

Hands-On Science Made Easy: Discover Carolina and OpenSciEd Together for Your Students! (K-5)



CAROLINA® +  **OpenSciEd**®

Hoover Herrera
National Presenter
Carolina Science



Designed and Built with Students Front and Center



- Exploration is driven by **students'** questions and ideas
- Builds on **students'** prior knowledge and experiences
- **Students** use evidence to revise their thinking
- **Students** figure out ideas as a classroom community



Funded by Renowned Philanthropic Organizations



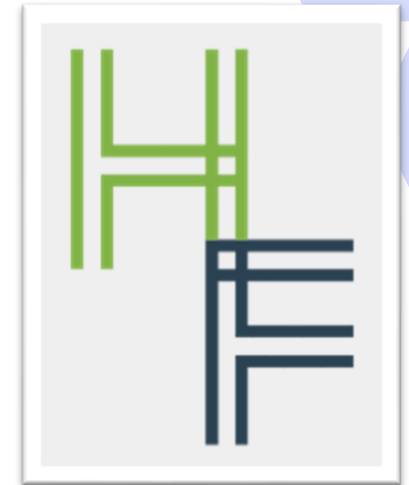
**Bill & Melinda Gates
Foundation**



**Carnegie Corporation
of New York**



**Charles and Lynn
Schusterman
Family Foundation**



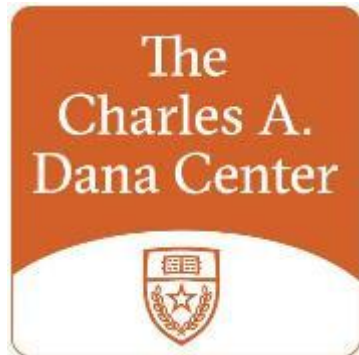
**William and Flora
Hewlett Foundation**



Developed by Leading Education and Research Institutions



BSCS Science Learning Team



Dana Center Team



**NextGen Science Storylines
Northwestern University Team**



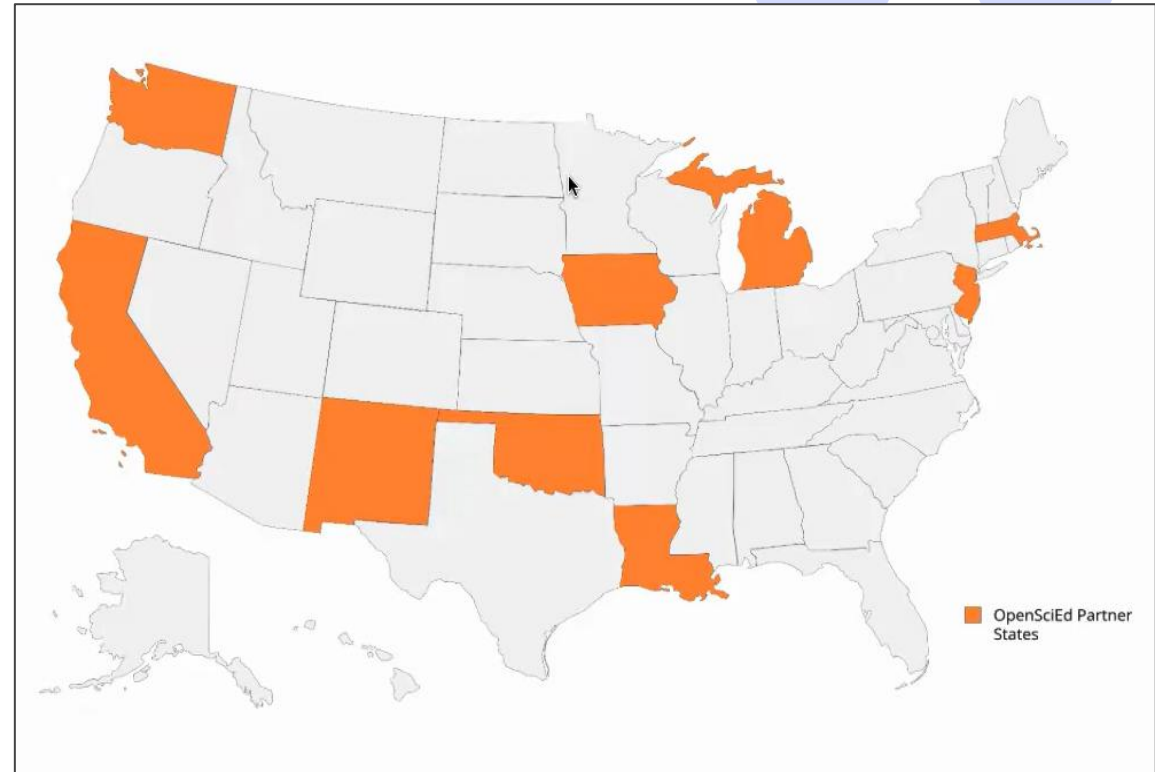
**University of Colorado Boulder
University of Colorado Boulder Team**



