Amplify Science

# Unit 1: Balancing Forces

## Getting Ready for Next Year - Planning Support (with a focus on Science & Engineering Practices)

## Grade 3

LAUSD
Date: May 7,2022
Presented by: James Kochi

# James Kochi - Amplify Science Facilitator

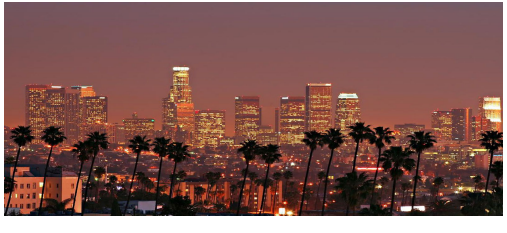
Born and raised in Kailua, O'ahu, Hawai'i

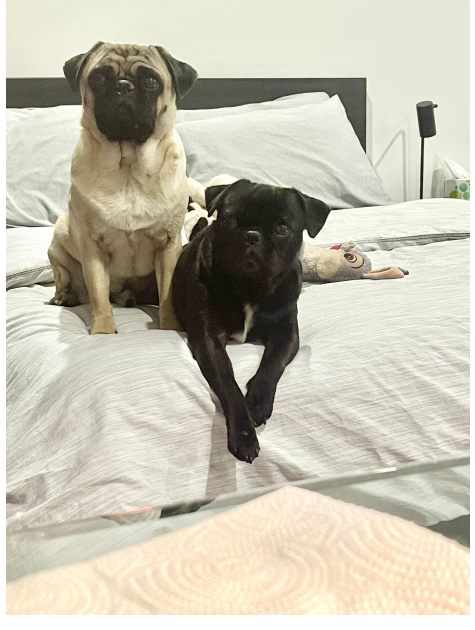
CA State Univ., San Marcos - Molecular Biology

Los Angeles USD for 22+years

Three Beautiful Teenagers

Pug Kids  Alfred and Arnold





# Amplify's Purpose Statement

**Dear teachers**,

You do a job that is nearly impossible and **utterly essential**.

**We are in your corner** – extending your reach, saving you time, and enhancing your understanding of each student.

**Thank you for working with us** to craft rigorous and riveting learning experiences for your classroom.

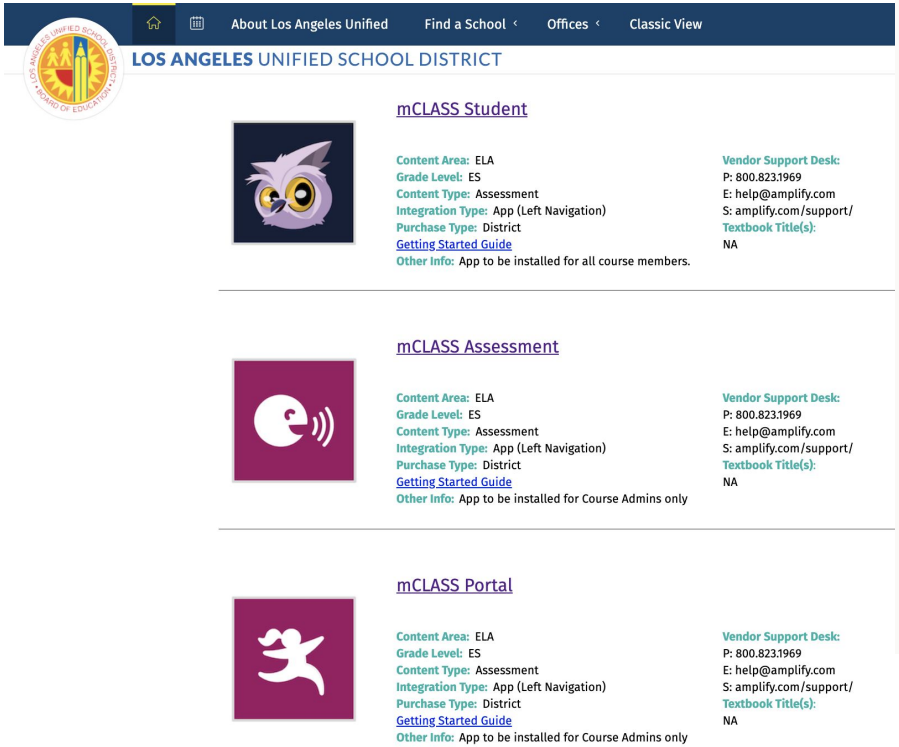
We share your goal of **inspiring all students to think deeply, creatively, and for themselves.**

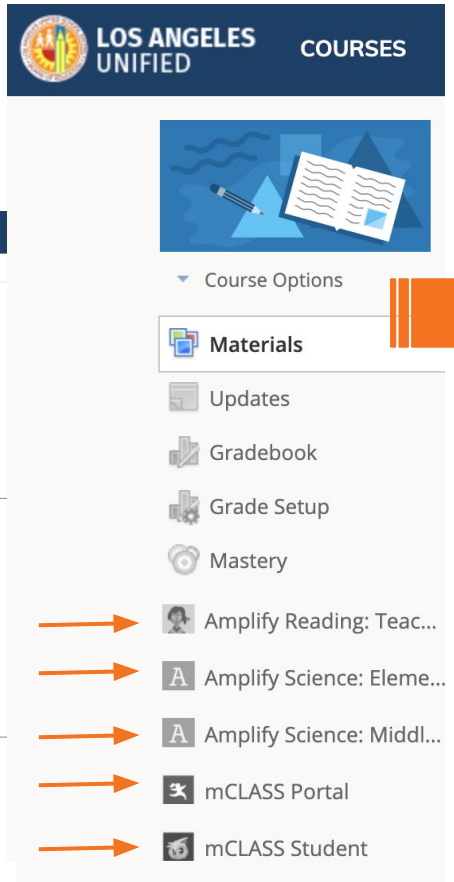
**Sincerely,**
**Amplify**

# Norms: Establishing a culture of learners

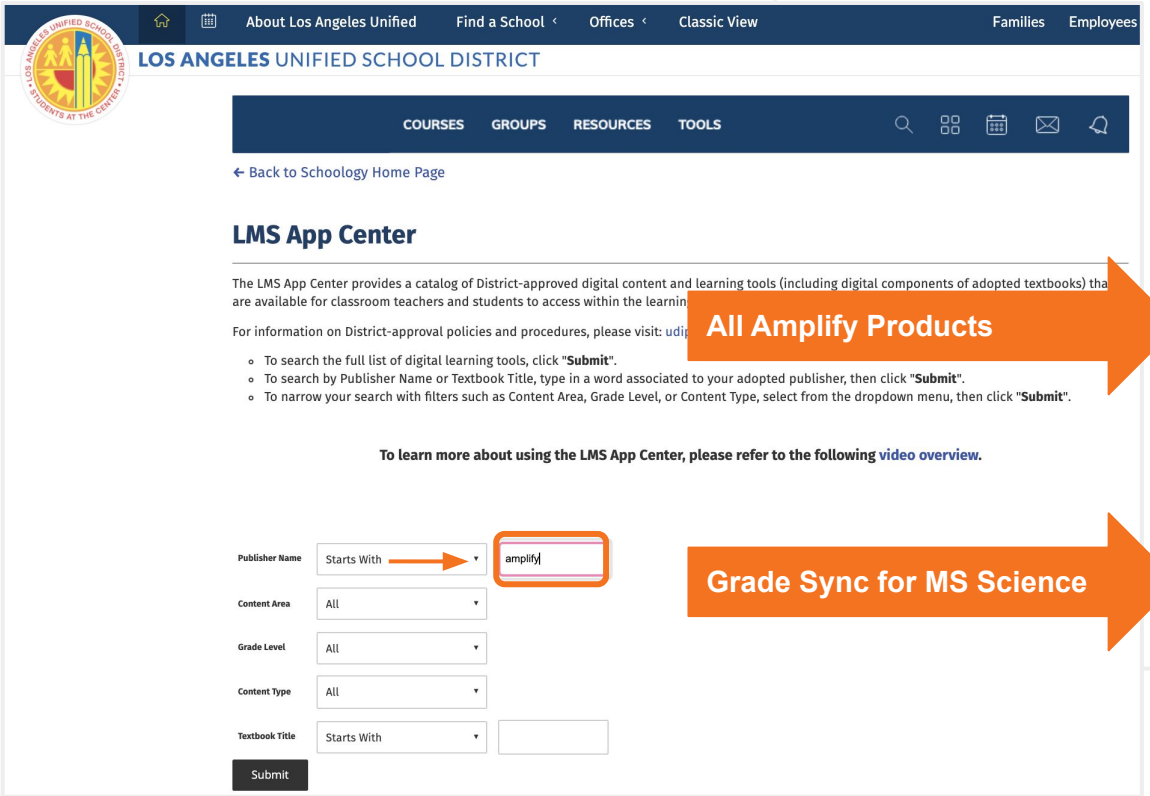
- **Take risks:** Ask any questions, provide any answers.
- **Participate:** Share your thinking, participate in discussion and reflection.
- **Be fully present:** Unplug and immerse yourself in the moment.
- **Physical needs:** Stand up, get water, take breaks.

# Last year's Amplify apps.



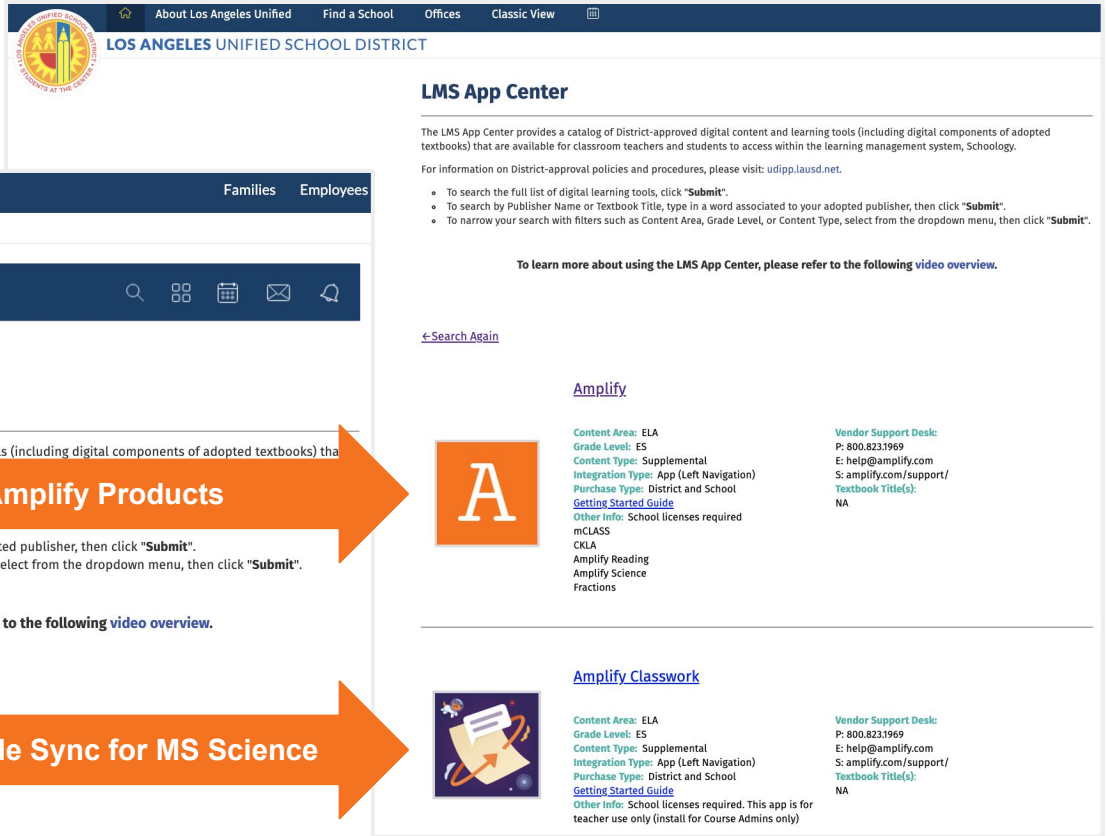




# This year's app(s).




**All Amplify Products**

**Grade Sync for MS Science**



# my.amplify.com

Amplify. MY ACCOUNT ADMIN REPORTS LAUNCH PROGRAMS TERIN NGO

mCLASS Educators: To view or make changes to your account go to mclass.amplify.com.

Hi, Terin

Classes

Programs & Licenses

Account Settings

Help Center

CKLA Hub

CKLA Resource Site

mCLASS Assessment

mCLASS Reporting

Reading 6-8

Reading K-5

Science

Vocabulary

# Amplify. on Schoology

2021-2022

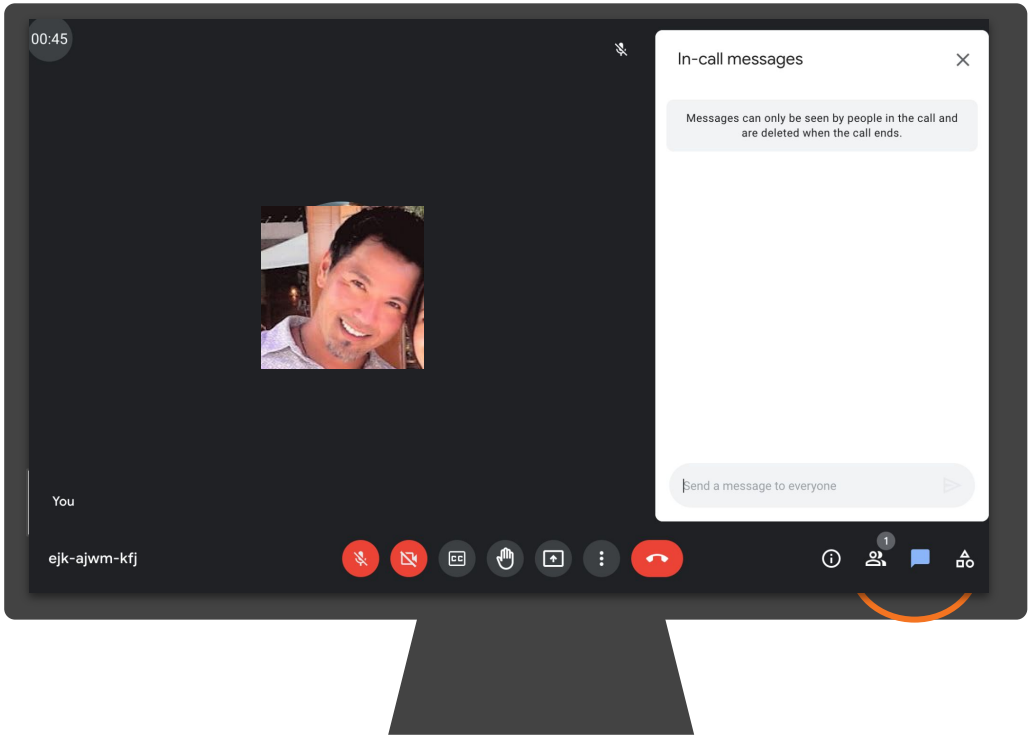
# Schoology

- To join Amplify ES Group: W4PK-W466-63F5B

# Ice Breaker!

## Who do we have in the room today?

- **Question: Now that we are coming to the end of this school year, what is one positive experience with your first year of implementing Amplify Science?**



# Navigation Temperature Check

Rate yourself on your comfort level accessing Amplify Science materials and navigating a digital curriculum.

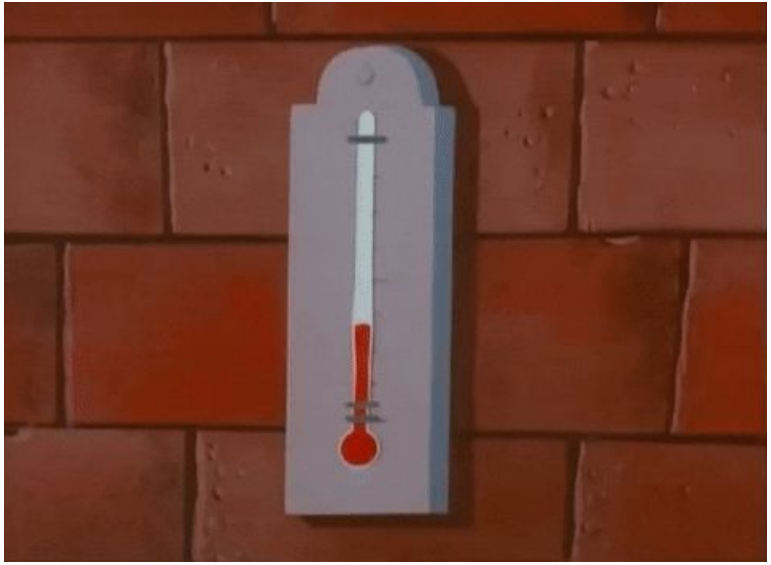
1 = Extremely Uncomfortable

2 = Uncomfortable

3 = Mild

4 = Comfortable

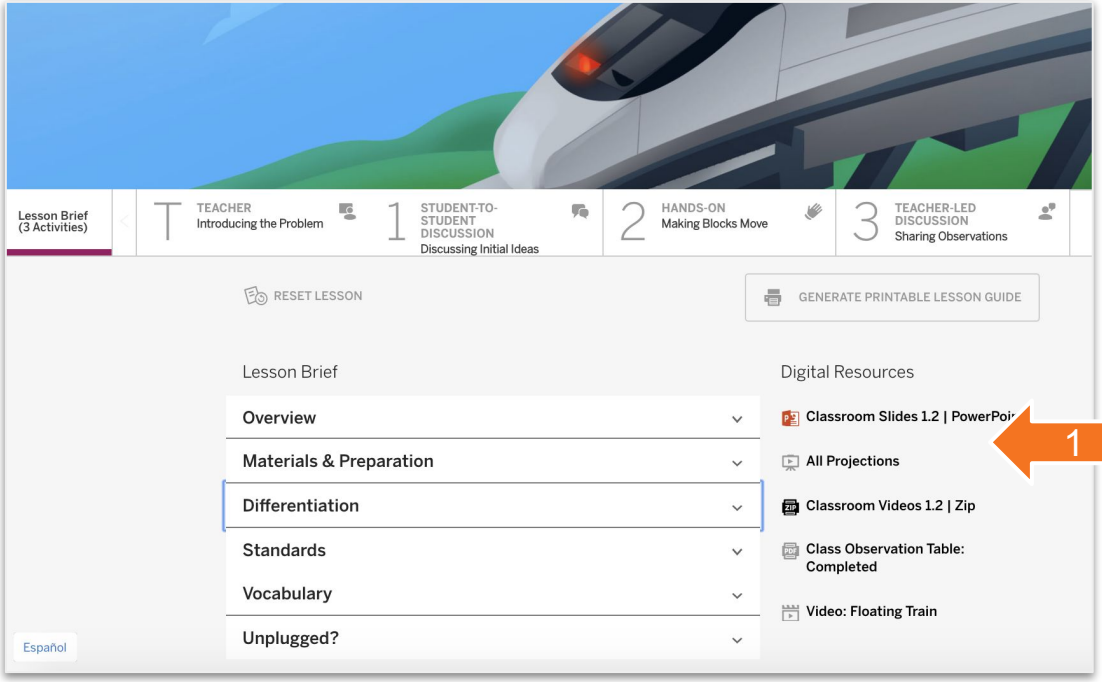
5 = Extremely Comfortable



# 4 Easy Steps to Teaching a lesson

**DIRECTIONS:**

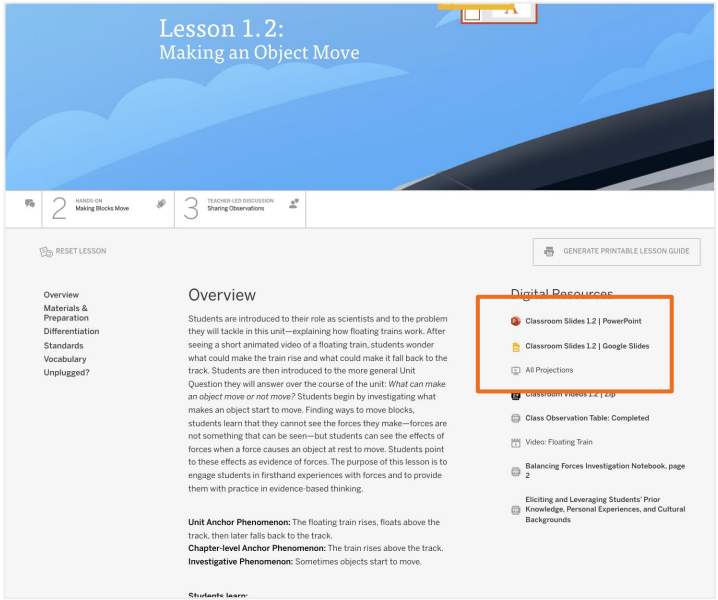
1. Download the **Classroom Slides** for **Lesson 1.1** and review them.
2. Read the **Overview**.
3. Explore the **Materials & Preparation** document.
4. Read the **Differentiation** document.



# Preparing to teach

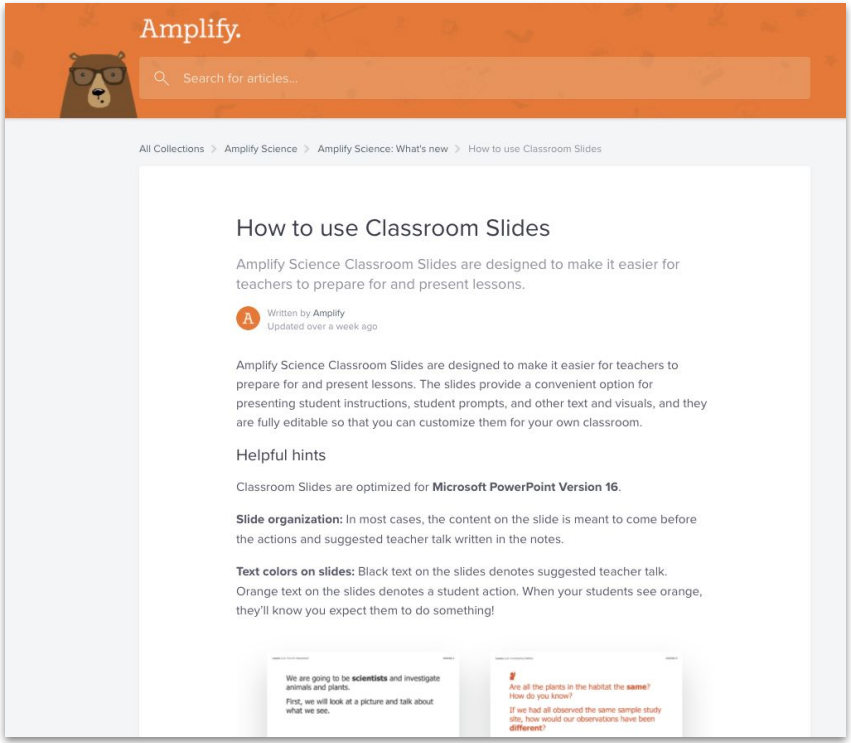
## Classroom Slides

1. Open the **Classroom Slides** under the **Digital Resources** (a lesson of your choice)
2. Read through the Classroom Slides including the **presenter notes** to gain a better understanding of the lesson.
3. **Consider:**
    - What features of the Classroom Slides will support you in teaching this lesson?



