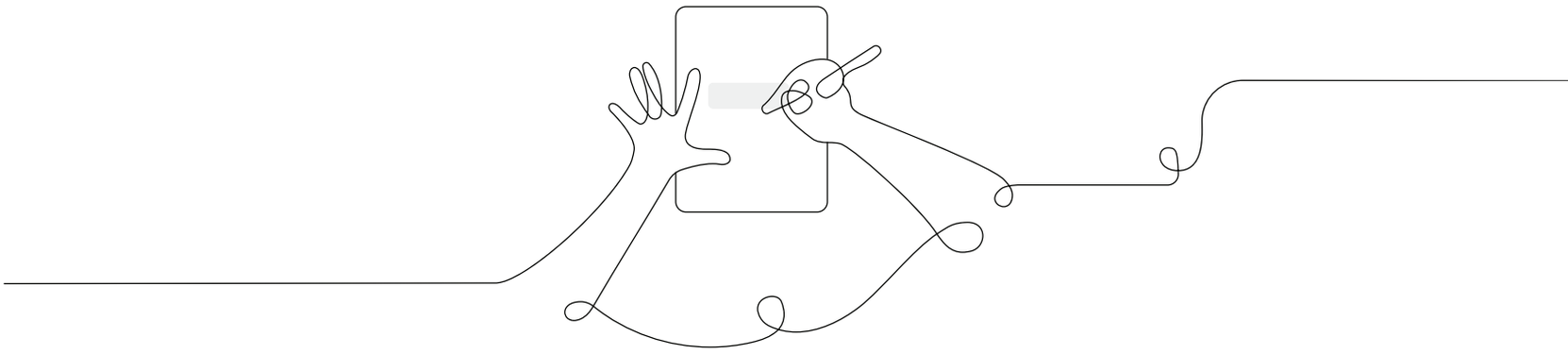
Amplify Science

Participant Notebook

Supporting Diverse Learner Needs
Grade 1: Light and Sound

New York City Schools



Supporting Diverse Learners
Unit-specific workshop agenda

Reflections and Framing the Day

Defining Diverse Learners

Understanding Opportunities for Supporting Diverse Learners

Analyzing Formative Assessment Data and Embedded Differentiation Strategies

Planning to Teach

Closing

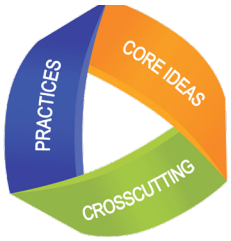
Demo account for your workshop:

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

Temporary account: _____**@tryamplify.net**

Password: **AmplifyNumber1**

Three dimensions of NYSSLS 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:
ESS1: Earth's Place in the Universe
ESS2: Earth's Systems
ESS3: Earth and Human Activity

Life Sciences:
LS1: From Molecules to Organisms
LS2: Ecosystems
LS3: Heredity
LS4: Biological Evolution

Physical Sciences:
PS1: Matter and its Interactions
PS2: Motion and Stability
PS3: Energy
PS4: Waves and their Applications

Engineering, Technology and the Applications of Science:
ETS1: Engineering Design
ETS2: 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**

Unit Map

How can we use light and sound to design shadow scenery and sound effects for a puppet theater?

Students take on the dual role of light engineers and sound engineers for a puppet-show company as they investigate cause-and-effect relationships and learn about the nature of light and sound. They apply what they learn to designing shadow scenery and sound effects for a puppet show.

Chapter 1: How do we make brighter or darker areas on a surface?

Students figure out: Without light, we cannot see. Light comes from a source and travels to a surface. Light from the source must be getting to the surface in order to make some parts of the surface look bright. If there is no light source, a surface looks dark.

How they figure it out: The class attempts, in vain, to make the classroom completely dark, identifying light sources at each failed attempt. Students read a book about whether one can see in the dark, and then they hunt for light sources in their school and in the pictures of a book. Students investigate a series of questions with their own light source (a flashlight), investigating how light gets to a surface.

Chapter 2: How do we make a dark area in a bright puppet show scene?

Students figure out: A dark area is the result of putting an object between a light source and a surface. When an object blocks a light source, the surface behind the object looks darker. This dark area is called a shadow.

How they figure it out: Students explore by making shadows on different surfaces. They then investigate how to make a dark area on the surface by using different materials to block light from reaching a surface.

Chapter 3: How do we make bright, medium bright, and dark areas in a puppet show scene?

Students figure out: Different materials let different amounts of light pass through. Bright areas are the result of all or almost all the light passing through an object and reaching a surface. This happens if there is no object or if the object is transparent. Medium-bright areas result when only some of the light passes through and reaches the surface. Dark areas happen because no light passes through an object. Light is blocked, so the surface looks dark.

