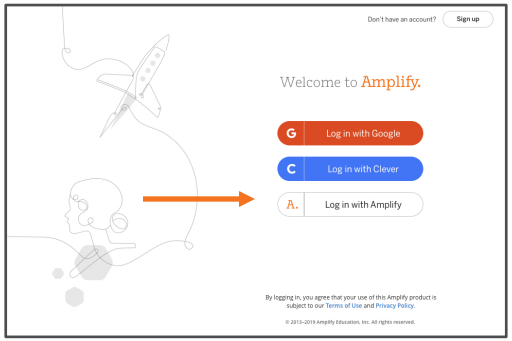
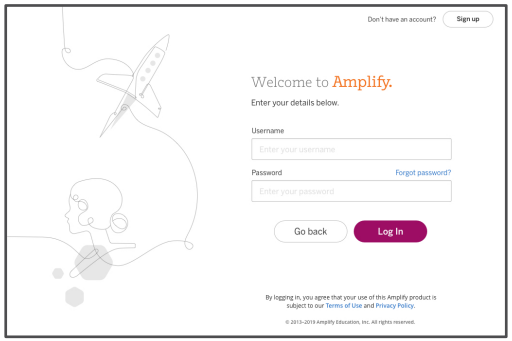
Welcome to Amplify Science!

Do now: Name tent and login



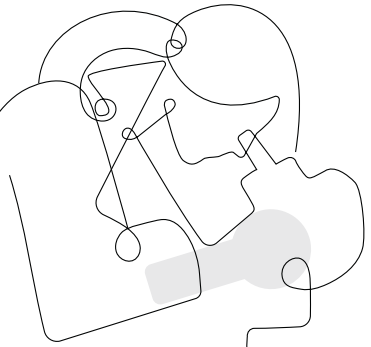


1. Make a name tent
2. Go to **learning.amplify.com**
3. Select **Log in with Amplify**
4. Enter teacher demo account credentials
    - T.nycelementary@tryamplify.net
    - Password: science1
5. Explore as we wait to begin

Amplify Science

Grade K: Pushes and Pulls Implementation workshop

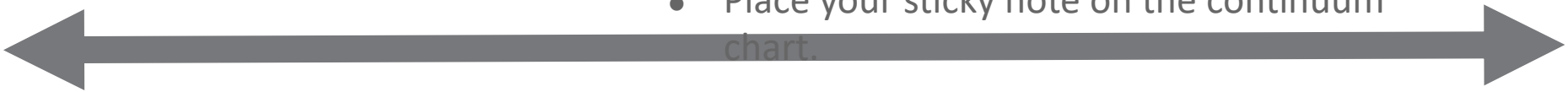
Supporting Diverse Learner Needs
New York City Elementary Teachers (Yr. 2)



NYC DOE
November 5, 2019
Presented by: Your Name

Reflecting on Unit 1:
Where are you on the implementation continuum?

- Reflect on the overall implementation of unit 1 and determine where you would rate your implementation on the continuum.
- On a sticky note, write why you chose that location on the continuum.
- Place your sticky note on the continuum chart.



Implementation Not Yet Started Implementation

Effective

Norms: Establishing a culture of learners

Take risks: Ask any questions, provide any answers.

Participate: Share your thinking, participate in discussion and reflection.

Be positive/present: Unplug and immerse yourself in the moment.

Physical needs: Stand up, get water, take breaks.

One Voice: Respect everyone's voices and opinions

Sharing Ideals and Solutions

- Move to right side if you feel confident in the implementation area.
- Move to the left side if you feel less confident in the implementation area.
- On cue, form groups of two (confident / less confident ratings) to discuss the implementation area.
- Each rotation will be 1 minute.

Implementation Areas:

- Tips for Navigating platform and locating digital materials
- Tips for Multi-modal Instruction
- Tips for Managing print materials, kits and/or devices
- Tips for Utilizing Formative and/or Summative Assessments
- Tips for Planning and Pacing

Workshop goal

- Prepare teachers to implement Pushes and Pulls in their classrooms

22 Lessons

Pushes and Pulls

Plan for the Day

- 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

- 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

Workshop Title: Supporting Diverse Learner Needs

By the end of this session, K-5 participants will be able to…

Which of these outcomes are you most interested in learning more about? Why?

- Identify embedded opportunities that support diverse learner needs within the unit of study
- Understand how to utilize the embedded multimodal curricular supports (do, talk, read, write, visualize) to help all students gather sources of evidence and argue like scientists
- Articulate the critical role that language and literacy play in developing scientific understanding
- Apply the End of Unit assessment rubric to understand student expectations
- Apply strategies that support diverse learner needs when planning instructional sequences

Elementary school course curriculum structure

Grade K

- Needs of Plants and Animals
- Pushes and Pulls
- Sunlight and Weather

Grade 1

- Animal and Plant Defenses
- Light and Sound
- Spinning Earth

Grade 2

- Plant and Animal Relationships
- Properties of Materials
- Changing Landforms

Grade 3

- Balancing Forces
- Inheritance and Traits
- Environments and Survival
- Weather and Climate

Grade 4

- Energy Conversions
- Vision and Light
- Earth's Features
- Waves, Energy, and Information

Grade 5

- Patterns of Earth and Sky
- Modeling Matter
- The Earth System
- Ecosystem Restoration

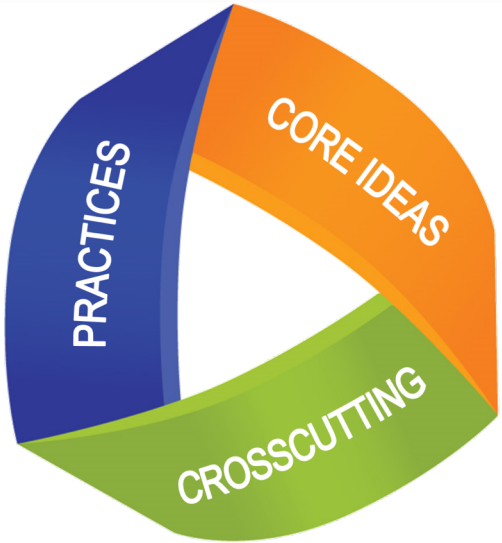
AmplifyScience

authored by THE LAWRENCE HALL OF SCIENCE UNIVERSITY OF CALIFORNIA, BERKELEY

Problem-based deep dives

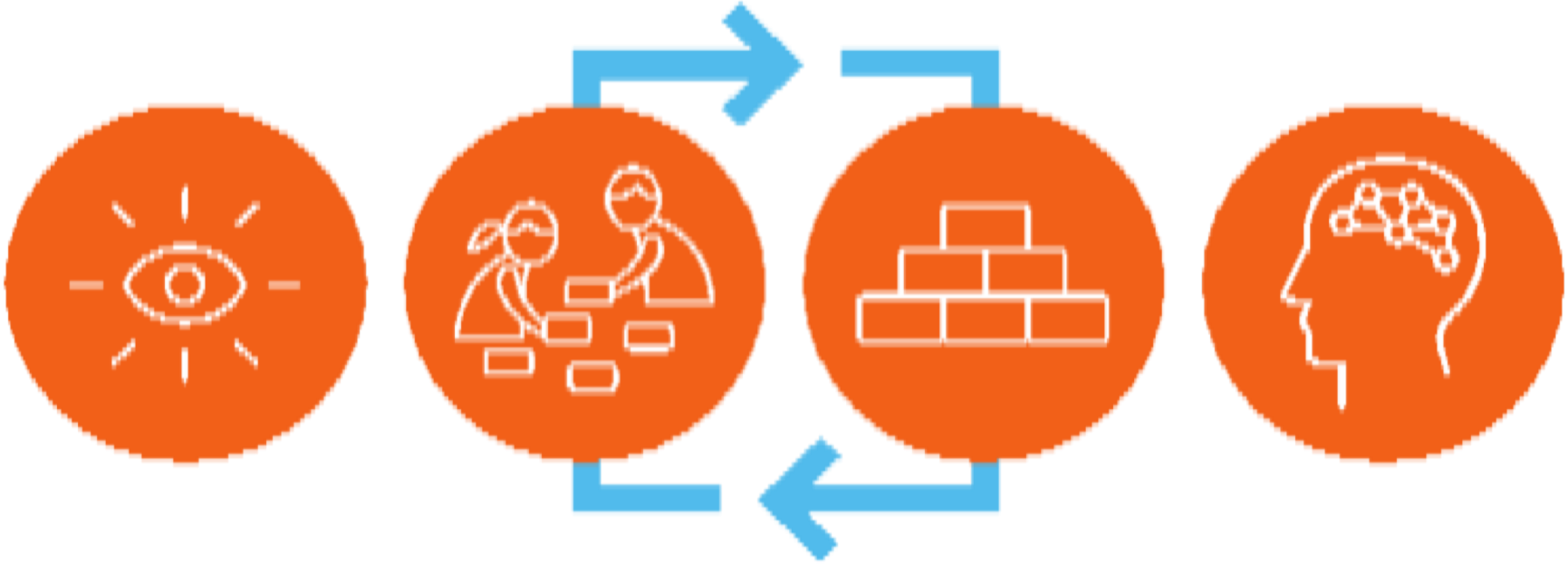
Students inhabit the role of scientists and engineers to explain or predict phenomena. They use what they figure out to solve real-world problems.

Thinking three dimensionally



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

Amplify Science approach



Introduce a phenomenon and a related problem

Collect evidence from multiple sources

Build increasingly complex explanations

Apply knowledge to a different context

Amplify Science approach

- 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

Who are our Diverse Learners?

"Diverse learning is not based on race or dependent on a deficit model. Students who are considered gifted are also diverse learners. All students are diverse and unique, in their own right. Let's agree that diverse learning recognizes that all students have unique learning needs and we educators must be prepared to provide multiple entry points for all learners to access the rigor of the goals and standards."

Anonymous Educator

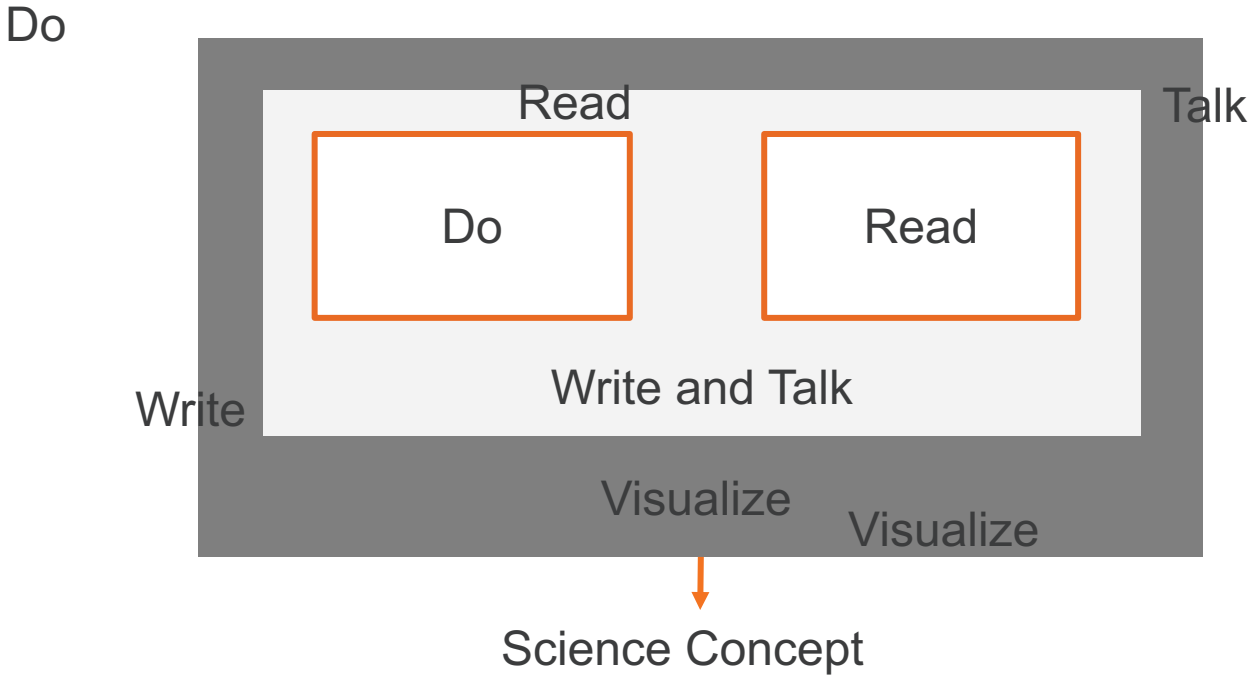
Charting Ideas from **your own** Teacher Toolkit?