# Teaching with Classroom Slides

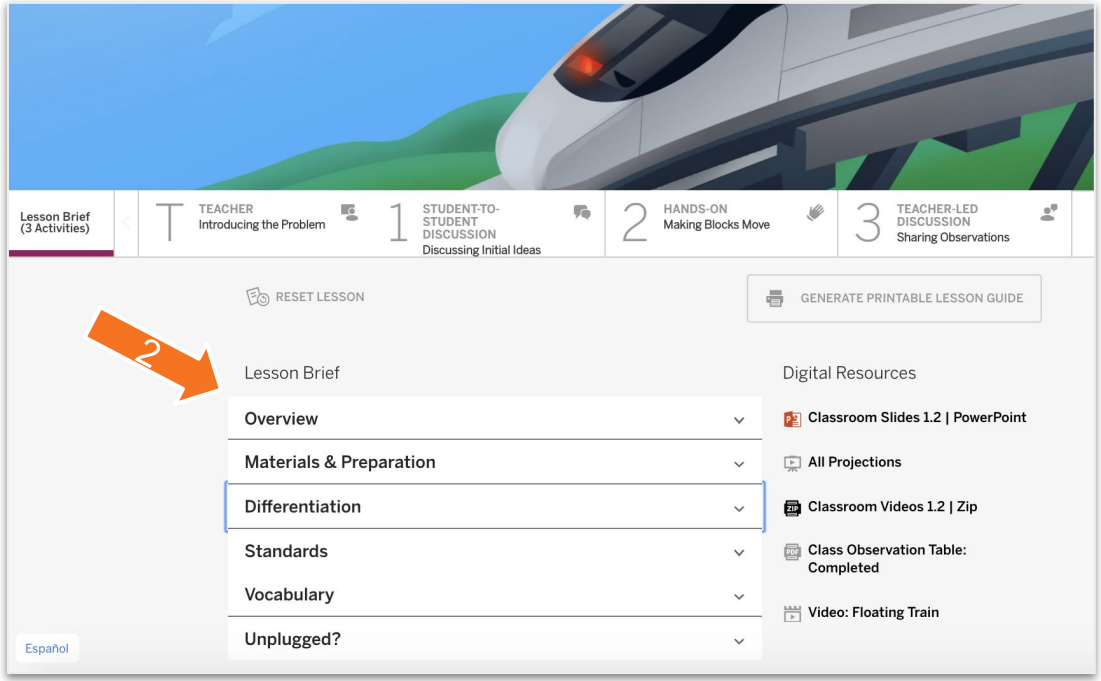
This detailed guide on the Amplify Science Help Site includes tips for teaching with Classroom Slides and information about the different symbols and activity types you'll find in the slide deck.



# 4 Easy Steps to Teaching a lesson

**DIRECTIONS:**

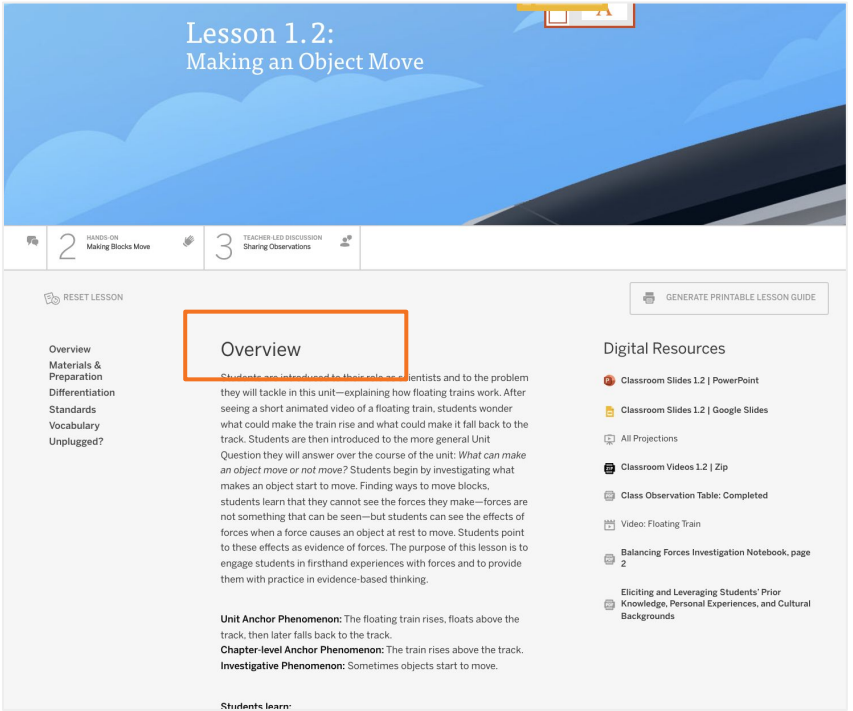
1. Download the **Classroom Slides** for **Lesson 1.2** and review them.
2. Read the **Overview**.
3. Explore the **Materials & Preparation** document.
4. Read the **Differentiation** document.



# Preparing to teach

## The Overview

- Read through the lesson overview.
- Find the purpose of the lesson.



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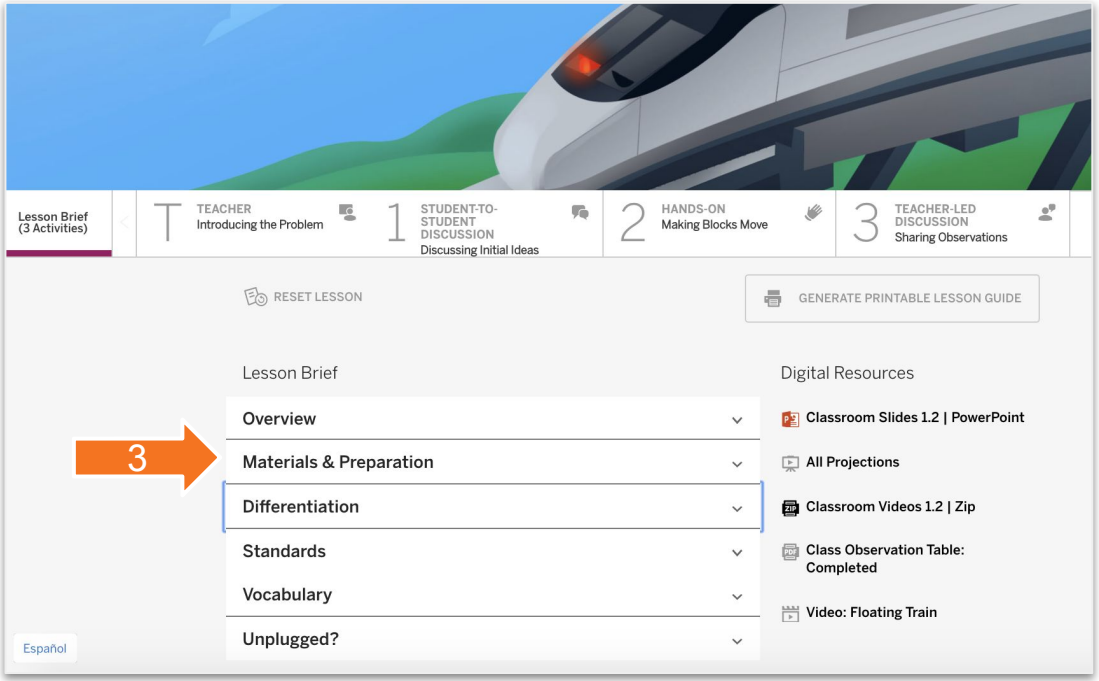
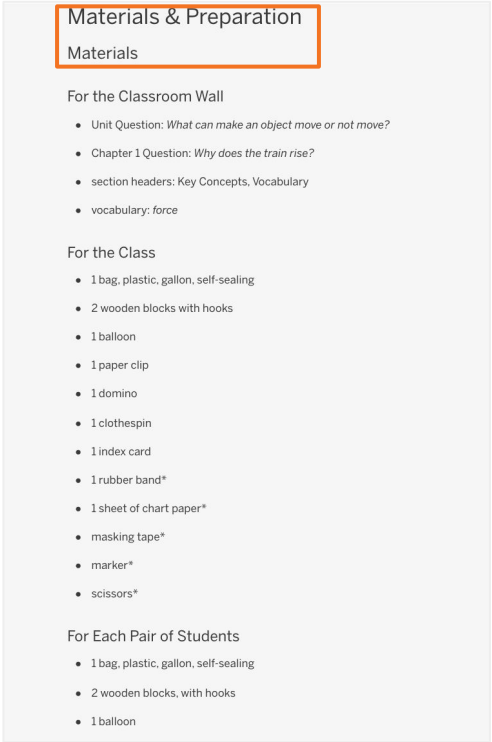


# Preparing to teach

## Materials and Prep

Review the materials needed for:

- The Classroom Wall
- For the Class
- For each pair of students (if applicable)
- Preparation



Materials & Preparation

Materials

For the Classroom Wall

- Unit Question: *What can make an object move or not move?*
- Chapter 1 Question: *Why does the train rise?*
- section headers: Key Concepts, Vocabulary
- vocabulary: *force*

For the Class

- 1 bag, plastic, gallon, self-sealing
- 2 wooden blocks with hooks
- 1 balloon
- 1 paper clip
- 1 domino
- 1 clothespin
- 1 index card
- 1 rubber band*
- 1 sheet of chart paper*
- masking tape*
- marker*
- scissors*

For Each Pair of Students

- 1 bag, plastic, gallon, self-sealing
- 2 wooden blocks, with hooks
- 1 balloon

# 4 Easy Steps to Teaching a lesson

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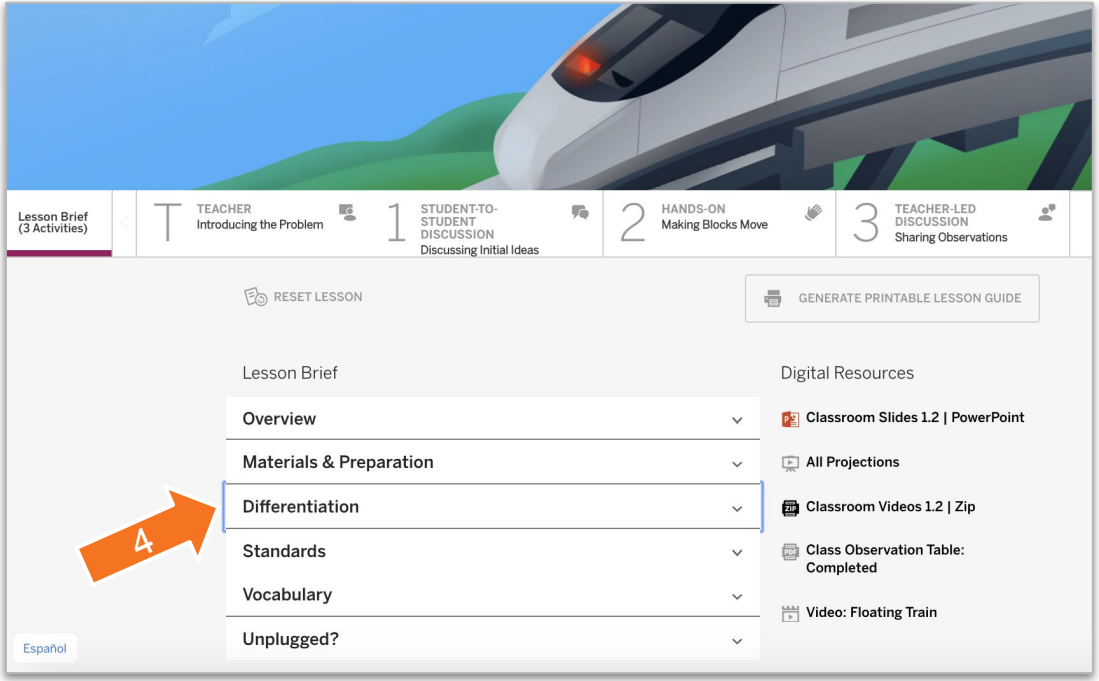
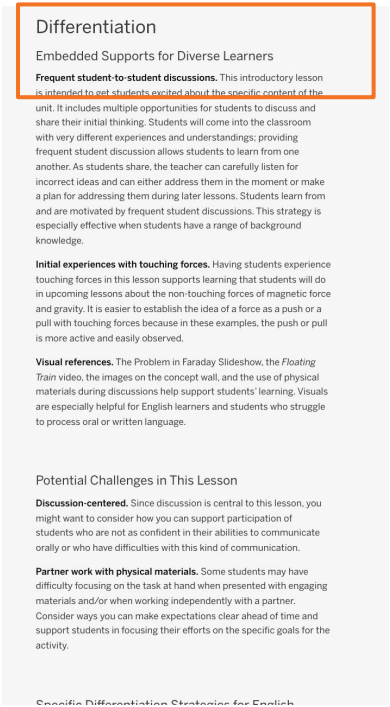


# Preparing to Teach

## Lesson-specific differentiation

- Embedded supports
- Potential challenges
- Strategies for:
  - English Learners
  - Students who need more support
  - Students who need more challenge



### Differentiation

#### Embedded Supports for Diverse Learners

**Frequent student-to-student discussions.** This introductory lesson is intended to get students excited about the specific content of the unit. It includes multiple opportunities for students to discuss and share their initial thinking. Students will come into the classroom with very different experiences and understandings; providing frequent student discussion allows students to learn from one another. As students share, the teacher can carefully listen for incorrect ideas and can either address them in the moment or make a plan for addressing them during later lessons. Students learn from and are motivated by frequent student discussions. This strategy is especially effective when students have a range of background knowledge.

**Initial experiences with touching forces.** Having students experience touching forces in this lesson supports learning that students will do in upcoming lessons about the non-touching forces of magnetic force and gravity. It is easier to establish the idea of a force as a push or a pull with touching forces because in these examples, the push or pull is more active and easily observed.

**Visual references.** The Problem in Faraday Slideshow, the *Floating Train* video, the images on the concept wall, and the use of physical materials during discussions help support students' learning. Visuals are especially helpful for English learners and students who struggle to process oral or written language.

#### Potential Challenges in This Lesson

**Discussion-centered.** Since discussion is central to this lesson, you might want to consider how you can support participation of students who are not as confident in their abilities to communicate orally or who have difficulties with this kind of communication.

**Partner work with physical materials.** Some students may have difficulty focusing on the task at hand when presented with engaging materials and/or when working independently with a partner. Consider ways you can make expectations clear ahead of time and support students in focusing their efforts on the specific goals for the activity.

Specific Differentiation Strategies for English

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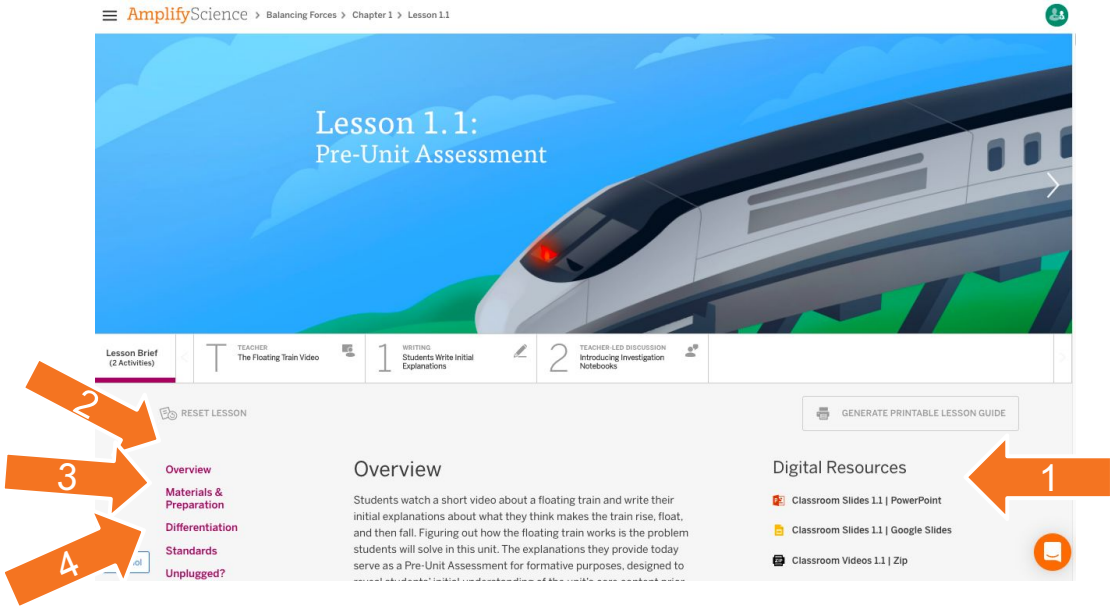
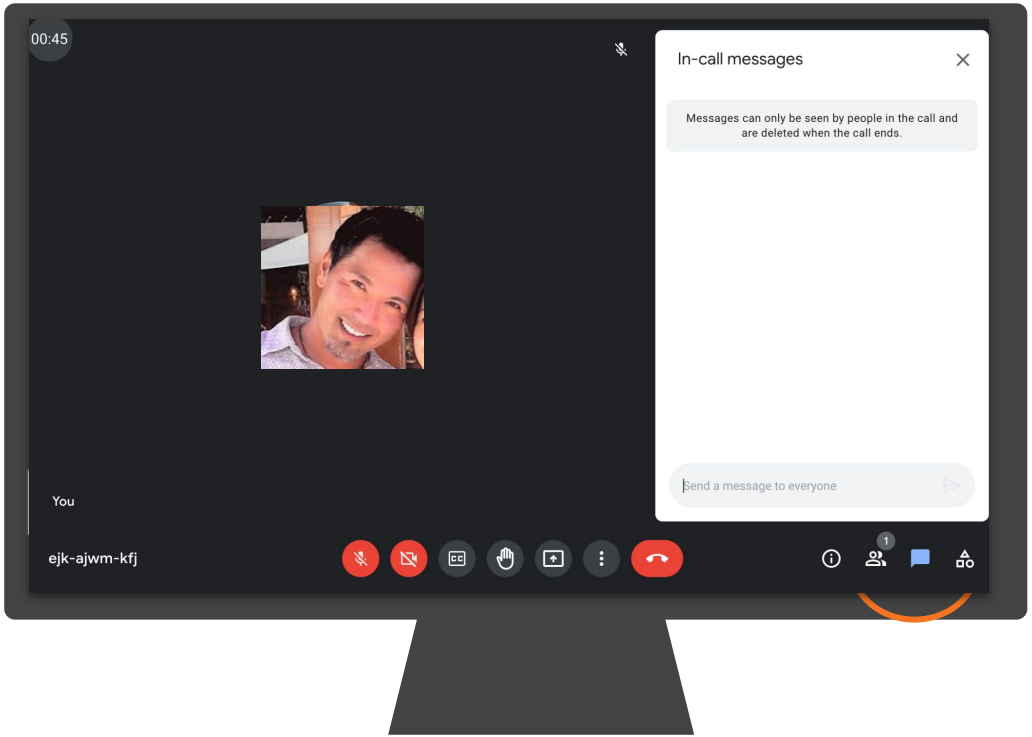


# Ice Breaker!

## Who do we have in the room today?

**Question:** In the chat, share one or two of the Science and Engineering Practices in NGSS.







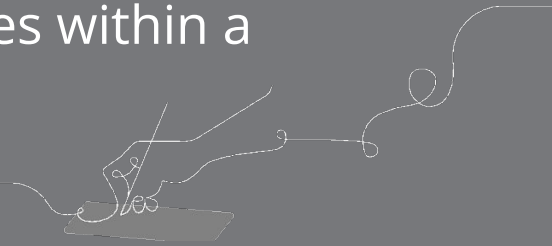
# Plan for the day

- Framing and Review
- Introducing the Unit
- Unit Internalization
- Identifying the Science and Engineering Practices (Unit and Chapters)
- Science and Engineering Practices within a lesson
- Lesson Planning
- Closing

# Overarching goals

By the end of this workshop, you will be able to:

- ❑ Internalize the unit
- ❑ Identify the Science and Engineering Practices within the unit
- ❑ Identify the Science and Engineering Practices within a lesson and how they are taught.
- ❑ Apply this knowledge to prepare to teach.