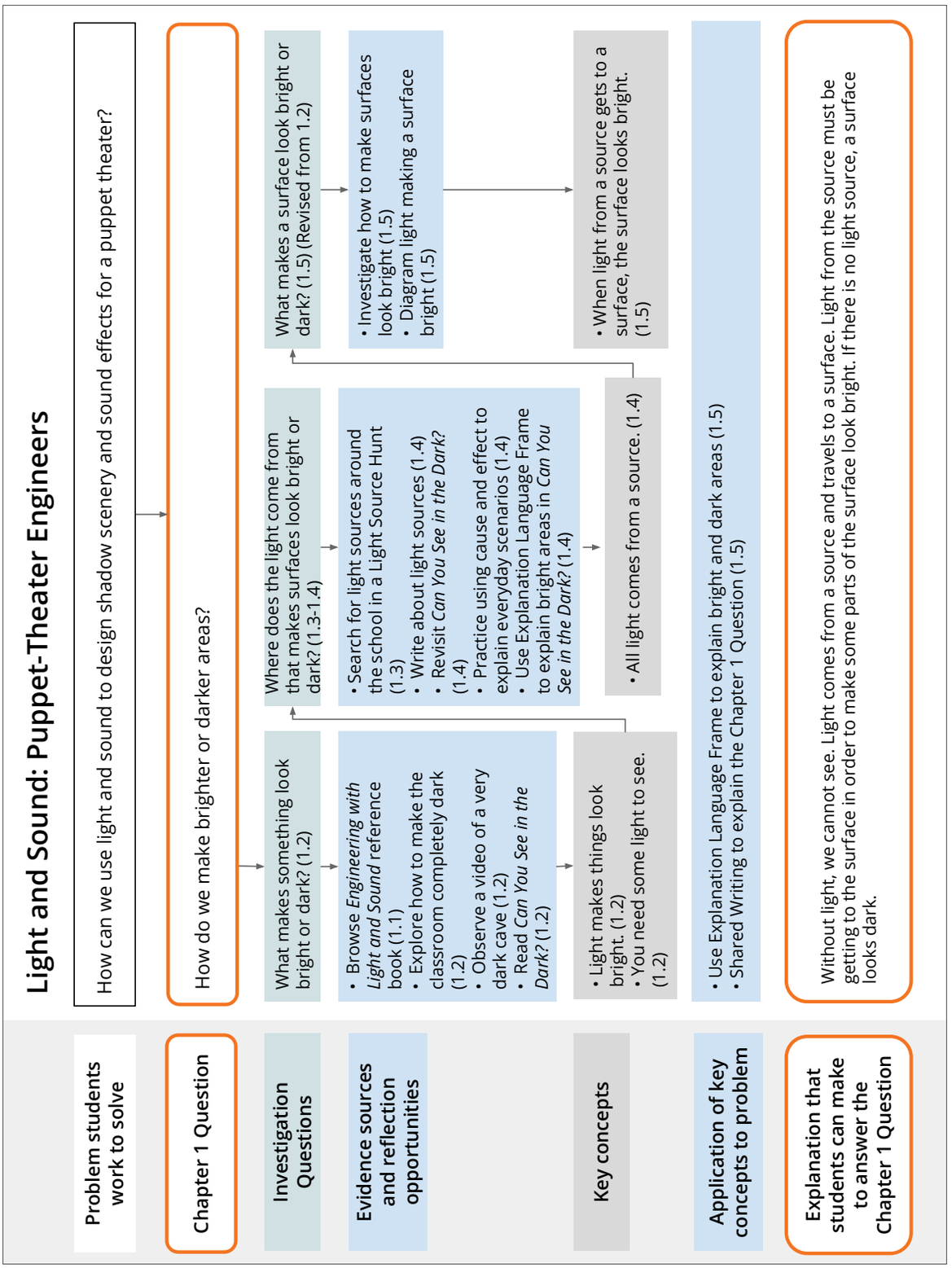
How they figure it out: Students refine their understanding of how light interacts with different materials and work as light engineers to plan, make, and test shadow scenery. Based on what they learn, students revise their own shadow scene to meet a set of design goals. Students write explanations of their scenes for the puppet-show company.