What intuitive teacher strategies would you add to this list?

Modalities	Strategies (Solo or Collaboratively)
• **Doing** and completing tasks	
• **Talking** and adding ideas	
• **Reading** for information	
• **Writing** to convey understanding	
• **Visualizing** ideas	

Multimodal instruction

Do, Talk, Read, Write, Visualize



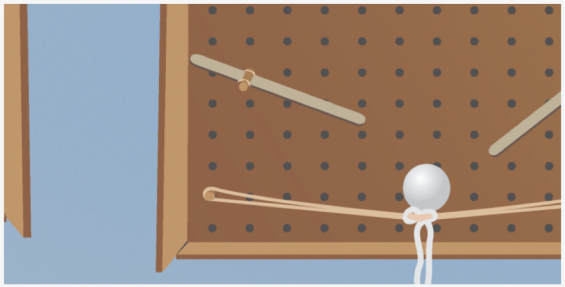
AmplifyScience

Hello Teacher Aboushusha
t.iaboushusha@tryamplify.net
Log Out
Go To My Account
Classroom Language Settings

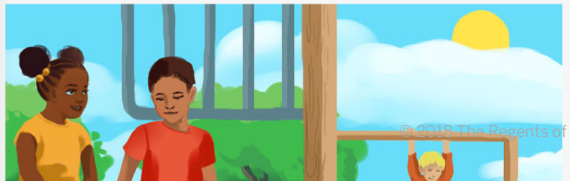
ELA Resources
Interim Assessments
LA Science Program Guide
NYC Resources
Science Program Guide
Standards Map

Kindergarten

22 Lessons
Needs of Plants and Animals



22 Lessons
Pushes and Pulls

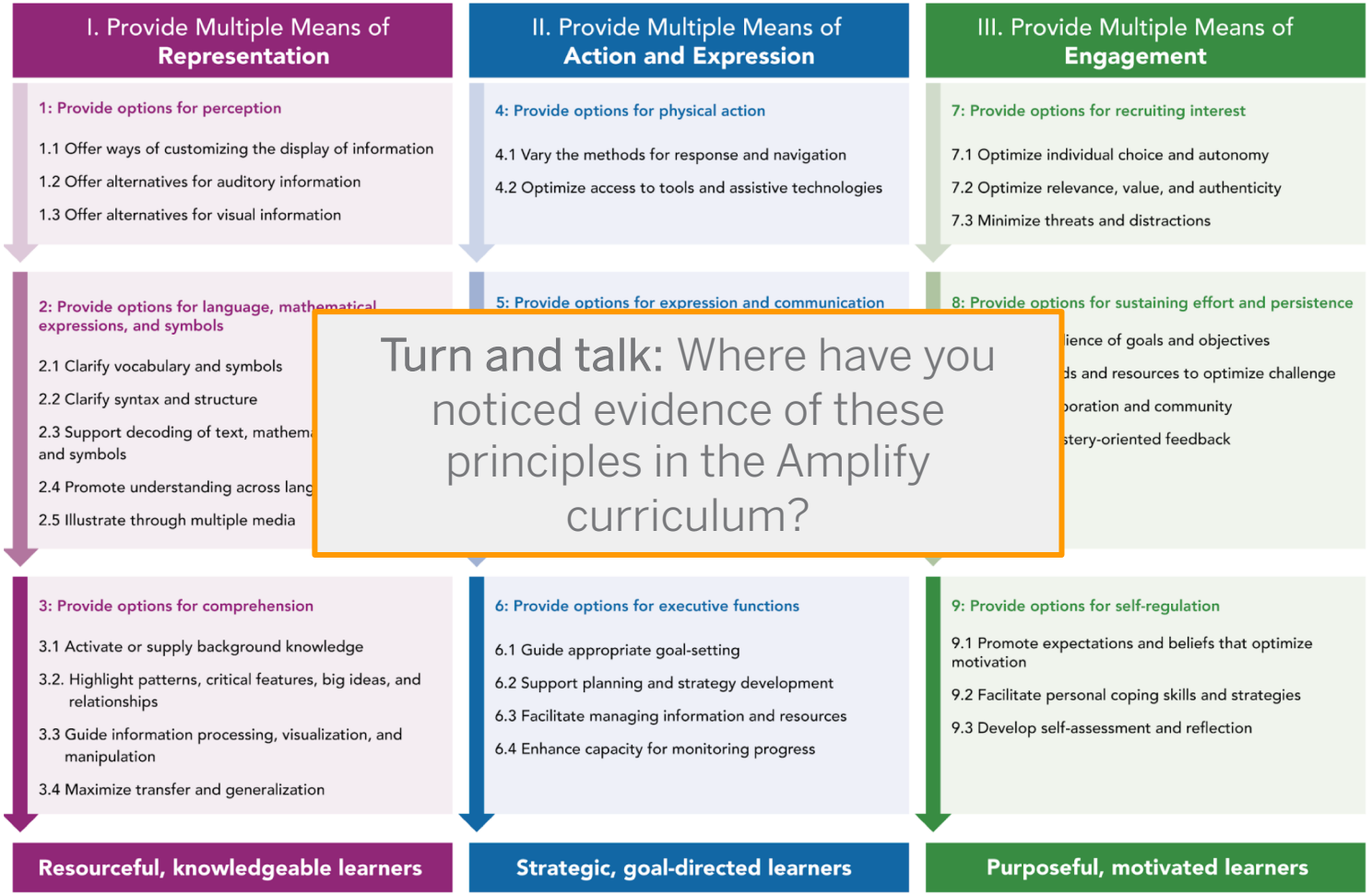


The Amplify Science Curriculum was developed with Supporting Diverse Learning Needs In Mind.

Universal Design for Learning

Universal Design for Learning (UDL) is a **research-based framework** for improving student learning experiences and outcomes by **focusing on careful instructional planning to meet the varied needs of students.** UDL is **NOT a special-education initiative**. Through the UDL framework, the **needs of ALL learners are considered** and planned for at the point of first teaching, thereby **reducing the need to reteach concepts.**

Universal Design for Learning Guidelines



Turn and talk: Where have you noticed evidence of these principles in the Amplify curriculum?

Culturally and linguistically responsive teaching

Culturally and linguistically responsive teaching (CLRT) principles **emphasize validating and valuing students' cultural and linguistic heritage** and **creating positive and nurturing learning environments** so that learning is more effective.

Access and Equity

Culturally and linguistically responsive teaching

Turn and talk: Where have you noticed evidence of these principles in the Amplify curriculum?

CULTURALLY AND LINGUISTICALLY RESPONSIVE TEACHING PRINCIPLES

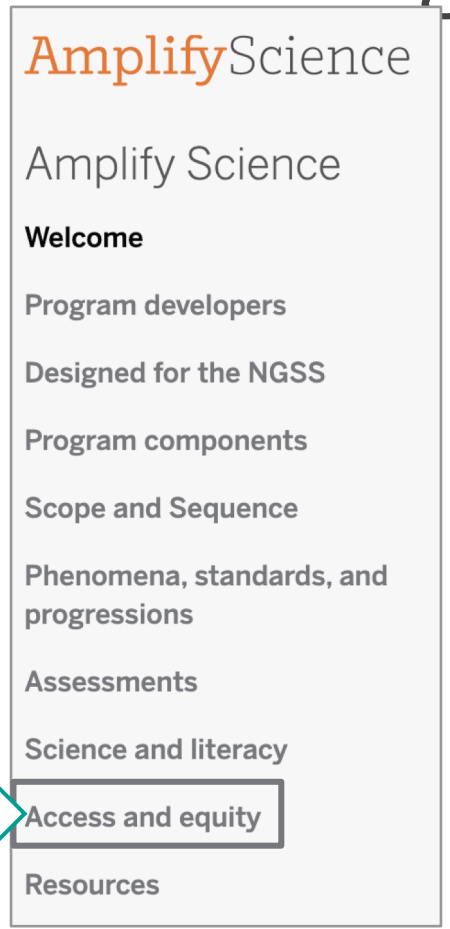
- Promote a positive disposition toward diversity: +
- Leverage students' cultural and experiential backgrounds: +
- Value language diversity and multilingualism: +
- Cultivate students' development of the language of science: +

Differentiation Strategies

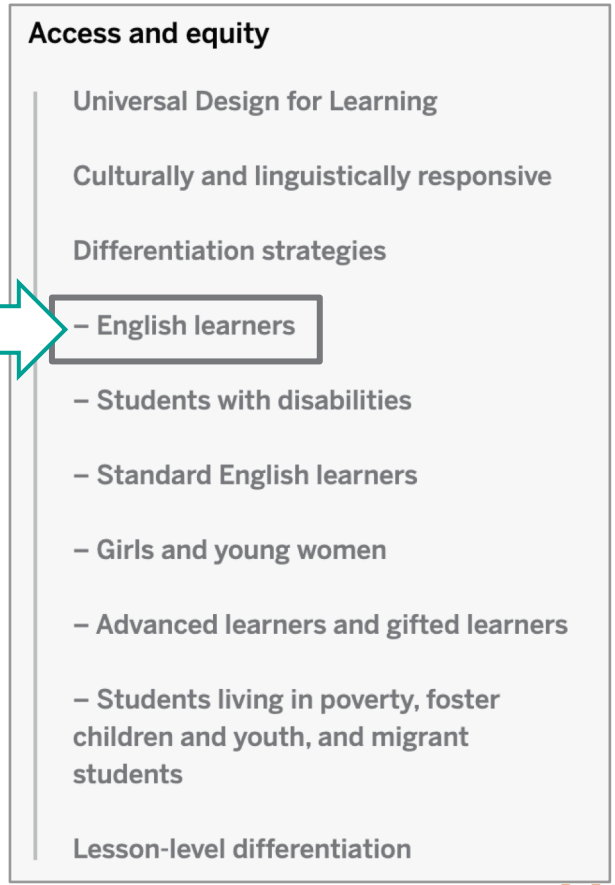
1

2

3



4



English Learners

- Principle 1: Leverage and build students' informational background knowledge.
- Principle 2: Capitalize on students' knowledge of language.
- Principle 3: Provide explicit instruction about the language of science.
- Principle 4: Provide opportunities for scaffolded practice.
- Principle 5: Provide multimodal means of accessing science content and expressing science knowledge.

Language supports for English Learners in Amplify

Embedded instructional design: Many **scaffolds are embedded** within the instructional plan and are presented to teachers through the digital teacher materials and to all students as activities within the unit. Throughout the process of designing the curriculum, these scaffolds and supports were **planned, tested, and refined** to provide **rigorous yet accessible science instruction.**

Additional support: **Additional activities** and **specific methods for supporting English learners** are provided for use **as needed**, especially in the **Teacher Support notes within the lessons.**

English Learners jigsaw

- Principle 1: Leverage and build students' informational background knowledge.
- Principle 2: Capitalize on students' knowledge of language.
- Principle 3: Provide explicit instruction about the language of science.
- Principle 4: Provide opportunities for scaffolded practice.
- Principle 5: Provide multimodal means of accessing science content and expressing science knowledge.