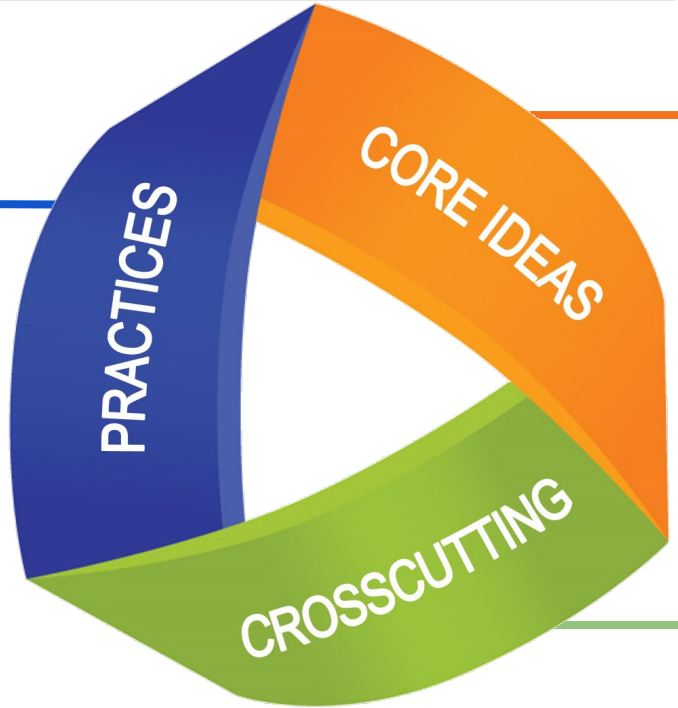


# Next Generation Science Standards

## Designed to help students build a cohesive understanding of science

**What scientists do**

Science and Engineering Practices




**What scientists want to know**

Disciplinary Core Ideas

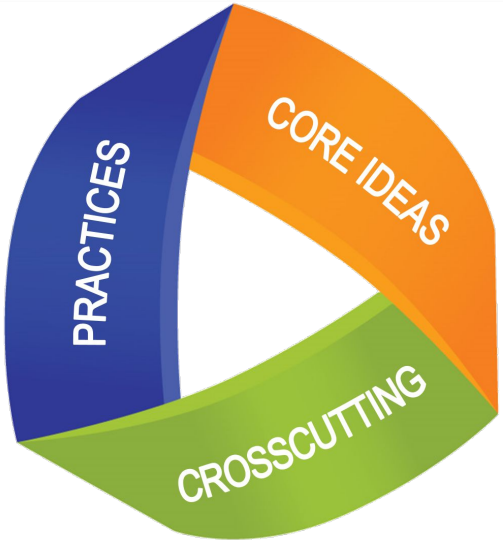
**How scientists think**

Crosscutting Concepts

# Next Generation Science Standards

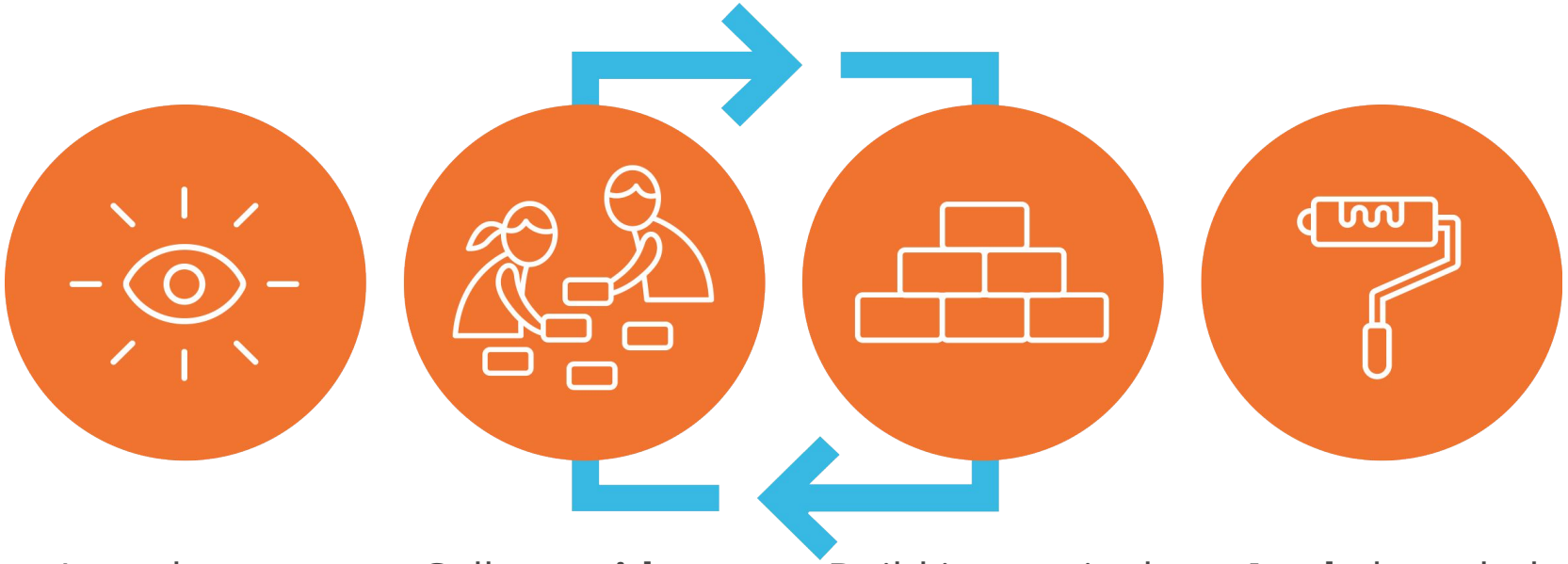
## Science and Engineering Practices

**"Language Intensive"**




1. Asking questions (for science) and defining problems (for engineering)
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 (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

# Amplify Science Approach



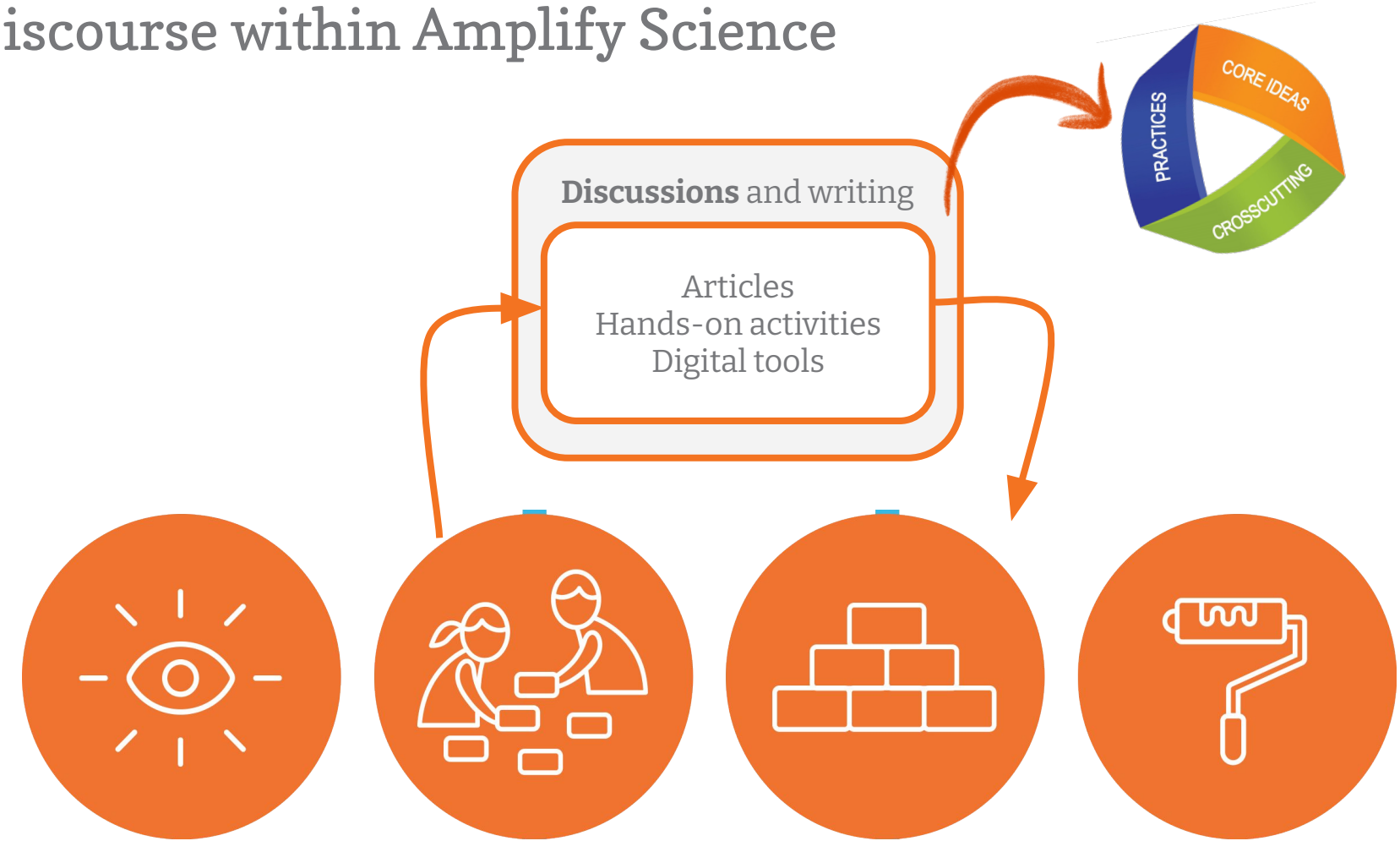
Introduce a **phenomenon** and a related problem

Collect **evidence** from multiple sources

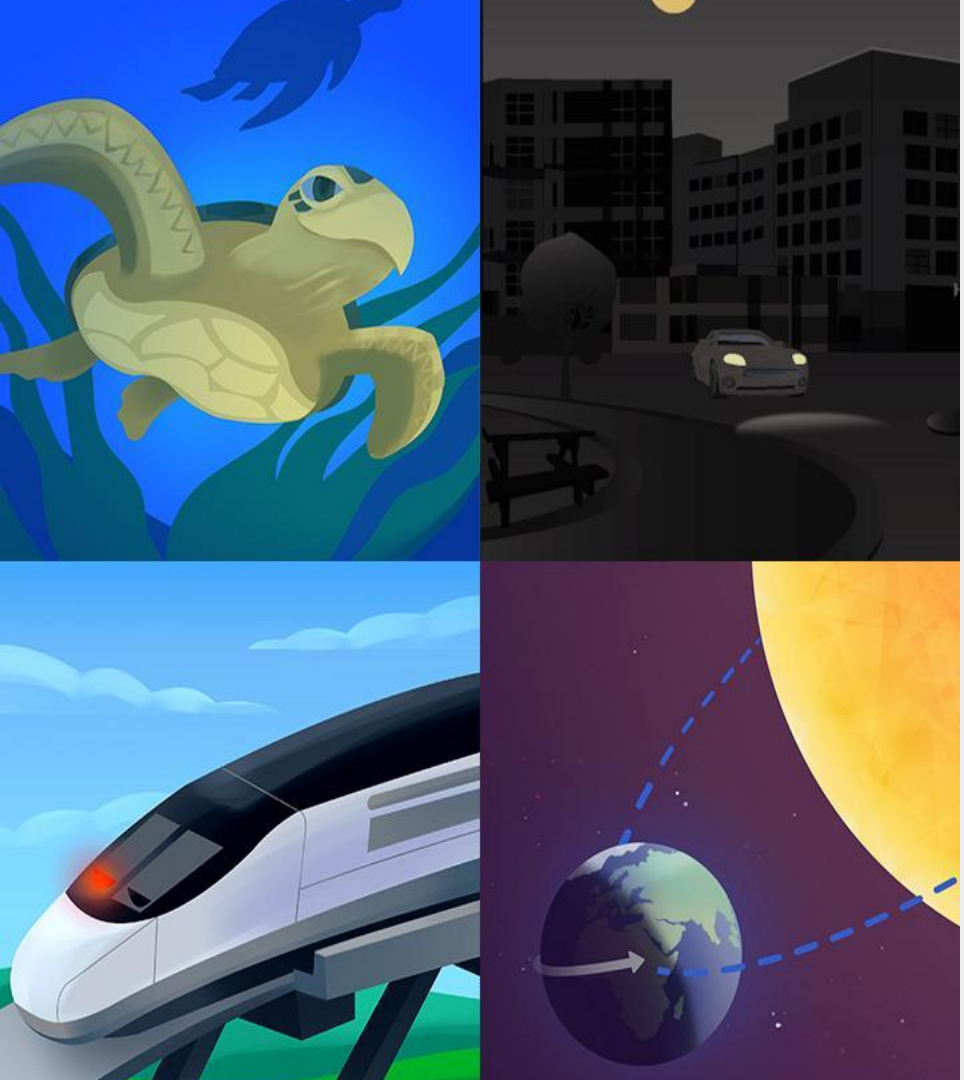
Build increasingly complex **explanations**

**Apply** knowledge to solve a different problem

# Discourse within Amplify Science



# Questions?



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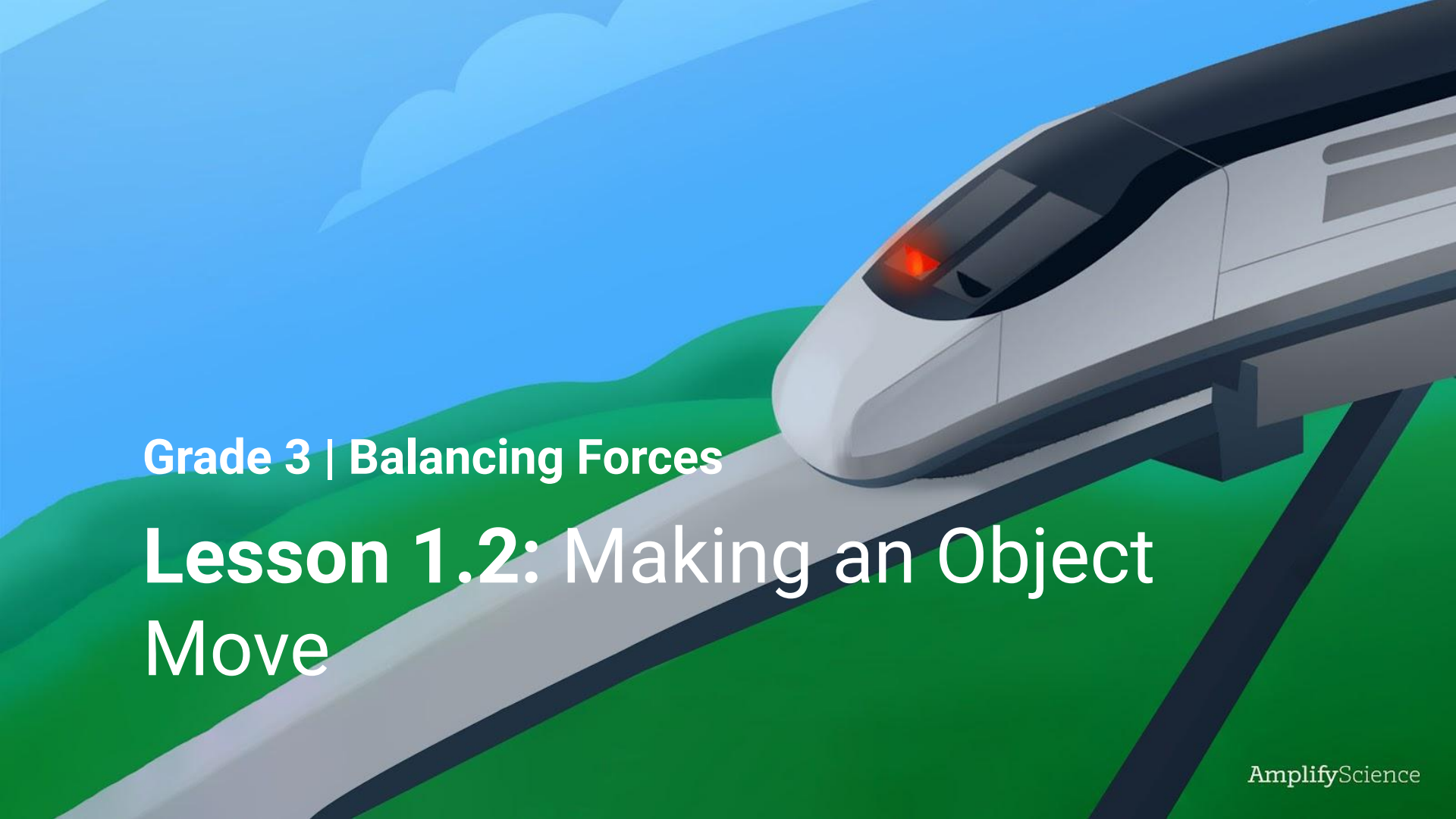

Grade 3 | Balancing Forces

# **Lesson 1.2:** Making an Object Move

AmplifyScience

**20 MIN**

## Activity 1

# Discussing Initial Ideas

Real engineers invented floating trains. The trains are faster and use less energy than regular trains.

You will be student **scientists** investigating what can make things move, float, and fall.

# Balancing Forces

**Problem**: Students are challenged to figure out how a floating train works in order to explain it to the citizens of Faraday

**Role:** Engineer

# Balancing Forces

## Coherent Storylines

Chapter 1: Why does the train rise?

4 Lessons

Chapter 2: Why does the train rise without anything touching it?

5 Lessons

Chapter 3: Why does the train fall?

4 Lessons

Chapter 4: Why does the train float, even though gravity is acting on it?

4 Lessons

Chapter 5: Why does the train change from floating to falling?

5 Lessons

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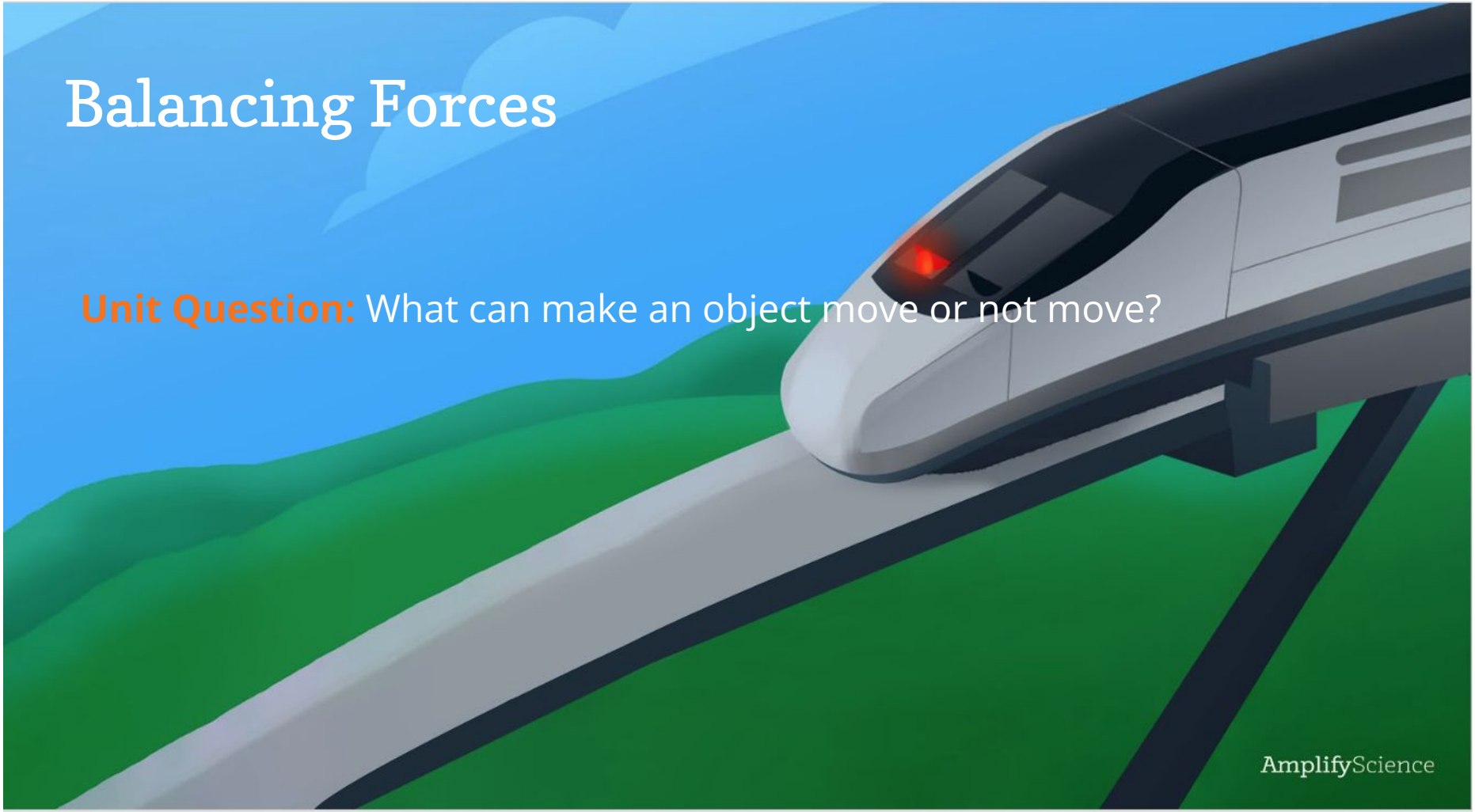
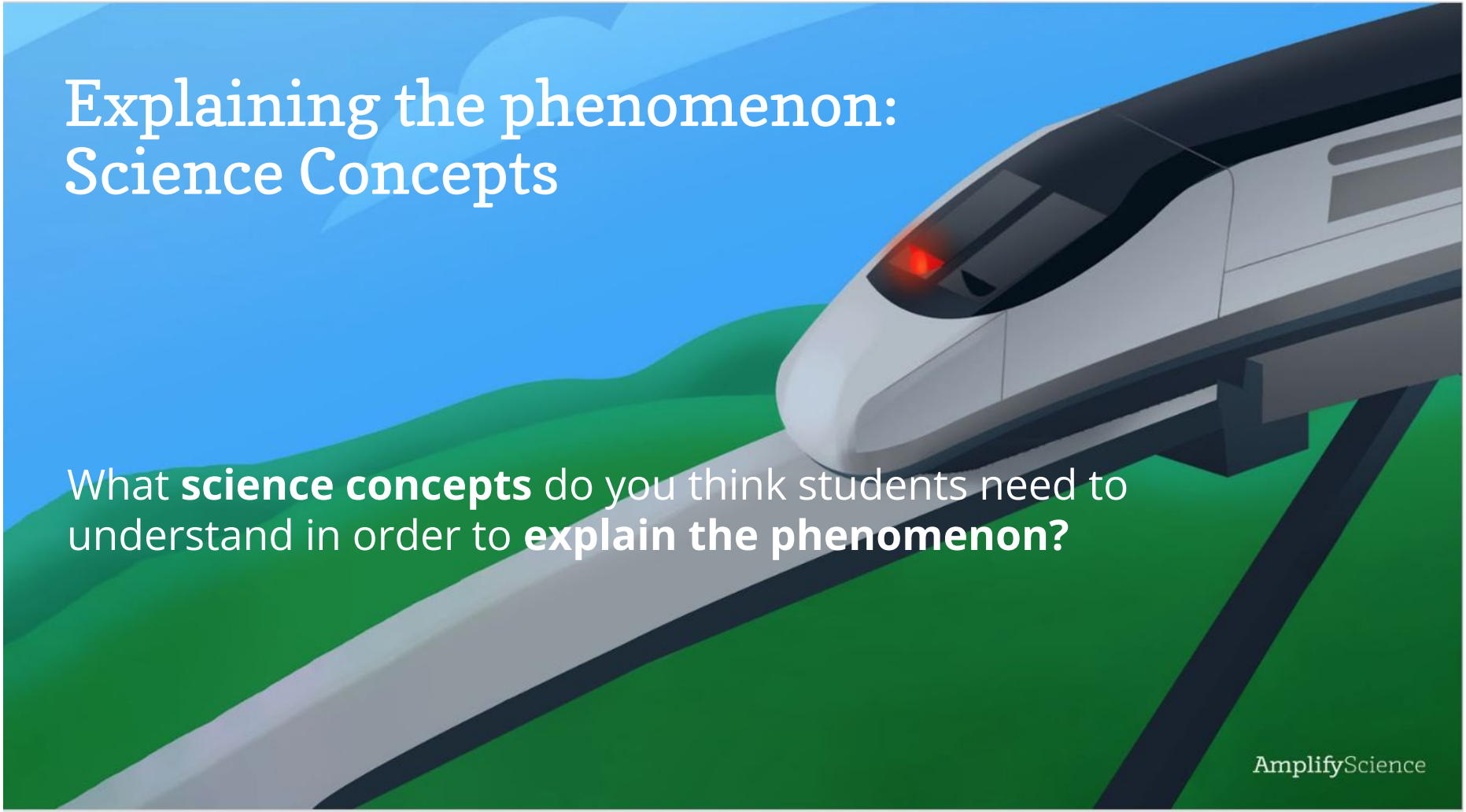
# Balancing Forces

**Unit Question:** What can make an object move or not move?



# Explaining the phenomenon: Science Concepts



What **science concepts** do you think students need to understand in order to **explain the phenomenon?**

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# Balancing Forces: Progress Build

**Assumed prior knowledge (preconceptions)**: Students have some knowledge that When you push or pull something, it starts moving.

