

Studies  
 Weekly



# EXPLORE SCIENCE

Program Preview

Dive in!



# TEACHERS LOVE STUDIES WEEKLY

"I loved how hands-on it is and allows for teacher flexibility. My students enjoy having the tangible paper but also enjoy how interactive it is online. It's easy to cut apart the weekly issue and do more project-based activities with it. Which is why I recommended it to my current school, and the committee voted to adopt this program."

Early Childhood & Lower School Counselor

"Studies Weekly's science curriculum is everything I always looked for as a teacher. It's engaging for the students, easy to implement, and three-dimensional."

Curriculum Writer



"This is my 24th year teaching, and this is the best science program I've ever used before. You can do so many hands-on things with it. The terminology is awesome for kids. It's easy for teachers."

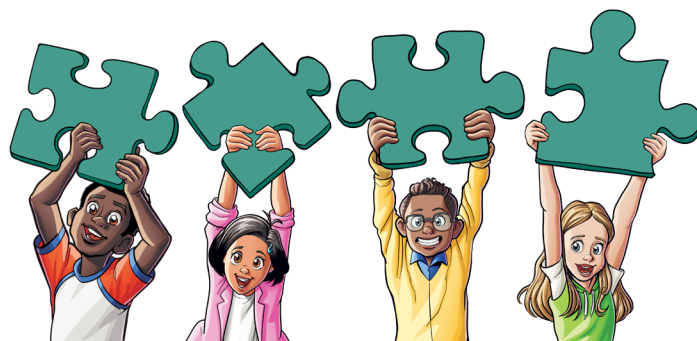
1st Grade Teacher



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# COMPREHENSIVE CORE CURRICULUM



	COMPREHENSIVE	SUPPLEMENTAL
THE BACKBONE OF CLASSROOM INSTRUCTION	✓	
HEAVILY BASED ON EDUCATIONAL RESEARCH	✓	
ADDRESSES MOST OR ALL STATE STANDARDS AND FRAMEWORKS	✓	
USED FOR TIER 1 INSTRUCTION	✓	
INCLUDES FORMATIVE AND SUMMATIVE ASSESSMENTS	✓	
COMPLEMENTS STUDENT MATERIALS WITH RICH TEACHER MATERIALS	✓	
MAY INCLUDE EXTRA TOPICS AND DEPTH	✓	✓
CAN BE USED FOR TIER 2 OR 3 INSTRUCTION	✓	✓
MAY INCLUDE REMEDIATION, ENRICHMENT, AND EXTENSION ACTIVITIES	✓	✓
TEACHERS CAN DIFFERENTIATE CLASS MATERIALS TO MEET DIVERSE STUDENT NEEDS	✓	✓
STUDIES WEEKLY!	✓	✓

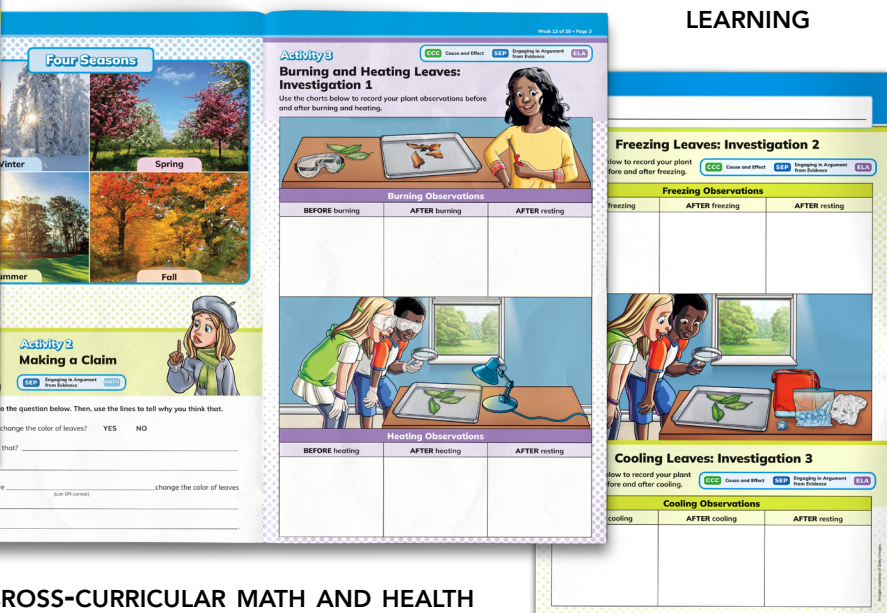
# NEW K–5 SCIENCE

Fully aligned to the **NEXT GENERATION SCIENCE STANDARDS (NGSS)**, Studies Weekly's Explore Science curriculum builds scientific literacy and competency through three dimensions: Scientific and Engineering Practices, Crosscutting Concepts, and Disciplinary Core Ideas.



**DRIVEN BY  
STUDENT INQUIRY**

**INTEGRATED CLAIMS, EVIDENCE, REASONING**

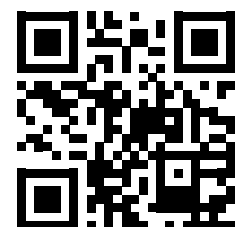


**CROSS-CURRICULAR MATH AND HEALTH  
SKILLS EMBEDDED THROUGHOUT**

**ACTIVITY-BASED  
LEARNING**



SEE MORE OF YOUR  
HANDS-ON SCIENCE



[s-w.co/sci-sample](https://s-w.co/sci-sample)

# WHAT COMES WITH STUDIES WEEKLY



## Teacher Edition

Spend less time planning and more time teaching.

- Ready-made lessons
- Essential questions
- Activities & assessments
- Standards correlations
- Material lists



## Online Platform

Engage all students and expand their learning!

- Exclusive video library
- Audio reader
- Rewards system
- Customizable content
- Teacher resources



## Printables

Each unit includes multiple lesson supports, graphic organizers, activity sheets, flash cards, and word wall cards to **REINFORCE** and **EXTEND** student learning.



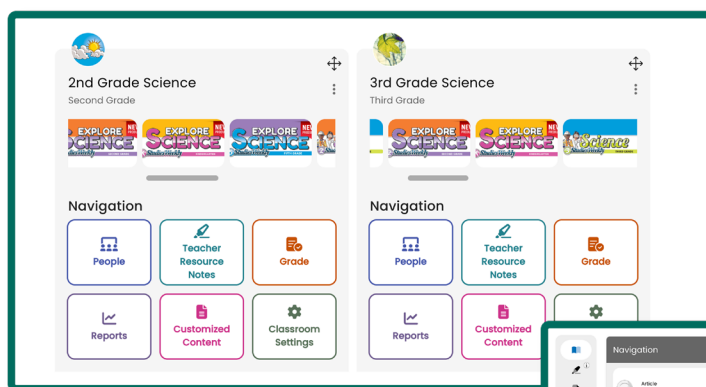
## Student Artifacts

### **CUT IT. CONSUME IT.**

Students can make the print publications their own by highlighting and annotating on it. Use Student Editions to create student artifacts and assess knowledge.

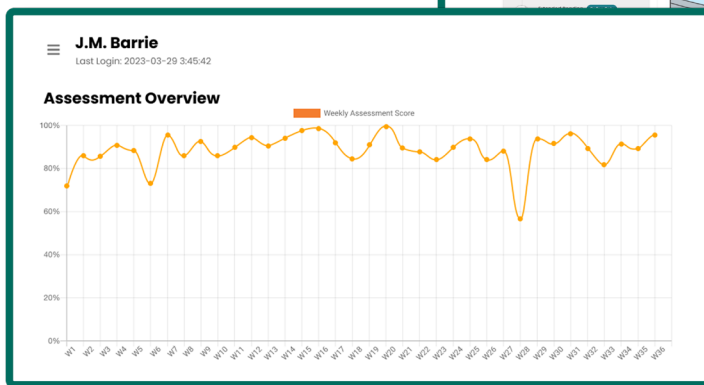
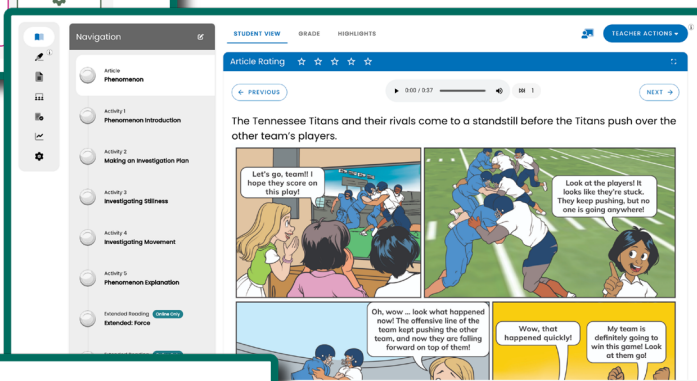
# STUDIES WEEKLY ONLINE

Our user-friendly digital learning program is used by over **1.7 MILLION TEACHERS** and **STUDENTS**. It is similar to popular LMS platforms and appeals to all learning styles with easy-to-use lesson plans, videos, and activities.



**PLAN YOUR LESSONS,  
ASSIGNMENTS, AND ASSESSMENTS  
ALL IN ONE PLACE**

**BUILT-IN AUDIO READER  
TEXT ANNOTATION TOOLS  
AUTO-GRADED ASSESSMENTS  
GOOGLE CLASSROOM INTEGRATION**



**MONITOR INDIVIDUAL  
STUDENT OR CLASS PROGRESS  
WITH JUST A FEW CLICKS**



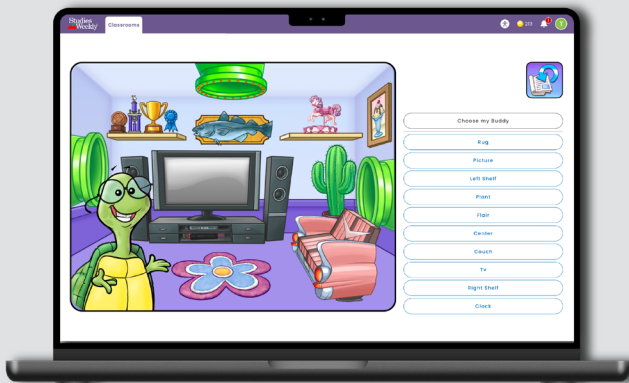
[s-w.co/online](https://s-w.co/online)

**START A 60-DAY  
FREE TRIAL!**



# GAMIFICATION AND TOOLS

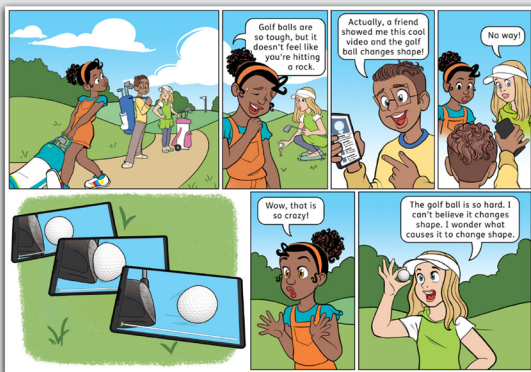
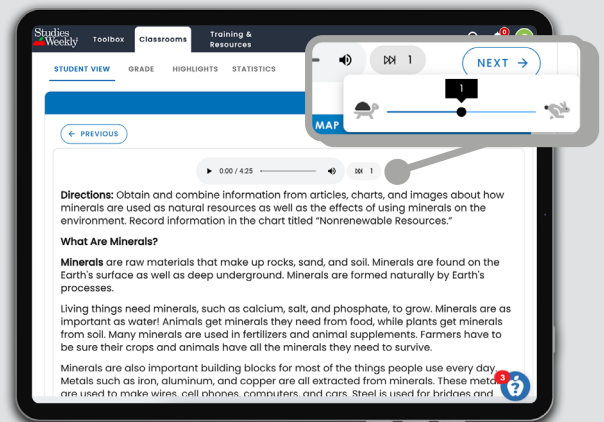
Your science program includes many additional resources within the digital platform to enhance and expand your teaching.