Boston College Team

Field Test

- 9 partner states
- Field tested by 450+ teachers and about 10,000 students





Pathways to Adoption

**OPEN EDUCATIONAL
RESOURCE (OER)**

Download the learning
materials freely



Grade K**K.1 Energy: Sunlight**

K-PS3-1, K-PS3-2,
K-2-ETS1-1,
K-2-ETS1-2

K.2 Weather

K-ESS2-1, K-ESS3-2

K.3 Forces & Motion

K-PS2-1, K-PS2-2,
K-2-ETS1-1, K-2-ETS1-2,
K-2-ETS1-3

K.4 Ecosystems

K-LS1-1, K-ESS2-2,
K-ESS3-1, K-ESS3-3

Grade 1**1.1 Waves: Light**

1-PS4-2, 1-PS4-3

1.2 Waves: Sound

1-PS4-1, 1-PS4-4,
K-2-ETS1-1, K-2-ETS1-2,
K-2-ETS1-3

1.3 Space: Sky Patterns

1-ESS1-1, 1-ESS1-2

1.4 Animal & Plant Traits

1-LS1-1, 1-LS1-2,
1-LS3-1, K-2-ETS1-1,
K-2-ETS1-2

Grade 2**2.1 Earth: Land Changing Shape**

2-ESS1-1, 2-ESS2-1,
K-2-ETS1-1, K-2-ETS1-2,
K-2-ETS1-3

2.2 Structure & Properties of Matter

2-PS1-1, 2-PS1-2,
2-PS1-3, 2-PS1-4,
K-2-ETS1-1, K-2-ETS1-2,
K-2-ETS1-3

2.3 Habitats & Biodiversity

2-LS4-1, 2-ESS2-2,
2-ESS2-3

2.4 Plants

2-LS2-1, 2-LS2-2

Grade 3**3.1 Forces & Interactions**

3-PS2-1, 3-PS2-2,
3-PS2-3, 3-PS2-4,
3-5-ETS1-1, 3-5-ETS1-3

3.2 Weather & Hazards

3-ESS2-1, 3-ESS2-2,
3-ESS3-1, 3-5-ETS1-2

3.3 Trait Variations

3-LS1-1, 3-LS3-1,
3-LS3-2, 3-LS4-1,
3-LS4-2

3.4 Ecosystem Change & Survival

3-LS2-1, 3-LS4-3,
3-LS4-4, 3-5-ETS1-2

Grade 4**4.1 Energy Transfer: Collisions**

4-PS3-1, 4-PS3-3

4.2 Energy Transfer: Electricity

4-PS3-2, 4-PS3-4,
4-PS4-3, 4-ESS3-1,
3-5-ETS1-1, 3-5-ETS1-3

4.3 Earth Processes

4-PS4-1, 4-ESS1-1,
4-ESS2-1, 4-ESS2-2,
4-ESS3-2, 3-5-ETS1-2

4.4 Structure & Function

4-LS1-1, 4-LS1-2,
4-PS4-2

Grade 5**5.1 Ecosystems & Matter Cycling**

5-PS1-1, 5-PS3-1,
5-LS1-1, 5-LS2-1

5.2 Matter Properties

5-PS1-2, 5-PS1-3,
5-PS1-4, 3-5-ETS1-1,
3-5-ETS1-3

5.3 Earth Systems

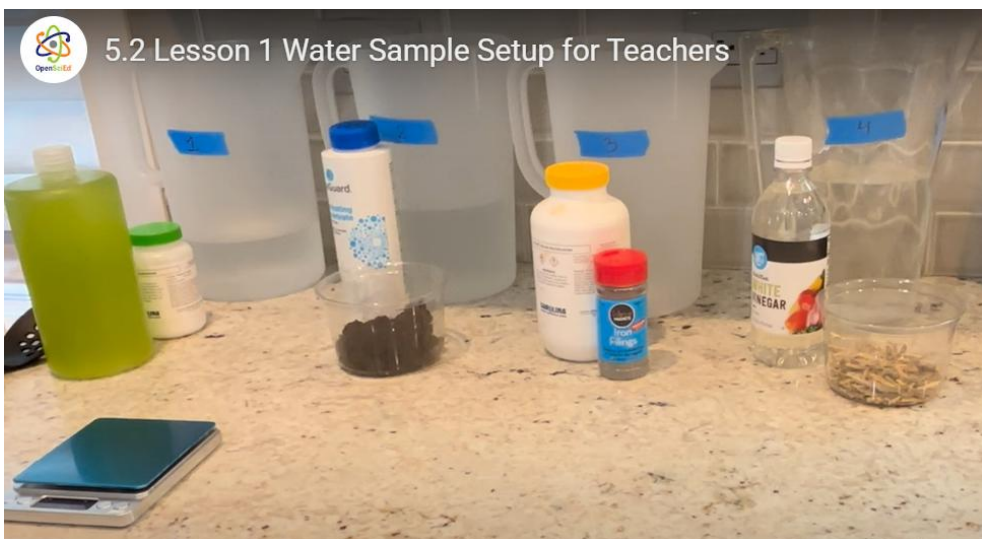
5-ESS2-1, 5-ESS2-2,
5-ESS3-1, 3-5-ETS1-2

5.4 Earth in the Universe

5-ESS1-1, 5-ESS1-2,
5-PS2-1

Updated 7/29/2024

5.2 Matter Properties



- Requires teachers to prepare exact measurements
- Teacher prep ~20 mins per group (2.5–3 hours total)