## Level 1

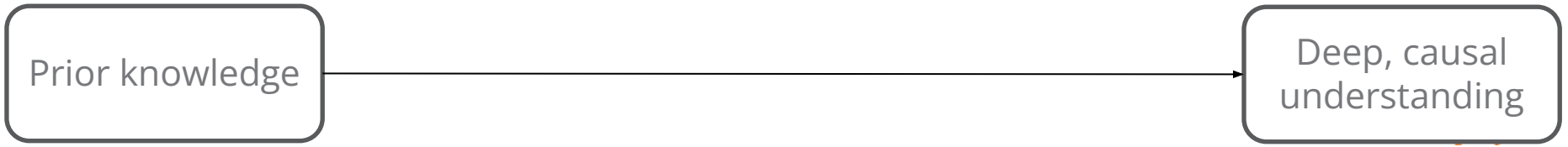
A force is a push or pull that acts between two objects.

## Level 2

Forces can be touching or non-touching.

## Level 3

More than one force can act on an object at the same time. When those forces are balanced, a still object will remain still; when those forces are unbalanced, the object will start to move.



# Questions?


# Plan for the day

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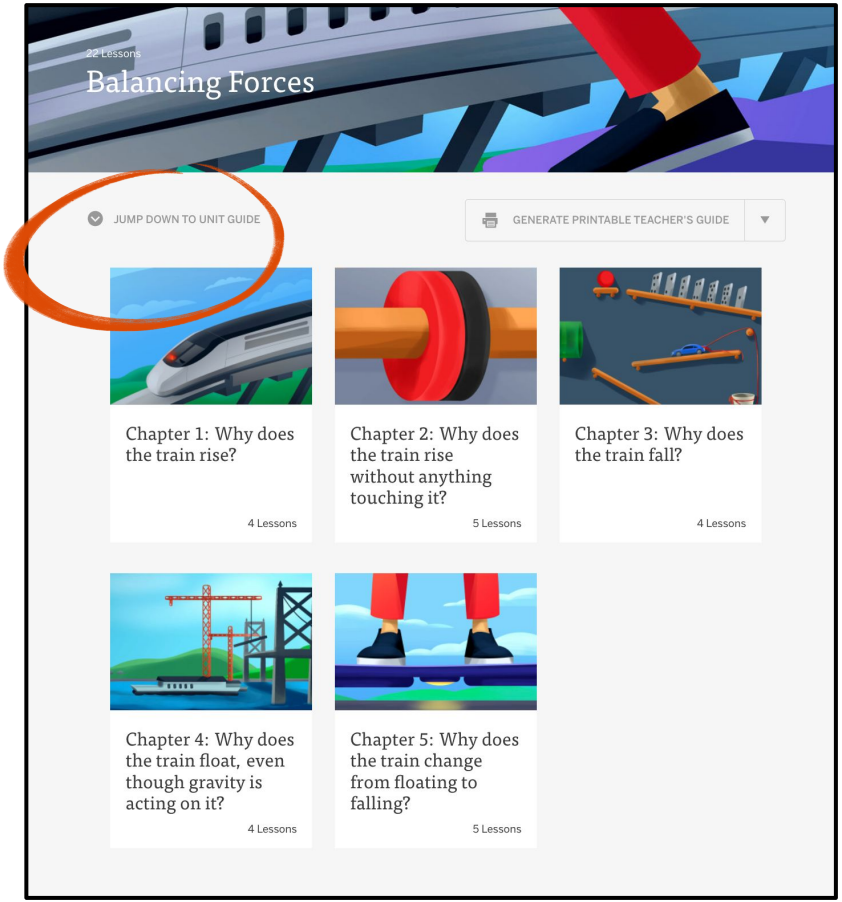
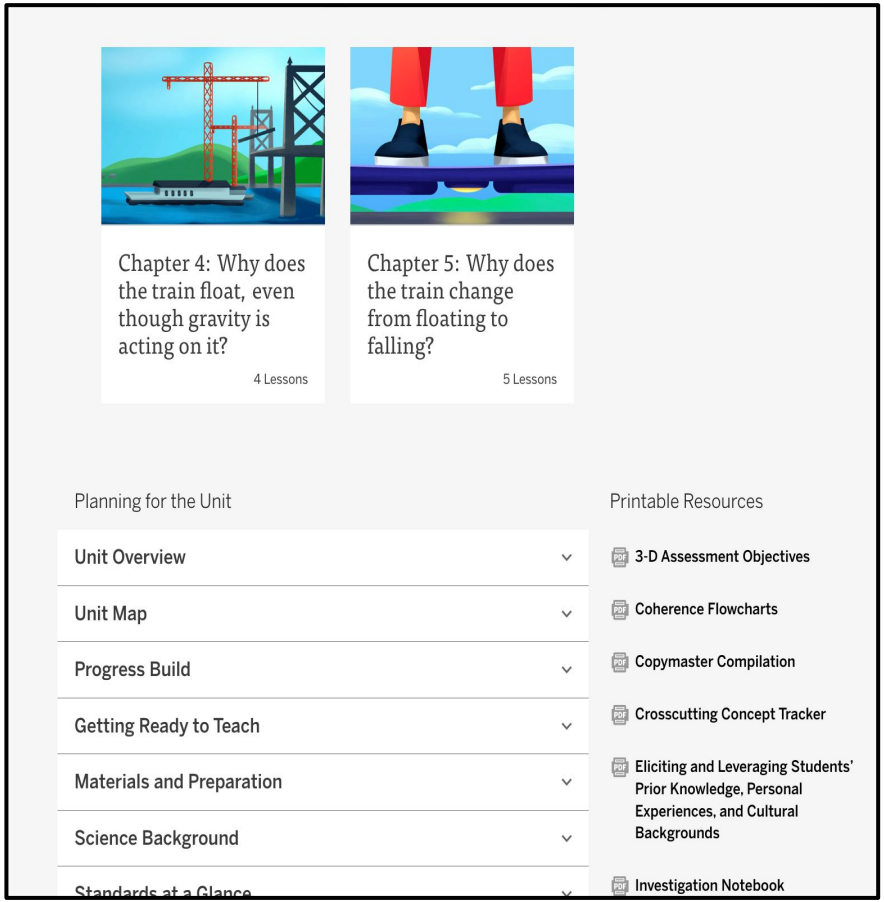
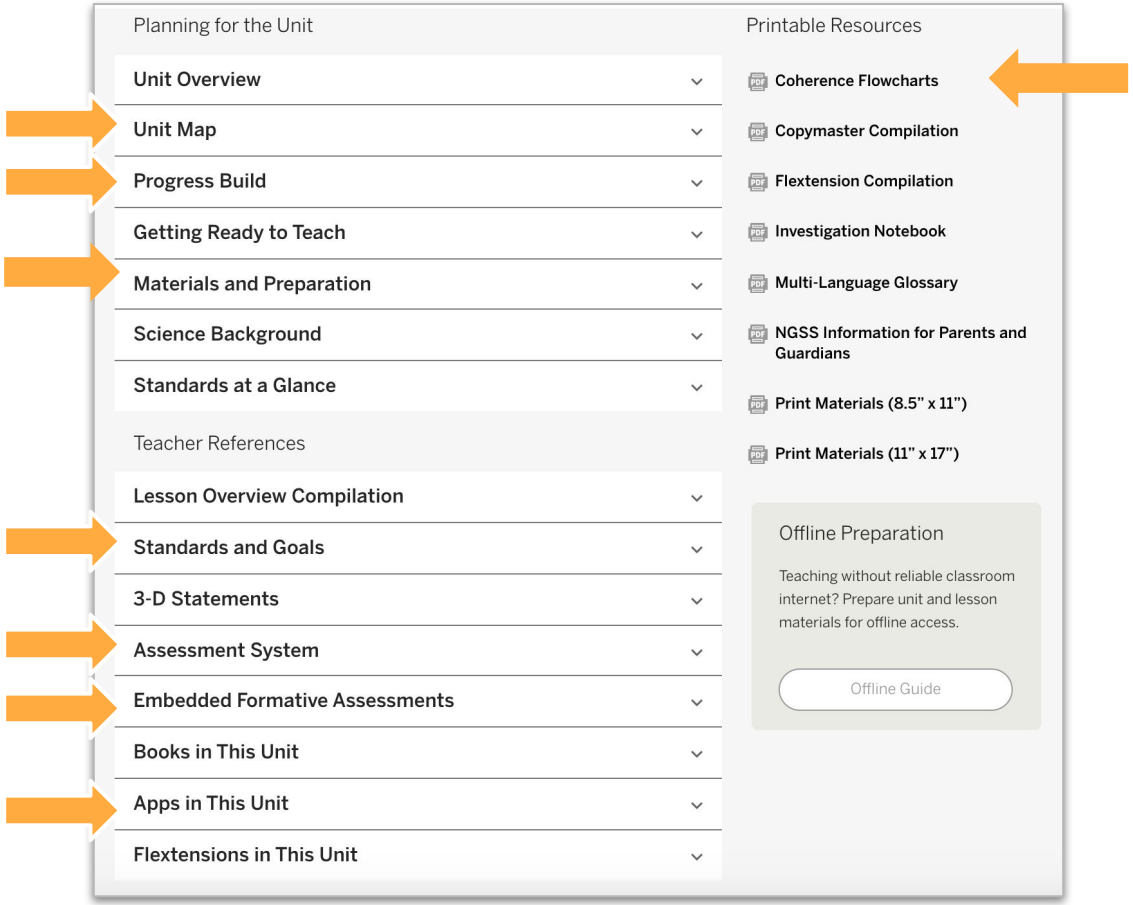
# Balancing Forces: Unit Page



# Key Unit Guide Documents for Planning



## Core Unit Planning & Internalization

Unit Title: 1

**Overview**

[Resources: Unit Overview, Teacher's Guide, Coherence Flowchart, Unit Map, 3-D Statements]

What is the phenomenon/real-world problem students are investigating in your unit? 2

Student Role: 3

Unit Question: 4

Relationship between the Unit Phenomenon and Unit Question: 5

By the end of the unit, students figure out... 6

How do students engage with three-dimensional learning to figure out the phenomenon/real-world problem in your unit? 7



**Unit Guide resources:**
- Unit Overview
- Unit Map
- Coherence Flowchart

**Unit Guide resources:**
- Lesson Overview Compilation
- Unit Overview

**Unit Guide resources:**
- Unit Map

**Unit Guide resources:**
- 3D Statements at the Unit Level

## Core Unit Planning & Internalization

| Unit Title: | Balancing Forces |
|---|---|

**Overview**

[Resources: Unit Overview, Teacher's Guide, Coherence Flowchart, Unit Map, 3-D Statements]

| What is the phenomenon/real-world problem students are investigating in your unit? | Student Role: |
|---|---|
| Students are challenged to figure out how a floating train works in order to explain it to the citizens of Faraday. | Engineers |
| **Unit Question:** | **Relationship between the Unit Phenomenon and Unit Question:** |
| What can make an object move or not move? | Students learn how the train floats, falls, and moves and stops. |

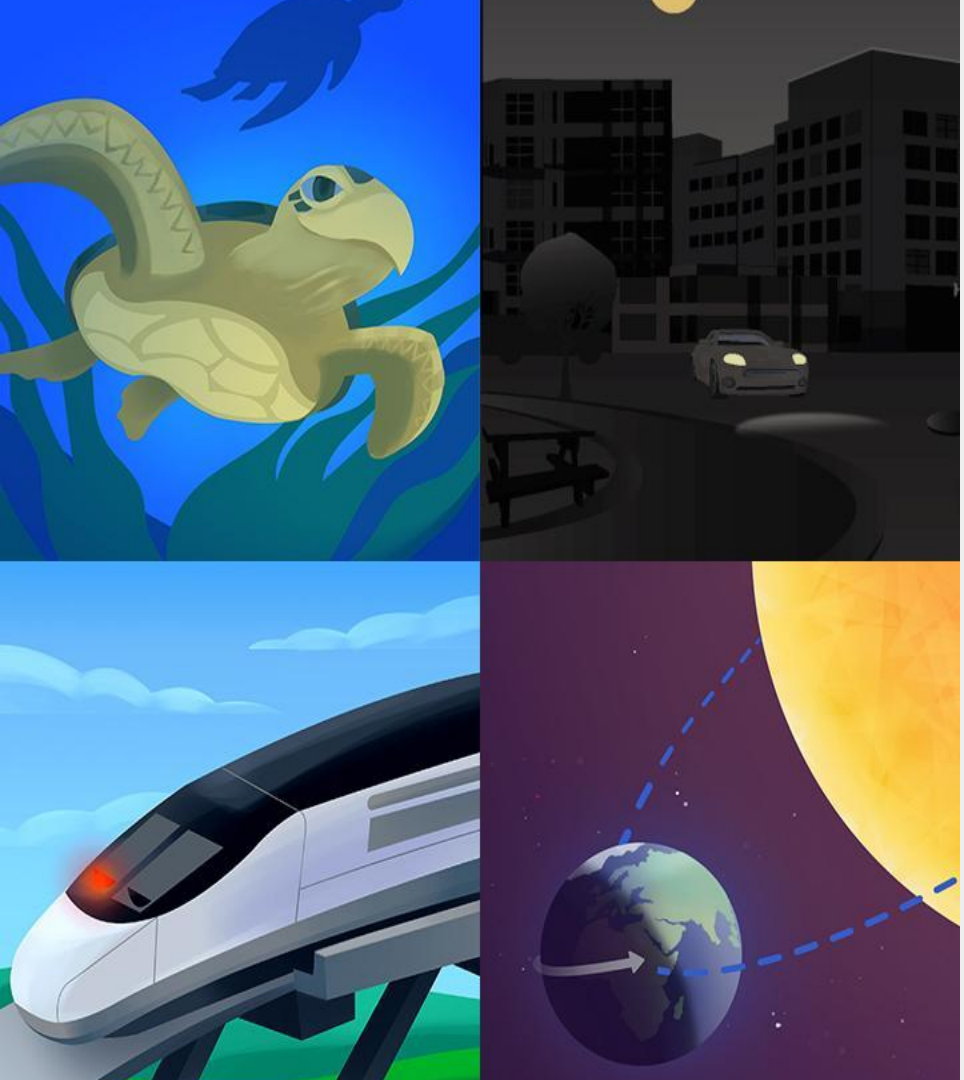
By the end of the unit, students figure out...

Student figure out that there must be some force acting on the train and another object to make it rise. They also figure out that there are magnetic forces and force from gravity to make the train move.

How do students engage with three-dimensional learning to figure out the phenomenon/real-world problem in your unit?

Students are challenged to explain how a floating train works in order to reassure nervous citizens. To solve the mystery, students plan and conduct investigations, analyze patterns in data (patterns), and obtain information about magnetic force, gravity, and balanced and unbalanced forces. Students write explanations and create physical models and diagram models to show why the train's vertical motion is stable at times and changes at times (stability and change).

# Questions?



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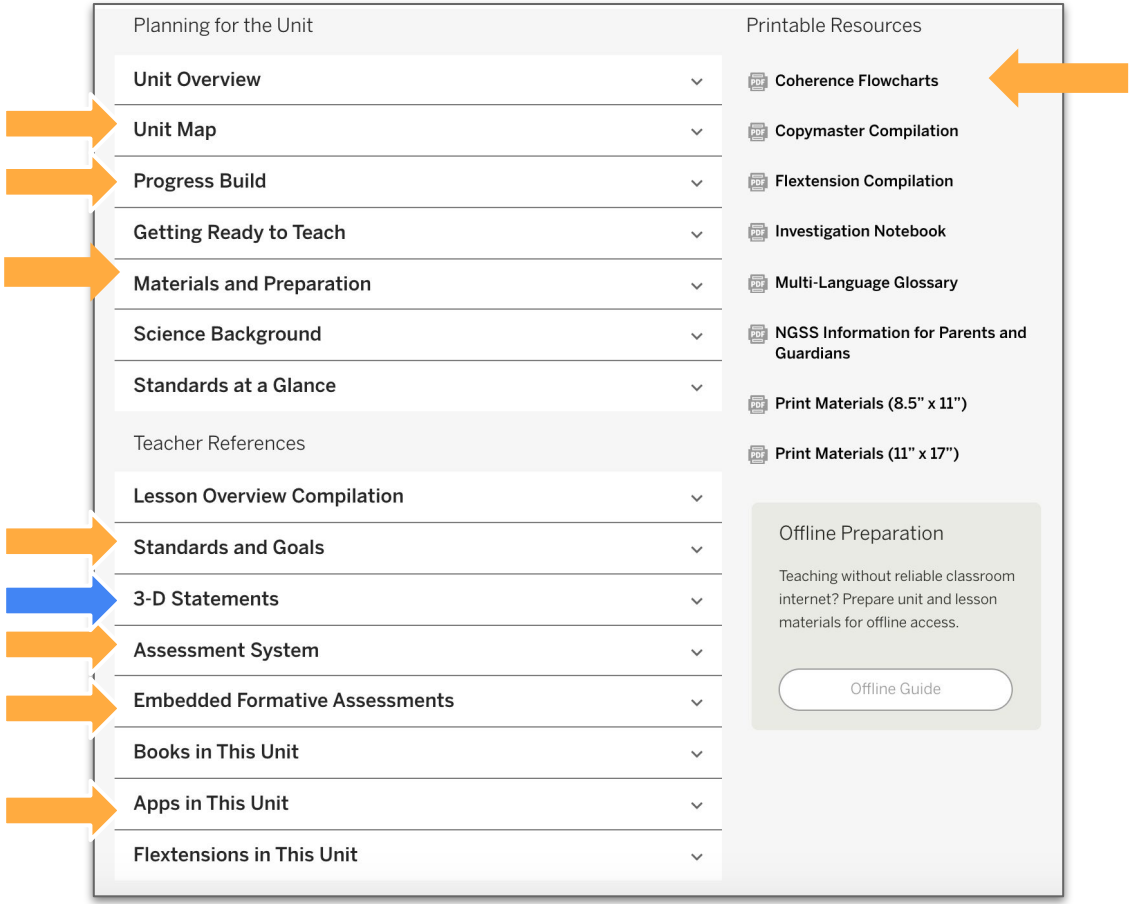
# Key Documents for Planning Work Time



# Balancing Forces: Unit Level 3D Statements

Key

Practices | Disciplinary Core Ideas | Crosscutting Concepts

## Unit Level

Students are challenged to explain how a floating train works in order to reassure nervous citizens. To solve the mystery, students plan and conduct investigations, analyze patterns in data (patterns), and obtain information about magnetic force, gravity, and balanced and unbalanced forces. Students write explanations and create physical models and diagram models to show why the train's vertical motion is stable at times and changes at times (stability and change).

# Balancing Forces: Unit Level 3D Statements

Key

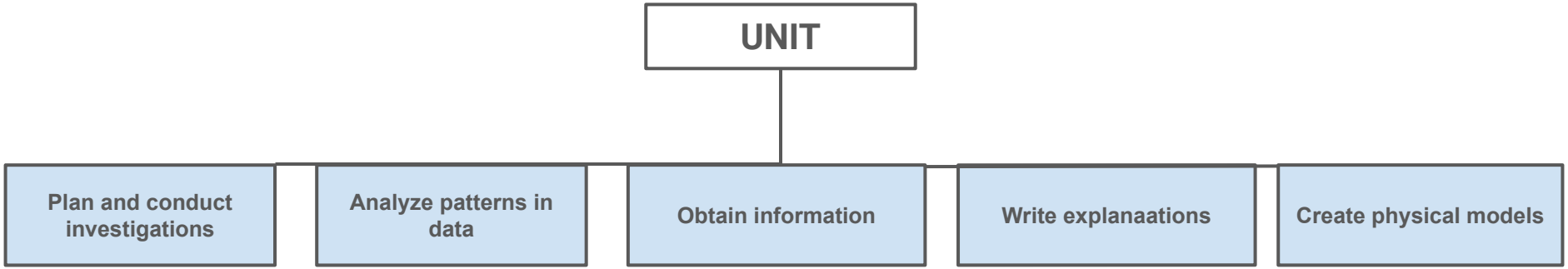
Practices | Disciplinary Core Ideas | Crosscutting Concepts

## Unit Level

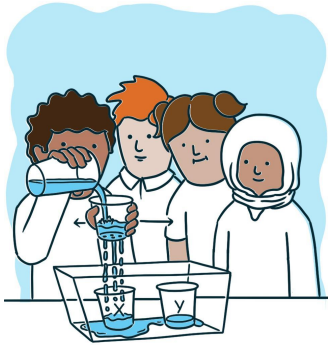
Students are challenged to explain how a floating train works in order to reassure nervous citizens. To solve the mystery, students plan and conduct investigations, analyze patterns in data (patterns) and obtain information about magnetic force, gravity, and balanced and unbalanced forces. Students write explanations and create physical models and diagram models to show why the train's vertical motion is stable at times and changes at times (stability and change).