**GAMIFICATION** encourages student engagement

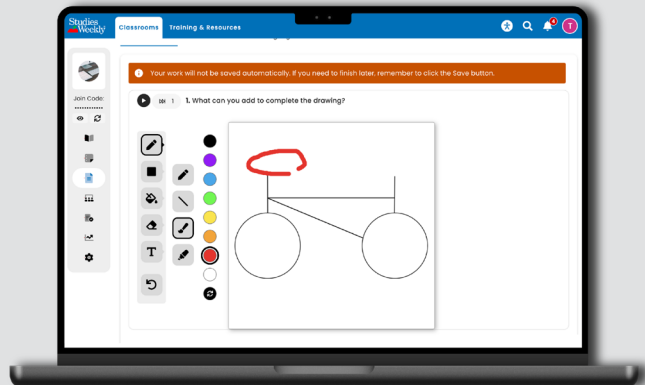
**ARTICLE TOOLS** include:

- Variable speed audio reader
- Highlighting & annotating tools



**PHENOMENON COMICS** introduce concepts through engaging stories

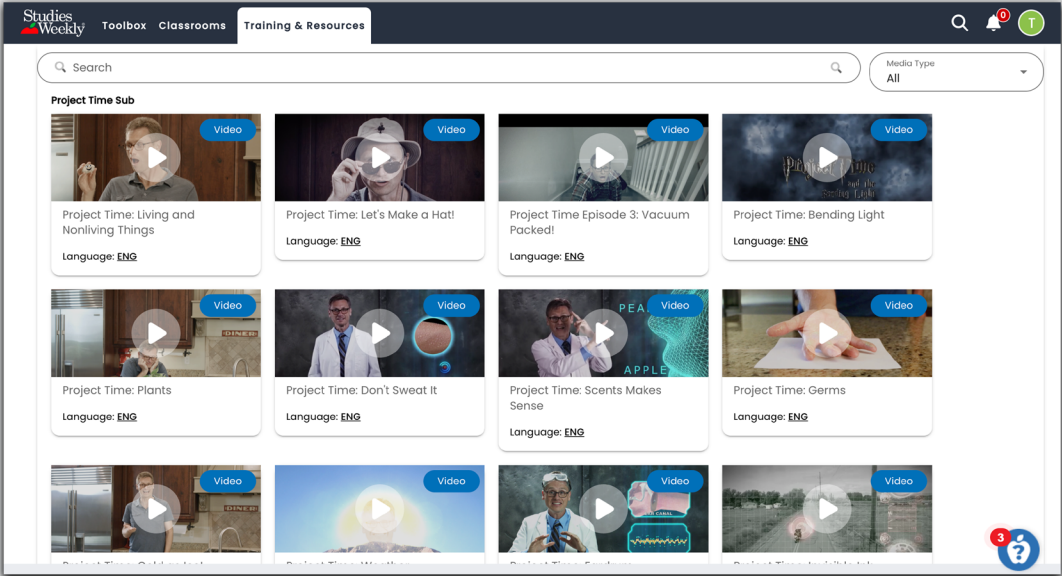
**INTERACTIVE QUESTIONS** that allow students to draw, sort, group, label, and more



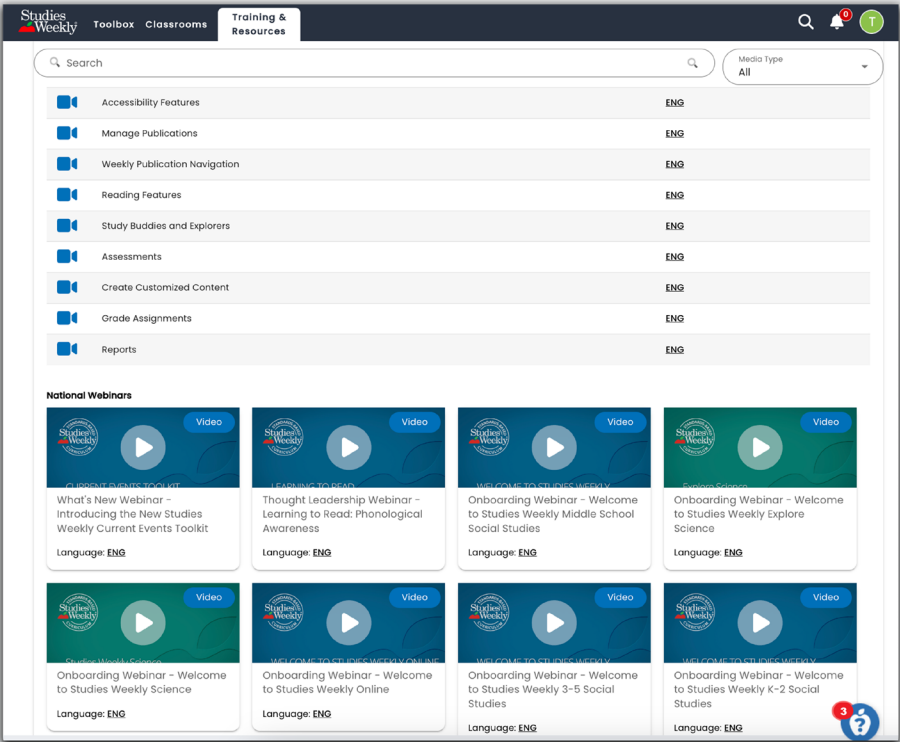


# TEACHER RESOURCES

Empower teachers with comprehensive teacher resources to lessen preparation time, deepen learning, and enhance the teacher experience.



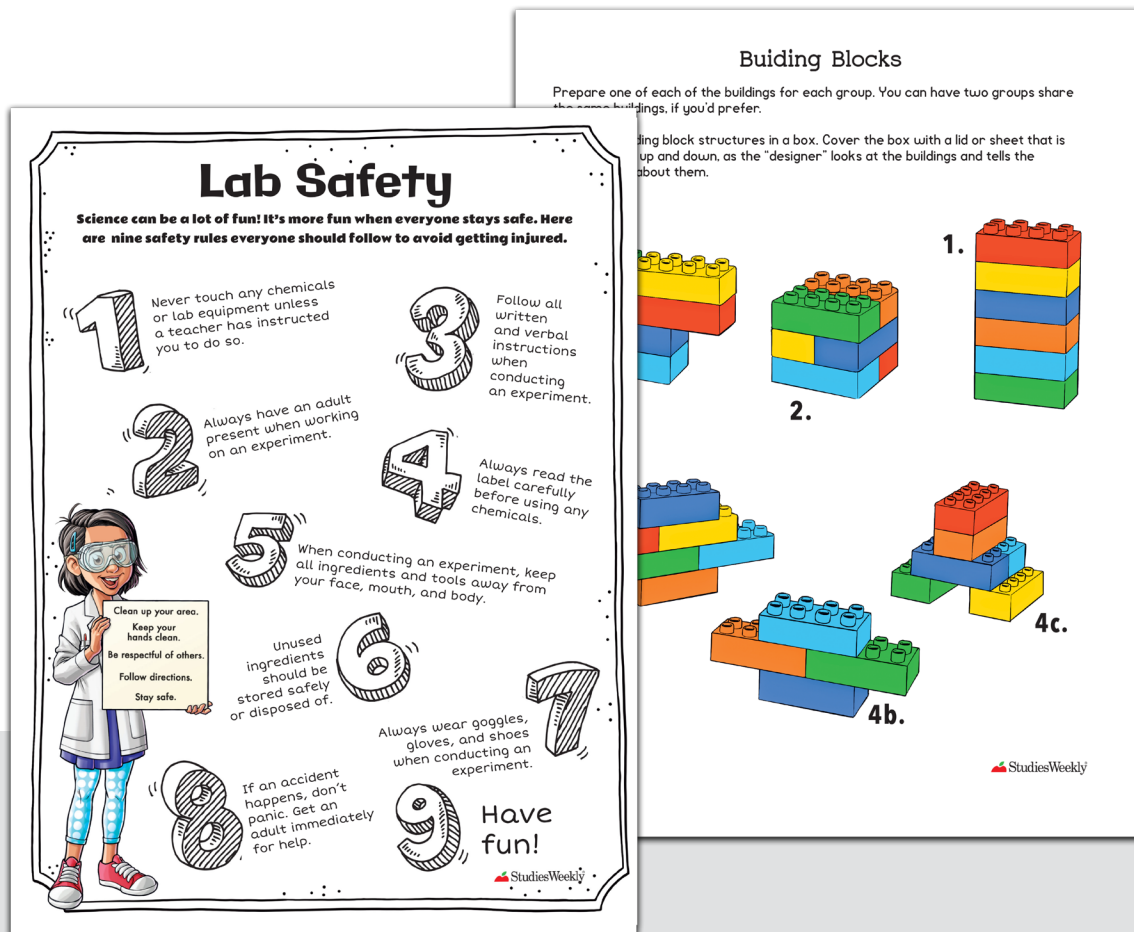
Engaging  
**SCIENCE VIDEOS**



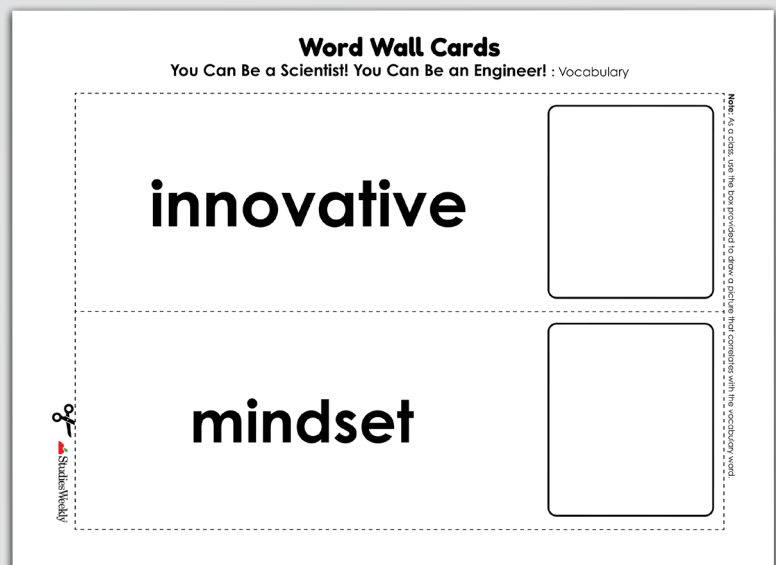
**TRAINING** and  
**ON-DEMAND PD**

# PRINTABLES

Printables help students connect with the material, extend learning, and reinforce key concepts.



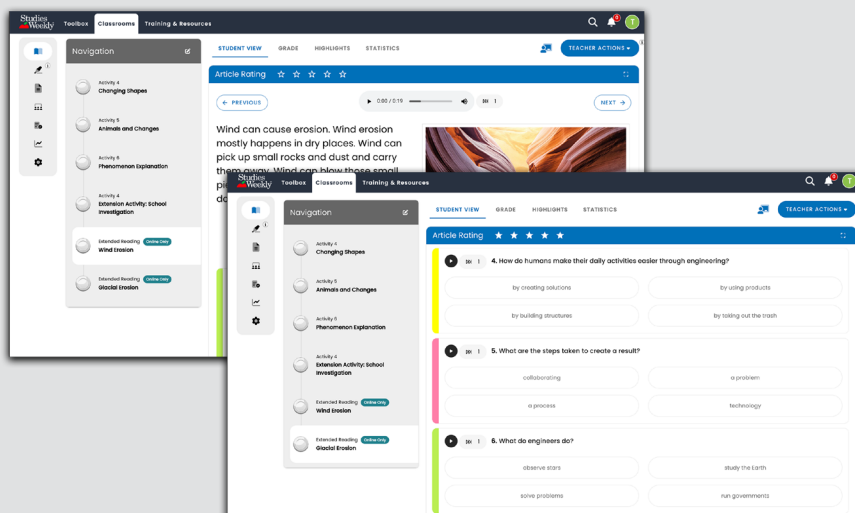
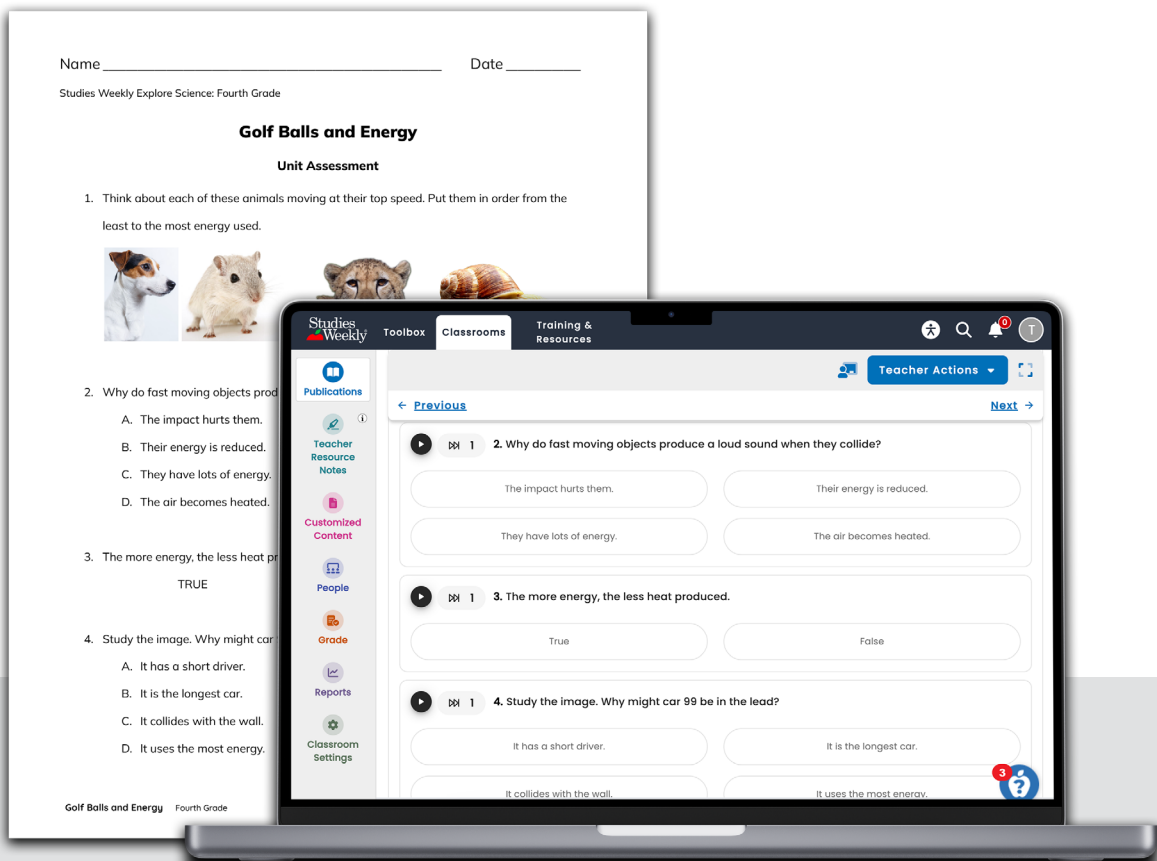
Word wall  
**VOCABULARY** cards