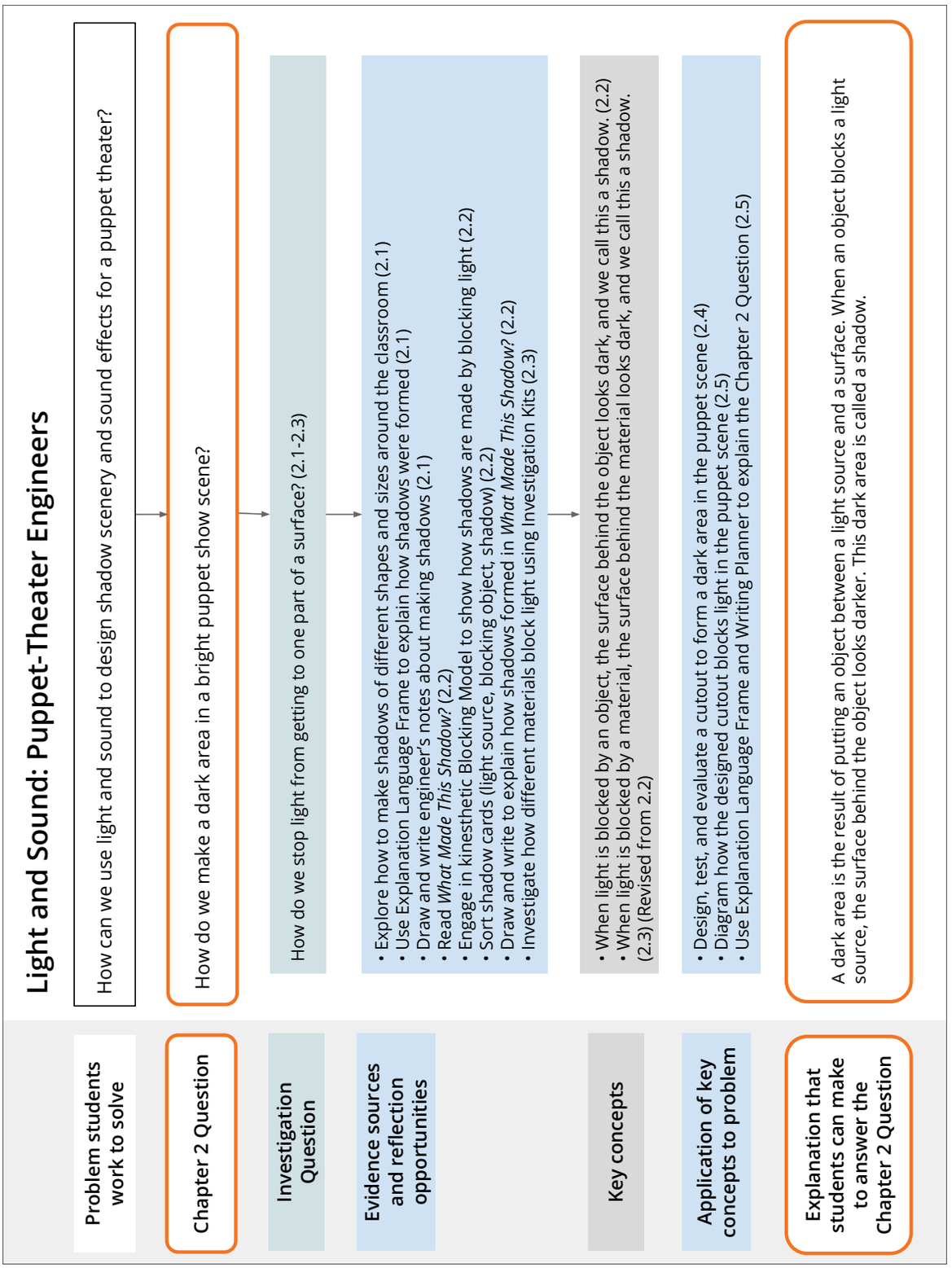
Chapter 4: How do we design a sound source to go with a puppet show scene?

Students figure out: Sound has a source, just like light does. Sound is made when an object vibrates. The object that vibrates is the source of the sound. Like light, sound also travels. Sound travels from the source to our ears. You can start and stop sound by starting and stopping the vibration of an object.