# Balancing Forces: Unit Level 3D Statements

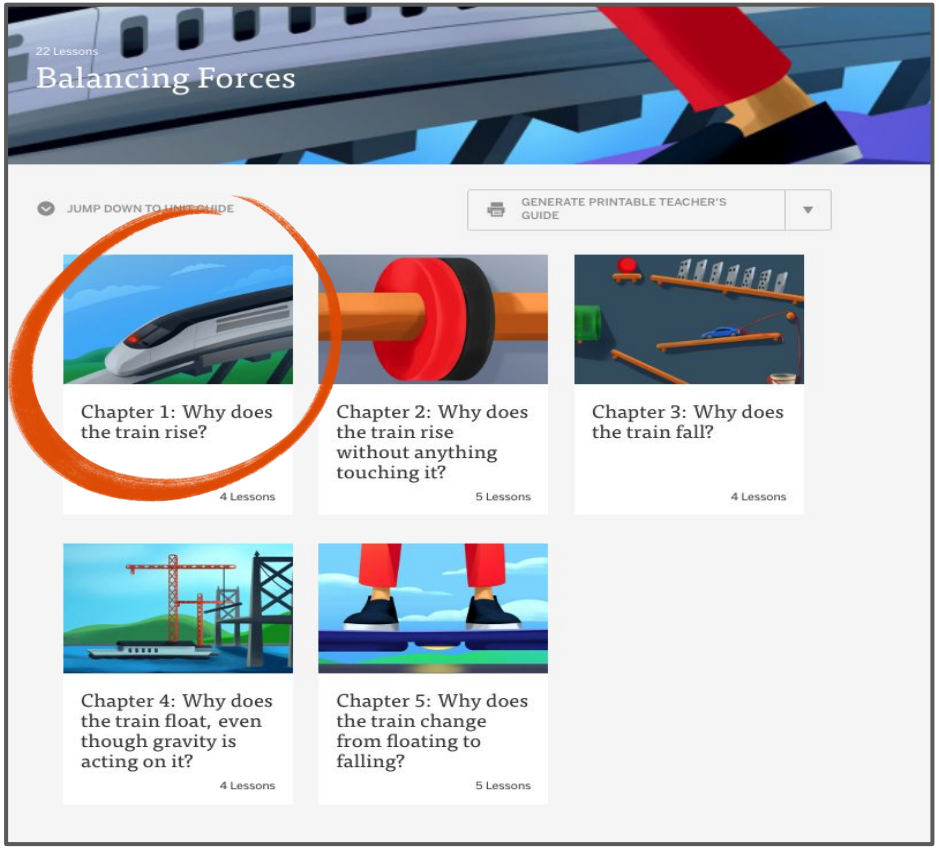
## Science and Engineering Practices




These are the five Science and Engineering Practices that the students will be engaging with in this unit.



# Balancing Forces: Chapter Level 3D Statements

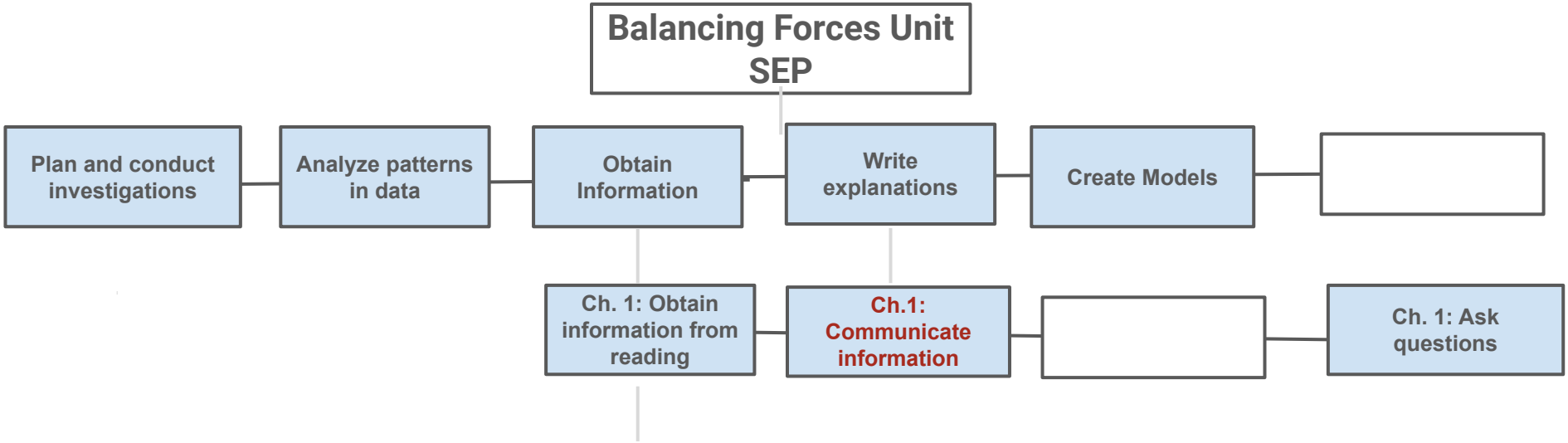


# Balancing Forces: Chapter Level 3D Statments

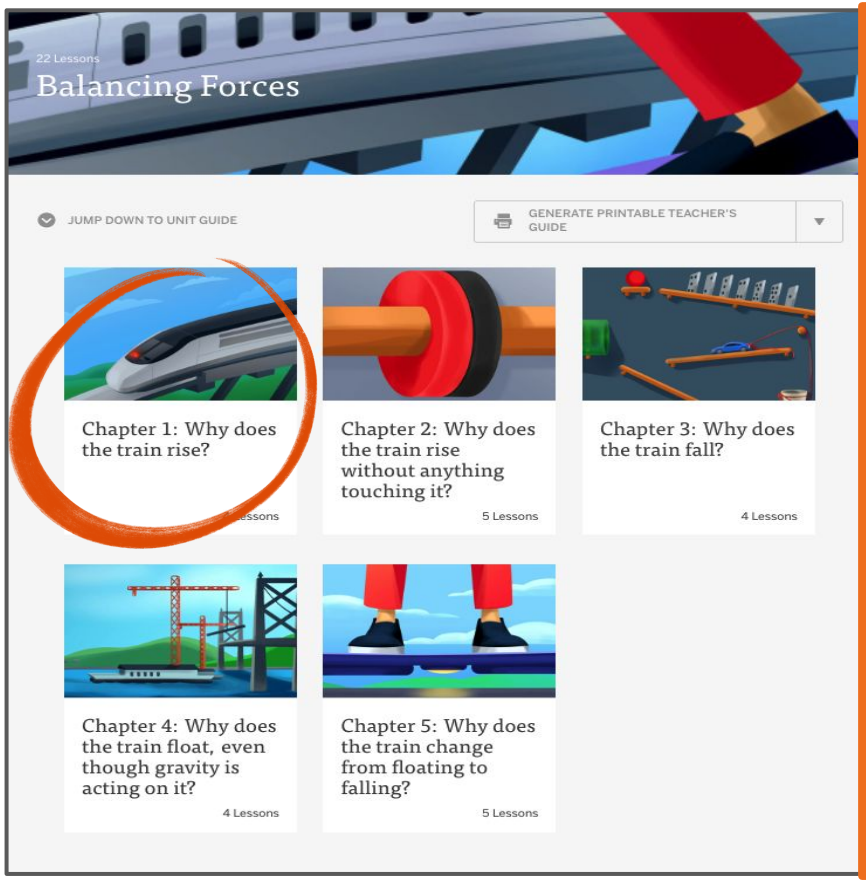
## Chapter 1: Why does the train rise?

Students ask questions about the floating train and discover, by obtaining information from reading, how a force can cause an object's motion to change as it starts or stops moving (cause and effect; stability and change). They then communicate this information in an explanation about the floating train.

# Balancing Forces: Science & Engineering Practices



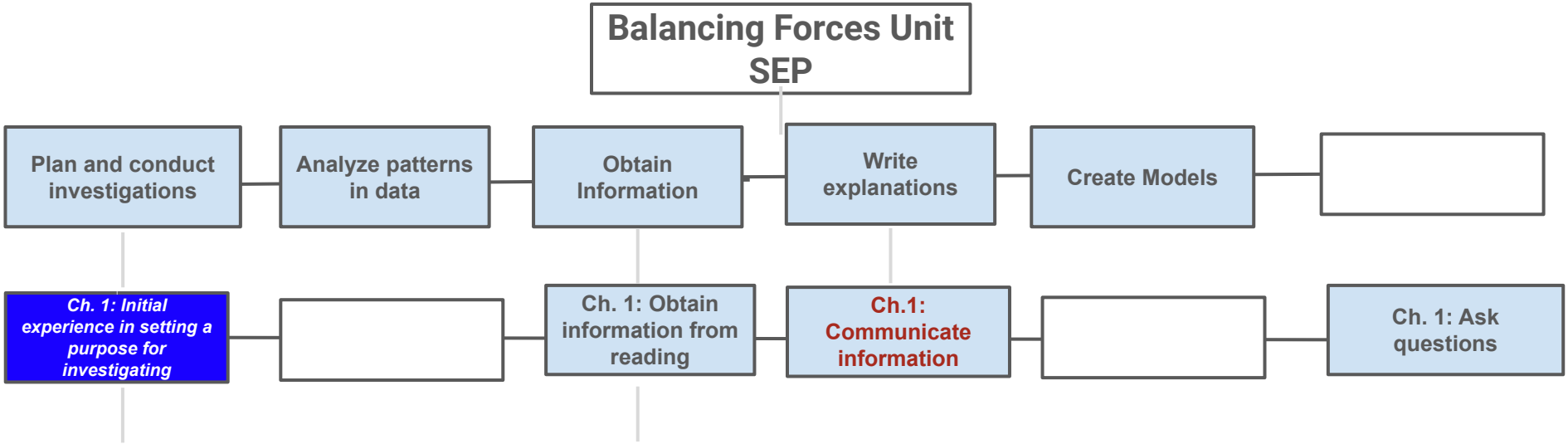
# Balancing Forces Chapter 1 Overview




## Chapter Overview

Students are introduced to a fictional scenario—the citizens of the city of Faraday are excited to hear that a new train service will be built for their city, but they become concerned when they hear that the train will be a floating train. Students are challenged to figure out how the floating train works in order to explain it to the citizens of Faraday. After watching a brief animation of the train, the class begins by investigating the question *Why does the train rise?* Using simple materials, students observe what makes an object start to move. They learn that the pushes and pulls by one object on another are called forces and that a force can make an object start moving. They further investigate forces by reading Forces All Around, and discover that when you observe an object start to move or stop moving it is evidence that a force is acting on it. Based on evidence from the book and their hands-on investigations, students conclude that a force acts between two objects. They reflect on their learning about forces by creating a chain reaction and analyzing the forces involved and by writing an explanation as a class of why the train rises—a force must act on it to make it rise. The purpose of this chapter is for students to understand what constitutes evidence of a force acting on an object; discover that a force acts between two objects; and gain initial experience with setting a purpose for investigating and with constructing explanations.

# Balancing Forces: Science & Engineering Practices

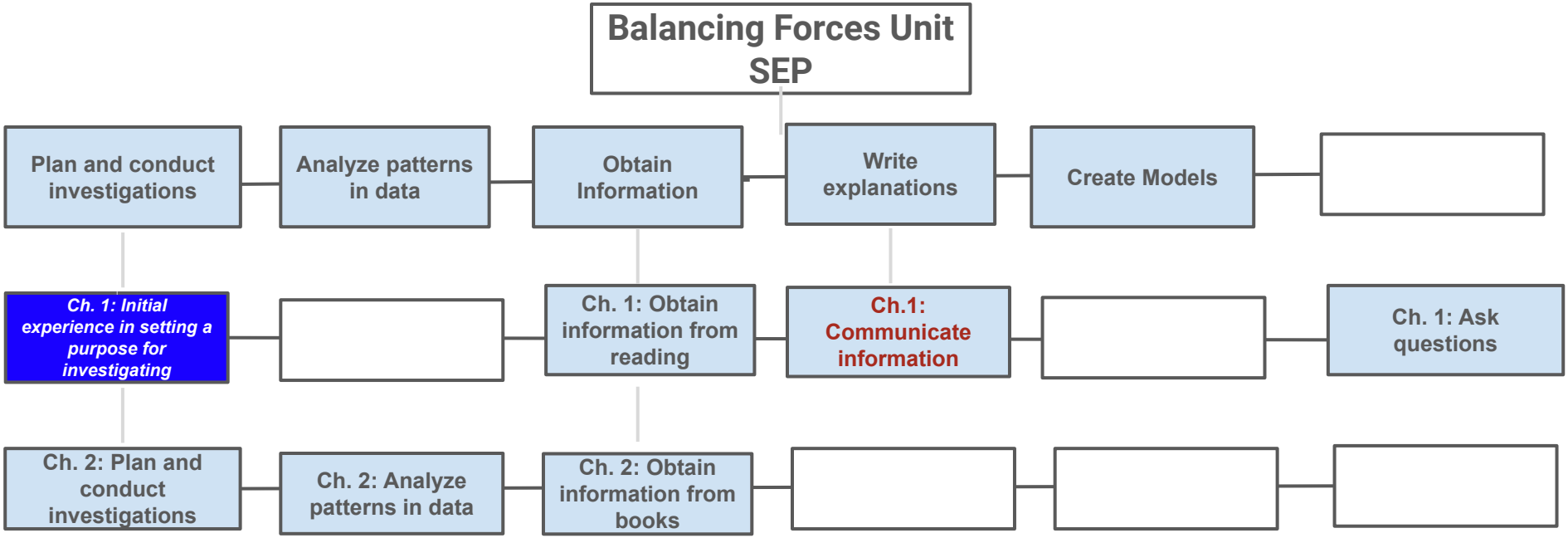


# Balancing Forces: Chapter Level 3D Statments

## Chapter 2: Why does the train rise without anything touching it?

Students plan and conduct investigations, obtain information from books, and analyze patterns in data to gather evidence that a magnetic force can cause some objects to move without the magnet touching the object (cause and effect).

# Balancing Forces: Science & Engineering Practices



# Balancing Forces: Science & Engineering Practices

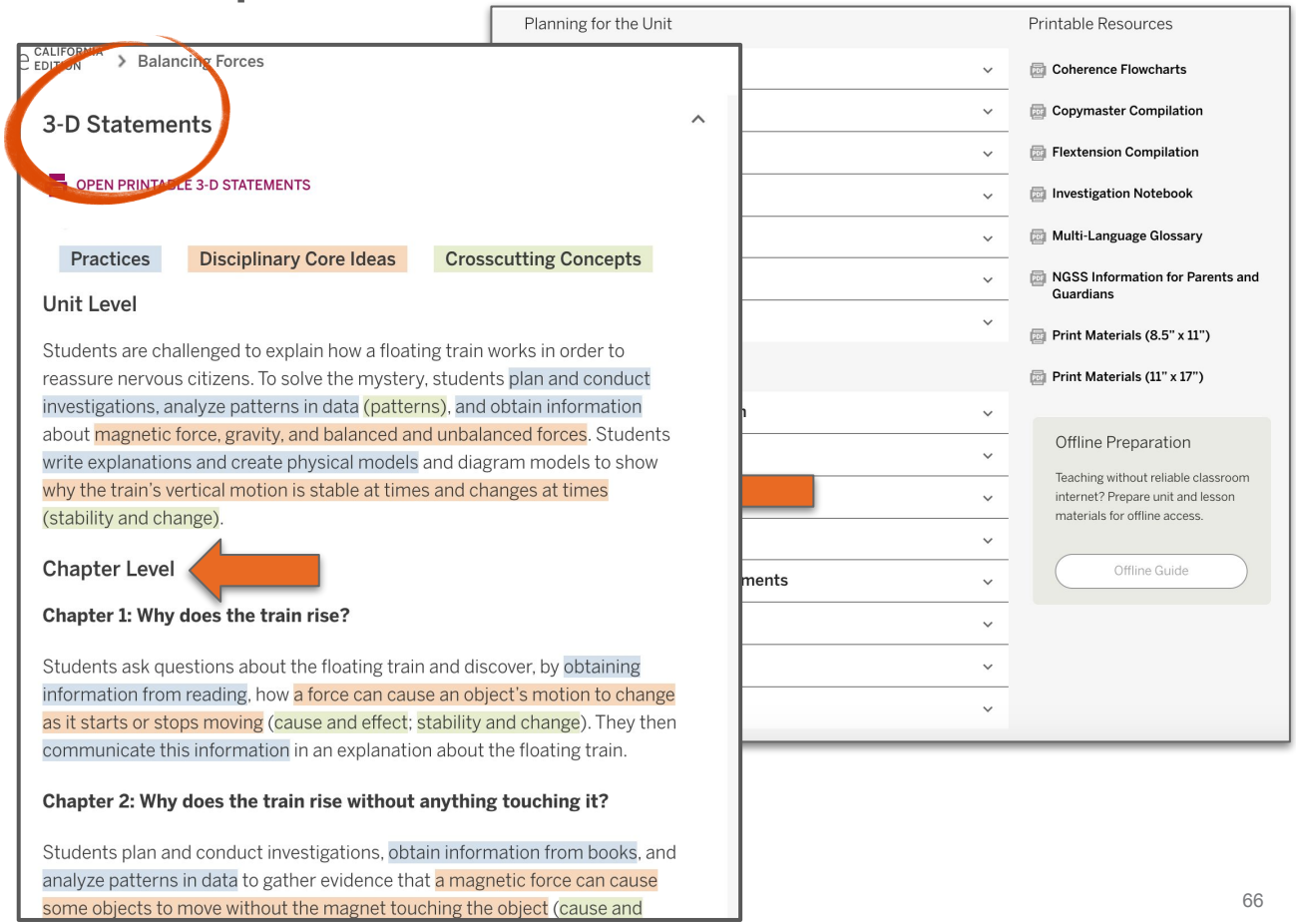
Chapter Worksheet: Science and Engineering Practices

**Unit:**

| SEP #<br>Chapter # | SEP #1: Plan and conduct investigations | SEP #2: Analyze patterns in data | SEP #3: Obtain Information | SEP #4: Write explanations | SEP #5: Create Models | | |
|---|---|---|---|---|---|---|---|
| Chapter # 1 | | | | | | | |
| Chapter # | | | | | | | |
| Chapter # | | | | | | | |
| Chapter # | | | | | | | |
| Chapter # | | | | | | | |

# 3D Statements Chapter Work Time

Identifying what **Science and Engineering Practices** are addressed in each chapter.



## Chapter Worksheet: Science and Engineering Practices

**Unit:** Balancing Forces

| SEP # Chapter # | SEP #1: Plan and conduct investigations | SEP #2: Analyze patterns in data | SEP #3: Obtain Information | SEP #4: Write explanations | SEP #5: Create Models |
|---|---|---|---|---|---|
| Chapter # 1 | | | Obtain information from reading | Communicate this information | |
| Chapter # 2 | | Analyze patterns in data | Obtain information from books | | |
| Chapter # | | | | | |
| Chapter # | | | | | |
| Chapter # | | | | | |

# 3D Statements Chapter Work Time

Identifying what **Science and Engineering Practices** are addressed in each chapter.


CALIFORNIA EDITION > Balancing Forces

## 3-D Statements

OPEN PRINTABLE 3-D STATEMENTS

Practices | Disciplinary Core Ideas | Crosscutting Concepts

### Unit Level

Students are challenged to explain how a floating train works in order to reassure nervous citizens. To solve the mystery, students plan and conduct investigations, analyze patterns in data (patterns), and obtain information about magnetic force, gravity, and balanced and unbalanced forces. Students write explanations and create physical models and diagram models to show why the train's vertical motion is stable at times and changes at times (stability and change).

### Chapter Level

**Chapter 1: Why does the train rise?**

Students ask questions about the floating train and discover, by obtaining information from reading, how a force can cause an object's motion to change as it starts or stops moving (cause and effect; stability and change). They then communicate this information in an explanation about the floating train.

**Chapter 2: Why does the train rise without anything touching it?**

Students plan and conduct investigations, obtain information from books, and analyze patterns in data to gather evidence that a magnetic force can cause some objects to move without the magnet touching the object (cause and

Planning for the Unit

Printable Resources

- Coherence Flowcharts
- Copymaster Compilation
- Flextension Compilation
- Investigation Notebook
- Multi-Language Glossary
- NGSS Information for Parents and Guardians
- Print Materials (8.5" x 11")
- Print Materials (11" x 17")

Offline Preparation

Teaching without reliable classroom internet? Prepare unit and lesson materials for offline access.

Offline Guide

# Balancing Forces: Chapter Level 3D Statments

## Chapter 3: Why does the train fall?

Students ask questions about what causes objects to fall, and they write explanations and make models to show how the force of gravity causes the train to fall back to the track (cause and effect).

# Balancing Forces: Chapter Level 3D Statments

## Chapter 4: Why does the train float, even though gravity is acting on it?

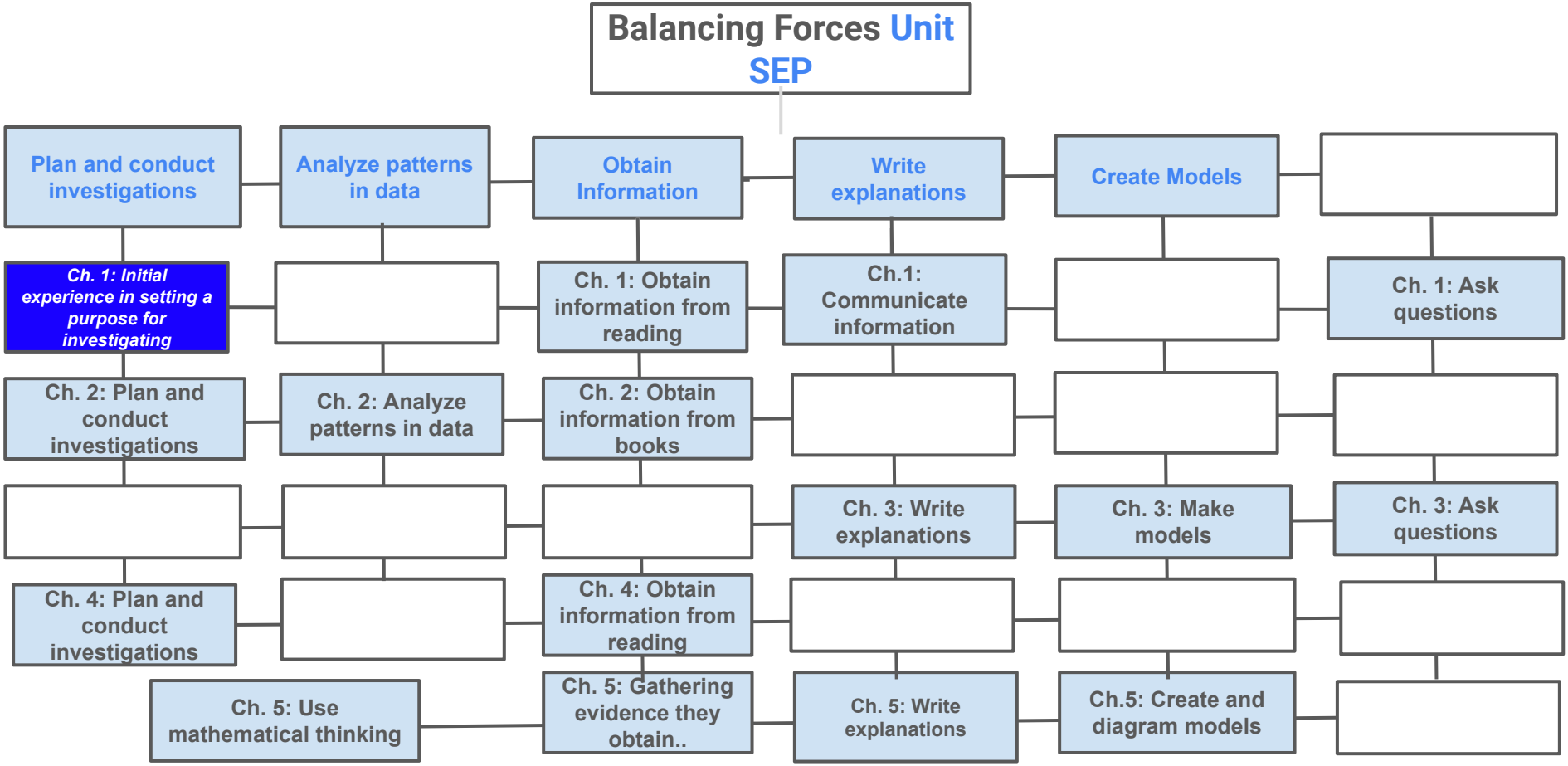
Students gather evidence to support the claim that two forces can act on an object at once. They discover how balanced forces can make an object's motion stable (stability and change) by planning and conducting investigations and obtaining information by reading.