# ASSESSMENTS

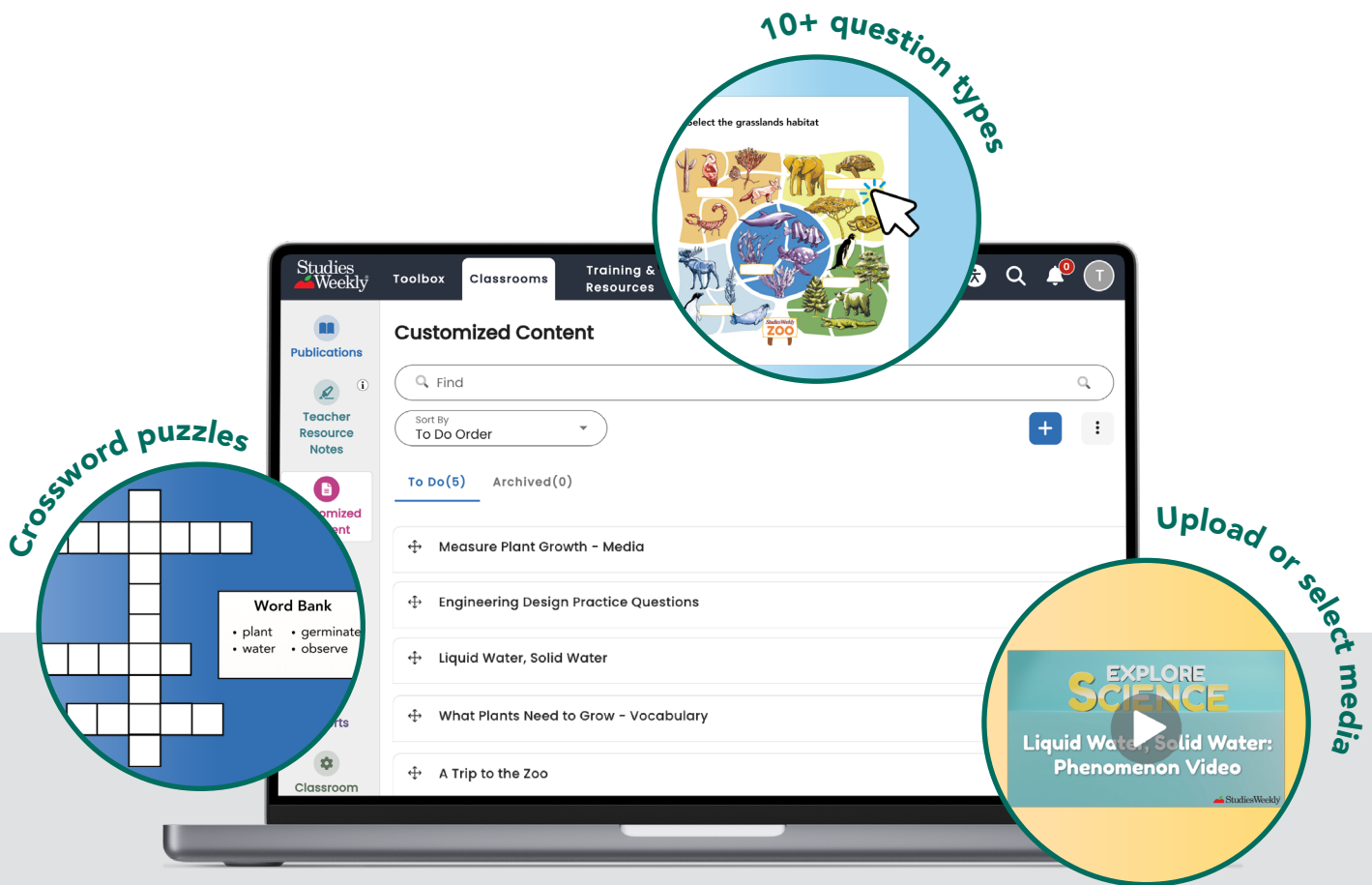
Monitor student progress with formative and summative assessments that are easy to edit, assign, and grade in print or online.



Check knowledge with comprehension questions after each article and lesson activity

# CUSTOMIZABLE CONTENT

Create a **DYNAMIC ONLINE LEARNING EXPERIENCE** that works for you and your students. Customize assignments, assessments, media, and more in your publications. Or, create and upload your own content to fit your students' needs.



Assign content to the whole class or individual students for increased **DIFFERENTIATION**



# SCIENCE Kits

Optional science kits available to enhance  
**EXPERIENTIAL LEARNING** through hands-on instruction.



Science Kit Grade 4 example



## YOUR SCIENCE KIT INCLUDES:

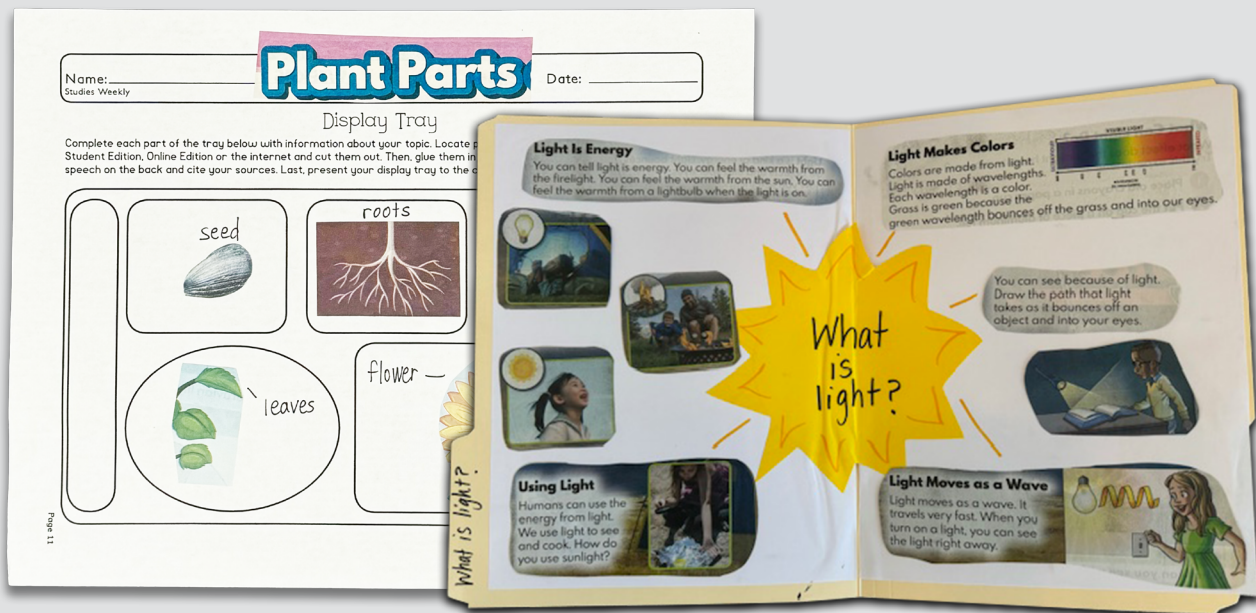
- Essential materials needed in the hands-on curriculum activities
- Important science tools such as thermometers, scales, beakers, and more
- Consumable materials not typically found in the classroom
- Enough items to support a typical classroom of students working in groups
- Unit-specific packaging within the storage bins

**You can replace kit items yearly by ordering refill kits**



# STUDENT ARTIFACTS

Because Studies Weekly is a consumable program, students can cut out images and information from the print publication to create learning artifacts.



# Natural Hazards

- Hurricanes
- Floods
- Earthquakes
- Tornadoes
- How Can We Prepare

Week 25 of 28 • Page 4

SEP Developing and Using Models CCC Patterns ELA

## Activity 4 Landforms

Plains Hills Canyon Plateau Beach Mountains Desert

Landforms

Cause → Effect match

## Cause and Effect

Understanding Cause and Effect  
Cause and effect can help you understand why things happen. Scientists use cause and effect to understand the world. Engineers use cause and effect in their designs.

SE → EFFECT

## Seasons

Winter Spring Summer Fall



# UNIQUE BENEFITS OF PRINT

While it may take a little time initially to separate the publications, having the ability to file each week separately can actually save time in the long run. Whereas workbook-style curricula offer the risk that students will lose their curriculum, the newspaper format also allows you to give students just one week or unit at a time.

"The most appealing feature is that students have the newspaper format, which they prefer over a textbook. They can interact with it online or on paper. The online features allow students to highlight, underline, and circle which reinforces the information taught in class."

Curriculum Supervisor

"The students absolutely love the newspapers. It takes complicated material and puts it in a way that they can understand and enjoy. They then like to take them home and share them with their family!"

1st Grade Teacher

# SORTING STUDENT EDITIONS

Because the Studies Weekly Student Editions are printed in complete student sets, they come nested together into a student edition with all the weeks together. As you separate publications, you can sort them by themes or units and hand them out individually during instruction, giving you more control over how much curriculum your students receive at one time.

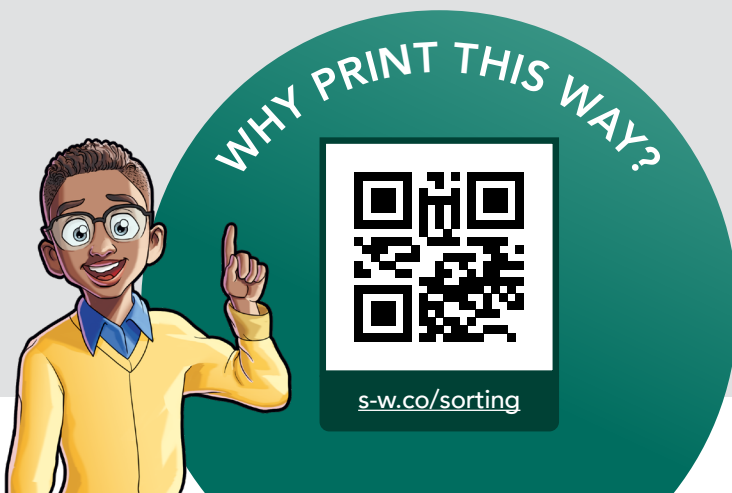
## IDEAS FOR SORTING

1. Put your students in a circle
2. Assign them each a week to find in the SE
3. One student starts by pulling out Week 1, then passes the rest to the student in charge of Week 2, etc.
4. Gather papers by weeks, clip together



2. Give older students a service opportunity and ask them to sort

3. Ask a parent helper to sort



# EDUCATOR SUPPORT

At Studies Weekly, we believe every educator deserves equitable access to effective, ongoing training and support. Our programs offer student and teacher-friendly resources, Professional Development opportunities, and a partnership with dedicated teams ready to assist you every step of the way.

Our Professional Development and Customer Support teams partner with you to help you reach your professional, classroom, and implementation goals.

Support options include:

- Step-by-step Onboarding Guide available to all educators
- Training resources and videos available in Studies Weekly Online
- Professional Development that can be built around your school or district needs
- One-on-one help from a Teacher Advocate
- Free weekly Teacher Talk Q&A sessions
- A comprehensive Help Center filled with useful articles, videos, and step-by-step guides
- A friendly Customer Support team that can troubleshoot issues with orders, shipping, technical difficulties, rostering, etc.





# CUSTOMIZED PD

All sessions can be tailored to fit your needs by:

- Content area
- Grade level
- Instructional focus
- Learning outcomes
- Mode of delivery
- Audience



## Onboarding

Receive introductory training in your print publications and online platform



## Instructional Modeling

Demonstrate effective teaching strategies in real classroom settings



## Train the Trainer

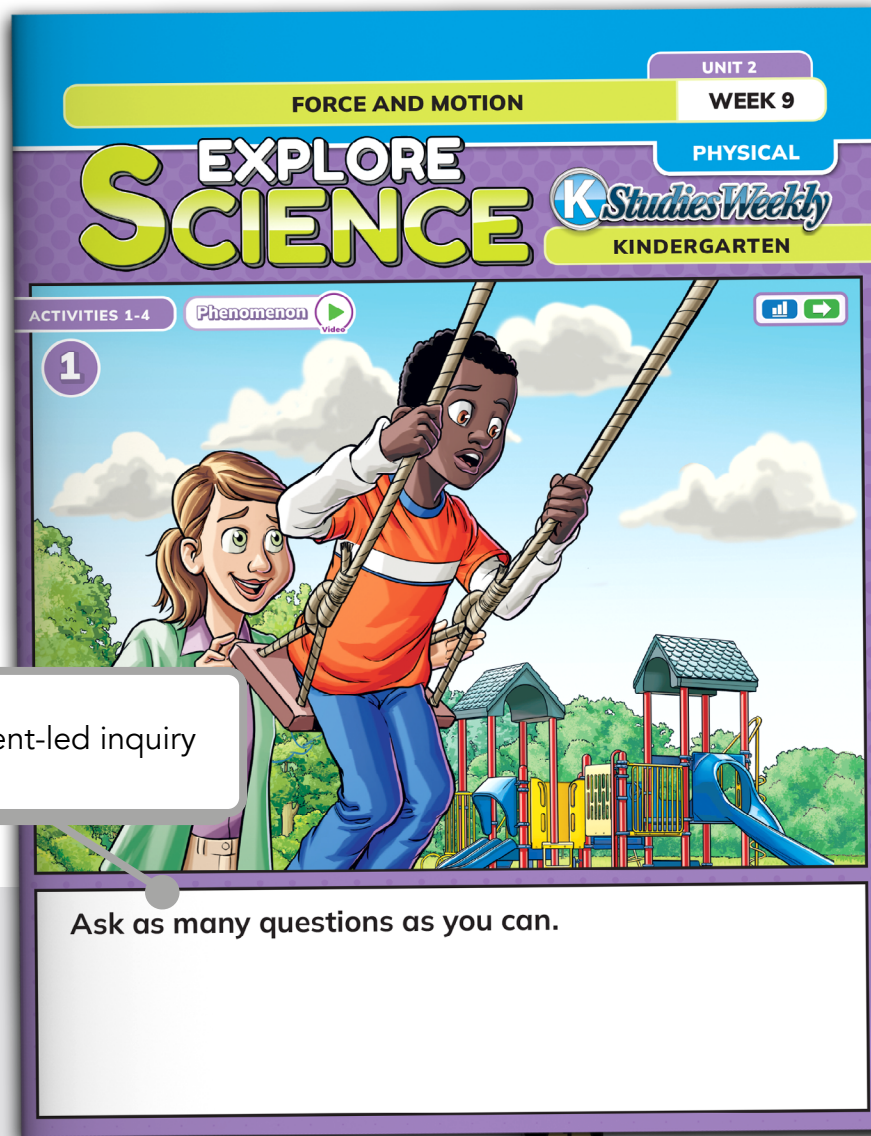
Coach leaders in Studies Weekly professional development