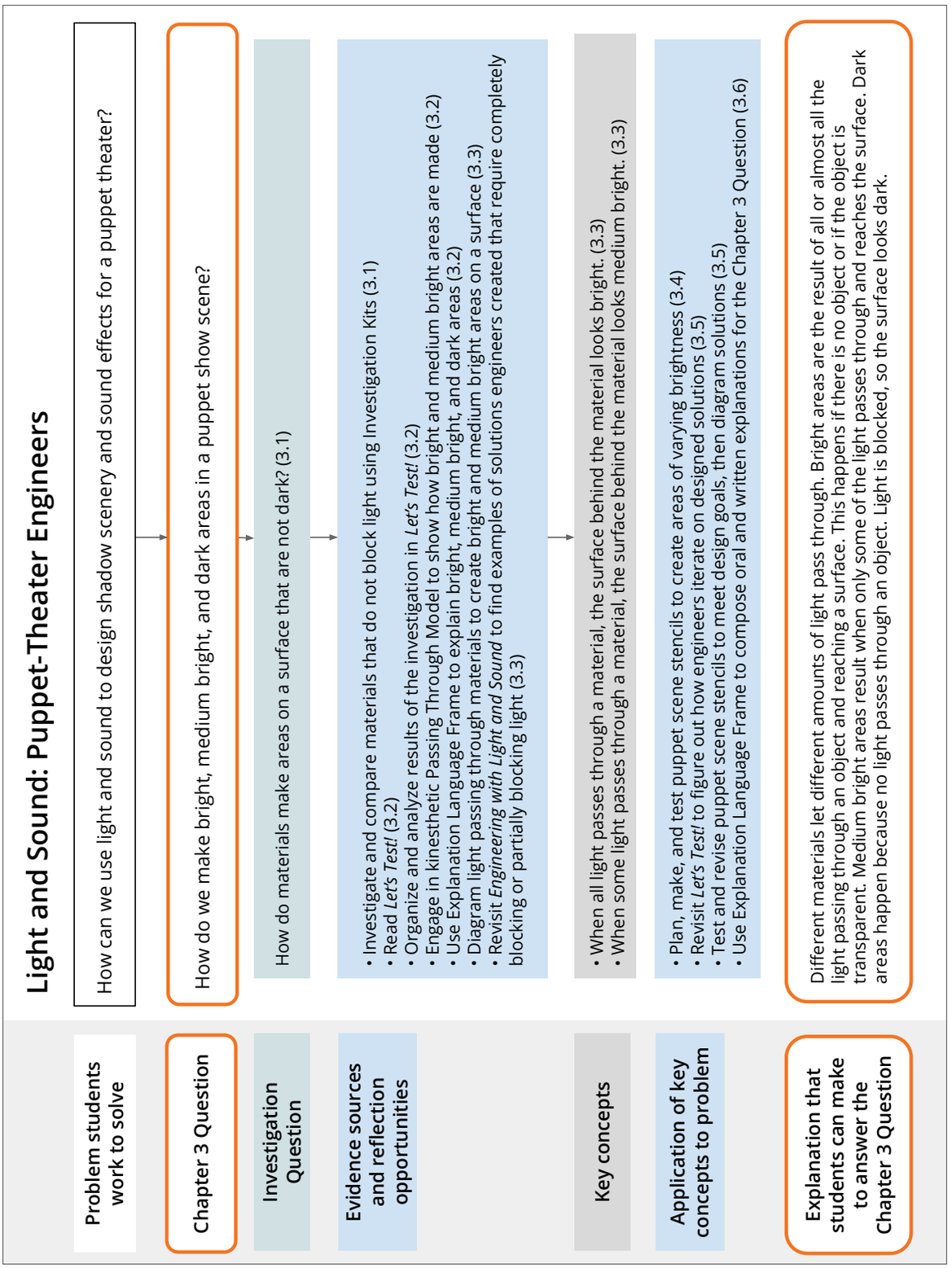
How they figure it out: Working as sound engineers, students hunt for sound sources, investigate how sounds are made, and explain what vibrates in a particular sound source. They plan, make, and test different ways of making sound effects. They read a book about sound and share what they learn in a mini-book they create for the puppet-show company.