# Balancing Forces: Chapter Level 3D Statments

## Chapter 5: Why does the train change from floating to falling?

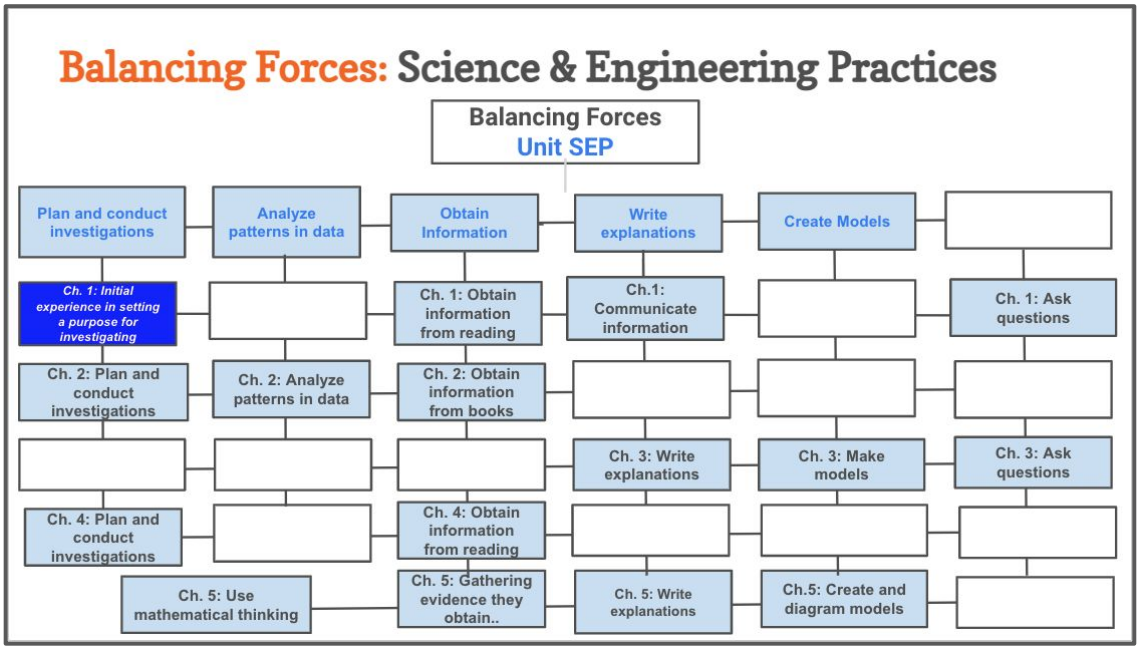
Students use mathematical thinking as they measure the distance at which magnetic force on a paper clip no longer balances the force of gravity (stability and change). They gather evidence they obtain by reading and engage in oral argumentation about balanced and unbalanced forces and create final written explanations physical models, and diagram models about the floating train.

# Balancing Forces: Science & Engineering Practices

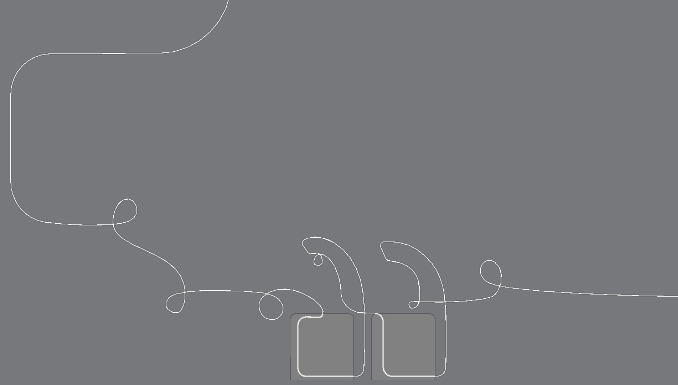


# Science & Engineering Practices: Balancing Forces

Building the practices incrementally, chapter by chapter.

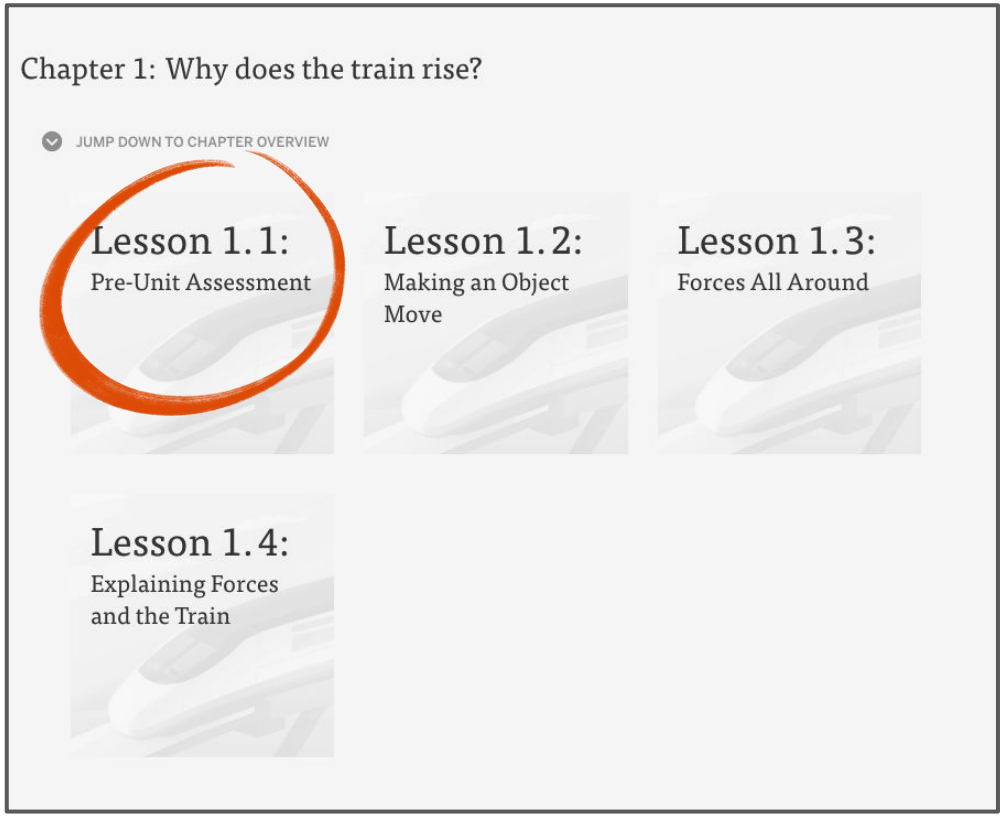
# Questions?




# Plan for the day

- Framing and Review
- Introducing the Unit
- Unit Internalization
- Identifying the Science and Engineering Practices (Unit and Chapters)
- Science and Engineering Practices within a lesson
- Lesson Planning
- Closing

# Balancing Forces



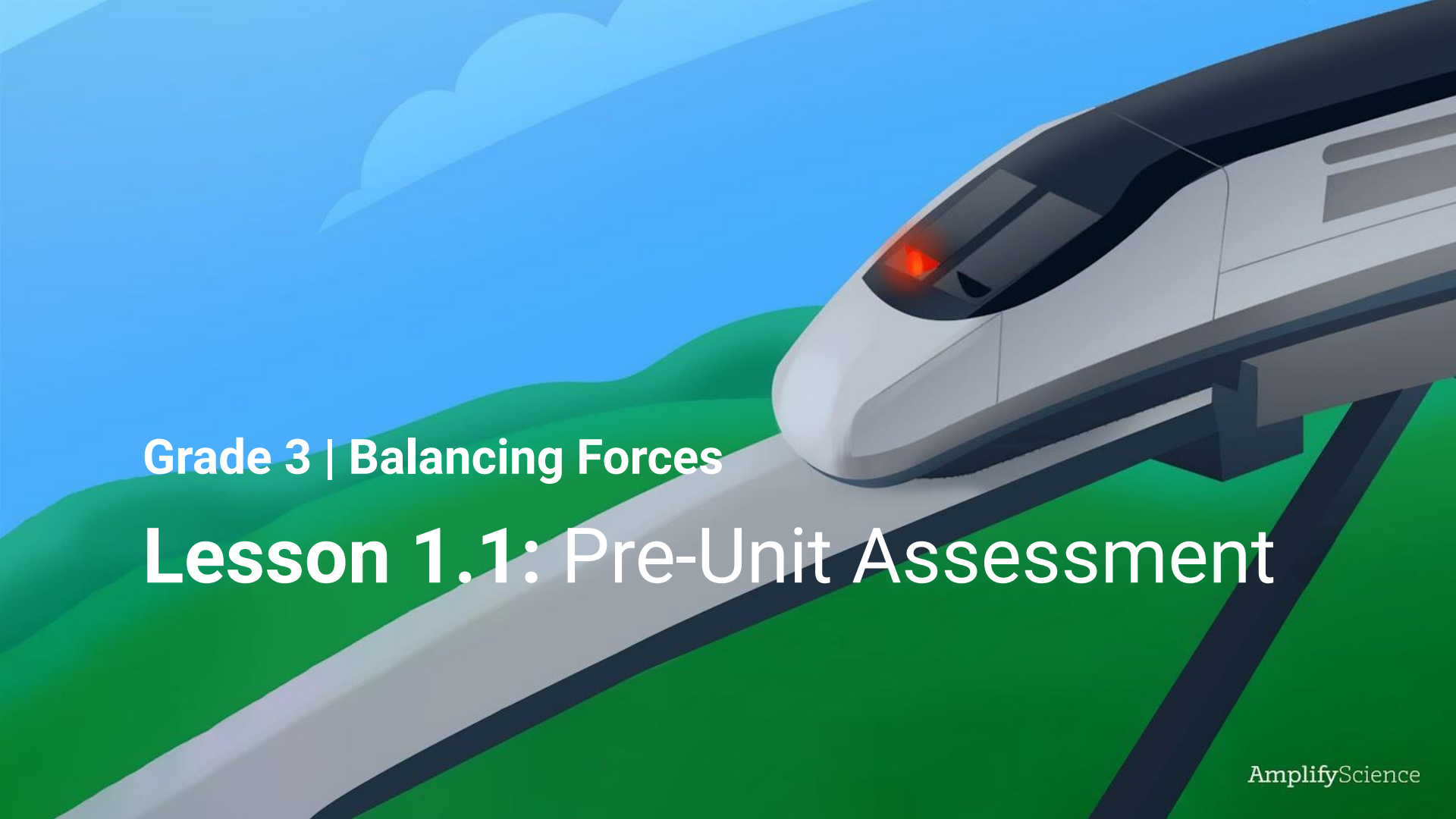
# 3D Statements, Lesson 1.1

## 3-D Statement

### Key

Practices Disciplinary Core Ideas Crosscutting Concepts

Students write initial explanations about what causes a train to start and stop moving (stability and change) as it rises, floats, and falls back to the tracks.



Grade 3 | Balancing Forces

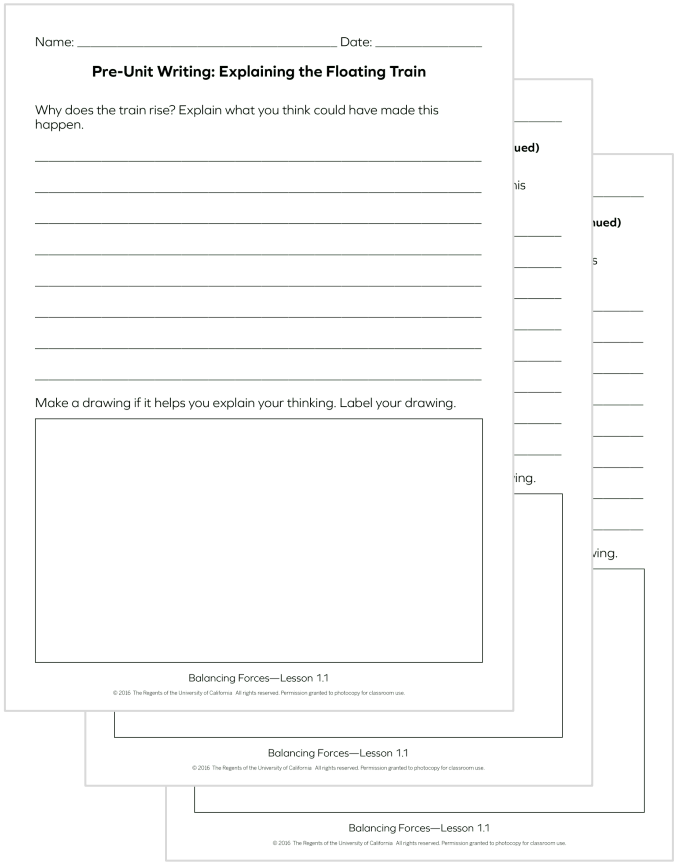
# Lesson 1.1: Pre-Unit Assessment

AmplifyScience

**30 MIN**

## Activity 1

# Students Write Initial Explanations


Name: _____ Date: _____

**Pre-Unit Writing: Explaining the Floating Train**

Why does the train rise? Explain what you think could have made this happen.

Make a drawing if it helps you explain your thinking. Label your drawing.

Balancing Forces—Lesson 1.1



Balancing Forces—Lesson 1.1

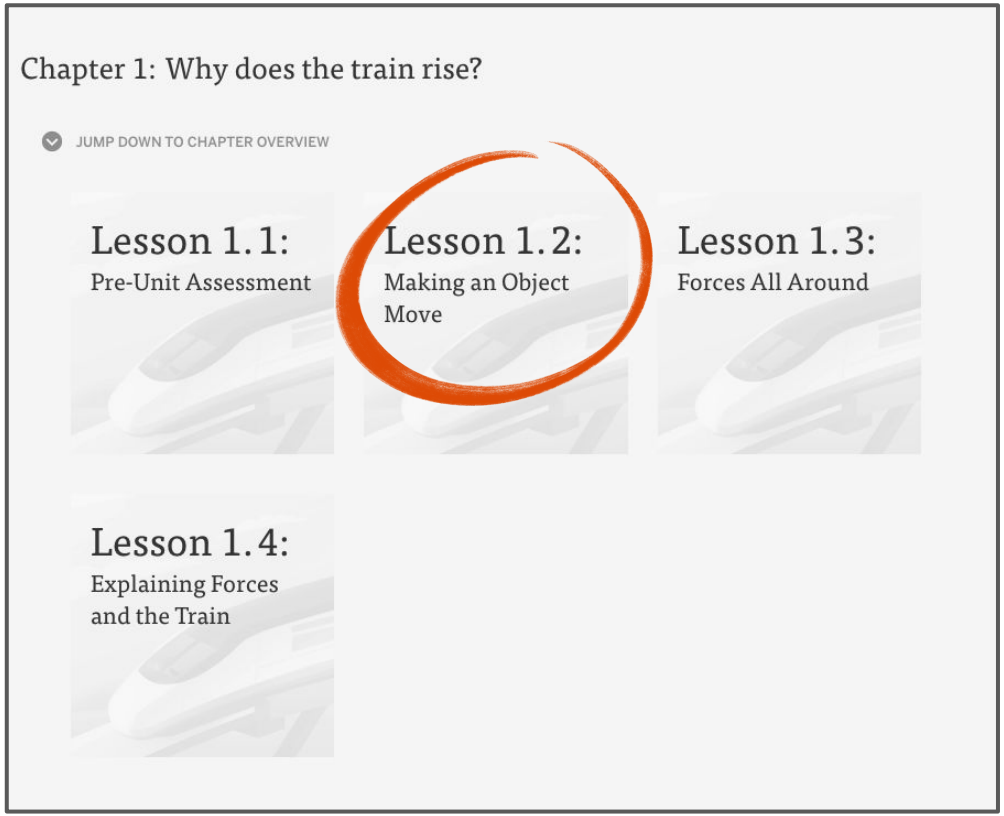


Balancing Forces—Lesson 1.1



**Write and draw your ideas** about why the train rises above the track, floats, and then falls back down.

# Weather and Climate

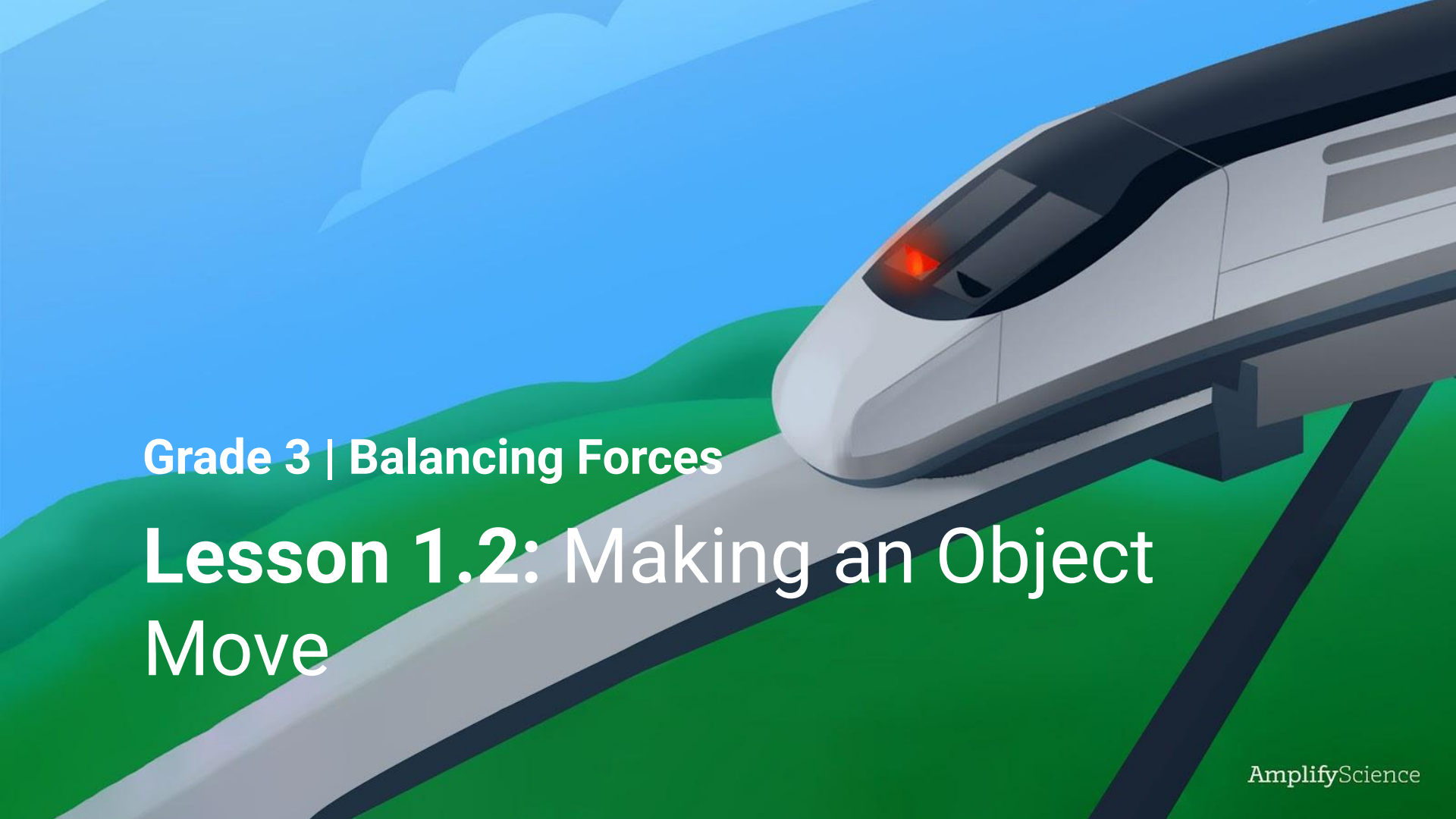


# 3D Statements, Lesson 1.2

## Key

Practices Disciplinary Core Ideas Crosscutting Concepts

Students ask questions about the floating train. They plan and conduct investigations to figure out many ways to cause a wooden block to start to move (cause and effect) and learn that these pushes and pulls are called forces.



Grade 3 | Balancing Forces

# **Lesson 1.2:** Making an Object Move

AmplifyScience

**20 MIN**

## Activity 1

# Discussing Initial Ideas

Real engineers invented floating trains. The trains are faster and use less energy than regular trains.

You will be student **scientists** investigating what can make things move, float, and fall.

# Think-Pair-Share Routine

## Think

Think silently about the question.

## Pair

Turn and talk to a partner about the question.

## Share

Share your ideas about the question with the class.

What do you think could make a train **rise up** off the track?

What do you think could make a train **float above** the track?

What do you think could make a train **fall back** onto the track?

# What questions do you have about the floating train?

Key

Practices Disciplinary Core Ideas Crosscutting Concepts

Students ask questions about the floating train. They plan and conduct investigations to figure out many ways to cause a wooden block to start to move (cause and effect) and learn that these pushes and pulls are called forces.