DIRECTIONS

- Read your assigned principle
- Be ready to **share out how your principle appears in the Amplify curriculum**.

Students with disabilities meet the criteria under one of the following categories:

- Autism
- Deafness
- Deaf-blindness
- Emotional disturbance
- Hearing impairment
- Intellectual disability
- Multiple disabilities
- Orthopedic impairment
- Other health impairment
- Specific learning disability
- Speech or language impairment
- Traumatic brain injury
- Visual impairment (including blindness)

Standard English learners

Students who are Standard English Learners (SELs) are **ethnic minority students** and **primary English speakers who speak a dialect of English** in their home communities that is different from the “standard” dialect of English used in schools. **The goal for SELs** is to become bidialectal by **maintaining their home dialect of English while mastering standard English (SE) across the disciples**, including science.

Girls and young women

Historically, girls and young women have had **fewer opportunities** to participate in and benefit from **deep science and engineering learning**. To help combat this issue, Amplify Science aids teachers in **positioning girls and young women as powerful science and engineering learners**.

Advanced learners and gifted learners

Advanced learners and gifted learners, who **may be formally or informally identified,** show the **capacity for performance that is significantly higher than their age peers**. This group of students require their teachers to **focus on adding depth and complexity** in the science topics under study (as opposed to merely adding more work, additional topics, or skipping content or grade levels).

Access and Equity

Students living in poverty, foster children and youth, and migrant students

Children and youth who experience **disruptions to their education** or are **living in potentially stressful situations lack equal access to quality science and engineering learning experiences**, and are **disproportionately negatively impacted in science academic outcomes**.

- 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

22 Lessons

Grade K Pushes and Pulls

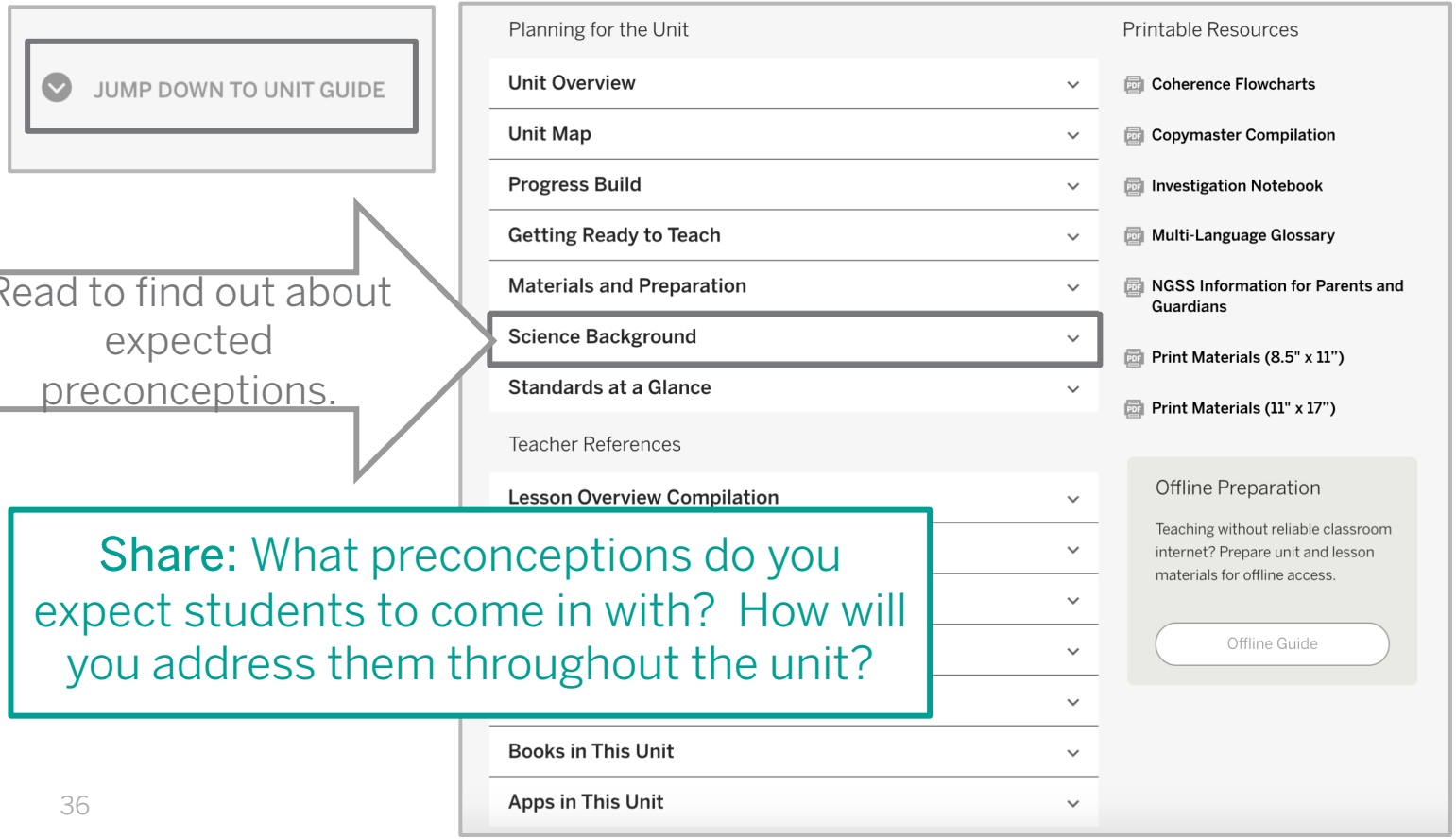
Anchor Phenomena:

Pinball machines allow people to control the direction and strength of forces on a ball.

Role of the Student:

Students take on the role of scientists and engineers. They ask and answer questions to help them learn about problems, search for cause and effect relationships to explain natural events, talk about pushes and pulls by saying "Objects move because other objects exert forces on them, and learn about constructing models.

Student preconceptions in this unit



Read to find out about expected preconceptions.

Share: What preconceptions do you expect students to come in with? How will you address them throughout the unit?

Unit Level 3-D Statement

3-D Statements

Key

Practices Disciplinary Core Ideas Crosscutting Concepts

Unit Level

Students plan and carry out investigations to determine how force affects the movement of an object, its direction, and its distance (cause and effect; scale, proportion, and quantity; structure and function). They assume the role of engineer as they engage in the design process to develop models that test ideas and construct solutions with the goal of designing a Class Pinball Machine.

Unit Map

Pushes and Pulls
Planning for the Unit

Unit Map

Unit Map

How can we create a pinball machine for our class?

Students take on the role of pinball engineers as they investigate the effects of forces on the motion of an object. They test their own prototypes (models) of a pinball machine and use what they learn to contribute to the design of a class pinball machine. Over the course of the unit, students construct a foundational understanding of why things move in different ways.

Chapter 1: How do we make a pinball start to move?

Students figure out: To make our pinball start to move, we must exert a force on the pinball. We can use a rubber band launcher to exert a force on the pinball.

How they figure it out: Students investigate how to make objects in the classroom start to move. They talk about cause and effect, read a book that introduces key scientific language and use it to practice talking about forces and observed motion. Finally, students create models for testing their ideas about making the pinball start to move.

Chapter 2: How do we make a pinball move as far as we want?

Students figure out: To make our pinball go the distance we want, the rubber band launcher has to exert a strong force. To make it go a short distance, the rubber band launcher has to exert a gentle force. Attaching a shoelace to the rubber band launcher can help us adjust the force.

How they figure it out: Students investigate how to make a pinball move short or long distances by testing their ideas in the Box Models. They describe how the launcher can be used to exert gentle and strong forces to move a pinball different distances.

Chapter 3: How do we make a pinball move to a certain place?

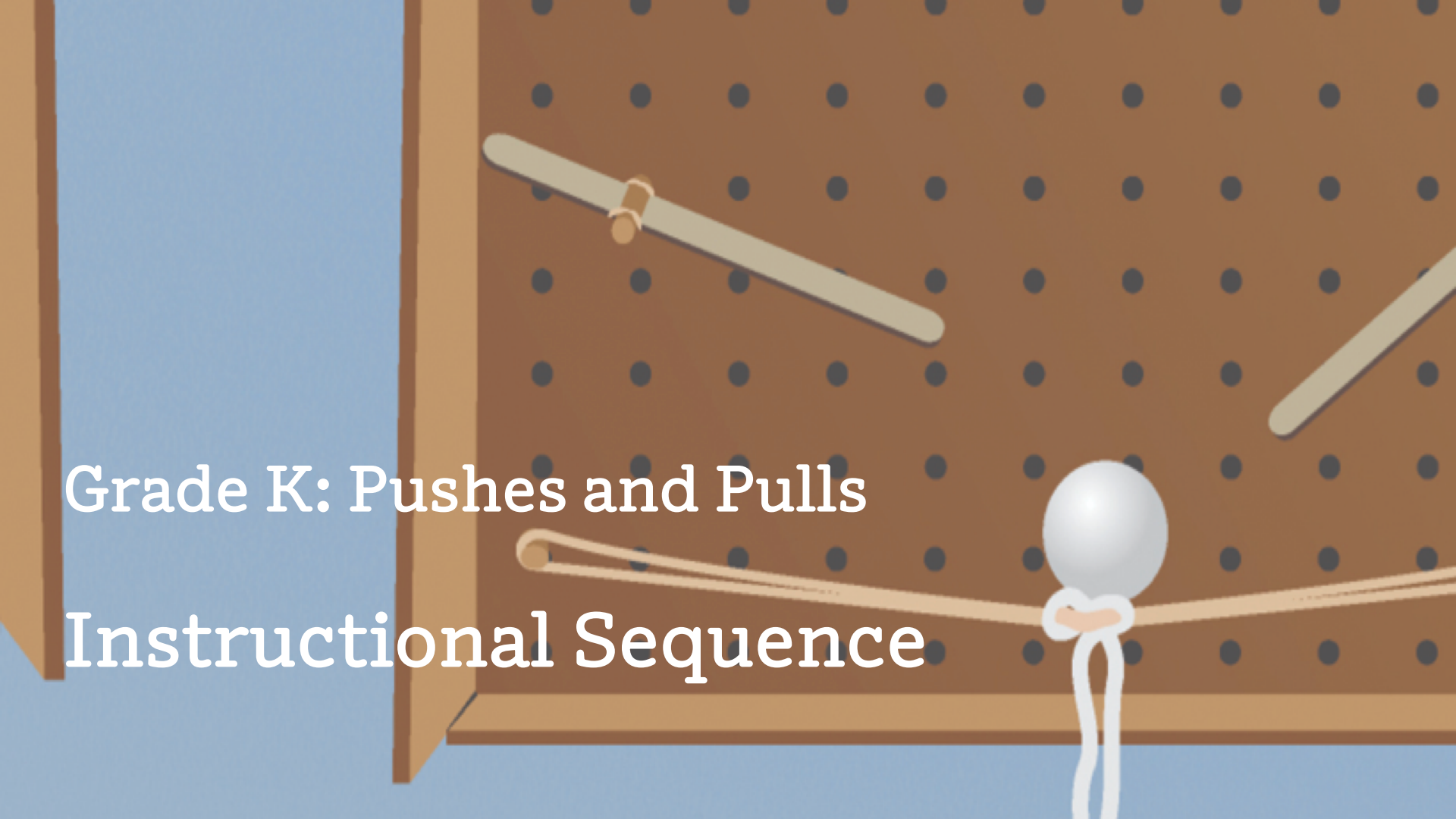
Students figure out: To get the pinball moving in the direction we want (left or right), we must exert a force on the pinball in the direction that we want it to move.