Light and Sound Coherence Flowchart

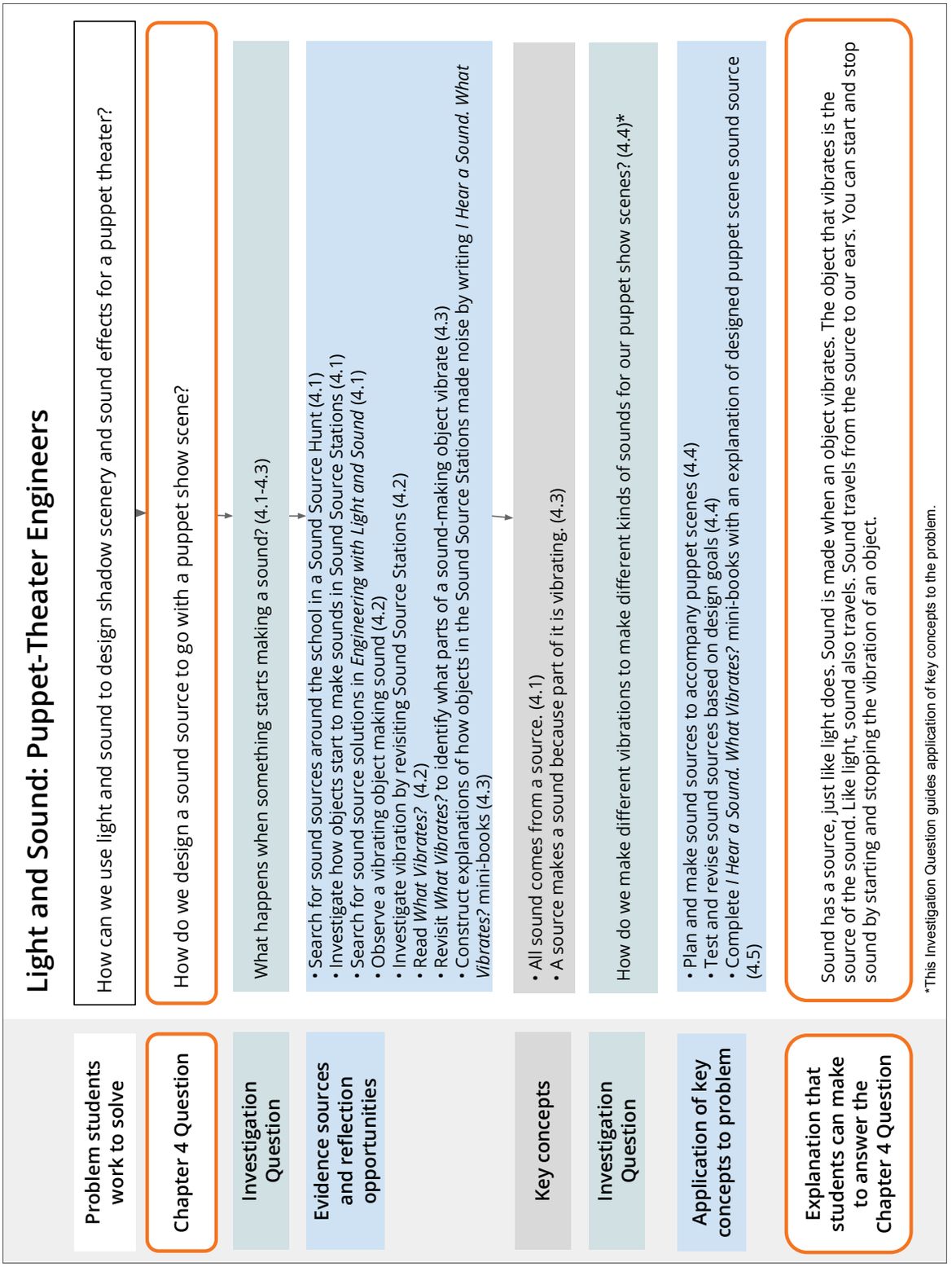




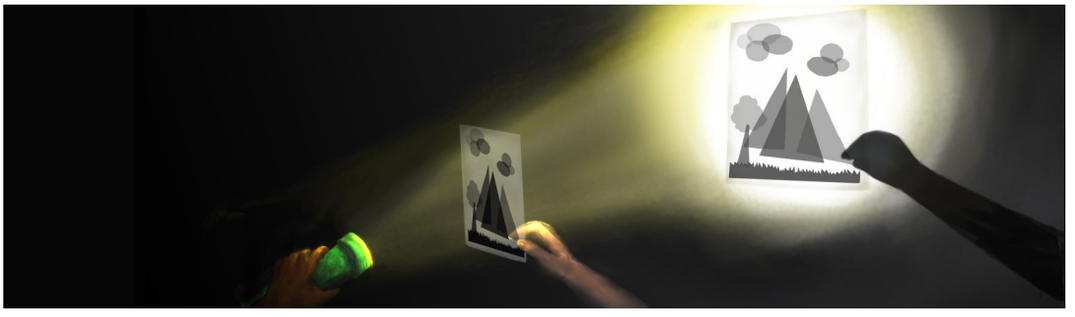
Light and Sound Coherence Flowchart cont.



Light and Sound Coherence Flowchart cont.



AmplifyScience



Light and Sound:

Puppet-Theater Engineers

Investigation Notebook

Name: _____ **Date:** _____

Shadow Cards Sorting Mat

Directions: Sort your cards into three columns.

Blocking object	Light source	Shadow

Name: _____ Date: _____

What Made This Shadow?

Directions:

1. Choose three Shadow Cards that go together.
2. Place one card in each column.
3. Write the name of the blocking object and the light source on the lines.

Blocking object	Light source	Shadow
The _____	blocks light from the _____,	so it makes this shadow.

Name: _____ Date: _____

Testing Materials

Directions:

1. For each material, circle **Yes** if the material blocked light or circle **No** if the material did not block light.

Material	Did the material block light?
cardboard	Yes No
clear plastic	Yes No
foam	Yes No
foil	Yes No
tinted plastic	Yes No
wax paper	Yes No

Teacher: Mr. Saturn **Grade Level** : 1 **Date:** 8 /2018
Unit Name: Light and Sound **Chapter:** 2 **Lesson:** 2.3, Act. 2

A.) Determine the "Look For's" for the On the Fly Assessment
On-the-Fly Assessment 6: Students' Understanding That Blocking Light Results in Dark Areas

B.) Rate the Look -Fors
'**3'** if student demonstrates a **strong understanding**
'**2'** if student demonstrates **some understanding**
'**1'-** if student demonstrates **no understanding**

Look Fors	Learner A	Learner B	Learner C	Learner D
Look for #1: Student participants in testing/ investigating materials with a partner.	3	3	3	3
Look for #2: Student recognizes the flashlight as the light source in this activity.	3	3	3	1
Look for #3: Student correctly incorporates relevant vocabulary in his/her explanation. (Block, material, source and surface)	2	1	1	2
Look for #4: Students should say that the material does block light, because they can see a dark area on the surface to which light is not getting.	2	1	1	1
Look for #5: Student describes blocking as preventing light from getting to a surface, resulting in a dark area.	3	2	1	1
Look for #6: Student is able to demonstrate evidence of how a material can block light from getting to a surface.	3	1	3	2

C.) After data are collected for the OTF, analyze the student needs and refer to the **NOW WHAT** section for ideas on how to respond to your students' needs.

Learner Profiles

Learner A: Enjoys science and math. Loves to tell stories about her many travels and enjoys figuring out phenomena presented. While she finds verbal explanations to be sufficient, she does not find it necessary to elaborate on her ideas through written explanation or written argument. She often shuts down when pushed to provide supporting details in writing.