# Unit Question

## What can make an object move or not move?

# Chapter 1 Question

## Why does the train rise?

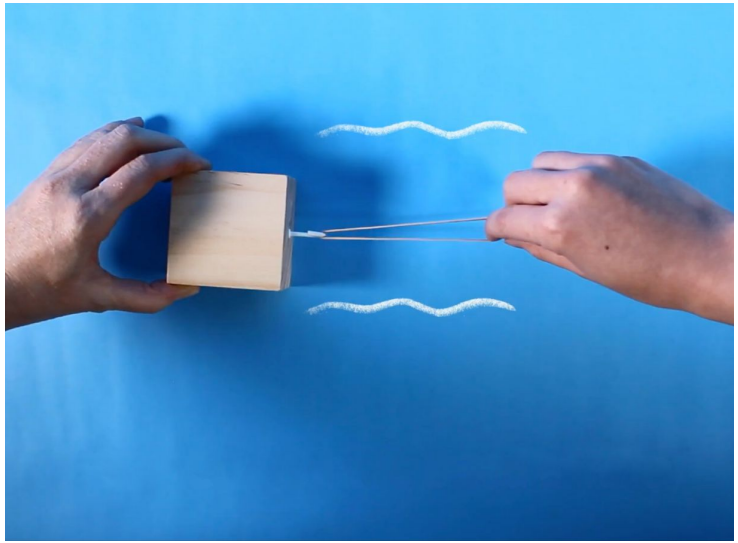
**20 MIN**

## Activity 2

# Making Blocks Move

Today, we're going to investigate this question:

What makes an object start to move?



**We figured out one way to make the block start to move.**

What did you **notice** when the block was let go?

# Vocabulary

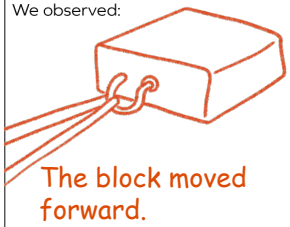
## observe

to use any of the five senses to learn more about something

Name: _____ Date: _____

**Making Blocks Move**

Directions:
1. With your partner, use the materials in your bag to make a block start moving.
2. In each box, record the object you used to make the block move.
3. In each box, record or draw your observation.

| | |
|---|---|
| We used a rubber band.<br>We observed:<br>  <br> | We used _____.<br>We observed: |
| We used _____.<br>We observed: | We used _____.<br>We observed: |





**Turn to page 2, Making Blocks Move, in your notebooks.**

On this page, we can **record what we observed** with words and drawings.

Name: _____ Date: _____

**Making Blocks Move**

Directions:

1. With your partner, use the materials in your bag to make a block start moving.
2. In each box, record the object you used to make the block move.
3. In each box, record or draw your observation.

| | |
|---|---|
| We used _____.<br>We observed: | We used _____.<br>We observed: |
| We used _____.<br>We observed: | We used _____.<br>We observed: |





**Write** and **draw** to record how you made the block move and what you observed.

# Find many ways to make one of the blocks start moving.

Key

Practices Disciplinary Core Ideas Crosscutting Concepts

Students ask questions about the floating train. They plan and conduct investigations to figure out many ways to cause a wooden block to start to move (cause and effect) and learn that these pushes and pulls are called forces.

**20 MIN**

## Activity 3

# Sharing Observations

## Class Observation Table

| Object 1 | Object 2 | Observation | Push, a pull, or not sure |
|---|---|---|---|
| | | | |

We will gather observations from the whole class and record them in this table.

Let’s discuss what we’ll record in each column.

## Class Observation Table

| Object 1 | Object 2 | Observation | Push, a pull, or not sure |
|---|---|---|---|
|  | | | |

**When scientists gather observations, they look for patterns they can notice.**

What patterns do you notice?

# Vocabulary

**force**

a push or a pull

# End of Lesson

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UNIVERSITY OF CALIFORNIA, BERKELEY

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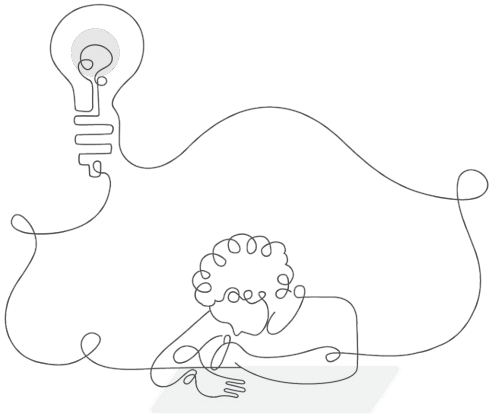
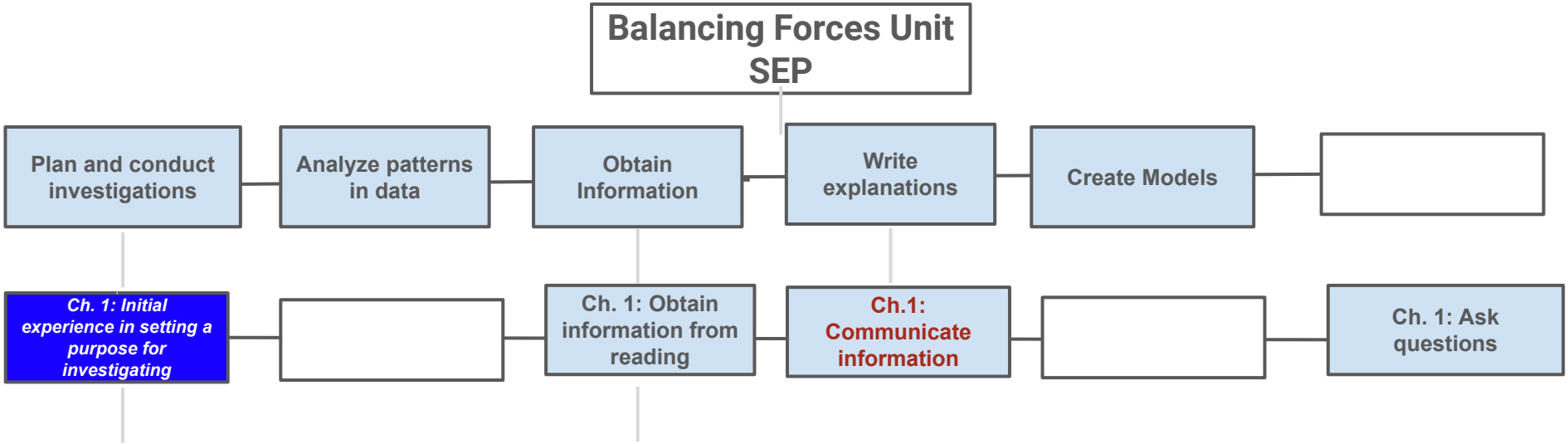
# Science and Engineering Practices

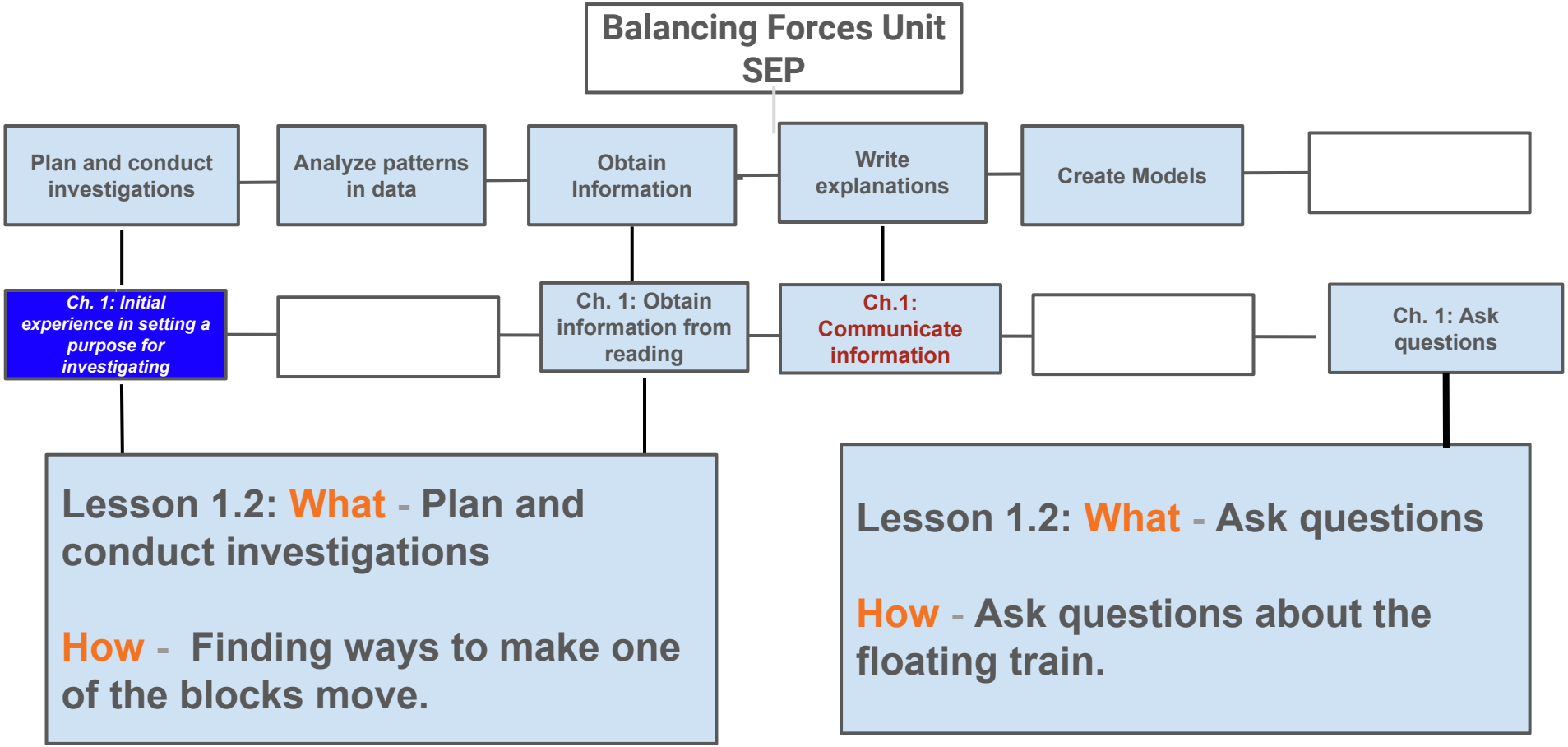
Describe the science and engineering practices the students were engaged in during this lesson.



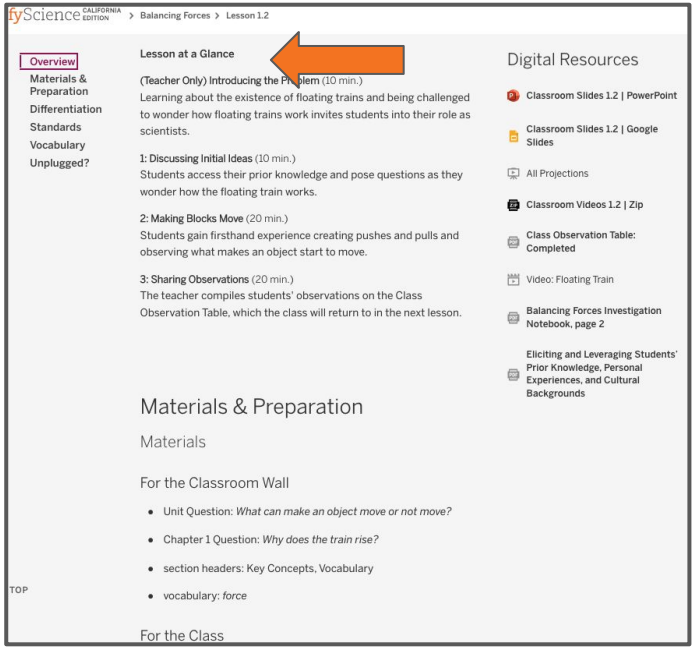
# Balancing Forces: Science & Engineering Practices