## Curriculum Coaching

Support for aligning Studies Weekly publications with local curriculum

*\*Studies Weekly awards PD credits for every completed PD session.*



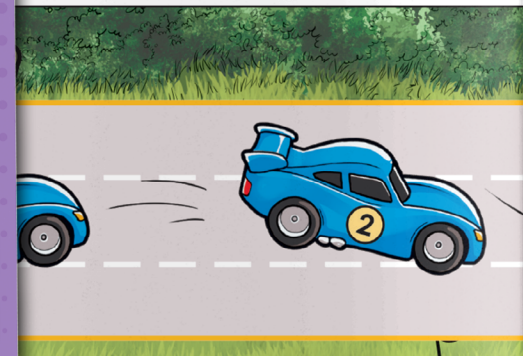
Model concepts with illustrations

things move. Motion can be  
n. Motion can be changed.



Student-led inquiry

Ask as many questions as you can.



ended up with each push.  
ush. Circle what kind of push you used

**BIG** small

**BIG** small

# KINDERGARTEN STUDENT EDITION


 GRADE

Circle the things that show **pull**. Put an X on the things that show **push**.



How many did you X?

1   2   3

How many did you circle?

1   2   3

Collect, record, and analyze evidence

## CHALLENGE

Effort you used for each pull.  
1. Record the time. Collect Evidence:

2<sup>nd</sup> Pull

3<sup>rd</sup> Pull



TIME

:

TIME

:

Learn cause and effect

A bigger push causes a \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ effect.

**BIG** small

\_\_\_\_\_ supports our claim.

Images used in this unit courtesy of Getty Images.

## Reference lesson materials

**Activity** **Motion Discovery — Explore** **15 minutes**

**Force and Motion: Poster Pal**

**SEP** Planning and Carrying Out Investigations  
**CCC** Cause and Effect

**Force and Motion: Word Wall Cards**

**Vocabulary**  
**collide**: when moving objects touch each other  
**direction**: the path that an object takes. For example, an object can be moved up, down, right, or left.  
**investigate**: to look for clues based on evidence  
**motion**: when an object is moving. When an object changes its position, it is moving.  
**pull**: to use force to move an object

**Objective**  
Students will use prior knowledge to ask questions to learn scientific vocabulary about the causes and effects of motion on objects.

**Teacher Note**  
Vocabulary will be introduced using the Poster Pal. Make sure this is posted so the class can see the photos.

**Lesson Guide**

**Student-Driven Inquiry**

- Ask:** What questions on our Storyboard have you been thinking about that relate to the phenomenon? **Students towards "How did Jackson feel?" or questions about being scared like in the phenomenon story.**

**Vocabulary**

- After allowing students to look at the Poster Pal, direct their attention to the Poster Pal.
- Have students look at the photos on the Poster Pal.
- Ask:** Based on what you see in the photos, what word enthusiastically corresponds?
- Continue this approach with all the photos on the Poster Pal, prompting students by asking questions about the photos on the Poster Pal.
- Students can illustrate the words on the Poster Pal. They can attach the photos provided on the Poster Pal.
- Direct students' attention to the Poster Pal and ask them to write out the different ways motion can be described.

**Whole Group**

- Direct students to their student edition and have them look at the top of the page.
- Instruct students to choose a word from the Poster Pal.
- Ask:** How are words separated by spaces in print?
- Direct students to point to each word in the word and write each word with a crayon.
- Model this for the class on the Poster Pal.
- Remind students that our vocabulary words describe how objects move.

**Unit 2.13 Force and Motion — Weeks 9 and 10**

## Integrated ELA standards

**ELA** RF.K.1.C: Understand that words are separated by spaces in print.

**Week 9 Lesson Plans**

**Activity 1** **Phenomenon Introduction — Engage** **15 minutes**

**Materials:**

**Objective**  
Students will be able to activate prior knowledge to ask questions about the phenomenon.

**Teacher Note**  
The Poster Pal will be used throughout this unit. Display or prepare the Poster Pal before beginning the lesson. The Student-Driven Question Board for this unit can be created in a visible area in your classroom. For example, calendar area or on an anchor chart.

**Lesson Guide**

**Introduce Phenomenon**

- Have students look at the Poster Pal with the phenomenon engagement photos.
- Say:** *Whenever Jackson's teacher pulls his swing back up over her head extra high before letting go, he feels as if he's floating and gets a little scared. Jackson has to hold on tight the higher and faster it goes.*
  - Play the **Force and Motion: Phenomenon Video**.
- Students will have their own student edition in front of them.
  - Say:** *Pay close attention to what you notice or question as you listen to the phenomenon story and the phenomenon video.*
  - Say:** *Use the thought bubble in your student edition to draw or write what you are thinking or trying to understand.*
  - Tip: Remind students just to collect ideas and questions. They should not talk about what they notice or think yet.
- Using the story, time-lapse video, and the Poster Pal, students should start to build awareness of different kinds of motion, direction, and speed.
  - Use the **Phenomenon Questioning Technique** printable found in the front matter to guide students in asking questions. See the key questions or phrases below for guidance in directing students to the guiding question: *How do pushes and pulls affect the motion of an object?*
    - What movement can we observe?
    - What is causing the swing to move?
    - Changes that can be observed
    - Different descriptive words about motion, speed, and direction
    - Prior experiences with testing speeds or directions

**Guiding Question**  
*How do pushes and pulls affect the motion of an object?*

**Tip:** If students struggle to create questions, remind them of the phenomenon story and what they already know in their lives. Example questions might include:

- Why would the character in the story feel a little scared?
- How is the swing affected by the pull?

**Unit 2.11 Force and Motion — Weeks 9 and 10**

# KINDERGARTEN TEACHER EDITION



## Activity 3

## Car Race — Explore

15 minutes

## Materials:

- masking tape
- toy cars (one per pair)



## Race Cars



SEP Planning and Conducting an Investigation

CCC Cause and Effect

**MATH** K.MD.A.2: Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. For example, directly compare the heights of two children and describe one child as taller/shorter.

## Objective

Students will be able to collect evidence to determine the effect of different pushes on an object's distance and speed. Data will be collected as evidence to support their understanding.

## Teacher Note

To prepare for this activity:

1. Clear several spaces three feet wide.
2. Using masking tape, mark a starting line.
3. To measure the distance, place race car pictures at the starting line.
  - a. Suggestion: Tape down the first picture 0 paces from the starting line, the second two paces, and the third three paces from the starting line.

## Lesson Guide

## Student-Driven Inquiry

1. **Ask:** Based on what you know, can you share with a partner and use a vocabulary word to describe one way an object can move? *(Students should share one or more vocabulary words with their partner.)*
2. Pick up a toy car.
  - a. **Ask:** How do you think you could make the car travel the furthest distance? *(to push it really hard)*
3. **Ask:** Does pushing something hard make you think of something we've seen this week? *(the phenomenon)*
4. **Ask:** Are there any questions on our Student-Driven Question Board related to our guiding question: *How do pushes and pulls affect the motion of an object?*
  - Guide students towards questions relating to pushes, speed, or strength of pushes.

## Collaborative Learning

1. Direct students' attention to one of the racetracks taped on the floor.
2. Tell students that they will have three tries. Their goal is to push their car hard enough to reach each target.
3. Point out the numbered race cars on the track and describe how they will be used to measure how far their car can travel.
  - a. Discuss procedural rules:
    - The car must stay on the ground at all times.
    - Take turns.
    - Follow the science rules for precise testing.
4. Choose two students to model a small push and big push with the toy cars at the starting line.
5. Direct students to their student editions and explain that they will perform three pushes, trying to reach target 1, target 2, and target 3.

- a. Students will draw in their student edition how close each car got to the target during each push.
  - b. They will circle what kind of push they used on each attempt in their student editions.
6. Dismiss teams to several locations around the room and monitor students' learning.

## Debrief

1. Gather the class. Direct their attention to the student edition.
2. **Ask:** Who can explain, using evidence, what the results were of our test of different strengths of pushes? *(The bigger push made the cars go farther.)*
3. Read the student edition drawings.
4. **Ask:** What kind of push did you use?
5. Write the student demonstration word with the word.
6. Tell students to turn to a partner and tell them how their evidence supports this. *(The car with the big push went farther than the car with the small push, or similar claims.)*

## Suggestions for differentiation

## Developing

Logically partner students who need more support with students who can take on a leadership role. For those who need extra help with fine motor skills, have them participate by watching.

## Advanced

Challenge students to think of three other items that could be used to test the same scientific idea of big pushes and pulls. Challenge them to perform these tests and report back the results to you.

Evidence Student Edition Response

Review the whole lesson and answers in the student edition to ensure correct completion and understanding.

UNIT 2

SOUND INVESTIGATION

WEEK 10

PHYSICAL

EXPLORE

SCIENCE

1 Studies Weekly

FIRST GRADE

ACTIVITIES 1-2

Phenomenon

Video

1

?

→

Our Investigation

Scientists **investigate**. They make a **plan**. They do their plan. They find **evidence**. You can investigate!

RULES:

1 Ask as many questions as you can.

2 Do not stop to discuss, judge, or answer the questions.

Circle your best question.

My Questions

Student-led inquiry

sounds

evidence

investigations

plans

vibrations

ee are called

phenon

g.

What is causing the sound?

# GRADE 1

## STUDENT EDITION

Write directly on the  
print publication

### Investigation Purpose

We want to find out



### OUR INVESTIGATION

Write or draw the steps of what you will do in the investigation.

- 1
- 2
- 3
- 4
- 5

Learn and plan  
investigations

What happened in your investigation.

Effect

cup make **sound**?  
ing evidence from the  
icture to help you.




can cause

Learn cause and effect




Reference media in the online platform

Optional:

 Sound Investigation: Phenomenon Video A

**Guiding Question**

*How does the screeching cup make its sound?*

 Sound Investigation: Word Wall Cards

**Vocabulary**

**Investigation:** an activity to collect information about the natural or designed world used to answer a question or solve a problem

**ELA** RF.1.1A Students will recognize the distinguishing features of a sentence by locating first words, capitals, and ending punctuation in an article.

**ELA Connection**

Have students identify features of a sentence by locating first words, capitals, and ending punctuation, number of sentences, etc.

**Optional**

**Differentiation**

**Developing**

Allow students to share their questions.

**Advanced**

Have extra writing paper if students need it on their student edition.

**Formative Assessment**

**Evidence** Self-Assessment

Students will participate in a discussion about the phenomenon. They will show their participation by showing a thumbs up, thumbs down, or a thumbs sideways, and responses and meet one on one with a peer.

Unit 2.11 Sound Investigation — Weeks 10, 11 and 12

happening. It is alright if they are incorrect or have misconceptions. You will come back to this picture at the end of the week.

9. Using their picture and the class picture, students will write or draw the questions they have about the screeching cup using the printable **Phenomenon Questioning Technique**. Guide students toward the guiding question: *How does the screeching cup make its sound?*

a. Optional: For the "Improve Questions" step, consider having students add to or revise their questions to include the following topics or words:

- Sound and Vibration (DCI): Students don't have to use this exact vocabulary yet.
- Cause and Effect (CCC): What happened next?
- Investigation (SEP): Students don't have to use this exact vocabulary yet.
- Related Phenomenon: Students don't have to use this exact vocabulary yet.

10. **Ask:** How can we find answers to our questions?

a. **Say:** We have to DO something to find out more about the world around us.

11. Read the article chorally and discuss the questions. Have students point to the words in the text that answer the questions.

**Vocabulary**

a. **Say:** When scientists call an investigation an **investigation**, they find out more about the world around us by asking questions.