Learner B: Enjoys reading and writing. When provided a written assignment, he is anxious to provide lengthy written and verbal explanations. Although, this learner enjoys reading, writing and speaking he is challenged by sentence structure, spelling and staying on topic.

Learner C: This new student enjoys expressing himself through art and drawings. He is not a strong reader, yet, as English is his second language. This student has strong comprehension skills and has adapted to using the classroom artifacts to help him construct written explanations.

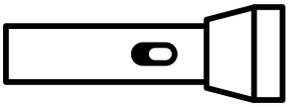
Learner D: Enjoys solving critical thinking problems and has rich science vocabulary. She works best when provided independent tasks and does not work well in collaborative group settings. She relies on step by step teacher validation and is not likely to complete a task without making sure her answer affirmed by an adult in the room.

Name: _____ Date: _____

Writing Planner: Explaining the Dark Area

Directions:

1. Circle the words for the material, the light source, and the effect.
2. Write the words that you circled on the blank lines to complete the sentence.

Material	Light source	Effect
foil foam cardboard	 flashlight	 dark  bright

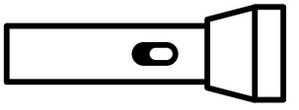
The _____ blocks light

from the _____, so the

surface looks _____.

Name: _____ Date: _____

Writing Planner: Explaining the Dark Area (continued)

Effect	Light source	Material
 dark  bright	 flashlight	foil foam cardboard

The surface looks _____, because light from the _____ is blocked by the _____.

Name: _____ Date: _____

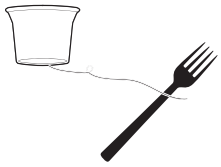
Investigating Sound Sources

Directions:

1. On the lines below, write what you plan to observe and record during your investigation.
2. Test the materials at each station and record your observations in the table below.
3. Circle the picture of each material that is a sound source.

What will you observe and record? _____

_____

	My observations
	
	
	
	

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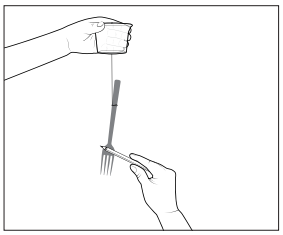
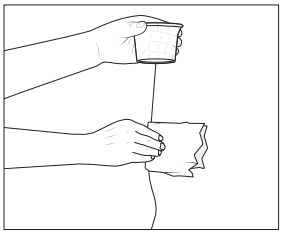
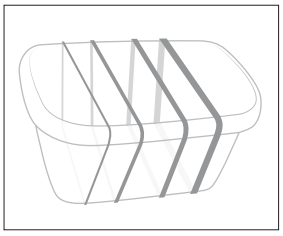
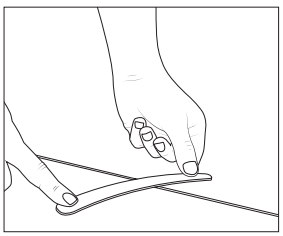
Name: _____ Date: _____

Investigating Vibration

Directions:

1. Observe what you hear, see, and feel for each sound source.
2. Circle **Yes** or **No** if you hear, see, or feel something for each sound source.

Sound source	**hear**	**see**	**feel**
	Yes No	Yes No	Yes No
	Yes No	Yes No	Yes No
	Yes No	Yes No	Yes No
	Yes No	Yes No	Yes No

Keeping Diverse Learner Needs in Mind

Reflection Tool

Unit Name: _____ Chapter #: _____ Lesson #: _____

Circle the Selected Learner Profile: A B C D

Directions: Reflect on each lesson activity and jot down strategies to support the student you selected from the Learner Profile.

Lesson Activity	My Student May be **Challenged by...**	Suggestions from the **Differentiation Brief**	Suggestions from my own **Teacher Toolkit**
1			
2			
3			
4			
5			

Take a Moment: How will this activity influence your planning practices?

Connecting key concepts to chapter explanations

Light and Sound

Directions:

1. For each chapter, read the key concepts, then the explanation.
2. With a partner, discuss how the key concepts connect to the explanation.
3. Make annotations about the connections.