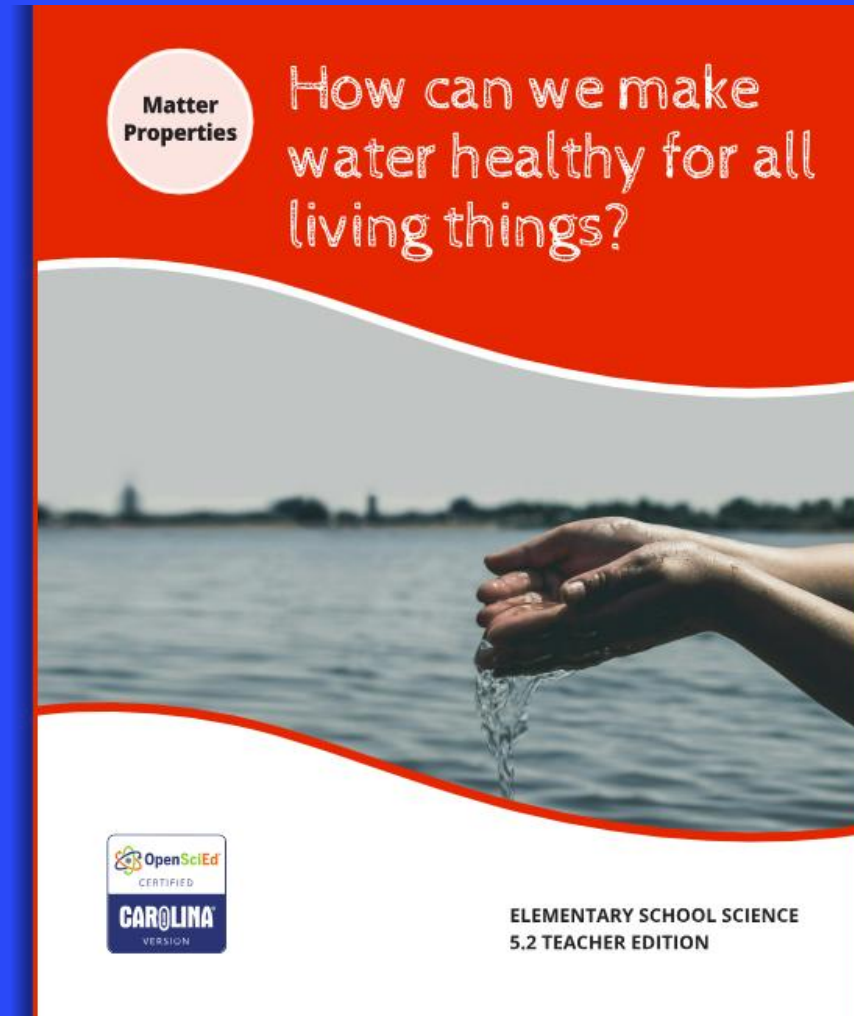


- Water Sample Kit
- Pre-measured amounts
- 1-minute prep time

- ✓ Fewer materials
- ✓ Cut prep time
- ✓ Better storage option

Grade 5

5.2 How can we make water healthy for all living things?



Connect to Our Experiences

**Floods Prompt Warnings
About Contaminated
River Water**

**Officials Recommend
Boiling Water Before
Drinking It Until Tests
Can be Ordered**

**Residents Warned to Not
Let Their Pets Drink the
Water in Area Pond**

**Beaches Closed Another Day
Due to the Presence of
Harmful Bacteria**

**Strange Smell Reported in the
Area After Rainfall**

Make Observations

Work with a small group to sort pictures of water as healthy or unhealthy.



Sulfur by CC BY SA 3.0



Francesco Ungaro



Elycefelize by CC BY 2.0



KoolShooters



Daria Klet

Make Observations

Work with a small group to sort pictures of water as healthy or unhealthy.

Be ready to share:

- How you decided if the water was healthy, unhealthy, or you're not sure?
- What other evidence would you like to have to help you decide?
- How could you get that evidence?



LESSON 1 • Handout

Name: _____ Date: _____

Healthy/Unhealthy Water?

With your group, sort the pictures into the three categories below. Together, decide on the ideas to use to sort the pictures. Discuss with your group: *What does healthy water mean to you? What makes water unhealthy? How will we decide if we are not sure?*

Healthy Water Ideas we will use to decide:	Not Sure Ideas we will use to decide:	Unhealthy Water Ideas we will use to decide:
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
Write the numbers of the pictures that you think are healthy:	Write the numbers of the pictures that you are not sure about:	Write the numbers of the pictures that you think are unhealthy:

Compare Our Ideas

Take a tour of other groups' sorted pictures and ideas.

Let's tally up our different ideas about the health of the water in each picture.

What other evidence would help us decide on the health of the water?