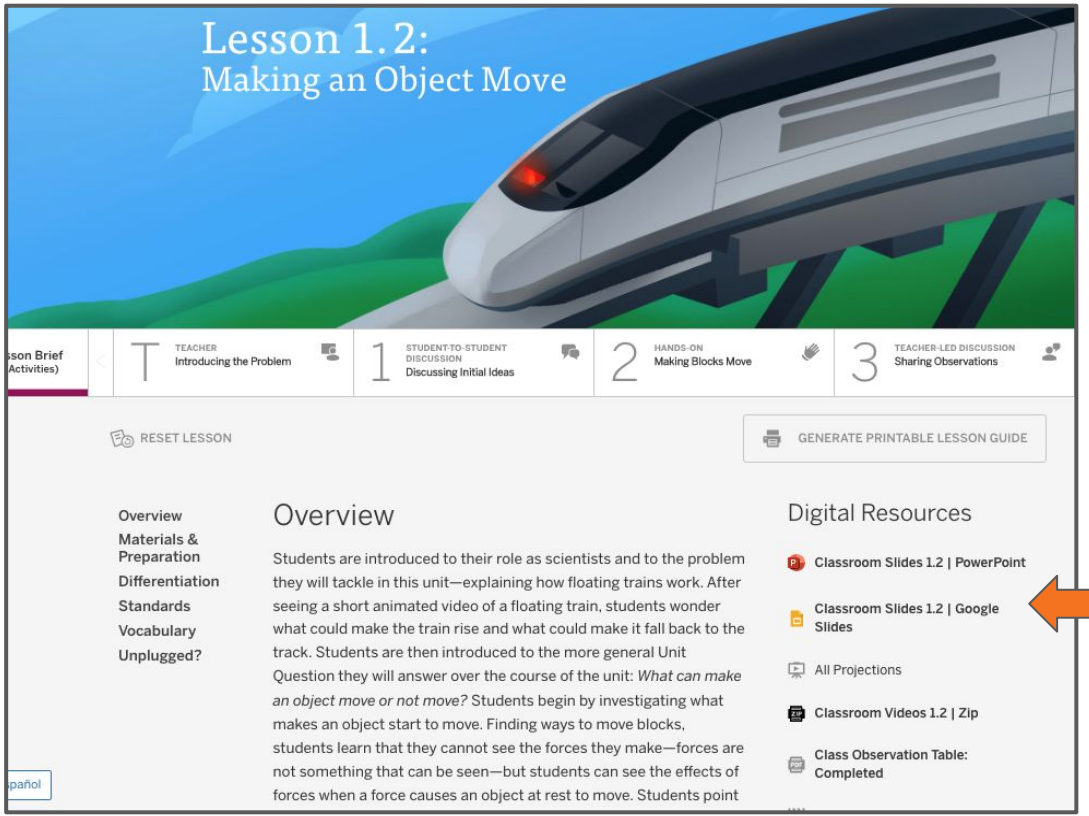


# Balancing Forces: Science & Engineering Practices

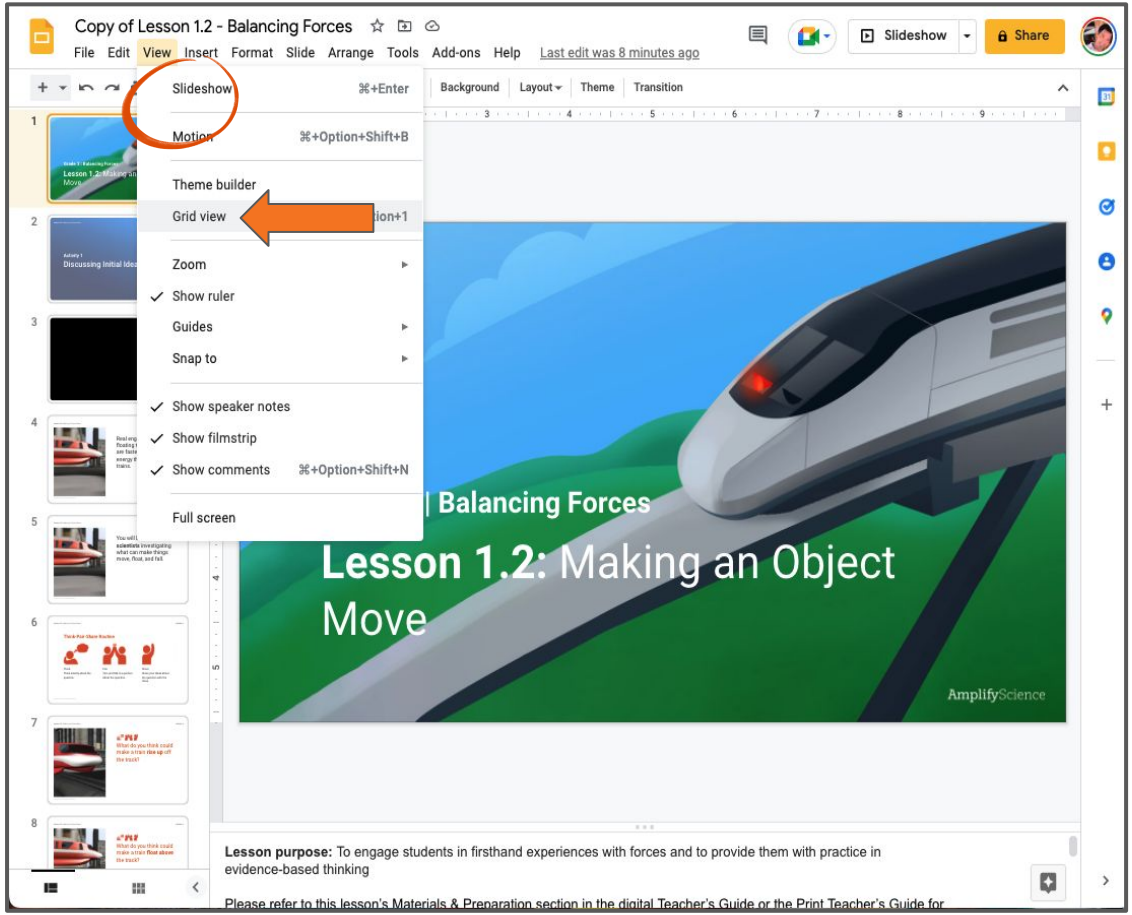


# Balancing Forces Lesson Brief

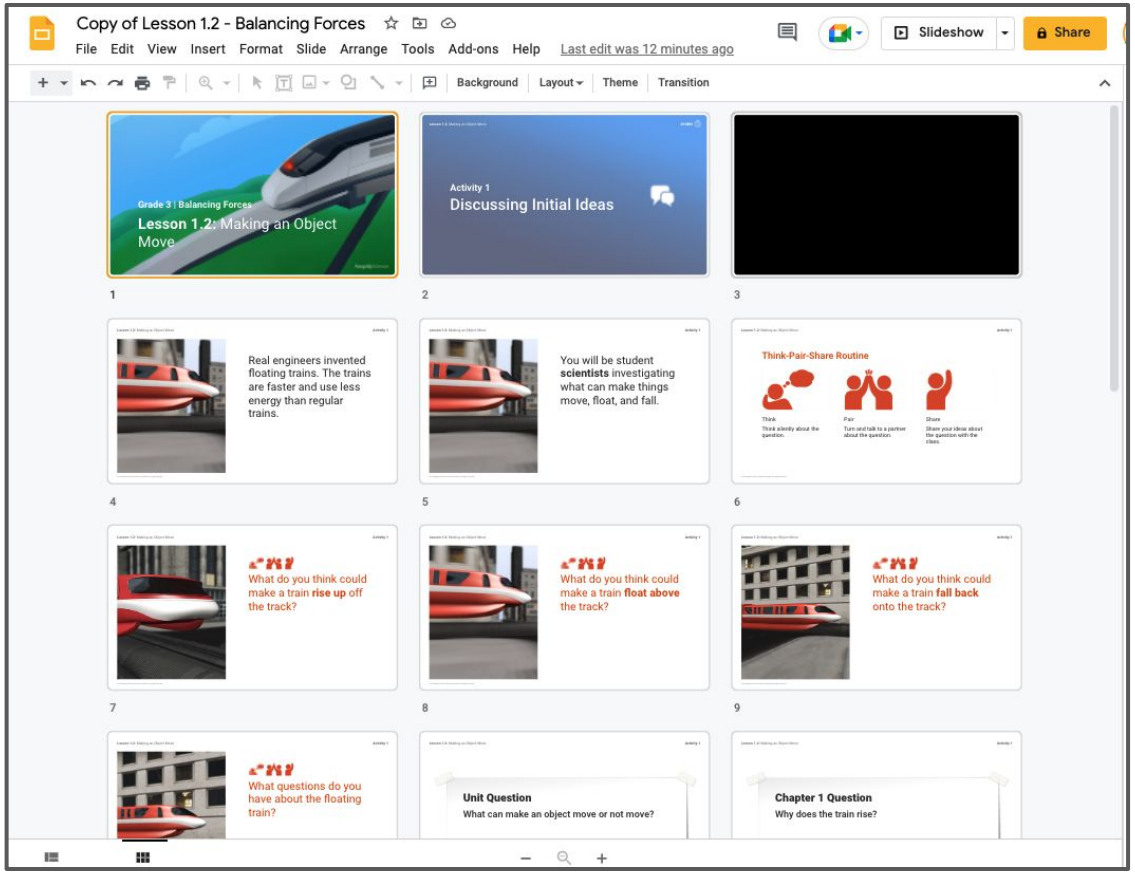


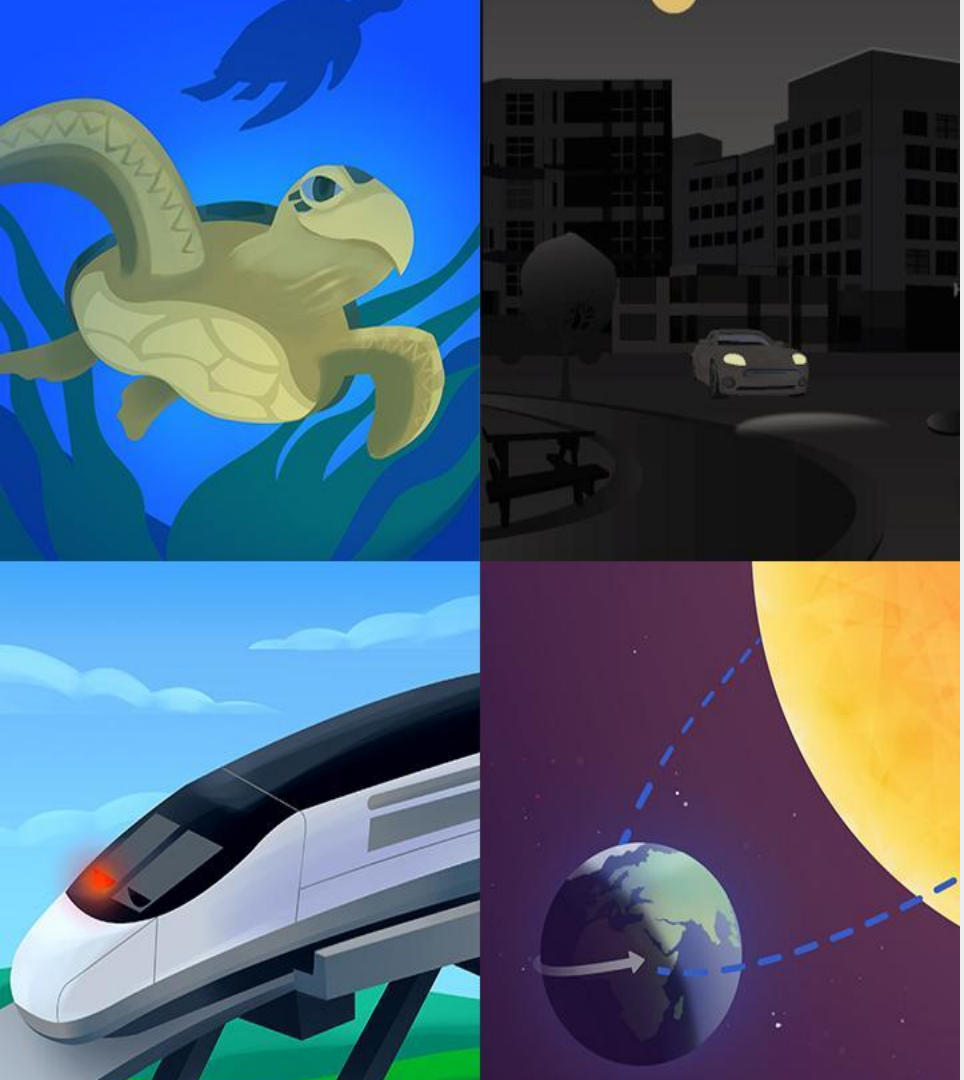



# Balancing Forces Classroom Slides



# Balancing Forces Classroom Slides-Gride View





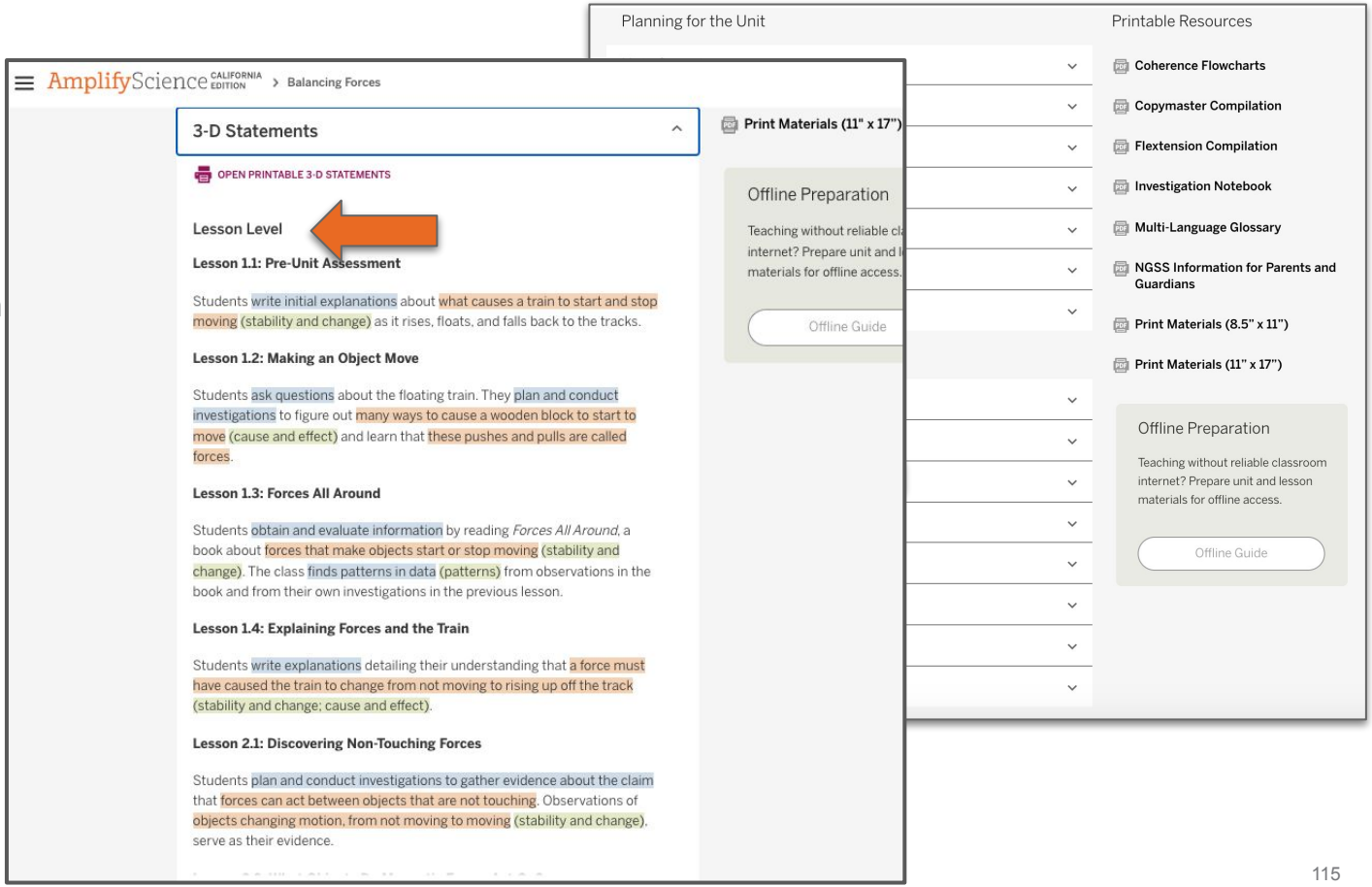
# Plan for the day

- Framing and Review
- Introducing the Unit
- Unit Internalization
- Identifying the Science and Engineering Practices (Unit and Chapters)
- Science and Engineering Practices within a lesson
- Lesson Planning
- Closing

# 3D Statements Lesson Work time

1. Identify what **Science and Engineering Practices** are addressed in each lesson in Chapter One

2. Identify how the **Science and Engineering Practices** are addressed



## Lesson Worksheet: Science and Engineering Practices

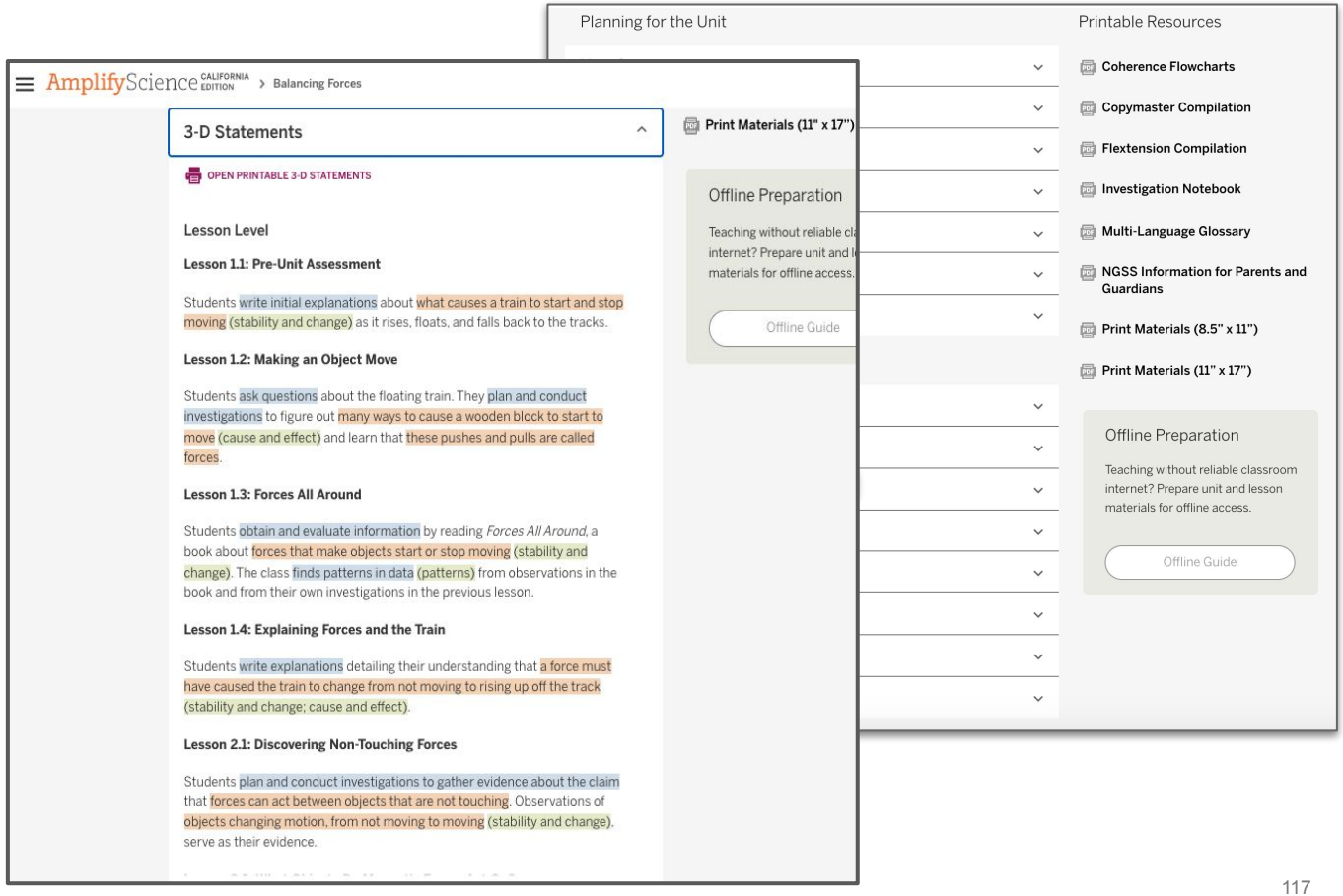
**Unit:** Balancing Forces

**Chapter:** 1 **Chapter Question:** Why does the train rise?

| Chapter SEP # / Lesson # | SEP #1: Asking questions | SEP #2: Obtaining information from reading | SEP #3: Communicate information | SEP #4: Plan and conduct investigations | SEP #5: |
|---|---|---|---|---|---|
| Lesson # 1.1<br>How: | | | Write initial explanations<br><br>Pre-unit Assessment | | |
| Lesson # 1.2<br>How: | Ask questions<br><br>Ask questions about the floating train | | | Plan and conduct investigations<br><br>Finding ways to make one of the blocks move | |
| Lesson # 1.3<br>How: | | | | | |
| Lesson # 1.4<br>How: | | | | | |
| Lesson#<br>How: | | | | | |

# 3D Statements Share Out

Share the what and how of the **Science and Engineering Practices** addressed in each lesson



## Lesson Worksheet: Science and Engineering Practices

**Unit:** Balancing Forces

**Chapter:** 1 **Chapter Question:** Why does the train rise?

| Chapter SEP # / Lesson # | SEP #1: Asking questions | SEP #2: Obtaining information from reading | SEP #3: Communicate information | SEP #4: Plan and conduct investigations | SEP #5: Analyze patterns in data |
|---|---|---|---|---|---|
| Lesson # 1.1<br>How: | | | Write initial explanations<br><br>Pre-unit Assessment | | |
| Lesson # 1.2<br>How: | Ask questions<br><br>Ask questions about the floating train | | | Plan and conduct investigations<br><br>Finding ways to make one of the blocks move | |
| Lesson # 1.3<br>How: | | Obtain and evaluate information<br><br>Reading Forces All Around | | | Find patterns in data<br><br>Looking at data from Class Observation Table |
| Lesson # 1.4<br>How: | | | Write explanations<br><br>Write about the floating training | | |
| Lesson#<br>How: | | | | | |

# Standards and Goals

## Standards and Goals

OPEN PRINTABLE STANDARDS AND GOALS

- **3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.**

  **Note:** Students focus on the disciplinary core ideas represented in this Performance Expectation in the Amplify Science *Environments and Survival, Energy Conversions,* and *The Earth System* units. Students make additional connections to the disciplinary core ideas represented in this Performance Expectation in the Amplify Science *Weather and Climate, Waves, Energy, and Information,* and *Ecosystem Restoration* units.

**Science and Engineering Practices**

As with all Amplify Science units, the *Balancing Forces* unit provides students with exposure to most of the eight science and engineering practices described in the NGSS. This unit emphasizes all eight practices (listed below in order of particular emphasis), providing students with explicit instruction and expectations for increasing independence over the course of the unit.

- **Practice 2: Developing and Using Models.** Students receive explicit instruction and opportunities to practice developing models: a) with diagrams, to represent the forces acting on the floating train, and b) with physical materials, to show how the floating train might work.
- **Practice 6: Constructing Explanations.** Students learn about scientific explanations and have multiple opportunities to write increasingly complex explanations over the course of the unit as they explain why the floating train rises above the track, floats, and then falls back on the track.
- **Practice 8: Obtaining, Evaluating, and Communicating Information.** Students receive explicit instruction and have multiple opportunities to use the reading comprehension strategy of *setting a purpose for reading* as they engage with the informational texts in the unit.
- **Practice 3: Planning and Carrying Out Investigations.** Just as students focused on using the strategy of setting a purpose for reading

Print Materials (8.5" x 11")

Print Materials (11" x 17")

### Offline Preparation

Teaching without reliable classr
internet? Prepare unit and lesso
materials for offline access.

Offline Guide

4 Lessons 5 Lessons 4 Lessons

Chapter 4: Why does the train float, even though gravity is acting on it?

4 Lessons

Chapter 5: Why does the train change from floating to falling?

5 Lessons

Planning for the Unit

- Unit Overview
- Unit Map
- Progress Build
- Getting Ready to Teach
- Materials and Preparation
- Science Background
- Standards at a Glance

Teacher References

- Lesson Overview Compilation
- Standards and Goals
- 3-D Statements

Printable Resources

- 3-D Assessment Objectives
- Coherence Flowcharts
- Copymaster Compilation
- Crosscutting Concept Tracker
- Eliciting and Leveraging Students' Prior Knowledge, Personal Experiences, and Cultural Backgrounds
- Investigation Notebook
- Multi-Language Glossary
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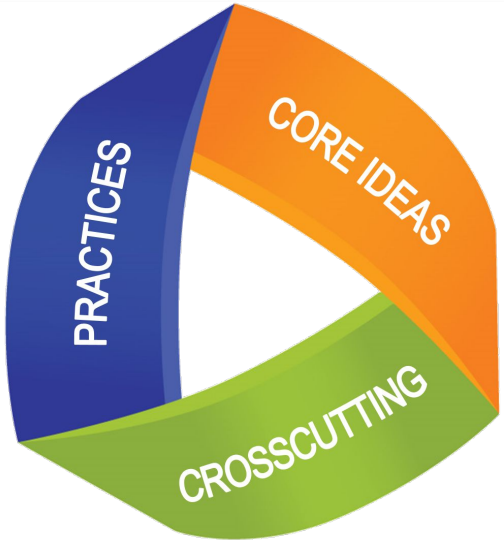
- Print Materials (8.5" x 11")
- Print Materials (11" x 17")

# Next Generation Science Standards

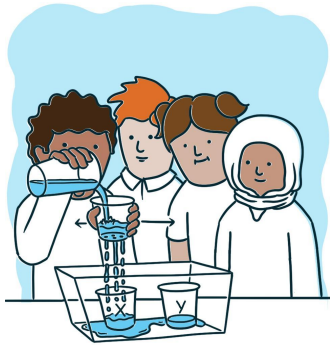
## Science and Engineering Practices




1. Asking questions (for science) and defining problems (for engineering) Ch. 1, 3
2. Developing and using models Ch. 3
3. Planning and carrying out investigations Ch.2, 4
4. Analyzing and interpreting data Ch. 2
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering) Ch. 1, 3
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information Ch. 1,2 4

# Science & Engineering Practices: Balancing Forces

Building the practices incrementally, lesson by lesson, chapter by chapter.



## Balancing Forces: Science & Engineering Practices

**Lesson Worksheet:** Science and Engineering Practices

**Unit:** Balancing Forces

**Chapter:** 1 **Chapter Question:** Why does the train rise?

| Chapter SEP # / Lesson # | SEP #1: Asking questions | SEP #2: Obtaining information from reading | SEP #3: Communicate information | SEP #4: Plan and conduct investigations | SEP #5: Analyze patterns in data |
|---|---|---|---|---|---|
| Lesson # 1.1 How: | | | Write initial explanations<br>Pre-unit Assessment | | |
| Lesson # 1.2 How: | Ask questions<br>Ask questions about the floating train | | | Plan and conduct investigations<br>Finding ways to make one of the blocks move | |
| Lesson # 1.3 How: | | Obtain and evaluate information<br>Reading Forces All Around | | | Find patterns in data<br>Looking at data from Class Observation Table |
| Lesson # 1.4 How: | | | Write explanations<br>Write about the floating training | | |
| Lesson# How: | | | | | |

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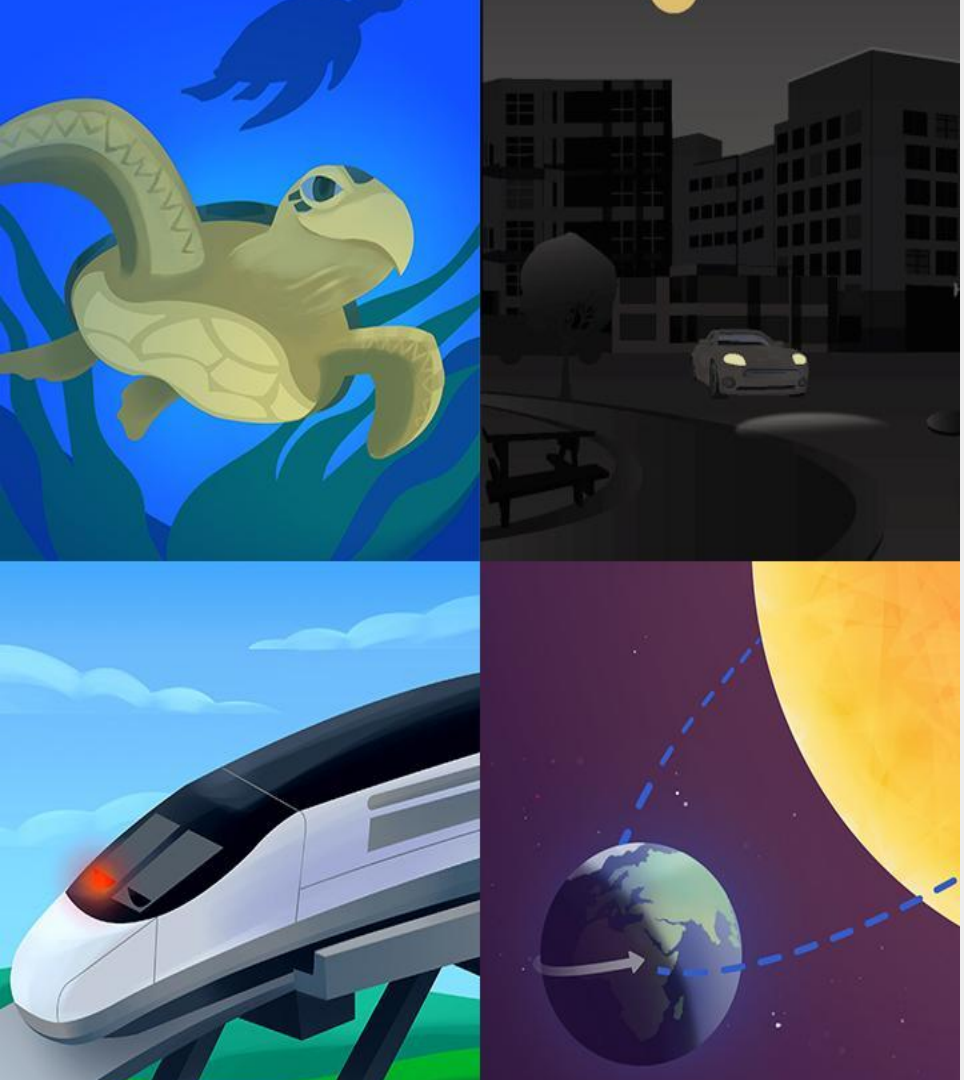
# Questions?



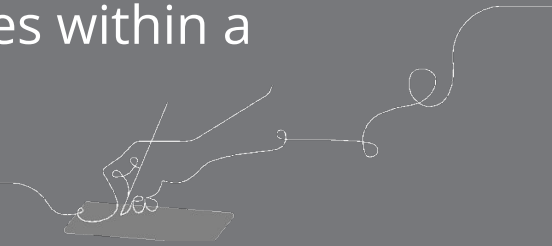
# Plan for the day

- Framing and Review
- Introducing the Unit
- Unit Internalization
- Identifying the Science and Engineering Practices (Unit and Chapters)
- Science and Engineering Practices within a lesson
- Lesson Planning
- Closing

# Overarching goals

We are able to:

- ☑ Internalize the unit
- ☑ Identify the Science and Engineering Practices within the unit
- ☑ Identify the Science and Engineering Practices within a lesson and how they are taught.
- ☑ Apply this knowledge to prepare to teach.



# Closing reflection

## Based on our work today, share:

**Head:** something you'll keep in mind

**Heart:** something you're feeling

**Feet:** something you're planning to do

LAUSD Microsite-
https://amplify.com/lausd-science

# Welcome to Amplify Science!

This site contains supporting resources designed for the LAUSD Amplify Science adoption for grades TK–8.

- Access the Amplify Science Program Hub (To help orient you to the new design, watch this video and view this reference guide.)
- Find out more about Amplify Science@Home
- Share the Caregiver Hub (Eng/Span) with your families
- For LAUSD ES Teachers- Amplify Science & Benchmark Advance Crosswalk
- Instructional guidance for a Responsive Relaunch of Amplify Science in 21-22

Click the button below to preview the digital Teacher's Guide, and check back for exciting updates to this site!



ify.

# Additional resources and ongoing support

## Customer Care

Seek information specific to enrollment and rosters, technical support, materials and kits, and teaching support, weekdays 7AM-10PM EST and weekends 10AM-6PM EST.

help@amplify.com

800-823-1969

Amplify Chat

# Thank You!

*Thank you for all you do!*