How they figure it out: Students investigate how to control the pinball's direction of movement by controlling the direction of applied forces. They read to obtain information from a book on building with forces and use this language to talk about forces moving in a particular direction.

Chapter 4: How do we make a moving pinball change direction?

Students figure out: To make a moving pinball change direction, we have to exert another force on it, either from a moving object or from a still object in its path.

How they figure it out: Students investigate how to change the direction of a moving pinball. Ultimately, the class decides whether and how to add flippers, targets, and a bumper to the Class Pinball Machine and use Explanation Language Frames to help them discuss and write about how forces cause a moving object to change direction.



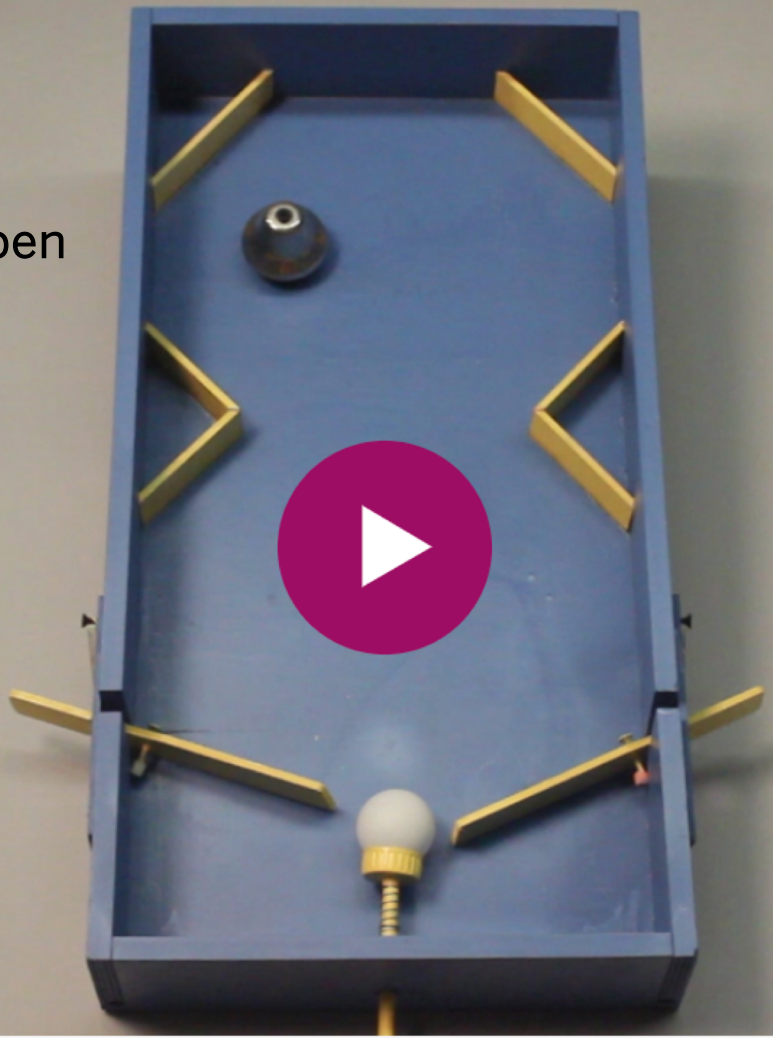
Grade K: Pushes and Pulls

Instructional Sequence

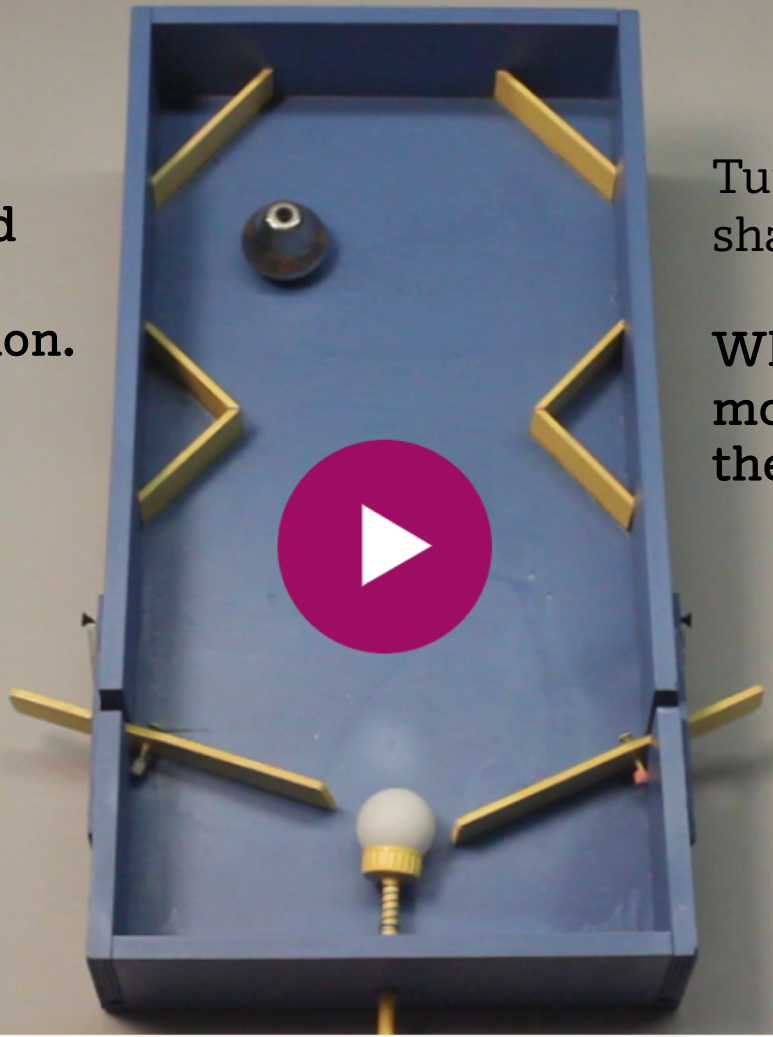
We are beginning a new unit to learn about why things move.

We will create a class pinball machine.
What do we already know about pinball machines?
In a moment we will watch a video to see what pinball machines can do.

What did you see happen in the video?



Play the video a second time for the pre-unit-assessment conversation.



Turn to your partner and share your ideas.

What made the pinball move in different ways in the video?

Ask partners to share their ideas with the class.
Invite any different ideas until all ideas have been shared.

Consider using the prompts below and gesturing to indicate the balls movement.

I noticed the ball was not moving at the beginning, but then it started moving. What do you think made it start to move?

I noticed the ball sometimes went a short ways and other times it went a long ways. What do you think made it move short ways or long ways?

I noticed that sometimes the ball went toward one side of the machine, and other times it went toward the other side. What do you think made it move one way or another?

Sometimes I saw the ball going one way, and then it went another way. Why do you think it changed direction like that?

Unit Question

Why do things move in different ways?

Lead Embodied Forces Routine

Students stand and act out the movement of a pinball in a pinball machine.
Model the movement for students keeping movements small and pointing in the direction of the movement.

Introduce Student's Role As Engineers

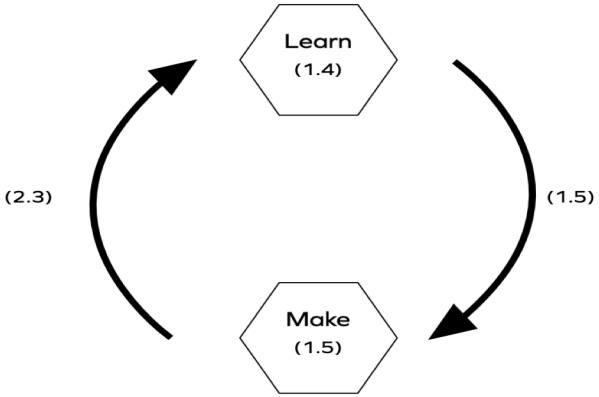
In order to figure out how a pinball machine moves we need to think like Engineers.

Introduce What Engineers Do Chart

What Engineers Do (1.1)

Find out about a **problem**. (1.1)

Design a **solution**. (1.5)



Share to communicate and explain your ideas. (1.5)

Chapter 1 Question

How do we make a pinball start to move?

Investigation Question

What makes an object start to move?

Introduce the vocabulary word

Object

Point to the Investigation Question as you give its definition

Introduce the Movement Hunt

Explain that the class will try to get objects, or things, in the classroom to start to move in order to answer the question
What makes an object start to move?

Invite students to anticipate objects they can move.

Ask students to look around the classroom from where they are seated. Ask them what they see that they might be able to start to move.

Have students model the Movement Hunt.

Call on two student volunteers to model walking and whispering as they move around the classroom, finding objects that they can move.

Set expectations for the Movement Hunt.

Students use only their hands to make objects move
make only objects move—*not* their classmates
put anything they moved back where it started

Invite students to hunt for movement in the classroom.

As students hunt, circulate and ask them to describe what they are doing.

Gather the class in the discussion area and remind them of the Investigation Question.

What makes an object start to move?

Review the vocabulary word

Object

Let students know they will learn new science words to investigate their unit.

Ask about objects in the Movement Hunt.
What was one object you made start to move? What did you do to make it move?

Refer to the Investigation Question.
What makes an object start to move?

Guide discussion

As students discuss, ask them to support their explanations through pantomiming.

Guide the discussion by asking questions.

Summarize the discussion and conclude the lesson.

Explain to students in the next lesson they will learn about how scientists and engineers talk about getting an object moving!

Chapter 1: How do we make a pinball start to move?

JUMP DOWN TO CHAPTER OVERVIEW

An object starts to move when another object exerts force on it.

Lesson 1.1:
Pre-Unit Assessment

Lesson 1.2:
Talking About Forces

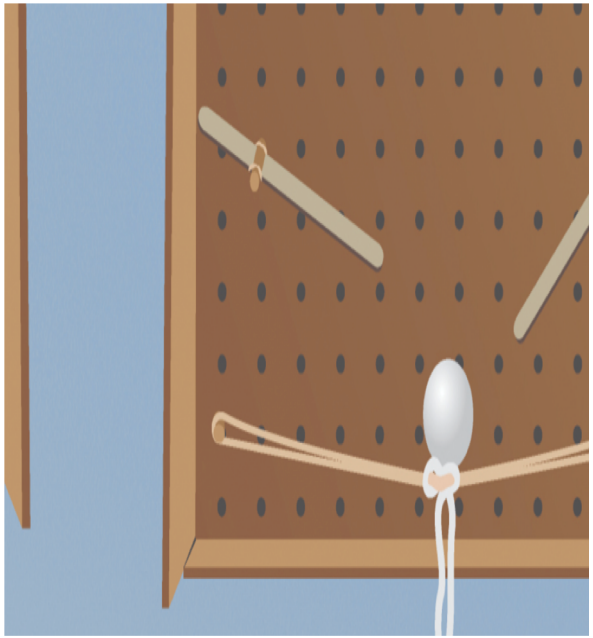
Lesson 1.3:
Forces Happen Between Two Objects

Force happens between two objects.

Lesson 1.4:
We Are Engineers

Lesson 1.5:
Writing About Forces

Pushes and Pulls solution



- An object starts to move when another object exerts a force on it. (1.3)
- • Forces happen between two objects.(1.3)
- To make our pinball start to move, we must exert a force on the pinball. We can use a rubber band launcher to exert a force on the pinball.

Chapter 2: How do we make a pinball move as far as we want?

JUMP DOWN TO CHAPTER OVERVIEW

Lesson 2.1:
Exploring Shorter and Longer Distances

Lesson 2.2:
Strong and Gentle Forces

Lesson 2.3:
Designing a New Launcher

Chapter 2 Question

How do we make a pinball move as far as we want?

Investigation Question:

What makes an object move shorter or longer distances?

Pushes and Pulls: Designing a Pinball Machine

Problem students work to solve

How can we create a pinball machine for our class?