**Week 10 Lesson Plans**

Activity 1	Phenomenon Introduction: Part One — Engage	20 minutes
<p><b>Materials:</b></p> <p><b>Objective</b></p> <p>Students will be able to ask questions about the cause of the phenomenon.</p> <p><b>Teacher Note</b></p> <p>Prior to the lesson, create the screeching cup using the printable <b>Screeching Cup Experiment Instructions</b>. Practice using the screeching cup several times so you can figure out how it works. You may wish to create a screeching cup for each student or pair of students.</p> <p>2. If, for some reason, your screeching cup isn't working, you can show <b>Sound Investigation: Phenomenon Video A</b>.</p> <p>3. The Poster Pal will be used in all activities this week.</p> <p><b>Lesson Guide</b></p> <p><b>Unit Transition</b></p> <p>Tell students that in the last unit, they learned about many different Crosscutting Concepts and Science and Engineering Practices. They have been taught about what scientists do in real life, and in this unit, they get to put some of that knowledge to work as they do their own investigating.</p> <p><b>Introduce Phenomenon</b></p> <ol style="list-style-type: none"> <li>1. Activate students' background knowledge:           <ol style="list-style-type: none"> <li>a. <b>Say:</b> Today, we're going to investigate an object that makes an interesting sound.</li> <li>b. <b>Ask:</b> Have you ever experienced something that made an interesting sound? What was it? What was the sound like?</li> </ol> </li> <li>2. Present students with the screeching cup. Tell students that you are going to slide your fingers down the string to make a sound.</li> <li>3. <b>Ask:</b> What do you think it will sound like? Have students share their sound ideas with a peer.</li> <li>4. Tell students that as you make the sound for them, they should think of what they are wondering about. They should look closely at all the parts of the screeching cup as they listen.</li> <li>5. Demonstrate the screeching cup several times for students.</li> <li>6. <b>Ask:</b> What was the sound like? Was it what you expected? What would you call the sound?           <ol style="list-style-type: none"> <li>a. If students come up with a different idea than "screeching cup" to call this phenomenon, you can use the term that students come up with.</li> </ol> </li> <li>7. Have students draw in their student editions the screeching cup and what happens when you slide your fingers down the string.</li> <li>8. Tell students that together, you will draw what you observed while listening to the screeching cup and what you think is happening.           <ol style="list-style-type: none"> <li>a. On the Poster Pal, add to the picture of the screeching cup with more drawings and labels from what students suggest is</li> </ol> </li> </ol> <p>Unit 2.10 Sound Investigation — Weeks 10, 11 and 12</p> <p><b>SEP</b> Asking Questions</p> <p><b>CCC</b> Cause and Effect</p>		

**Screeching Cup Experiment Instructions**

**Phenomenon Questioning Technique**

# GRADE 1

## TEACHER EDITION



## Lessons follow the 5E Model

### Activity 2

### How to Investigate — Explore/Explain

40 minutes

#### Materials:

- clipboards (one per student)
- prepared screeching cup(s) (see Activity 1)



Sound Investigation:  
Poster Pal

SEP

Planning and Carrying  
Out Investigations

CCC

Cause and Effect

#### Objective

Students will be able to collaboratively plan and conduct an investigation about the cause of the screeching cup's sound.

#### Teacher Note

- This lesson is designed to model how to plan and conduct an investigation so students are prepared to do their own investigations in subsequent weeks.
- You may wish to give each student their own screeching cup, have a few for small groups, or just have one to demonstrate with.
- If you are doing this activity on the same day as Activity 1, you may wish to stop after the activity introduction.
- Students will need to write in their student edition as you plan and conduct an investigation together. If you prefer students to be at their desks during this time, they can write there. If students are in a whole group setting without desks, clipboards are encouraged.
  - Tip: You may want students to sit on their clipboards if they are not actively being used.

#### Lesson Guide

##### Introduce Activity

- Ask:** What question(s) did we decide we want to investigate last week?
- Say:** *In order to start investigating, we need to look a little closer at our phenomenon. Pay attention to what you notice.*
- Have students share something they noticed about the screeching cup with a peer.

#### Vocabulary

- Some students will likely share that they notice fast back-and-forth movements. If they don't share this, do the following as a think aloud model starting with "I noticed parts of the screeching cup moving really fast. Who else noticed that?"
  - Say:** *These fast movements are called vibrations.*
  - Fill out the missing blank in the Poster Pal with the word "vibrations." Have students copy the word in their student editions. Read the sentence together.
- Review the vocabulary words **cause** and **effect** with students. Bring students back to the guiding question and how you're trying to figure out how the screeching cup makes its sound. Tell students you want to know their ideas about what is causing the sound (effect).
- Have students write or draw their ideas about what is causing the sound in their student editions.

#### Whole Group

- Tell students that today, you are going to walk them through how to plan an investigation and how to do an investigation. Encourage

students to participate with you so they are prepared to do their own investigation for the next two weeks.

- Ask:** Using our Student-Driven Question Board, what are we trying to figure out through our investigation? (**Answers could include: How the screeching cup makes sound or what causes the screeching cup to make a sound.**)
- Say:** *This is called the Investigation Purpose. Let's write it together.*
  - Write the Investigation Purpose, starting with "We want to find out ..." on the Poster Pal, and have students write it in their student editions.

#### Vocabulary

- Say:** *Next, we need to plan what we will do in our investigation. A plan is a written list of ideas and steps that helps you do an investigation.*
- Ask:** What do we need to do to find out the cause of the screeching cup's sound?
  - Using students' responses, create a list of steps in the Poster Pal of how you will find an answer to the guiding question.
  - You may need to ask some additional questions, such as:
    - Which part(s) of the screeching cup will we need to listen to? (**Answers may include: We need to listen to all the parts to see where the sound is coming from.**)
    - Which part(s) will we need to test for vibrations? (**Answers may include: We need to touch all the parts of the screeching cup to see which parts are vibrating.**)
    - Will we need to change anything with the screeching cup to figure out our answer? (**Answers may include: We can try the screeching cup with one element missing and see what happens for each test.**)

## Integrated vocabulary



Sound Investigation:  
Word Wall Cards

#### Vocabulary

**vibration:** when an object moves quickly back and forth

Tell students that when you plan an investigation, you have to think about what you might see and what it means.

- Discuss the following questions:
  - If your idea is correct, what will happen?
  - If your idea is incorrect, what might or won't happen?
  - Will the evidence help us answer our question? How? (**Students should realize that through the investigation, they will be able to see evidence to answer their question about how the screeching cup makes sound.**)

#### Investigation

11 and 12

StudiesWeekly

## Discussion questions

UNIT 5

WEEK 13

HEATING AND COOLING

PHYSICAL

EXPLORE SCIENCE

2 Studies Weekly

SECOND GRADE

Phenomenon

Leaves change color at different times of the year.

Look at how pretty the trees look today! They are so lush and green!

They are lovely! But some of the leaves aren't so green anymore.

I wonder why the leaves are changing colors?

They aren't just changing colors though. The ones on the ground are also drier than the leaves on the trees.

Well, the seasons are changing. It is almost fall.

But WHY do the leaves change color in fall and winter? And why don't they change color in the spring and summer?

They can change color in the summer. Last year, it was really hot all summer so the leaves on my grandma's plants looked lighter and the grass was brown.

What could be causing leaves to change colors?

I don't know yet, but I'm sure we can figure it out!

I agree! Let's brainstorm things that could make the color of leaves change. Then, we can collect some leaves and test it ourselves!

That's a great idea!

Let's try to create the seasons in our classroom to test what happens to leaves. Then we can find out what's happening in real life.

Activity 1 Phenomenon Introduction

Look at the picture "Four Seasons," then answer the questions in the space provided. What do you notice? What do you wonder?

CCC Cause and Effect

ELA

Rules:

1. Ask as many questions as you can.

2. Do not stop to discuss, judge, or answer the questions.

Circle your best question.

My Questions:

Four Seasons

Winter

Spring

Summer

Fall

Activity 2 Making a Claim

SEP Engaging in Argument from Evidence

MATH

o the question below. Then, use the lines to tell why you think that.

change the color of leaves? YES NO

that?

3. I think temperature \_\_\_\_\_ change the color of leaves because \_\_\_\_\_

Introduce scientific phenomenon

Write directly on the print publication

# GRADE 2 STUDENT EDITION



## Activity 3

### Burning and Heating Leaves: Investigation 1

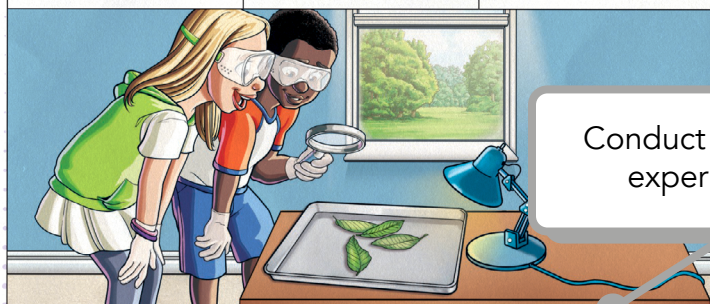
Use the charts below to record your plant observations before and after burning and heating.

CCC Cause and Effect SEP Engaging in Argument from Evidence ELA



#### Burning Observations

BEFORE burning	AFTER burning	AFTER resting



#### Heating Observations

BEFORE heating	AFTER heating	AFTER resting

Conduct hands-on experiments

CCC, SEP, and ELA coverage

### Freezing Leaves: Investigation 2

Use the charts below to record your plant observations before and after freezing.

CCC Cause and Effect SEP Engaging in Argument from Evidence ELA

Freezing Observations		
before freezing	AFTER freezing	AFTER resting



### Cooling Leaves: Investigation 3

Use the charts below to record your plant observations before and after cooling.

CCC Cause and Effect SEP Engaging in Argument from Evidence ELA

Cooling Observations		
before cooling	AFTER cooling	AFTER resting

Images courtesy of Getty Images

## Suggested lesson guide

- Read the comic aloud slowly and clearly, modeling fluency, rate, expression, and attention to punctuation.
- Ask:** What were some words you heard in the text that you think is important and will help us understand our next topic? Why do you think that?  
*Note: If students struggle to produce any words that seem significant to the topic and text, prompt students by asking them if there were any words that they'd never heard, words that were repeated, or words that were used in a new way. It may also be necessary to reread certain parts of the comic.*
  - List those words somewhere throughout the activity and
  - Ask:** Based on the illustration, what is the gist of this comic?
  - Ask:** What do you think this is about?
4. Second Read
- Say:** Great listening ladies! What this comic is mostly about is the topic of our next unit! Remember, it may be true but we aren't yet sure.
  - Tell students that they will

## Reference lesson materials

**Guiding Question**  
How does heating and cooling affect leaves?

- Use the **Phenomenon Questioning Technique** to present the phenomenon. Below are the key words for the guiding question: *"How does heating and cooling affect leaves?"*
  - Heating or cooling (DCI)
  - Cause and effect, Why (CCC)
  - Evidence, clues, (SEP)
  - Related Phenomenon: Still, cooling exist in other parts of the world.
- Tip: If students attempt to explain the phenomenon using words from the phenomenon, prompt them to rephrase their claim using words from the phenomenon. What makes leaves change color? How does heating and cooling affect the color of leaves?
- Example questions from students
  - Why do leaves change color?
  - What happens to leaves when it gets hot?
  - What happens to leaves when it gets cold?
  - Does heating and cooling affect the color of leaves?

Unit 5.10 Heating and Cooling — Weeks 13 and 14

### Week 13 Lesson Plans

#### Activity 1

#### Phenomenon Introduction — Engage

25 minutes

#### Materials:

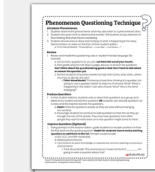
- pencils
- anchor chart



Four Seasons



Phenomenon Questioning Technique



**SEP** Engaging in Argument from Evidence

**CCC** Cause and Effect

**ELA** SL.2.2: Students recount or describe details from the comic read aloud.

**NOS** Science searches for cause and effect relationships to explain patterns in nature

#### Phenomenon Comic Strip:



Unit 5.9 Heating and Cooling — Weeks 13 and 14

#### Objective

Students will be able to use evidence from illustrations and texts to make and support a claim about the topic of this unit.

#### Teacher Note

This unit will take two weeks to complete and there will be two student editions for this unit. However, students will be using week 13 of their student edition for the first activity of week 14. Be sure students have a safe space to store their student edition.

#### Lesson Guide

#### Introduce Activity

- Gather students as a class.
- Have students raise a hand if they have ever been extremely hot OR cold.
- Give students 15 seconds to reflect on a time they've been too hot or too cold. Prompt students to think about how it felt, what it was like, and any changes they may have noticed.
- Select 2-3 students to share some of the things they reflected on about being too hot or cold.
- Give each student their student edition and bring all students' attention to the illustrations.
- Tell students that they will be starting a new unit and using a phenomenon picture and a comic to help them better understand their topic.

#### Phenomenon Introduction

- Display the **Four Seasons** image from Studies Weekly Online and refer students to the beginning of page 2 of their student edition for a closer look.
- Give students 30 seconds to observe the photographs. Then, direct them to answer the first two questions with a teammate before responding in their student editions. (What do you notice? What do you wonder?)
- Have 2-3 students share what their teammate either noticed or wondered.

#### Comic Reading

Use the procedure outlined below or a similar one to guide students through understanding the phenomenon comic.

- Give students 30 seconds to observe the illustration and text of the comic independently.
- Ask:** What do you think this comic will be about? What evidence or clues from the illustrations or text make you think that?

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# GRADE 2 TEACHER EDITION

Lessons follow the 5E Model

Activity 2

Making a Claim — Engage

5 minutes

Materials:

- pencils (one per student)

Self-Assessment

Objective

Students will be able to use evidence from the phenomenon activity to make a claim that they will spend the unit investigating.