Ch	Key concepts	Explanation
1	Light makes things look bright. (1.2) You need some light to see. (1.2) All light comes from a source. (1.4) When light from a source gets to a surface, the surface looks bright. (1.5)	**Puppet scene:** Students consider how they would make a specific surface bright for the puppet company. They show how they can shine a flashlight on a wall to make the wall look brighter. **Explanation:** Without light, we cannot see. Light comes from a source and travels to a surface. Light from the source must be getting to the surface in order to make some parts of the surface look bright. If there is no light source, a surface looks dark.
2	When light is blocked by a material, the surface behind the material looks dark, and we call this a shadow. (2.3)	**Puppet scene:** Students decide what they would like to represent as a dark object in their puppet scene, for example, a mountain or a house. Students select an opaque material (cardboard, foam, aluminum foil) and design a cutout in the shape of the object they chose for their puppet scene. **Explanation:** A dark area is the result of putting an object between a light source and a surface. When an object blocks a light source, the surface behind the object looks darker. This dark area is called a shadow.
3	When all light passes through a material, the surface behind the material looks bright. (3.3) When some light passes through a material, the surface behind the material looks medium bright. (3.3)	**Puppet scene:** Students assemble their completed puppet scene stencils. They use clear plastic for the background to create a bright sky on the projected scene. They use their opaque cutout from Chapter 2 to create a dark area. They select a semi-transparent material (tinted plastic, wax paper) to design cutouts for medium-bright areas and objects. **Explanation:** Different materials let different amounts of light pass through. Bright areas are the result of all or almost all the light passing through an object and reaching a surface. This happens if there is no object or if the object is transparent. Medium-bright areas result when only some of the light passes through and reaches the surface. Dark areas happen because no light passes through an object. Light is blocked, so the surface looks dark.

End-of-Unit Assessment Questions

Science Content: Light Sources and Bright and Dark Areas

Prompt the student to explain each area in the scene.

- *We have been working as light-and-sound engineers to make solutions for the puppet-theater company. One thing they asked us to do is to explain how the stencils we made work. I am going to ask you to explain to me how each part of your stencil works, just like you would explain it to them.*

- *Why do these different areas of the wall look dark, bright, and medium bright?*

  If the student does not explain the bright area, point to it.
  - *Why does this area of the surface look bright?*

  If the student does not explain the dark area, point to it.
  - *Why does this area of the surface look dark?*

  If the student does not explain the medium-bright area, point to it.
  - *Why does this area of the surface look medium bright?*

Ask follow-up questions to probe for ideas that students did not mention. If students do not mention ideas that were the focus of the unit, they may still have some understanding of those ideas, even if they did not independently use them in their explanations. You can ask the following questions to probe for ideas that students did not include.

If the student does not mention the flashlight as the source of light.
- *Light is getting to different areas of this surface. Where is that light coming from?*

If the student does not mention the different amounts of light getting to one or more parts of the surface, point to the bright, dark, and medium-bright areas, one at a time.
- *How much light from the source is getting to this bright area of the surface?*
- *How much light from the source is getting to this dark area of the surface?*
- *How much light from the source is getting to this medium-bright area of the surface?*

If the student does not mention the different materials allowing different amounts of light through each material, point to the opaque material, the transparent material, and the tinted material, one at a time.
- *How much light gets through this (opaque) material? How do you know it does that?*
- *How much light gets through this (transparent) material? How do you know it does that?*
- *How much light gets through this (tinted) material? How do you know it does that?*

End-of-Unit Assessment Questions (continued)

Crosscutting Concept: Cause and Effect

Prompt the student to give an example of cause and effect in the scene. Remind the student that cause and effect means when one thing happens, something else happens.

- *As we have been learning about light, we have been talking about cause and effect. It means when one thing happens, something else happens.*
- *Look at the stencil projecting the scene on the surface. What is an example of cause and effect here?*
- *In your example, what is the cause and what is the effect?*

Science and Engineering Practice: Evaluating a Solution Based on Design Goals

Prompt the student to evaluate the solution (stencil) based on the design goals. Point to the Puppet Scene Design Goals chart and remind the student that the scene should have a bright area, a dark area, and a medium-bright area.

- *The puppet-theater company asked us to design a scene that meets three design goals. The scene should have a bright area, it should have a dark area, and it should have a medium-bright area.*
- *Does this solution (stencil) meet the puppet-theater company's design goals? Why or why not?*

Grade 1: Unit 2 - Light and Sound

Sample Rubric Compilation & Scoring Guide for the End of Unit Assessment (Lesson 4.6)