Pg. 5-9

Chapter 2 Question

How do we make a pinball move as far as we want?

Investigation Question

What makes an object move shorter or longer distances? (2.1-2.3)

Evidence sources and reflection opportunities

- Engage in Embodied Forces Routine to practice moving short and long distances (2.1)
- Investigate how to make a tennis ball move a short distance and a long distance in partners (2.1)
- Investigate making an object move short and long distances in full-class Rugball routine (2.1)
- Read Forces in Ball Games to find out about strong and gentle forces in sports (2.2)
- Practice exerting strong and gentle forces in full-class Rugball routine (2.2)
- Sort images of objects moving based on the strength of the force exerted (2.2)
- Use Explanation Language Frame to explain forces exerted in images from the sort (2.2)

What are students figuring out?

Key concepts

- An object moves a long distance when a strong force is exerted on it. (2.2)
- An object moves a short distance when a gentle force is exerted on it. (2.2)

Application of key concepts to problem

- Add shoelaces to student Box Models to control the strength of the forces the launchers exert (2.3)
- Diagram modified Box Model launcher designs (2.3)
- Modify Class Pinball Machine launcher (2.3)
- Shared Writing to explain the Chapter 2 Question (2.3)

Explanation that students can make to answer the Chapter 2 Question

To make our pinball go the distance we want, the rubber band launcher has to exert a strong force. To make it go a short distance, the rubber band launcher has to exert a gentle force. Attaching a shoelace to the rubber band launcher can help us adjust the force.

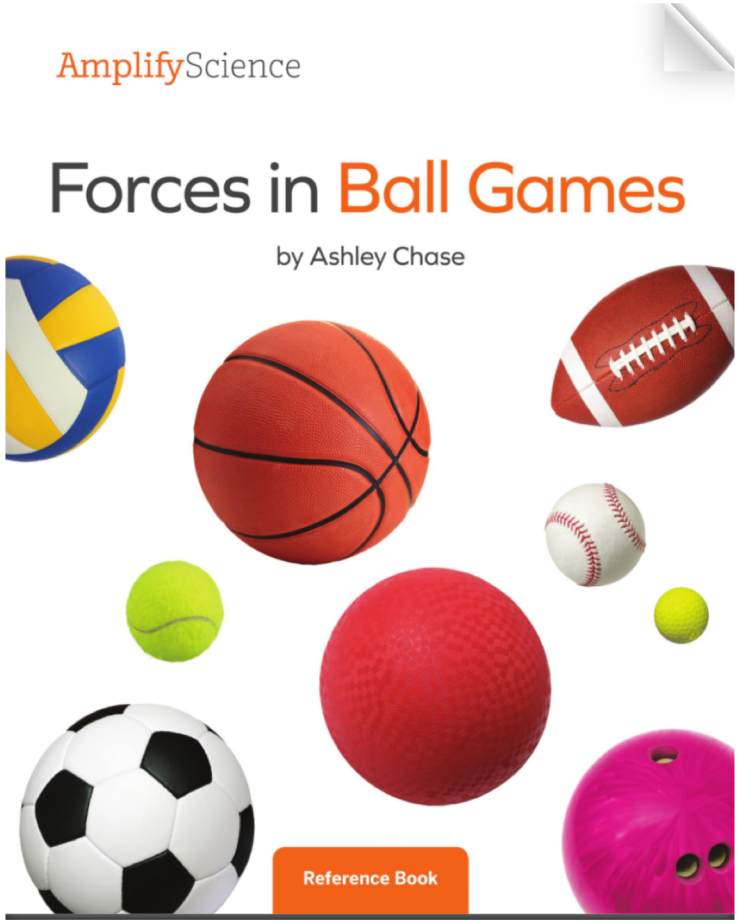
Chapter 2: How do we make a pinball move as far as we want?

JUMP DOWN TO CHAPTER OVERVIEW

Lesson 2.1:
Exploring Shorter and Longer Distances

Lesson 2.2:
Strong and Gentle Forces

Lesson 2.3:
Designing a New Launcher



Today, we will read to build on what we've learned about forces.

What do you notice about the front cover?

Contents

Show students the content page to demonstrate how to locate information.

Introduction

People love to play ball games. A ball game is any game with a ball in it.

To play a ball game, you need to make the ball move. To make a ball move, you need to **exert** a **force** on it. Forces are pushes and pulls.

You can exert a force on a ball by hitting it, kicking it, bouncing it, throwing it, or catching it. There are lots of other ways, too.

In many games, players need to get the ball to a goal. Soccer is a game like this. To make the ball go into the goal, you have to exert a force on the ball in the **direction** of the goal.

The goal might be nearby or very far away. You can make a ball move a long **distance** by exerting a strong force on it. You can exert a gentle force on the ball to make it move a short distance instead.

You can make a ball move fast or slow. The stronger the force you exert on the ball, the faster it will go.

This is a book about forces in ball games.

How does the ball move in baseball?

The men played baseball. This player hit the ball hard with the bat. The ball went fast. It flew far away.

The ball went a long **distance** because the bat **exerted** a strong **force** on it.

This player hit the ball gently with the bat. The ball moved slowly. It landed nearby.

The ball went a short distance because the bat exerted a gentle force on it.

How does the ball move in croquet?

The girl played croquet (kro-KAY). She wanted the ball to go to the striped stick. The stick was not far away. She hit the ball gently with the mallet. It rolled slowly to the stick.

The ball went a short **distance** because the mallet **exerted** a gentle **force** on it.

Turn to pages 12-13 and read aloud.

The ball rolled to the striped stick. It hit the stick and bounced back a little.

The ball changed **direction** when it hit the stick because the stick exerted a force on the ball.

Strong Force vs. Gentle Force

Have students act out a strong force and then a gentle force.

Strong Force vs. Gentle Force

1. Set Rugball purpose
2. Review Rugball expectations
3. Begin the activity by having a volunteer move the rugball
4. Ask the volunteer to describe what she did
5. Allow other volunteers to move the rugball long or short distances

Strong Force vs. Gentle Force

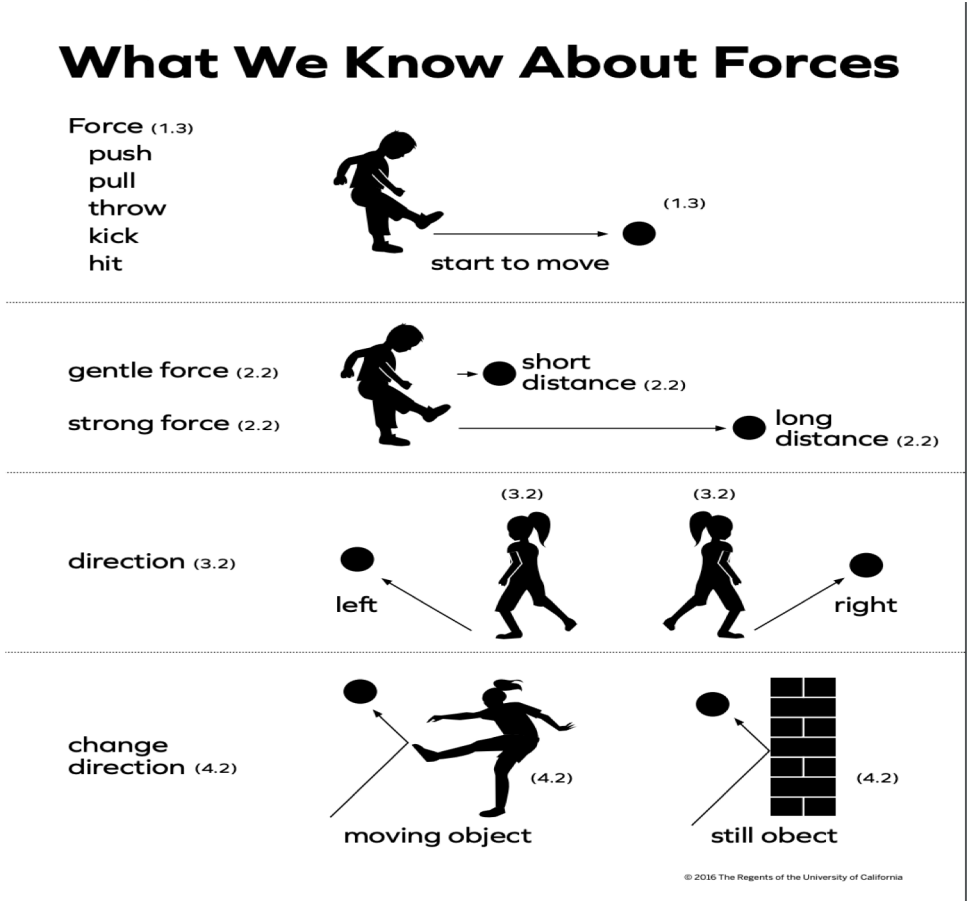
6. Allow volunteers to move the rugball long or short distances.

7. Allow other volunteers to determine whether they want the ball to roll a long distance or a short distance.

8. Ask students to compare the forces applied by different students.

9. Conclude the rugball game.

Add To The Chart



Key Concepts

An object moves a long distance when a strong force is exerted on it.

An object moves a short distance when a gentle force is exerted on it.

You will practice **sorting** force cards. Visualize whether you think the force was strong or gentle.

The way the object moved is the effect then you will think about what cause the object to move the way it did.

Pushes and Pulls: Designing a Pinball Machine

Problem students work to solve

How can we create a pinball machine for our class?

Chapter 2 Question

How do we make a pinball move as far as we want?

Pg. 6

Investigation Question

What makes an object move shorter or longer distances? (2.1-2.3)

Evidence sources and reflection opportunities

- Engage in Embodied Forces Routine to practice moving short and long distances (2.1)
- Investigate how to make a tennis ball move a short distance and a long distance in partners (2.1)
- Investigate making an object move short and long distances in full-class Rugball routine (2.1)
- Read Forces in Ball Games to find out about strong and gentle forces in sports (2.2)
- Practice exerting strong and gentle forces in full-class Rugball routine (2.2)
- Sort images of objects moving based on the strength of the force exerted (2.2)
- Use Explanation Language Frame to explain forces exerted in images from the sort (2.2)

What are students figuring out?

Key concepts

- An object moves a long distance when a strong force is exerted on it. (2.2)
- An object moves a short distance when a gentle force is exerted on it. (2.2)

Why post this key concept now?

Application of key concepts to problem

- Add shoelaces to student Box Models to control the strength of the forces the launchers exert (2.3)
- Diagram modified Box Model launcher designs (2.3)
- Modify Class Pinball Machine launcher (2.3)
- Shared Writing to explain the Chapter 2 Question (2.3)

Explanation that students can make to answer the Chapter 2 Question

To make our pinball go the distance we want, the rubber band launcher has to exert a strong force. To make it go a short distance, the rubber band launcher has to exert a gentle force. Attaching a shoelace to the rubber band launcher can help us adjust the force.

Chapter 2: How do we make a pinball move as far as we want?

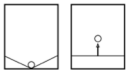
JUMP DOWN TO CHAPTER OVERVIEW

Lesson 2.1:
Exploring Shorter and Longer Distances

Lesson 2.2:
Strong and Gentle Forces

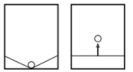
Lesson 2.3:
Designing a New Launcher

Pinball Machine Design Goals

- ☐ Make the pinball start to move. (1.4)  (1.5)
- ☐ Make the pinball move a short distance. (2.1)  (2.3)
- ☐ Make the pinball move a long distance. (2.1)  (2.3)
- ☐ Make the pinball move to the left. (3.1)  (3.5)
- ☐ Make the pinball move to the right. (3.1)  (3.5)
- ☐ Make the pinball hit a target. (3.3)  (3.5)
- ☐ Make the pinball change direction in different ways: (4.1)  (4.3)
  - by hitting a moving object (4.3)  (4.3)
  - by hitting a still object (4.3)

Re-view the pinball machine design goals chart and review the two design goals.