Health of the Water			
	Healthy	Not Sure	Unhealthy
1			
2			
3			
4			
5			

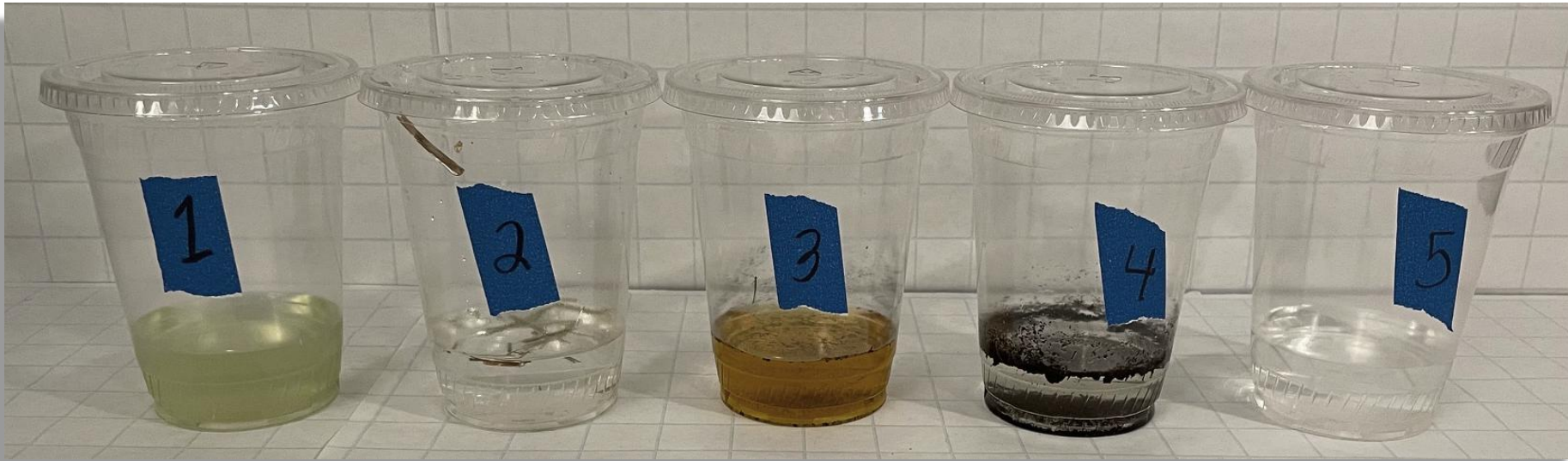


Make Observations



Take a closer look at the water samples and discuss initial ideas.

- For whom or for what would each water sample be healthy or unhealthy?
- Which sample does your group think is the least healthy? The healthiest?
- How could the unhealthy water become healthy again?



Develop an Initial Model



Develop a model to explain:

What is causing the water sample to be the **healthiest**?

What is causing the water sample to be the **least healthy**?

For the least healthy water:

What could cause the water to become healthy again?

LESSON 1 • Notebook Sheet	
Name: _____ Date: _____	
Initial Model	
Develop a model that explains what is causing this sample to be the most healthy .	Develop a model that explains what is causing this sample to be the least healthy .