Criteria	0	1	2	3	4
Assessing Students Understanding of Science Concepts in the Unit Did the student explain how their stencils create different areas of brightness on the surface Did the explanation reflect an understanding of the Disciplinary Core Ideas in the unit?	No or inaccurate response	The student describes **1-2** of the following: light as coming from a light source, explains brighter and darker areas as a result or more or less light getting to the surface, describes the opaque materials as letting no light pass through, explains the dark area is dark because no light gets to the surface, describes the transparent material as letting all light pass through, explains the bright area is bright because all light passes through, describes the tinted material as letting some light pass through, or explains that the medium bright area is medium bright because some light gets to the surface.	The student describes **3-4** of the following: light as coming from a light source, explains brighter and darker areas as a result or more or less light getting to the surface, describes the opaque materials as letting no light pass through, explains the dark area is dark because no light gets to the surface, describes the transparent material as letting all light pass through, explains the bright area is bright because all light passes through, describes the tinted material as letting some light pass through, or explains that the medium bright area is medium bright because some light gets to the surface.	The student describes **5-6** of the following: light as coming from a light source, explains brighter and darker areas as a result or more or less light getting to the surface, describes the opaque materials as letting no light pass through, explains the dark area is dark because no light gets to the surface, describes the transparent material as letting all light pass through, explains the bright area is bright because all light passes through, describes the tinted material as letting some light pass through, or explains that the medium bright area is medium bright because some light gets to the surface.	The student describes **all** of the following: light as coming from a light source, explains brighter and darker areas as a result or more or less light getting to the surface, describes the opaque materials as letting no light pass through, explains the dark area is dark because no light gets to the surface, describes the transparent material as letting all light pass through, explains the bright area is bright because all light passes through, describes the tinted material as letting some light pass through, or explains that the medium bright area is medium bright because some light gets to the surface.
Assessing Student Understanding of the Crosscutting Concept of Cause and Effect Did the student provide a unifying example of cause and effect?	No or inaccurate Argument	The student did **one** of the following: provide an appropriate example of cause and effect and explicitly identify cause and effect accurately, provide an appropriate example of cause and effect from the stencil and explicitly identify cause and effect	The student did **two** of the following: provide an appropriate example of cause and effect and explicitly identify cause and effect accurately, provide an appropriate example of cause and effect from the stencil and explicitly identify cause and effect	The student did **three** of the following: provide an appropriate example of cause and effect and explicitly identify cause and effect accurately, provide an appropriate example of cause and effect from the stencil and explicitly identify cause and effect	The student did **all** of the following: provide an appropriate example of cause and effect and explicitly identify cause and effect accurately, provide an appropriate example of cause and effect from the stencil and explicitly identify cause and effect
Assessing Students Understanding of Evaluating a Solution Based on a Design Goal. Did the student explicitly evaluate the performance of the solution?	No or inaccurate Argument	The student does **one** of the following: accurately state whether the solution met all design goals, evaluate each design goal individually, describe or point to the area that relates to the design goal claimed to be met.	The student does **two** of the following: accurately state whether the solution met all design goals, evaluate each design goal individually, describe or point to the area that relates to the design goal claimed to be met.	The student does **all** of the following: accurately state whether the solution met all design goals, evaluate each design goal individually, describe or point to the area that relates to the design goal claimed to be met.	The student does **all** of the following: accurately state whether the solution met all design goals, evaluate each design goal individually, describe or point to the area that relates to the design goal claimed to be met. Provides an additional example of cause and effect.

Preparing to teach

Directions:

1. Navigate to the Chapter 1 landing page in the Teacher's Guide and read the Chapter Overview.
2. Navigate to Lesson 1.1 and use the table below to guide your planning.

Consider	Read
Lesson Purpose • What is the purpose of the lesson? • How do the activities in this lesson fit together to support students in achieving this purpose?	**Lesson Brief:** • Overview • Standards
Preparing • What materials do you need to prepare? • Is there anything you will need to project? • Will students need digital devices? • Are there partner or grouping structures you need to plan for? • Are there activities you need to practice before showing students? • Are there space considerations to think about (e.g., outside observation, projections, whole-group floor space)? • Are there documents in Digital Resources that you need to review (e.g., Assessment Guide)?	**Lesson Brief:** • Materials and Preparation • Unplugged • Digital Resources
Timing • How will teaching this lesson fit into your class schedule? • Will you need to break the lesson into activities over several days? **Teaching the Lesson** • Are there specific steps you have questions about? • What challenges might you encounter in teaching this lesson, and how might you address these challenges?	**Lesson Brief:** • Lesson at a Glance **Instructional Guide:** • Step-by-Step tab • Teacher Support tab
Supports and Challenges • What might be challenging for your students? • What additional supports can you plan for individual students?	**Lesson Brief:** • Differentiation **Instructional Guide:** • Teacher Support tab

**If you have additional time, continue planning with Lesson 1.2.*

Grade: _____ Unit Name:_____

Scoring Guide for the End of Unit Assessment (Template)

Criteria	0	1	2	3	4

[Status of the Class Data Collection and Organizational Tool]

Teacher: **Grade Level** : **Date:**

Unit Name: **Chapter:** **Lesson:**

A.) Determine the "Look For's" for the On the Fly Assessment

On-the-Fly Assessment # ____:

B.) Rate the Look -Fors

'3' if student demonstrates a strong understanding

'2' if student demonstrates some understanding

'1' if student demonstrates no understanding

Students	Look For #1	Look For #2	Look For #3	Look For #4	Look For #5

Amplify Support

Program Guide

Glean additional insight into the program's structure, intent, philosophies, supports, and flexibility.
my.amplify.com/programguide

Amplify Help

Find lots of advice and answers from the Amplify team.
my.amplify.com/help

Customer care

Seek information specific to enrollment and rosters, technical support, materials and kits, and teaching support, weekdays 7AM-7PM EST.

800-823-1969

scihelp@amplify.com

Amplify Chat

When contacting customer care, be sure to:

- 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, etc.).
- Note the web browser you are using (Chrome or Safari).
- Include a screenshot of the problem, if possible.
- Cc: your district or site IT contact.

Notes

Notes