Pinball Machine Design Goals

- ☐ Make the pinball start to move. (1.4)  (1.5)
- ☐ Make the pinball move a short distance. (2.1)  (2.3)
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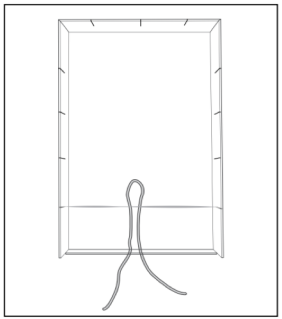
- ☐ Make the pinball move to the left. (3.1)  (3.5)
- ☐ Make the pinball move to the right. (3.1)  (3.5)
- ☐ Make the pinball hit a target. (3.3)  (3.5)
- ☐ Make the pinball change direction in different ways: (4.1)  (4.3)
  - by hitting a moving object (4.3)  (4.3)
  - by hitting a still object (4.3)

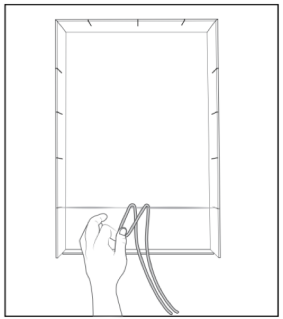
Discuss the pinball machine design goals chart and review the two design goals.

Box Model Preparation: Lesson 2.3

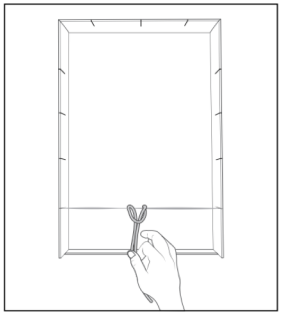
1. Double the shoelace over and slide it under the launcher.



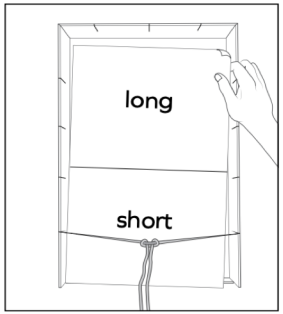
2. Pull the loop over the top of the launcher.



3. Pull the shoelace ends through the loop and tighten the knot.



4. Insert the mat.



Introduce the box model materials.

Name: _____ Date: _____

Box Model Diagram:
Drawing the Ball Moving a Short Distance

Directions:

1. Draw the launcher in orange.

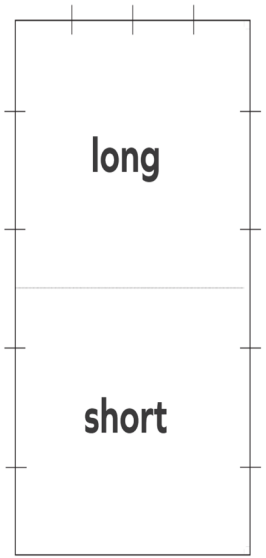
2. Draw the shoelace in black.

3. Draw the ball.

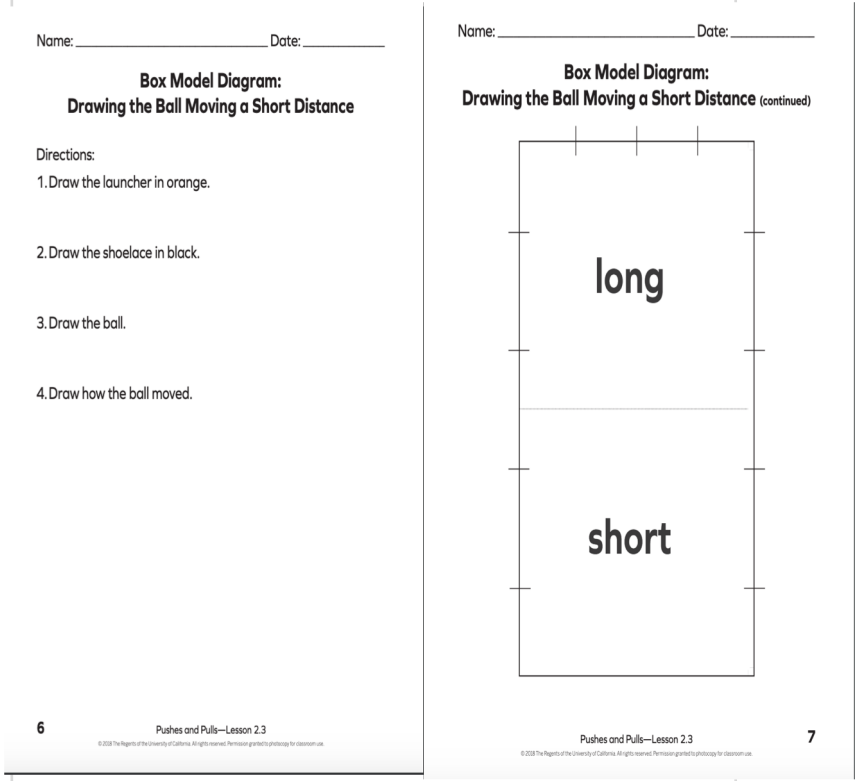
4. Draw how the ball moved.

Name: _____ Date: _____

Box Model Diagram:
Drawing the Ball Moving a Short Distance (continued)



Students draw a diagram in their Investigation Notebooks to record how the ball in the model moved a short distance and a long distance.



Name: _____ Date: _____

Box Model Diagram:
Drawing the Ball Moving a Short Distance

Directions:

1. Draw the launcher in orange.

2. Draw the shoelace in black.

3. Draw the ball.

4. Draw how the ball moved.

6 Pushes and Pulls—Lesson 2.3

Name: _____ Date: _____

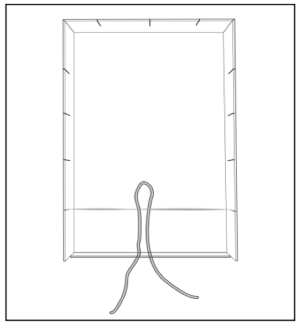
Box Model Diagram:
Drawing the Ball Moving a Short Distance (continued)

Pushes and Pulls—Lesson 2.3 7

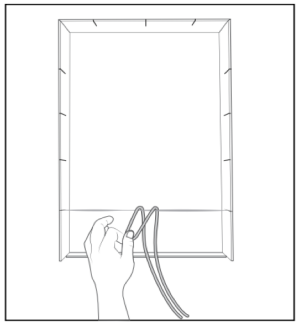
Remind students that engineers use notebooks to keep track of what they do so they can go back and learn from the information later.

Box Model Preparation: Lesson 2.3

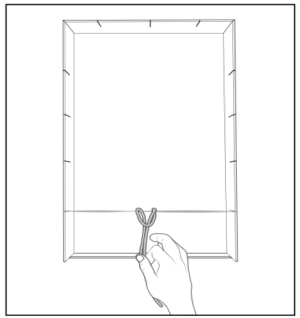
1. Double the shoelace over and slide it under the launcher.



2. Pull the loop over the top of the launcher.



3. Pull the shoelace ends through the loop and tighten the knot.



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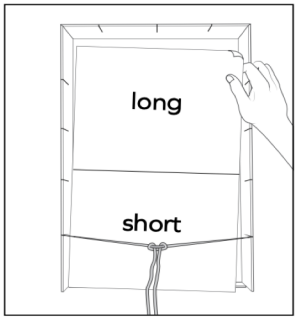
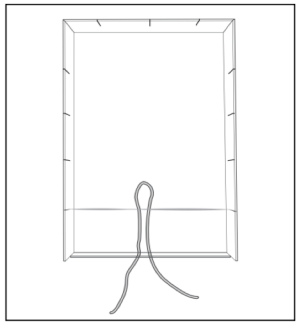


Think aloud as you use the Box Model to inform your diagram. Model looking at the position of the launcher and the shoelace in the Box Model as you draw your diagram. Emphasize that it is important that the diagram shows where objects are placed in the Box Model.

Box Model Preparation: Lesson 2.3

1. Double the shoelace over and slide it under the launcher.



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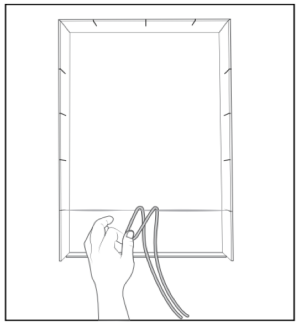

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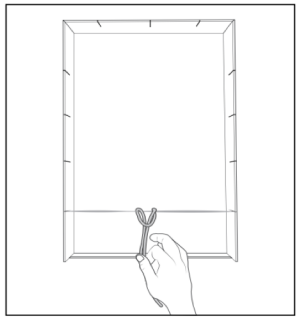
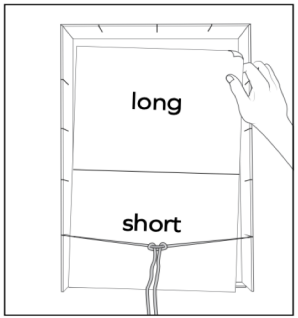


4. Insert the mat.



Modifying the Pinball Machine

Ask volunteers to point out where you might attach a shoelace to the Class Pinball Machine launcher so that the pinball can travel long distances and short distances.

Have partners talk about solutions.

Shared Writing: Lesson 2.3

What did we do to make the pinball move a short distance?
We pulled the shoelace back a little bit and let it go.

Why did that make the pinball move a short distance?
It moved a short distance because the force was gentle.

What did we do to make the pinball move a long distance?
We pulled the string back a lot and let it go.

Why did that make the pinball move a long distance?
It moved a long distance because the force was strong.

Set the purpose for Shared Writing.
Read the Chapter 2 Question aloud.
How do we make a pinball move as far as we want?
Review the purpose of the Shared Listening routine.
Provide the first Shared Listening prompt. Write "What did we do to make the pinball move a short distance?" at the top of the chart paper.
Record students' response to the first prompt.

- 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

Unpack and Analyze the Embedded Formative Assessment Data p.13

What do you notice about each diverse learner needs?

What connections can you make to each learner's profile?

How would you use the **Now What** strategies to support each learner?

Amplify Science

[On-The- Fly Status of the Class Data Organization Tool]

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.

Sample Classroom Profile

Learner A: Gets along well with others. Enjoys learning but is unable to focus for extended periods of time therefore often misses pertinent information. Has difficulty holding a pencil, manipulating items, and attending to details.

Learner B: Enjoys participating in classroom discussions. When provided a specific question he is eager to answer but often has lengthy responses that are unrelated to the question.