The healthiest water sample is	The least healthy water sample is
	
Based on your model of the least healthy water, develop a model that explains what could cause the water to become healthy again.	

Share Models

Show and tell a partner about your model.



Listen and observe while they tell you about theirs.

Identify at least two ways your models are the same, and at least two ways they are different.

LESSON 1 • Notebook Sheet

Name: _____ Date: _____

Initial Model

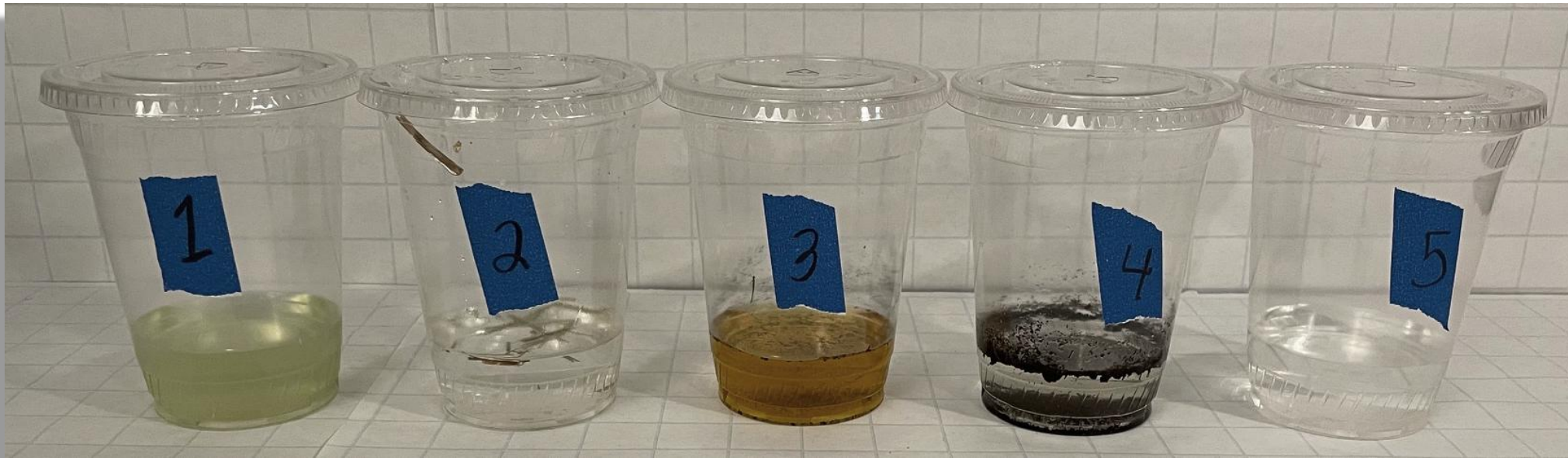
Develop a model that explains what is causing this sample to be the most healthy .	Develop a model that explains what is causing this sample to be the least healthy .
The healthiest water sample is 	The least healthy water sample is 
Based on your model of the least healthy water, develop a model that explains what could cause the water to become healthy again.	