Lesson Guide

Collaborative Learning

- Tell students that they have done a great job identifying the topic of their next unit. Inform students that they will be experimenting to gather evidence to learn if changes in temperature can change the color of leaves. Tell students that before they get started, they first need to decide if they believe heating and cooling will change a plant, and then they need to determine how to test out their claim. Have students raise their hand if they think changes in temperature can change the color of leaves. Count the number of students who raised their hand. Record that number somewhere all students can see it. Have students raise their hand if they think changes in temperature can NOT change the color of leaves. Count the number of students who raised their hand. Record that number beside the first number. Math Integration: Which number is larger? Which number is smaller? If the words greater than OR less than, compare these two numbers from left to right. Do more students believe that temperature CAN or can NOT change the color of leaves? Use evidence from the graph to support your response. Allow students two minutes to complete the "Making a Claim" section in their student edition.

Optional

Creating a Solar Oven

Printable

Creating a Solar Oven

This unit requires students and teachers to have access to spaces that can keep a substance warm for a prolonged period of time. Coming across enough of these materials can be difficult or costly. Teachers can use this optional extension activity to guide students through making their own homemade solar oven to keep their leaves at a high temperature longer.

Optional

Creating a Classroom Language

Printable

Creating a Classroom Language

This unit requires students to make a claim about the understanding of a scientific principle. It could be useful to give the class a chance to exchange their thoughts with. Teachers can use this activity to determine how to support natural language development that keeps student language at the forefront of instruction.

Optional

Differentiation

Developing

- If students struggle with speaking in complete sentences or providing responses to questions, provide students with sentence starters to help them produce a response to questions.
- If students have a hard time responding to the questions during the first comic reading, reread the pertinent information and stop after reading all information that can help students answer the question.

Advanced

- Have students read the comic independently.
- Have students write their responses regarding the gist of the comic. In their writing, students state a claim about what the comic is about and use evidence from the text to support their claim.
- Have students write their predictions and write whether they were right or wrong using evidence from the text.

Formative Assessment

Printable

Self-Assessment

Evidence

Self-Assessment

Students respond to questions designed to get them to think critically about the phenomenon and unit topic. Then, students assess themselves on their engagement with the questioning strategy.



Phenomenon

A soccer ball moves when it is kicked.

Video

This team is the best!

It's so fun to watch how well they play!

GOOOOAL!

EEEEEEEEEEEEEEEEEEEE

I wish I knew how they can kick the ball and it goes exactly where they want it.

My aim needs some work too!

They just know exactly how hard and where to kick the ball for the perfect aim. I learned it in science!

Soccer is science? Alright, this is something I want to learn about.

Me too, let's go experiment!

Activity 1 Phenomenon Introduction

My Questions:

SEP Asking Questions ELA

Rules:

1. Ask as many questions as you can.

2. Do not stop to discuss, judge, or answer the questions.

3. Change all statements into questions.

Circle your three best questions.

Vocabulary

My Definition

SEP Planning and Carrying Out Investigations

CCC Cause and Effect

ELA

Investigation

ations to better understand the natural world. Read about how one scientist Then answer the questions below.

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essions e technology se early. Smith ogy as a high

g

cientific research rs old. "My mom and I a makeshift earching for questions," s spanned as curious all. Science orm to me that h. Then, when had the idea ching a video ations on that whenever ough it came off

Process ch after ctors and family members of people who had Parkinson's disease. She also read medical journals to get as much information as possible. Smith came up with a hypothesis, or idea, to be te vari

has come as she's worked hard to find answers to her questions. She has done this through research and investigation.

Advice to Young Scientists

"Learn to really cultivate your curiosity. I think every invention or research project I've had came through curiosity," Smith says. "That's really where the best ideas come from. And secondly, start pursuing your ideas today, even if it's just a small step forward. There are so many really amazing, impactful ideas that never turned into reality just because there's no perfect time to start. So start today."

How did Ms. Smith start her investigation?

What did she decide before testing?

What did you learn about planning an investigation as you read?

What about Ms. Smith's research is most interesting to you?

Introduce scientific phenomenon

Read and analyze text

GRADE 3 STUDENT EDITION

30



## Activity 3 Investigating Movement

Week 7 of 36 • Page 3

**SEP** Planning and Carrying Out Investigations  
Constructing Explanations  
Analyzing and Interpreting Data  
Use Mathematics and Computational Thinking

**CCC** Cause and Effect **ELA**

### Investigative Question

How do different forces affect the movement of a soccer ball?

Describe the investigation:

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Variable:

What are you going to measure and how will you measure it?

Trial	1	2	3	4
Force				
Measure the Movement				

How do different forces affect the movement of a soccer ball?

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Vocabulary	My Definition

SEP, CCC, ELA, and Math coverage

**SEP** Planning and Carrying Out Investigations  
Constructing Explanations  
Analyzing and Interpreting Data  
Use Mathematics and Computational Thinking

**CCC** Cause and Effect **ELA** **MATH**

### Investigative Question

Can I apply force on a soccer ball and have it NOT move?

Describe the investigation:

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What are you going to measure and how will you measure it?

	1	2	3	4
Force				
Measure the Movement				

How do different forces on a soccer ball cause no movement?

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Vocabulary	My Definition

Images courtesy of Getty Images. Page 2 Images of Erin Smith courtesy of Erin Smith.

## Differentiation ideas

### Optional Differentiation



Question Starters



### Developing

Provide students with questions to help them think about the phenomenon.

### Advanced

Have students identify questions on their own.

### Formative Assessment



Evidence  
Students will use their own questions to investigate the phenomenon.

## Reference standards coverage

Unit 2.10 Investigating Forces — Weeks 7 and 8

## Week 7 Lesson Plans

### Activity 1

### Phenomenon Introduction — Engage

30 minutes

#### Materials:

- soccer balls (one per group)



Investigating Forces:  
Phenomenon Video



Phenomenon  
Questioning Technique



#### Phenomenon Comic Strip:



Investigating Forces:  
Flash Cards  
Investigating Forces:  
Word Wall Cards

Investigating Forces:  
Word Wall Cards

#### Guiding Question

How do different forces affect the movement of a soccer ball?

#### SEP Asking Questions

**ELA** SL.3.1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

Unit 2.9 Investigating Forces — Weeks 7 and 8

#### Objective

Students will be able to make observations about a phenomenon and ask questions about kicking a soccer ball.

#### Teacher Note

Prior to this lesson you will need to set up the soccer balls either outside or in the gym.

#### Lesson Guide

##### Phenomenon Comic

Have students read the comic strip. The purpose of the comic strip is to get students thinking about the phenomenon. Use the comic strip to activate student's prior knowledge and experiences about kicking a soccer ball.

##### Phenomenon Introduction

- Bring the rules of questioning to students' attention. Tell students they will be experiencing a phenomenon, and that while experiencing the phenomenon, they need to be thinking about questions.
- Take students to the gym or outside. Line up soccer balls and have students kick the balls.
- Return to the classroom.

#### Vocabulary

Ask students to describe how they caused the balls to move. After they describe causing the balls to move through kicking, tell them that they exerted a **force** on the soccer ball. **Force** is a push or pull on an object. **Force** causes the object to speed up, slow down, change place, or stay in the same place.

- Present the phenomenon video: [Investigating Forces: Phenomenon Video](#).

- Use the [Phenomenon Questioning Technique](#) to present the phenomenon and guide students in asking questions. Below are the key words to be aware of to direct students to the guiding question: How do different forces affect the movement of a soccer ball?

- Movement
- Force
- Direction
- Strength
- Lack of movement, or stillness

- Tip: If students struggle to create questions, encourage students to use their prior knowledge discussed from the comic to create questions from what they already know.

- Think-Aloud Model:** I know that forces make the ball move, but are there any forces acting on the ball when it isn't moving? Why does the soccer ball stop?

StudiesWeekly

# GRADE 3 TEACHER EDITION



Lessons follow the 5E Model

## Suggested lesson guide

Activity 2

Planning an Investigation

SEP

Planning and Carrying Out Investigations

CCC

Cause and Effect

ELA

SL.3.2: Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.  
SL.3.1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

NOS

Scientific Investigations Use a Variety of Methods: Scientific investigations use a variety of methods, tools, and techniques.

Objective

Students will be able to plan an investigation.

Lesson Guide

Whole Group

- Say:** As we read, pay attention to Erin Smith's methods, tools, and techniques. Scientists follow important guidelines so that their investigation will be respected by the scientific community.
- Read the article as a whole class to introduce Erin Smith.
- Discuss with students ways they think professional scientists might go about planning an investigation. (First, they must determine what they are investigating. They start by asking a question. Next, they decide how they will investigate their question. They determine a theory to test. They set the variables they will test. They decide on the number of tests to run. They also decide how they will measure the results of the test.)
- Have students answer the questions in the student edition.

Debrief

**Ask:** How did Erin Smith start her investigation? What did she decide before testing? What did you learn about planning an investigation as you read? What would you want to ask Erin Smith if you could talk to her?

Optional

Interview with Erin Smith

Printable

Interview with Erin Smith (Extension Activity)

The full interview with Erin Smith can be found online. It is a written interview students can read. As well, Erin took part in a TEDx conference, and you might want to watch the video found on Youtube with your students.

Optional

Differentiation

Printable

Investigating Forces: Lower Lexile® Measure Articles

Printable

Developing

Students can read the lower Lexile® measure version of the article "Planning an Investigation" (Lexile® measure: 410L-600L; word count: 310) in the **Investigating Forces: Lower Lexile® Measure Articles** printable.

Advanced

Have advanced students research other scientists and find out what their real life investigation process is.

Formative Assessment

Evidence

Student Edition Response

Use student answers to numbers 1-3 to determine if students understand the steps of planning an investigation.

### Activity 3 Investigating Movement — Explore 30 minutes

**Materials:**

- soccer balls (one per group)
- measuring devices

**SEP** Planning and Carrying Out Investigations

#### Objective

Students will be able to conduct an investigation to answer how different forces affect the motion of an object.

#### Teacher Note

This investigation may need to happen outside or in the gym. Also, students will need to take a measurement of some kind. You can provide rulers, meter sticks, or even encourage students to use their feet to measure. The important thing in this investigation is that they are consistent in what they measure.

#### Lesson Guide

##### Student-Driven Inquiry

- Ask students to look through the Student-Driven Question Board and discuss any questions they already have ideas about with a partner. Encourage students to share their unique perspectives and show respect as their peers express their ideas during their conversations. Call on students to share.
- When students share ideas around the guiding question, "How do different forces affect the movement of a soccer ball?", tell them that is what they will be investigating today.

##### Whole Group

- Ask:** What is our investigative question? (**How do different types of forces affect the movement of a soccer ball?**)
- Ask:** How will we investigate our guiding question? (**conduct an investigation in which we will apply different forces on a soccer ball such as: pushing, kicking, throwing, blowing on, flicking, etc.**)
- Ask:** What will be the variable in our investigation? (**the type of force applied**)
- Ask:** How will we measure the results? (**Answers will vary.**)

##### Collaborative Learning

- Break students up into small groups to conduct the investigation.
- As a small group they will need to decide on four ways to apply force to a soccer ball.
- Students will then conduct their investigation.
- After recording their data, students need to answer the question in the student edition: How do different forces affect the movement of a soccer ball?

##### Debrief

- Discuss with students how their investigations went.
  - What types of forces did you try?
  - How did it go?
  - What did you notice?
  - How do you think different forces affect the movement of a soccer ball?
  - Can you identify the cause and effect?

and 8

StudiesWeekly

UNIT 2  
 WEEK 7

**GOLF BALLS AND ENERGY**

# EXPLORE SCIENCE

**4 StudiesWeek**  
**FOURTH GRADE**

**PHYSICAL SCIENCE**

**Phenomenon** A golf ball changes shape when hit by a golf club.

**Activity 1 Phenomenon Introduction**

**Rules:**

- Ask as many questions as you can.
- Do not stop to discuss, judge, or answer your questions.
- Change your statements into questions.

Circle your best question.  

ELA

SEP Asking Questions

**My Questions:**  


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**Activity 2 How Fast? How Slow?**

After you have placed the images in order from slowest to fastest, answer these questions:  
 What was the easiest image to place? Why?  


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What was the hardest image to place? Why?  


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How did you decide where to put each image? What was your reasoning or thought process?  


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MATH

ELA

SEP

 Developing and Using Models

Define hypotheses

## Speed and Impact

An object moving \_\_\_\_\_ will make \_\_\_\_\_ sound.  
 An object moving \_\_\_\_\_ will create \_\_\_\_\_ heat.  
 An object moving \_\_\_\_\_ will make an object at rest move \_\_\_\_\_ distance after they collide.  
 An object moving \_\_\_\_\_ will make an object at rest move \_\_\_\_\_ distance after they collide.

Trial 1:	1. Slowly roll the marble toward the hard surface. Did the impact create a soft or loud sound?	2. Slowly roll the marble toward the hard surface again. Did the impact create a soft or loud sound?
	_____	_____
Trial 2:	1. Quickly roll the marble toward the hard surface. Did the impact create a soft or loud sound?	2. Quickly roll the marble toward the hard surface again. Did the impact create a soft or loud sound?
	_____	_____
Trial 3:	1. Slowly tap your pencil on your hard surface. Did the impact create a soft or loud sound?	2. Slowly tap your pencil on your hard surface again. Did the impact create a soft or loud sound?
	_____	_____
Trial 4:	1. Quickly tap your pencil on your hard surface. Did the impact create a soft or loud sound?	2. Quickly tap your pencil on your hard surface again. Did the impact create a soft or loud sound?
	_____	_____
Conclusion: A _____-moving object will make a _____ sound.		