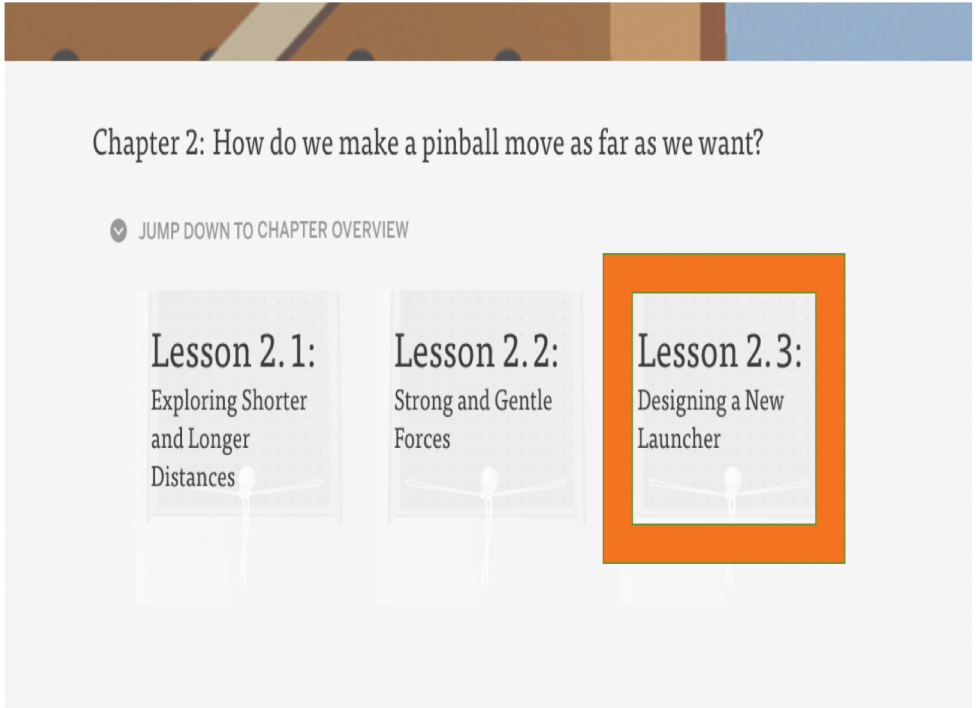
Learner C: This new student enjoys expressing himself through art and drawings. He has a difficult time verbally expressing himself as English is his second language. This student has strong comprehension skills and has adapted to using the classroom artifacts to help him express himself.

Learner D: Enjoys Science activities and is enthusiastic about learning. She works best when provided independent tasks and does not work well in collaborative group settings. She is able to express herself well both verbally and in writing.

Let’s see what students will need to know and be able to do in the upcoming lesson?

Turn and Talk

If the preconceptions, misconceptions and/or academic behaviors are not addressed, what challenges might the teacher anticipate the following lesson?



Pushes and Pulls: Designing a Pinball Machine

Problem students work to solve

How can we create a pinball machine for our class?

Chapter 2 Question

How do we make a pinball move as far as we want?

How do previous lessons prepare students to apply key concepts to the problem

Investigation Question

What makes an object move shorter or longer distances? (2.1-2.3)

Evidence sources and reflection opportunities

- Engage in Embodied Forces Routine to practice moving short and long distances (2.1)
- Investigate how to make a tennis ball move a short distance and a long distance in partners (2.1)
- Investigate making an object move short and long distances in full-class Rugball routine (2.1)
- Read Forces in Ball Games to find out about strong and gentle forces in sports (2.2)
- Practice exerting strong and gentle forces in full-class Rugball routine (2.2)
- Sort images of objects moving based on the strength of the force exerted (2.2)
- Use Explanation Language Frame to explain forces exerted in images from the sort (2.2)

Pg.

Key concepts

- An object moves a long distance when a strong force is exerted on it. (2.2)
- An object moves a short distance when a gentle force is exerted on it. (2.2)

Application of key concepts to problem

- Add shoelaces to student Box Models to control the strength of the forces the launchers exert (2.3)
- Diagram modified Box Model launcher designs (2.3)
- Modify Class Pinball Machine launcher (2.3)
- Shared Writing to explain the Chapter 2 Question (2.3)

Explanation that students can make to answer the Chapter 2 Question

To make our pinball go the distance we want, the rubber band launcher has to exert a strong force. To make it go a short distance, the rubber band launcher has to exert a gentle force. Attaching a shoelace to the rubber band launcher can help us adjust the force.

Coherence FlowCharts

Reviewing coherence (5 mins):

- Review the Coherence Flowcharts for Chapters 1 & 3. CFs can be found on page __ of the Participant Notebook.
    - Partner A will review Ch. 1
    - Partner B will review Ch.3
- Partners will make connections between the application of key concepts section and the differentiation Brief for their chapter. Each partner will jot down key strategies for supporting Diverse Learners.

Pair share (5 mins):

- Partner A will take up to 1 minute to share connections for Ch. 1. Then Partner B will paraphrase what he/she heard the partner share.
- Then, Partner B will take up to 1 minute to share connections for Ch. 3. Then Partner A will paraphrase what he/she heard the partner share.

Pushes and Pulls: Designing a Pinball Machine

Problem students work to solve	How can we create a pinball machine for our class?
Chapter 1 Question	How do we make a pinball start to move?
Investigation Question	What makes an object start to move? (1.1-1.4)
Evidence sources and reflection opportunities	• Investigate how to make objects start to move in a classroom Movement Hunt (1.1) • Investigate making an object start to move in full-class Rugball routine (1.2) • Use recognizable images of objects moving to visualize movement (1.2) • Practice using cause and effect to explain everyday scenarios (1.2) • Read Talking About Forces (1.2) • Investigate how to make an object move by exerting a force on it using Forces Investigation materials (1.3) • Use Explanation Language Frame to explain forces and movement in Forces Investigation (1.3)
Key concepts	• An object starts to move when another object exerts a force on it. (1.3) • Forces happen between two objects. (1.3)
Application of key concepts to problem	• Design launchers to make a pinball start to move in individual student Box Models (1.4) • Diagram Box Model launcher design (1.4) • Add a launcher to make the pinball start to move in Class Pinball Machine (1.5) • Shared Writing to explain the Chapter 1 Question (1.5) • Revisit Talking About Forces to use Explanation Language Frame to explain how objects move in the text (1.5)
Explanation that students can make to answer the Chapter 1 Question	To make our pinball start to move, we must exert a force on the pinball. We can use a rubber band launcher to exert a force on the pinball.

Pushes and Pulls: Designing a Pinball Machine

Problem students work to solve

How can we create a pinball machine for our class?

Chapter 3 Question

How do we make a pinball move to a certain place?

Investigation Questions

What makes an object start moving in a certain direction? (3.1-3.2)

What makes an object move to a certain place? (3.3-3.5)

Evidence sources and reflection opportunities

- Investigate how to make a tennis ball move in different directions in small groups (3.1)
- Investigate making an object move in different directions in full-class Rugball routine (3.1)
- Use images in Building with Forces to visualize making objects move in different directions (3.1)
- Read Building with Forces (3.2)
- Use Explanation Language Frame to explain movement in images from Building with Forces (3.2)
- Use shoelaces in student Box Models to control the direction of the force the launcher exerts (3.2)

- Investigate how to make a tennis ball move to a target in partners (3.3)
- Investigate making an object move to a certain place in full-class Rugball routine (3.3)
- Predict direction and strength of force required to hit a target, and then test predictions (3.3)
- Use Explanation Language Frame to explain how to move an object to a certain place (3.4)

Key concepts

- An object starts to move in the same direction as the force that starts the motion. (3.2)

- Every force has a strength—gentle or strong—and a direction. (3.3)
- Every force has a strength—gentle or strong—and a direction, which makes the object move a certain distance and direction. (3.4)

Application of key concepts to problem

- Control direction and strength exerted by the launcher to move a pinball to a target in student Box Models (3.4)
- Diagram how to move the pinball to a target in student Box Models (3.4)
- Make the pinball move to a target in Class Pinball Machine (3.5)
- Shared Writing to explain the Chapter 3 Question (3.5)
- Revisit Forces in Ball Games to explain how objects move to a specific place (3.5)

Explanation that students can make to answer the Chapter 3 Question

To get the pinball moving in the direction we want (left or right), we must exert a force on the pinball in the direction that we want it to move.

Engaging with ideas over multiple activities

- Supports all learners
- Supports making connections
- Provides different, related pieces of evidence
- Models what scientists do
- Situates concepts in a variety of contexts

Walk and Talk:

- Which learner profile would you like to focus on during the model lesson?
- What types of modifications do you think would be beneficial to this learner's needs?

Learner A: Gets along well with others. Enjoys learning but is unable to focus for extended periods of time therefore often misses pertinent information. Has difficulty holding a pencil, manipulating items, and attending to details.

Learner B: Enjoys participating in classroom discussions. When provided a specific question he is eager to answer but often has lengthy responses that are unrelated to the question.

Learner C: This new student enjoys expressing himself through art and drawings. He has a difficult time verbally expressing himself as English is his second language. This student has strong comprehension skills and has adapted to using the classroom artifacts to help him express himself.

Learner D: Enjoys Science activities and is enthusiastic about learning. She works best when provided independent tasks and does not work well in collaborative group settings. She is able to express herself well both verbally and in writing.

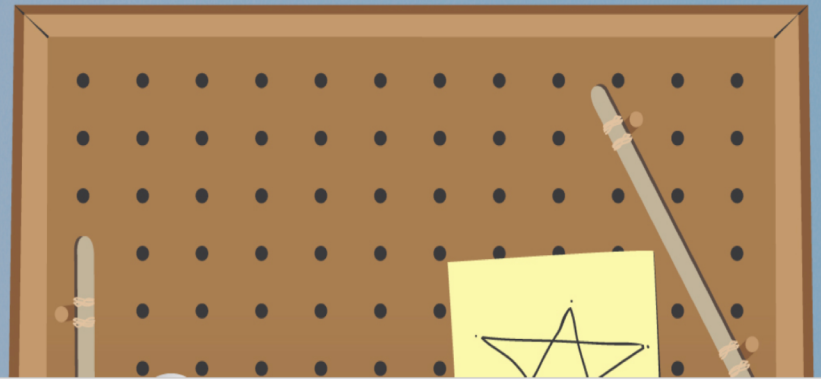
As you experience the Lesson...

A. Stay in the role of the student

A. Jot down thoughts or questions on the “Keeping Diverse Learner Needs in Mind” note-catcher
(you will have time to add more thoughts to this document after experiencing the lesson)

Model Lesson 5.2

Lesson 5.2:
Testing and Improving Our Box Models



Lesson Brief (4 Activities)

1 READING Completing Read-Aloud: Room 4...

2 TEACHER-LED DISCUSSION Reflecting on

3 HANDS-ON Testing in the Box Model

4 WRITING Introducing the Mini-Book

RESET LESSON

GENERATE PRINTABLE LESSON GUIDE

Lesson Brief

- Overview
- Materials & Preparation
- Differentiation
- Standards
- Vocabulary

Digital Resources

- All Projections
- What Engineers Do Chart: Completed
- Completed Box Model
- Sample Incorrect Box Model Diagram
- How to Play Pinball with Forces Mini-Book copymaster
- Pinball Machine Design Goals Checklist copymaster

Español

It’s Lunch Time

Reflection Part 1

Solo Time (5 minutes)

- Navigate to the model lesson:
  Chapter __5__ Lesson __2__
- Review the differentiation brief and jot down notes on the note-catcher "Keeping Diverse Learner Needs in Mind" to describe the supports you think would would best support your diverse learner

Keeping Diverse Learner Needs in Mind
Reflection Tool

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

Cirlce 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?

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?