Carry Out an Investigation



What more do we want to know about the water samples?

How could we further investigate the water samples?



**Lake
Water**

**Pool
Water**

**Metallic
Water**

**Rain
Water**

**Drinking
Water**

Participate in a Discussion

Based on the properties that were observed and measured, can we confirm any of the materials we thought might be in our water samples?

Healthy/Unhealthy Water Chart
Water Sample Materials

Water Samples	We think it might be....	We have evidence that it is...	In what ways is it healthy?	In what ways is it unhealthy?	How did we make this water sample healthier?
#1 Lake Water					
#2 Pool Water					
#3 Metallic Water					
#4 Rain Water					
#5 Drinking Water					

Connect to Our Experiences



Talk with one partner:

When have you...

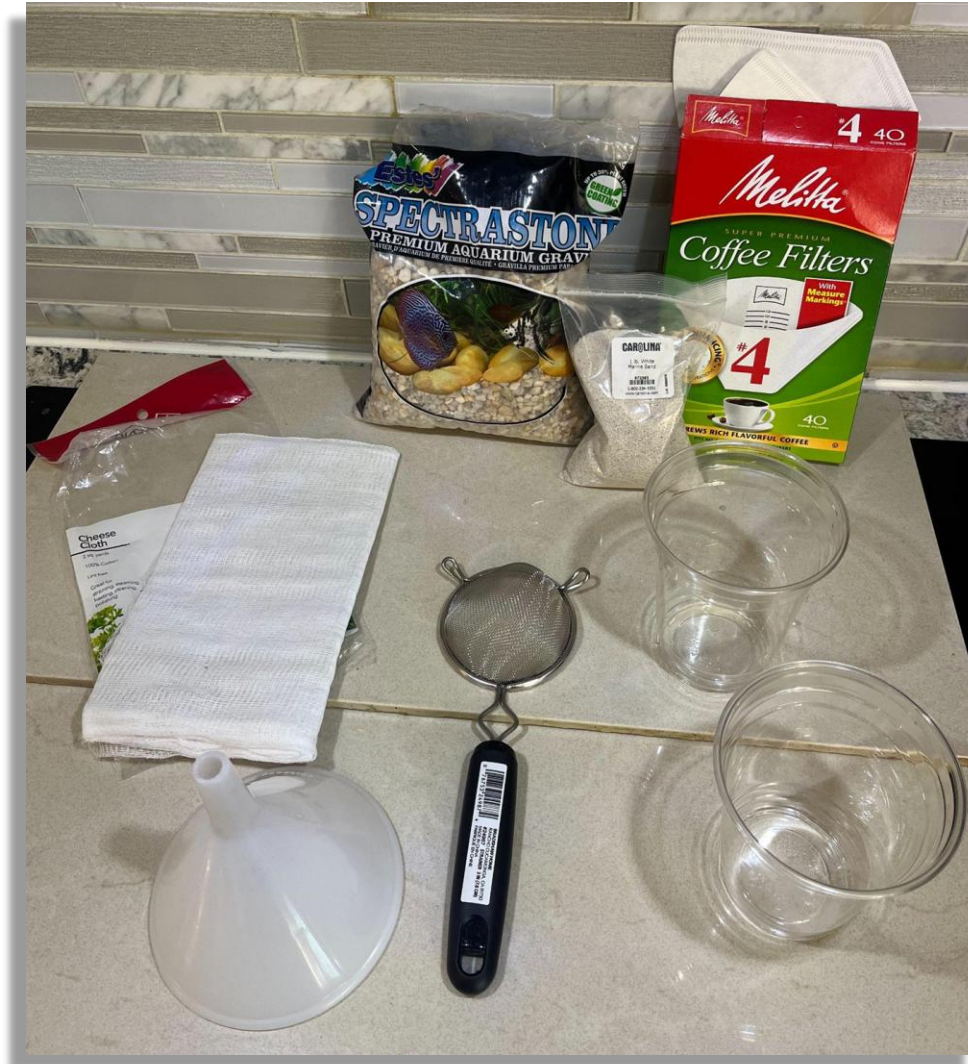
- removed materials from water?
- observed materials removed from water by others or in nature?