Trial 1:	1. Slowly rub your hands together. Did the impact create more or less heat?	2. Slowly rub your hands together. Did the impact create more or less heat?
	_____	_____
Trial 2:	1. Quickly rub your hands together. Did the impact create more or less heat?	2. Quickly rub your hands together. Did the impact create more or less heat?
	_____	_____
Trial 3:	1. Slowly snap your fingers. Did the impact create more or less heat?	2. Slowly snap your fingers. Did the impact create more or less heat?
	_____	_____
Trial 4:	1. Quickly snap your fingers. Did the impact create more or less heat?	2. Quickly snap your fingers. Did the impact create more or less heat?
	_____	_____
Conclusion: A _____-moving object will create _____ heat.		

Reflect and connect

# GRADE 4 STUDENT EDITION



## Conduct experiments

## Grade-level reading practice

### Distance Experiment

**Directions:**  
1. Using a ruler, place one marble in the groove at 3 inches. This will be your "sitting marble." Place the other marble in the groove at 0 inches. This will be your "starting marble."  
2. Follow the directions in the table for each trial.  
3. Repeat each trial two times to record accurate results.

<b>Trial 1:</b>	1. Slowly roll the starting marble at the sitting marble. Did the impact cause the sitting marble to travel more or less distance?	2. Slowly roll the starting marble at the sitting marble. Did the impact cause the sitting marble to travel more or less distance?
<b>Trial 2:</b>	1. Quickly roll the starting marble at the sitting marble. Did the impact cause the sitting marble to travel more or less distance?	2. Quickly roll the starting marble at the sitting marble. Did the impact cause the sitting marble to travel more or less distance?
<b>Trial 3:</b>	1. Slowly kick the cotton ball. Did the impact cause the cotton ball to travel more or less distance?	2. Slowly kick the cotton ball. Did the impact cause the cotton ball to travel more or less distance?
<b>Trial 4:</b>	1. Quickly kick the cotton ball. Did the impact cause the cotton ball to travel more or less distance?	2. Quickly kick the cotton ball. Did the impact cause the cotton ball to travel more or less distance?

**Conclusion:** A \_\_\_\_\_-moving object will make an object at rest move \_\_\_\_\_ distance after it is hit.

### Speed Experiment

**Directions:**  
1. Using a ruler, place one marble in the groove at 3 inches. This will be your "sitting marble." Place the other marble in the groove at 0 inches. This will be your "starting marble."  
2. Follow the directions in the table for each trial.  
3. Repeat each trial two times to record accurate results.

<b>Trial 1:</b>	1. Slowly roll the starting marble at the sitting marble. Did the impact cause the sitting marble to move faster or slower after it was hit?	2. Slowly roll the starting marble at the sitting marble. Did the impact cause the sitting marble to move faster or slower after it was hit?
<b>Trial 2:</b>	1. Quickly roll the starting marble at the sitting marble. Did the impact cause the sitting marble to move faster or slower after it was hit?	2. Quickly roll the starting marble at the sitting marble. Did the impact cause the sitting marble to move faster or slower after it was hit?
<b>Trial 3:</b>	1. Slowly kick the cotton ball. Did the impact cause the cotton ball to move faster or slower after it was hit?	2. Slowly kick the cotton ball. Did the impact cause the cotton ball to move faster or slower after it was hit?
<b>Trial 4:</b>	1. Quickly kick the cotton ball. Did the impact cause the cotton ball to move faster or slower after it was hit?	2. Quickly kick the cotton ball. Did the impact cause the cotton ball to move faster or slower after it was hit?

**Conclusion:** A \_\_\_\_\_-moving object will cause an object at rest to move \_\_\_\_\_ after it is hit.

## The Impact

Read the article. Use the text from both readings as evidence to answer the comprehension questions.

Ms. Anderson was posting the grades late to myself. I had studied it and I really wanted it pressed the refresh button screen and waited were updated.

nd, when they loaded, I yelled as I ran out into a chair that was in the hall. The chair went down, and grabbed my toe.

Ms. Anderson said, coming out to see what was going on. "You were going to hurt yourself, didn't you?" I said as I hopped on my toe. Ms. Anderson said as she picked up the chair, "You collided with the chair. What does that mean?"

"An impact is the moment two things collide, or crash into each other. Like you and that chair," Mom said, pointing to my toe and the chair.

"But how do you know it had a big impact? It's my toe that is hurting right now," I said.

"I know it was a big impact because I heard a loud noise, and I saw the chair quickly fly down the hallway," Mom said. "Just like it said in your science homework the other night. There are a few things we can observe in an impact to tell us how

much speed the original object had." I laughed as I sat down on the chair to rub my toe. "That's right," I said. "How much sound, heat, distance, and speed are produced are all indicators."

"Exactly," Mom said, tapping my nose. "And the faster you go, the more sound, heat, distance, and speed are produced. So when you collided with that chair and made a lot of noise, and the chair went flying and fell over, I knew you had been going fast."

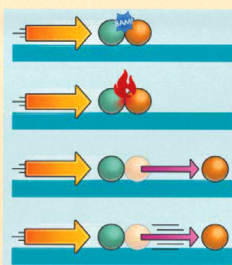
"Good job, Mom," I said.



### Effects Impact

When two objects collide, there are three things we can observe to see if an impact occurred: the original object's speed, the original object's direction, and the original object's temperature.

When an impact occurs and a change in speed is observed, it means the original object was traveling at a faster or slower speed. When an impact occurs and a change in direction is observed, it means the original object was traveling in a different direction. When an impact occurs and a change in temperature is observed, it means the original object was traveling at a faster or slower speed.



Distance is another factor we can observe. If two objects collide and the second object moves a great distance, that tells us the original object was traveling at a faster speed. If the two objects collide, but the second object doesn't move very far or stays in the same position, the original object was traveling at a slower speed.

The final factor we can observe is the speed at which the second object moves after the impact. If two objects collide and the second object starts moving at a fast speed, then we know the original object had a faster speed. If two objects collide and the second object starts moving very slowly, or not at all, then we know the original object was traveling at a slower speed.

An object that travels at a high speed will produce a greater observable impact than if the object were to travel at a low speed.

### Comprehension Questions

How did Gina's mom know she was running?

How does speed affect impact?

What can you observe in the original object?

How would the impact have been different if Gina was walking?

ELA CCC Energy and Matter SEP Obtaining, Evaluating, and Communicating Information

Background image courtesy of Getty Images.

## Draw conclusions

Lessons follow the 5E Model

Activity 2

How Fast? How Slow? — Explore

30 minutes

**Materials:**

- scissors (one per student)
- glue

**Movement and Speed**  
How Fast? How Slow?  
Printable

**Objective**  
Students will be able to order the relative speed of objects.

**Lesson Guide**

**Student-Driven Inquiry**

- Display the printable **Movement and Speed**. Have students observe the pictures and discuss the questions with a partner.
- Call on students to share their thoughts.
  - As students share ideas for movement? Clarify the concept. Movement is a change in position.
  - As students share ideas for speed? Clarify the concept. Speed is how fast or slow an object moves.
- After students have shared their thoughts, have them discuss the Student-Driven Question Board that were most important to investigate. Why does the golf ball change shape?
  - Guide students to move toward the question: How can we compare speeds?
- To further investigate these questions, have students use the printable.

**Collaborative Learning**

- Introduce the activity "How Fast? How Slow?"
- While students work, circulate to provide support.

**Standards coverage**

**ELA** SL.4.1.C: Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.

**MATH** MP.2: Reason abstractly and quantitatively.

**SEP** Developing and Using Models

- Review the discussion, "How Fast? How Slow?"
- Call on students to share their thoughts.
- Tell students to think about a time when they were moving quickly, like on a bike or scooter, or simply running. Have them imagine being in that situation and think about how fast they were moving.
- Ask students to think about how slow they were moving.
  - What did your surroundings look like? (e.g., students should suggest surroundings are blurry, slower, surroundings are easier to see, etc.)

Week 7 Lesson Plans

Activity 1

Phenomenon Introduction — Engage

30 minutes

**Materials:**

- golf balls (one per group)

**Golf Balls and Energy: Phenomenon Video**  
Video

**Phenomenon Questioning Technique**  
Printable

**Objective**  
Students will be able to make observations and ask questions about why the golf ball changed shape.

**Teacher Note**  
The students' initial ideas and understanding may include some misconceptions. However, at this point, do not correct any false assumptions. Rather, let students discuss, and encourage them to revise their initial ideas throughout the unit as new evidence builds on their prior knowledge.

**Lesson Guide**

**Phenomenon Comic**  
Have students read the phenomenon comic strip in the student edition. The purpose of the comic strip is to get students thinking about what caused the golf ball to change shape. Use the comic strip to activate students' prior knowledge and experience around hitting, kicking, or striking sports balls.

**Collaborative Learning**

- When students finish, place them in small groups. Give each small group one golf ball to observe.
- Post these questions in a place where all students can see them:
  - How would you describe a golf ball? Is it soft, hard, big, small, etc.?
  - What experiences have you had with golf balls?

**Discussion**

- Invite the students to share their own experiences with golf balls.
- Allow all possible answers to be shared.
  - Tip: Just collect ideas. Don't correct, confirm, or teach anything at this point.

**Introduce Phenomenon**

- Present the **Golf Balls and Energy: Phenomenon Video**.
- Use the **Phenomenon Questioning Technique** printable to present the phenomenon and guide students in asking questions. Below are key words to be aware of when directing students toward the guiding question: **Why does the golf ball change shape?**
  - golf ball, golf club, driver
  - motion, movement, speed
  - force, impact, collide
  - shape, hard, soft, squish, compact

Example questions from students could include:

- What is speed?
- How can we compare speeds of different objects?
- How can we measure speed?
- What is the relative speed of the golf club?

**Guiding Question**  
Why does the golf ball change shape?

Unit 2.11 Golf Balls and Energy — Weeks 7 and 8

Unit 2.9 Golf Balls and Energy — Weeks 7 and 8

StudiesWeekly

# GRADE 4 TEACHER EDITION

Ready-made assessments

Formative Assessment	Evidence	Student Edition Response
	Use student responses to check for proficiency or progression of understanding.	

Activity 4	The Impact — Explain	30 minutes
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Materials:

#### Objective

Students will be able to describe how speed affects impact by using specific information from a text.

#### Teacher Note

If time is short on time, you can have students jigsaw the reading, or write it into your language arts block.

#### Lesson Guide

##### Student-Driven Inquiry

Have students take out their "Speed and Impact" recording sheets from the previous lesson and review their recorded observations with a partner.

Display the [Station Reflection](#) printable.

Call on students to rate the level of impact caused by speed in each scenario using the terms more and less (while referring back to their recording sheets). **(Under the column titled "Fast," all impacts should be rated more. Under the column titled "Slow," all impacts should be rated less.)**

Circle all the instances where there was a greater impact and ask the students to share what they notice about the chart.

After students have shared their findings, have the class look at the Student-Driven Question Board to relate these ideas to the questions that were most important to investigate relating to the guiding question "Why does the golf ball change shape?"

- Guide students to move toward the questions: How does speed affect impacts? How does the speed of the golf club affect the shape of the golf ball?

To further investigate these questions, have students read and respond to a short story and an article to learn how speed affects impact.

#### Reading to Learn

Instructions for students can be found in the student edition.

Review annotation strategies with students as needed.

Optional Jigsaw Strategy: If you choose to, assign half the class one article and half the class the other article. Once students have read and annotated their assigned article, have them work with a partner that read the opposite article. Both students can then share their annotations and main ideas. Then work together on the comprehension questions.

#### Reflect and Connect

How has your understanding of the phenomenon changed from today's lesson? **(Answers will vary.)**

and 8

StudiesWeekly

Suggested lesson guide

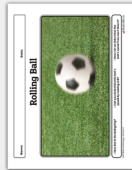
### Activity 3 Speed and Impact — Explore

#### Materials:

- marbles (two per student)
- hard surfaces
- pencils (one per student)
- rulers (one per student)
- cotton balls (one per student)



Speed and Impact:  
Teacher Instruction  
Page  
Printable Rolling Ball



**MATH** MP2: Reason abstractly and quantitatively.

**SEP** Planning and Carrying Out Investigations

**CCC** Energy and Matter Cause and Effect

#### Objective

Students will be able to recognize impact.

#### Teacher Note

This lesson will require some preparation.

[Speed and Impact: Teacher Instruction Page.](#)

#### Lesson Guide

##### Student-Driven Inquiry

- Display the printable [Rolling Ball](#). Have students observe the picture and discuss the questions with a partner.
- Call on students to share their thoughts and ideas.
- Discuss:** How can we determine the speed of the ball if we can't time it?
  - Say:** One way we can measure speed is by observing what happens to an object when it collides with (or crashes into) another object. We can call this collision an impact.
- After students have shared their ideas, have the class look at the Student-Driven Question Board to relate these ideas to the questions that were most important to investigate relating to the guiding question "Why does the golf ball change shape?"
  - Guide students to move toward the questions: How can we measure speed? What is the relative speed of the golf club?
- To investigate these questions, have students visit four different stations in order to observe how speed affects the level of observable impact (sound, heat, distance, and speed).

##### Collaborative Learning

- Introduce the stations to students.
  - Tip: If needed, explain to students that they should use their best (and safest) judgment when it comes to creating an impact.
- Have students complete predictions in the student edition before they begin stations.
- Have students follow the directions in the student edition.
- As students work at stations, circulate to check for accuracy of trials and understanding of:
  - A faster speed creates a greater observable impact.
  - A slower speed creates a lesser observable impact.
- Have students keep their recording sheets in a safe place where they can be located easily for the next activity.

