

Writing About How Animals Use Senses

1. Think about the videos you just watched of animals using their senses.
2. Answer the questions below.

The antelopes ran away when they heard their predator. If an antelope couldn't hear well, how could this antelope know when there is a predator nearby?

_____

_____

_____

_____

The raccoon was using its paws to feel for food in the water. If a raccoon couldn't feel things well, how could this raccoon find its food?

_____

_____

_____

_____

Name: _____ Date: _____

Exploring the Mystery Box

1. Follow the directions in each part to answer the questions below.

Part 1

When it is your turn, look through the eyehole of the Mystery Box. What do you see? Write your answer below and draw it in the box.

_____

_____

Stop here until your teacher says to go to Part 2.

Name: _____ Date: _____

Exploring the Mystery Box (continued)

Part 2

When given the signal, work with your group to figure out the answer to this question: What do you need in order to see the "food" that is inside the box?

_____

_____

With your group, decide one thing you will change about the Mystery Box so that you can see what is inside. Make this change, and then look through the hole to find out if you can see what is inside.

What did you change?

_____

_____

What kind of information did you observe about the object inside the box?

_____

_____

Name: _____ Date: _____

Chapter 1: Check Your Understanding

This is a chance for you to reflect on your learning so far. This is not a test. Be open and truthful when you respond.

Scientists investigate in order to explain how or why something happens. Am I getting closer to figuring out how a Tokay gecko uses its vision and other senses to survive in its environment?

I understand how a gecko uses its senses every day to survive.	____ Yes	____ Not yet
I understand how light allows a gecko to see.	____ Yes	____ Not yet
I understand how light travels from a source to a gecko's eyes.	____ Yes	____ Not yet
I understand what structures are involved in a gecko seeing its prey.	____ Yes	____ Not yet
I understand why the amount of light is important for a gecko to see well.	____ Yes	____ Not yet
I understand that science investigations use a variety of methods, tools, and techniques.	____ Yes	____ Not yet

I think I understand or don't yet understand these ideas because

_____

_____

What are you still wondering about how a gecko sees?

_____

_____

Additional Amplify resources

Program Guide

Additional insight into the program's structure, intent, philosophies, supports, and flexibility.

You can find your Program Guide through the Program and Apps menu, which is located in the top right corner of your screen. The Program Guide icon can be found under the "Other Resources" section.

Amplify Help

Frequently updated compilation of articles with advice and answers from the Amplify team.

my.amplify.com/help

Caregivers Site

https://amplify.com/science-caregivers

Amplify Support

Contact the Amplify support team for information specific to enrollment and rosters, technical support, materials and kits, and teaching support.

Email: help@amplify.com

Email: edsupport@amplify.com (pedagogical questions)

Phone: 800-823-1969

Or, reach Amplify Chat by clicking the  icon at the bottom right of the digital Teacher's Guide.

When contacting the support team:

- Identify yourself as an Amplify Science user.
- Note the unit you are teaching.
- Note the type of device you are using (Chromebook, iPad, Windows, laptop).
- Note the web browser you are using (Chrome or Safari).
- Include a screenshot of the problem, if possible. Copy your district or site IT contact on emails.

Notes

Amplify Science