Then discuss your ideas with another partner group. How are your ideas the same or different?

How can we remove materials that we can see from the water samples?

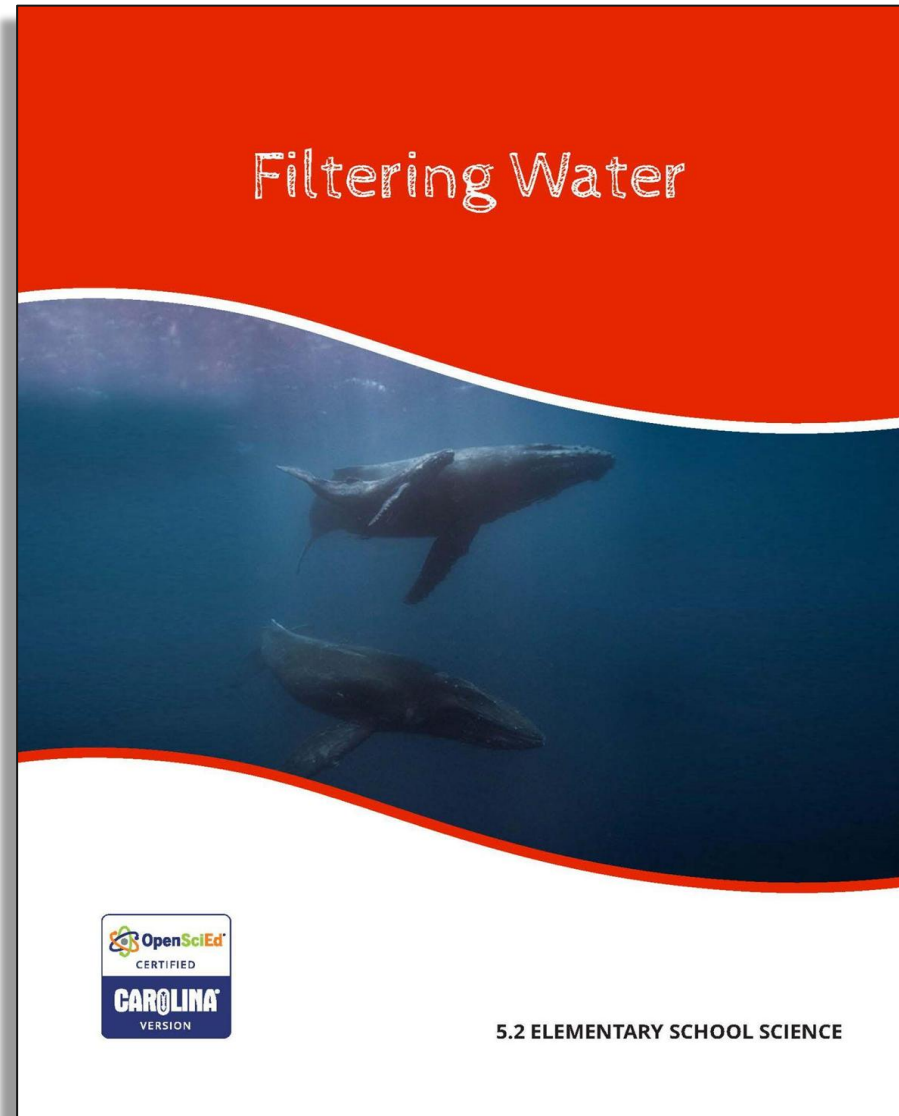
Consider Supplies

How might we use available supplies to filter our water samples?