#### Optional

##### Differentiation

#### Developing

Have students work in a small group and only complete trials one and two for each station. Have students discuss their observations as a group.

#### Advanced

Ask students to look for patterns in the observations they record.



UNIT 2

STRUCTURE OF MATTER

WEEK 7

PHYSICAL

EXPLORE SCIENCE

5 Studies Weekly

FIFTH GRADE

Phenomenon

Blowing air into a balloon causes it to inflate.

Activity 1 Phenomenon Introduction

Rules:

1 Ask as many questions as you can.

2 Do not stop to discuss, judge, or answer your questions.

3 Change your statements into questions.

Circle your best question.

My Questions:

Initial Model:

After completing the phenomenon demonstration, draw what you think is happening in the phenomenon. You'll have a chance to revise your model later.

SEP

Developing and Using Models; Asking Questions

Record results of experiments

Vocabulary:

Matter is anything that has \_\_\_\_\_ and takes up \_\_\_\_\_.

Before

After

Balloon Lab

ons:

inch. How could you show a half-inch measurement on your graph?

7. Observe the similarities and differences between the measurements of the deflated balloon and the inflated balloons.

8. Answer the "Investigation Questions."

9. Draw a model with a "before" and an "after" to show the conclusion of your investigation.

inch. How could you show a half-inch measurement on your graph?

7. Observe the similarities and differences between the measurements of the deflated balloon and the inflated balloons.

8. Answer the "Investigation Questions."

9. Draw a model with a "before" and an "after" to show the conclusion of your investigation.

Diving into Matter

serve the diagram. Graph the data from the diagram. Then answer the questions.

ght: Scientific Diver

work in a lab or an office. When divers, their workplace is the wide kelp, coral reefs, and creatures of all sizes. Scientific divers are specialized g. They make observations and ep blue sea to conduct their research. ting organisms, taking samples and ting up special underwater equipment. iving safety officer at the University (USC). Growing up on the coasts of orida, and San Diego, California, Reed bout humanity's responsibility to sea. She entered the Humboldt State ram when she was 18. After almost 10 ng, she now runs the scientific diving he following interview to learn more in scientific diving.

Studies Weekly: Why did you decide to become a scientific diver?

Hanna Reed: I became a scientific diver because I have a passion for the ocean and making positive change for the health of our oceans and climate.

SW: What's the best part about your job?

HR: When conducting surveys underwater, the dives are long and require extreme focus. It is quite special because after 20 minutes or so, I truly feel like "one" with the environment. As I am counting and identifying algae and marine life ... the animals become accustomed to my presence, and my breathing becomes calm and rhythmic. I become part of the seascape when I am down there, which at times can be truly magical.

SW: Tell me about how you safety check your equipment and air tank before a dive.

HR: Before I go on a dive, I do personal gear checks and a buddy check with my buddy. When I check my buddy's (or student's), we always check the air is on [and] the tank is secure. Then I move to the regulators (the part that you breathe from). I check their regulators by purging them, then move on to checking their dive computers and air pressure gauges. We make sure our weight we are wearing is "ditchable" in an emergency, make sure our inflator hoses work, then grab our masks and fins and head out to dive!

# GRADE 5 STUDENT EDITION

38



Analyze and interpret data

## Structure of Matter

with a  
at it in  
n. Keep  
n half  
anymore.

Draw the process of  
cutting your cracker. Predict  
how small you think the  
cracker could get if you were  
able to keep cutting it.

**Vocabulary:**  
All **matter** is made of \_\_\_\_\_, or small pieces.

Close the loop and  
connect ideas

**& Connect** How does knowing that matter is made of particles help us explain the phenomenon of air inflating a balloon? How could we revise and improve our class model to include particles?

## Activity 5 Phenomenon Explanation

**Phenomenon** Blowing air into a balloon causes it to inflate.

**CCC** Energy and Matter; Scale, Proportion, and Quantity  
**SEP** Developing and Using Models; Constructing Explanations

### Write:

- A short response to describe your model. Be sure to use the following vocabulary terms:
  - matter
  - particle
  - gas
  - volume

Use the following sentence stem, if necessary.  
In my model, I used \_\_\_\_\_ to show ...

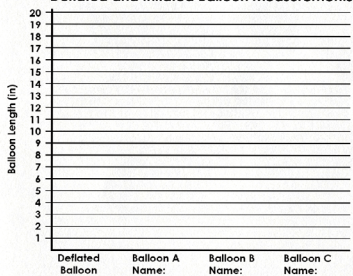
Images of Hanna Reed courtesy of Hanna Reed.

### Investigation Questions:

Which balloon has the most air in it? How do you tell?

How does this investigation show that air is matter?

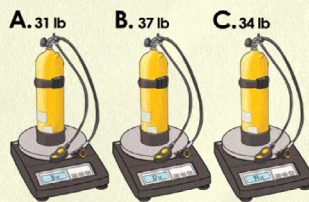
### Deflated and Inflated Balloon Measurements



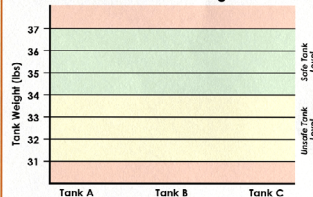
### Packable Air

Scuba diving is only possible because of air. In order for humans to dive into the depths of the ocean without holding their breath, they need the help of tanks filled with air. Air is matter. That means it can be captured and pushed into containers, just like stuffing clothes into a small suitcase. However, unlike solid clothes, air is an invisible gas. Even though air is invisible, it has mass and can be weighed.

Like all forms of matter, gases can be measured. The air in a scuba tank, for example, is measured by the space it takes up. In science, the amount of space an object takes up is called its **volume**. Volume is calculated by multiplying an object's length by its width by its height. Imagine a box that is one foot long, one foot wide, and one foot tall. Inside this box is air. You may not be able to see it, but it's there! At one foot by one foot by one foot, the volume of the air in the box is one cubic foot. Anything that has volume also has weight. The air in the box weighs about .08 pounds. Now, imagine the amount of air in 77 of those boxes. About 77 cubic feet of air and other gases are squeezed into a scuba tank. That's about as much air as would fit in a small closet! Using intense pressure to push air into scuba tanks is called compression. The result of compression is one heavy scuba tank. A standard aluminum tank, filled to its maximum capacity, is about 37 pounds. That's about the same weight as a four-year-old! When the tank is empty, it only weighs about 31 pounds. That means about six pounds of air were compressed into the tank. As a diver uses the tank to breathe underwater, that air is used up. This causes both the weight of the tank and the pressure of the air inside to decrease. A gauge monitoring the pressure tells the diver how much air is left in the tank. That way, the diver can return to the surface safely before the air runs out!



### Scuba Tank Weights



**Summarize to explain:**  
Why is it important for scuba divers to know that air is matter?

Which air tank (A, B, or C) would be the best choice to take on a dive? Provide one piece of evidence, and explain your reasoning.

### Reflect & Connect

How has your understanding of the phenomenon changed from this activity? What new evidence do you have?

Lessons follow the 5E Model

Materials needed in hands-on activities

Activity 2

Balloon Lab — Explore

30 minutes

**Materials:**

- balloons, 12 inch (one per student)
- soft tape measures (one per group)

**Objective**

Students will be able to draw models to show that air takes up space based on identified patterns in measurements.

**Whole Group**

- Have students follow the instructions to investigate and graph data about the student edition is designed to not reuse the balloons from Activity 1.
  - The graph in the student edition, **Measurements**, is also available on the whiteboard.

**Vocabulary**

- Have students try to name or describe the Earth is made of.
  - Say:** *In science, anything that has mass and takes up space is called **matter**.*
  - Ask students to fill in the missing words in the sentence stem in the student edition. They might have learned about matter in previous lessons.

**Misconception:** A deflated balloon still has air inside it. When air is blown into it by our breath, an inflated balloon is created.

**Discuss:** Why does an inflated balloon? **(because the air is taking up space and causing the sides of the balloon to push outwards)**

**Ask:** Would any other things happen if you put them inside? **(Yes. Water would sink and cause the sides to push outwards)**

**Structure of Matter:**  
Flash Cards  
Structure of Matter: Word Wall Cards

**Vocabulary**  
**matter:** anything that has weight and takes up space

Unit 2.12 Structure of Matter — Weeks 7 and 8

**Week 7 Lesson Plans**

Activity 1

Phenomenon Introduction — Engage

25 minutes

**Materials:**

- balloons, 12 inch (one per student)

**Objective**

Students will be able to make observations and ask questions about air inflating a balloon.

**Teacher Note**

The students' initial ideas and understanding may include some misconceptions. However, at this point, do not correct any false assumptions. Rather, let students discuss, and encourage them to revise their initial ideas throughout the unit as new evidence builds on their prior knowledge.

**Lesson Guide**

**Introduce Phenomenon**

- Tell students that they will be demonstrating this week's phenomenon themselves. Give one balloon to each student and ask them to blow it up.
- Prior to questioning, take student suggestions and/or ideas about how this phenomenon could be represented through a model, then draw an initial model as a class. Students should also draw this model in the student edition.
  - Tip: Follow student direction. Because it will be revised throughout the unit, do not attempt to draw a complete or correct model at this time.
- Discuss:** What ideas from this model do we not know and therefore need to investigate?
- Use the **Phenomenon Questioning Technique** printable to present the phenomenon and guide students in asking questions. Below are the key words to be aware of when directing students toward the guiding question: ***Is air matter?***
  - describe/show/draw
  - small/invisible
  - air/space/weight
  - matter
  - detect/inflate/observe

**Guiding Question**

*Is air matter?*

Unit 2.10 Structure of Matter — Weeks 7 and 8

# GRADE 5 TEACHER EDITION

## Suggested lesson guide

### Activity 3 Diving into Matter — Explore

#### Materials:

- balloons, 12 inch (2)
- cans of compressed air (3)
- prepared balance scale (1)
- digital scale (1)



Balance Scale: Teacher Instruction Page

#### Objective

Students will be able to collect data on compressed air, and an investigation.

#### Teacher Note

This activity is designed to be completed in 15 minutes. To prepare for this activity, refer to the [Balance Scale: Teacher Instruction Page](#) printable.

### Lesson Guide

#### Student-Driven Inquiry

Have students discuss what they remember from the previous activity.

- If students don't bring it up themselves, remind them that they were still left with the question "Is air matter?" because they couldn't verify that air has weight. Have a discussion about what they could do to determine whether air has weight.

If students suggest weighing the balloons before and after inflation to see if the air adds weight, you may want to point out or demonstrate that on a typical scale, a balloon is so light that its weight might not show up. Tell them that things in nature exist from very small to very large, so it is important to have ways to detect and measure things on the extreme ends of this spectrum.

Direct students' attention to the prepared balance scale.

**Ask:** What do you predict will happen when I place a deflated balloon and an inflated balloon on this balance scale? (*Answers will vary.*)

Place a deflated balloon and an inflated balloon on opposite sides of the prepared balance scale and discuss the results. You may reuse two balloons from Activity 1 or 2.

#### Whole Group

Explain to students that air can also be observed in larger quantities.

Show students a can of compressed air and, if any of them recognize what it is, ask them to share their experiences with it.

- If students aren't able to identify it, clarify that the can has air packed tightly inside it. Regardless, explain that this can of air can help us see our investigation on a larger scale.

Weigh each can of compressed air on the digital scale and record their weights in a table on the board.

Call on three volunteers and give a can to each of them. Tell them that on "go," they will have 30 seconds to release air from the can. They may release as much air as they want, even for as long as the full 30 seconds.

Ask students to make predictions about the weight of each can after air has been released.

#### Adding to Learn

Students will read the articles and observe the diagram in the student edition, then record the weight of each scuba tank on the bar graph to

nd 8

StudiesWeekly

solid, color, temperature, etc.) in a previous grade. Encourage students to try using "matter" in a new sentence with a partner.

#### Multi-Meaning Word

Address "space" as having multiple meanings:

- an area that is free, available, or unoccupied
- outer space; everything beyond Earth's atmosphere

- Discuss:** What evidence do we have that air takes up space? Turn to a partner and share your reasoning. Be sure to provide feedback about your partner's reasoning. (*Because the balloon inflated, we know that air takes up space because otherwise, nothing would have happened, like blowing into the air.*)

- Discuss:** Do you think that air is matter? Does it act in the same way as water in a balloon would? (*Answers will vary. Example: Maybe air is matter because it takes up space. But I know that water is a liquid, and air isn't observable like liquid water is. Plus, a balloon filled with water looks different than a balloon filled with air.*)

- Discuss:** Do you think that air only exists in the balloon? (*I know that I breathe air, so it must be all around us.*)

- As a class, review any revisions to the definition of "space" or "air" in the balloon, etc.

#### Debrief

Discuss the components of the definition of matter. (*The definition of matter says that matter has weight. I don't know if air weighs anything. Plus, I can't say for sure that air is matter because I can't see it inside the balloon.*)

## Differentiation strategies

#### Optional

#### Differentiation



#### Advanced

Challenge advanced learners to track the progress of inflating the balloon by measuring the length of the balloon after each of the three breaths and recording their data in a line graph using the printable [Balloon Lab: Differentiated Worksheet](#). Allow them to conduct this investigation at their own pace in pairs or small groups. (5.G.A.2)

#### Formative Assessment

#### Evidence

Student Edition Response

Use student graphs, models, and question responses to check for proficiency or progression of understanding.

# EXPLORE SCIENCE



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