Reflection Part 2

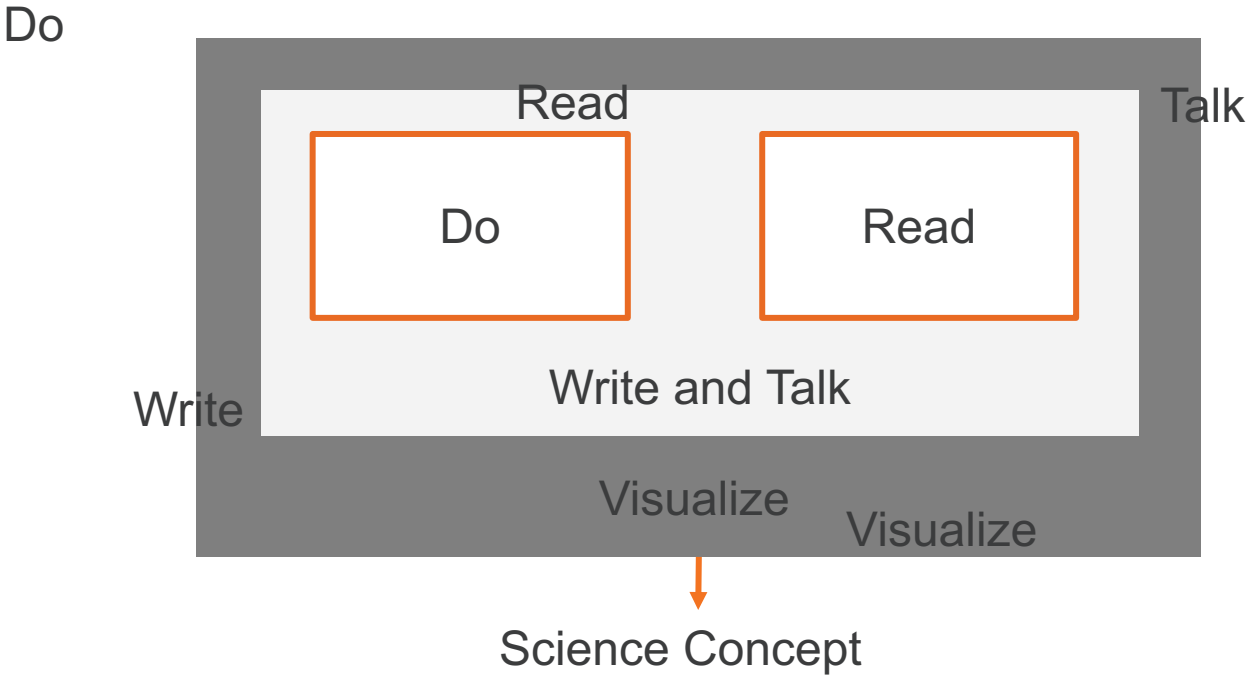
Collaborative Group (20 minutes)

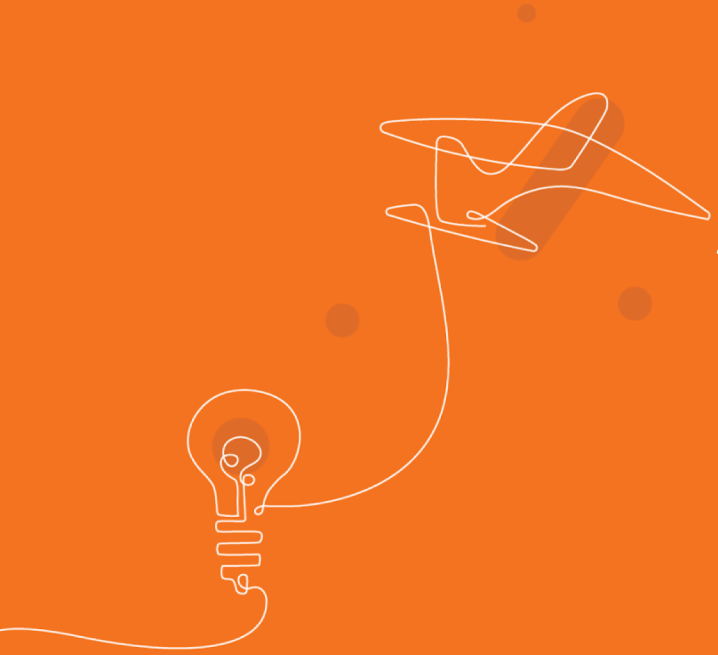
- Form Groups A - D to represent each learner profile
- Share and synthesize your reflections on chart paper
- Choose 1 person from your group to synthesize your groups thinking

Multimodal instruction

Do, Talk, Read, Write, Visualize

What role does language and literacy play in developing scientific understanding?



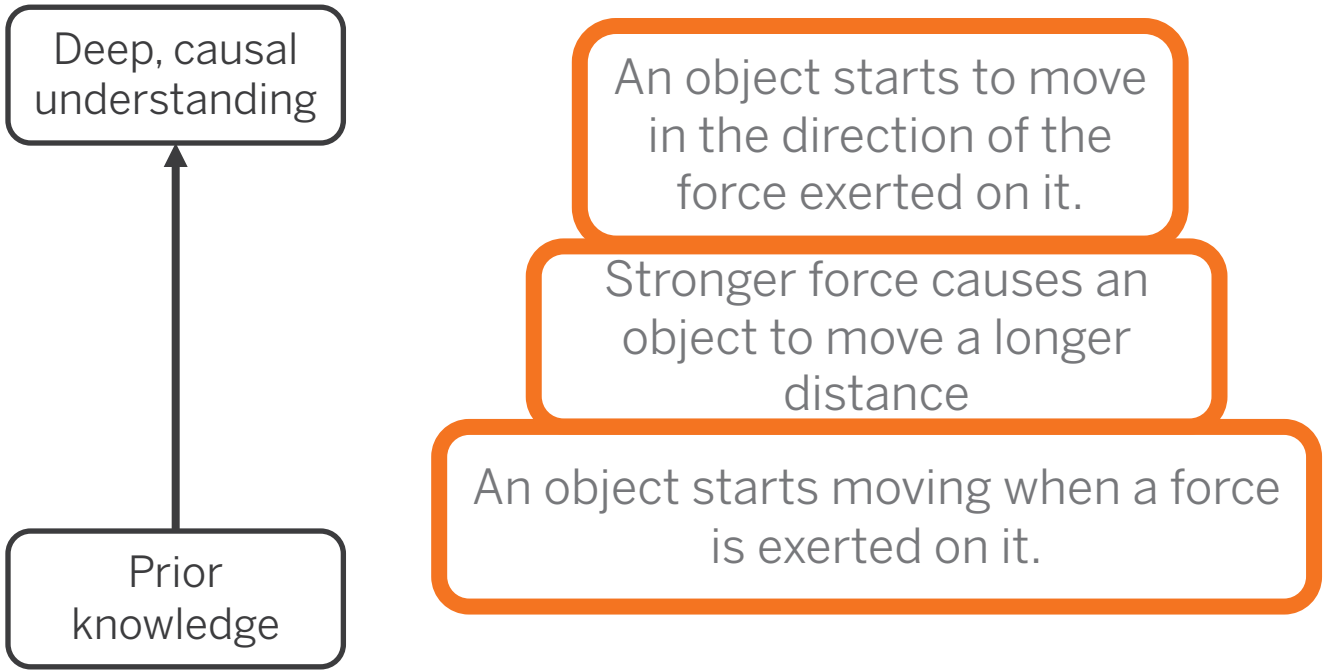


Building Complex Explanations Across the Unit

Coherence and Progress Builds

Progress Build: A unit-specific learning progression

Progress Build: A unit-specific learning progression



Pushes and Pulls: Designing a Pinball Machine

Problem students work to solve

How can we create a pinball machine for our class?

Chapter 4 Question

How do we make a moving pinball change direction?

Investigation Question

What can make a moving object change direction? (4.1-4.2)

Evidence sources and reflection opportunities

- Investigate how to make a moving tennis ball change direction in partners (4.1)
- Investigate making a moving object change direction in full-class Rugball routine (4.1)
- Engage in Embodied Forces Routine to practice changing direction (4.1)
- Read about moving objects changing direction in Forces in Ball Games (4.2)
- Use Explanation Language Frame to explain how the moving Rugball, and moving balls in Forces in Ball Games, change direction (4.2)

Key concepts

- A moving object changes direction when another moving object exerts a force on it. (4.2)
- A moving object changes direction when a still object in its way exerts a force on it. (4.2)

Application of key concepts to problem

- Add flippers and bumpers to student Box Models to change a moving pinball's direction (4.3)
- Diagram modified Box Model launcher design (2.3)
- Modify Class Pinball Machine to add flippers and bumpers (4.3)
- Shared Writing to explain the Chapter 4 Question (4.3)

Explanation that students can make to answer the Chapter 4 Question

To make a moving pinball change direction, we have to exert another force on it, either from a moving object or from a still object in its path.

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Analyzing the End of Unit Assessment

- Annotate the End of Unit Assessment (3 minutes)

  Circle **vocabulary**
  Considering the diverse learners in your classroom , **underline potential challenges**
  Ask questions in the left margin
  Write DCI to represent a Disciplinary Core Idea
  Write SEP to represent a Science and Engineering Practice
  Write CCC to represent a Crosscutting concept

- What kind of data could you gather from this EOU Assessment?
- What connections can you make between this EOU Assessment and the Coherence Flowcharts?
- What connections can you make between this EOU Assessment and to the unit's progress build?

Analyzing the End of Unit Assessment

- Complete the End of Unit Assessment by providing the best possible solution (3 minutes)
- Use the 3-part rubric to score and revise your work (7 minutes)

Turn and Talk to a Partner and discuss how you used the rubric to score and revise your work.

22 Lessons

Pushes and Pulls

Planning To Teach

- 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

Planning to teach

The purpose of this part of the day is for you to:

- Reflect on implementing Amplify Science in your classroom to select an area of growth.
- Apply learning from the session.

Planning to Teach

Teacher's Choice (20 mins)

Option # 1 Anticipating Preconceptions	Option # 2 Organizing Formative Assessment Data	Option #3 Classroom Artifacts	Option #4 Student Facing Rubrics	Option #5 End of Unit Assessment Analysis for Unit 1
Download the classroom slides for the upcoming lesson and include strategies from the Differentiation brief or your own teacher toolkit to address possible diverse learners needs.	Organize the look-fors for the the upcoming formative assessment using the Formative Assessment template (K-1, use the clipboard assessment for support)	Devise a strategy to enhance the classroom wall experience that supports diverse learner needs	Devise a **student facing rubric** combining the 3-dimensional rubrics from the Assessment Guide for unit 1 or 2	Devise teacher and student facing rubrics combining the 3-dimensional rubrics from the Assessment Guide

Reflecting on your plans (10 mins)

- *With your group, share which option you chose.*

- *Be prepared to share what you focused on, what you learned, and any remaining questions for the presenter.*

22 Lessons

Pushes and Pulls

Closing

- 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

Workshop Title: Supporting Diverse Learner Needs

By the end of this session, K-5 participants will be able to…

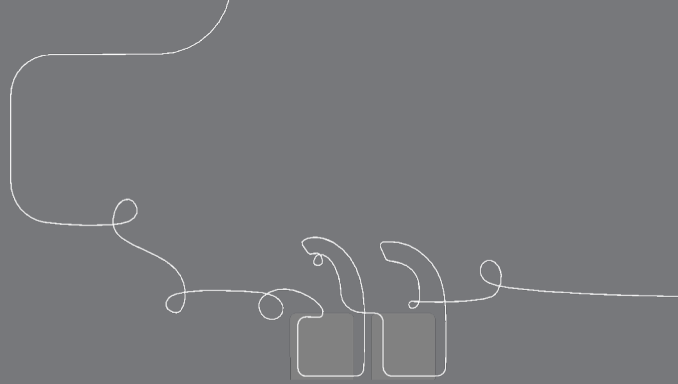
Did we meet the outcomes of this session?

- Identify embedded opportunities that support diverse learner needs within the unit of study
- Understand how to utilize the embedded multimodal curricular supports (do, talk, read, write, visualize) to help all students gather sources of evidence and argue like scientists
- Articulate the critical role that language and literacy play in developing scientific understanding
- Apply the End of Unit assessment rubric to understand student expectations
- Apply strategies that support diverse learner needs when planning instructional sequences

Closing

- ❑ Share 1 thing, from this session, that is “Sticking with You”. (I can apply)
- ❑ Share 1 thing, from this session, you are “Stuck On”. (I still need more support before I can apply)

Questions?



NYC Resource Site

https://www.amplify.com/amplify-science-nyc-doe-resources/

Amplify.

Introduction

Getting started resources

Planning and implementation resources

Admin resources

Parent resources

Professional learning resources

Questions

Missing Materials

- Contact the Core Curriculum Service Center Monday-Friday 8am-5pm

Email: curriculum@schools.nyc.gov

Phone: (718) 935-3334