Read a Book

Let's learn more about filter design to figure out what will work best for our water samples.



Carry Out an Investigation

Let's review the procedure for testing the water samples!






LESSON 6 • Notebook Sheet

Name: _____ Date: _____

Testing the Water Samples

Test your water sample following the steps in Table 1 and record the results of your tests in Table 2.

Table 1: Observation and Measurement Procedures

	Steps to measure	What to measure
Chlorine	<ol style="list-style-type: none"> Dip one test strip into a water sample for 1 second. Remove the strip and shake it briskly to remove excess water. Wait 1 minute. Match the strip to the color chart. Complete color matching within 15 seconds. 	 <p>Test strip indicates iron is present.</p>
Iron	<p>Test Strip</p> <ol style="list-style-type: none"> Dip one test strip into a water sample for 2–3 seconds without moving it. Remove the strip. Match the strip to the color chart. Complete color matching within 15 seconds. <p>Magnet</p> <ol style="list-style-type: none"> Press the magnet to the outside of the cup, near the bottom. Observe the visible matter in the cup. Notice if it moves toward the magnet or not. 	 <p>Test strip indicates that iron is present.</p> <p>Materials from the water move toward the magnet.</p>
Vinegar/ Acid	<ol style="list-style-type: none"> Dip one test strip into a water sample for 2–3 seconds without moving it. Remove the strip. Match the strip to the color chart. Complete color matching within 15 seconds. 	 <p>1–5 = high acidity 6–8 = normal acidity 9–12 = low acidity</p>

Unit 5.2 Student Notebook • Lesson 5 Carolina Certified Version of OpenSciEd 29

Carry Out an Investigation



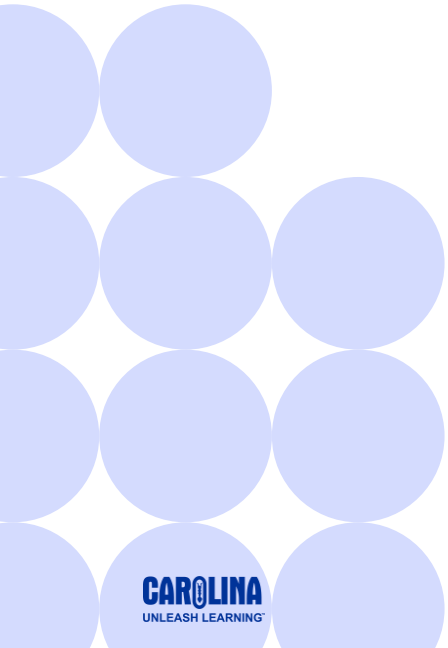
Use Table 2 to record which types of matter were detected in the water samples.

LESSON 6 • Notebook Sheet

Table 2: Test Results

	Results									
	#1 Lake Water		#2 Pool Water		#3 Metallic Water		#4 Rain Water		#5 Drinking Water	
Does the sample have chlorine in it?	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
	How do you know?		How do you know?		How do you know?		How do you know?		How do you know?	
Does the sample have iron in it?	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
	How do you know?		How do you know?		How do you know?		How do you know?		How do you know?	
What is the acidity level of the sample?	High	Low	High	Low	High	Low	High	Low	High	Low
	Normal		Normal		Normal		Normal		Normal	
	How do you know?		How do you know?		How do you know?		How do you know?		How do you know?	

30 Carolina Certified Version of OpenSciEd Unit 5.2 Student Notebook • Lesson 6



Carry Out an Investigation

What types of matter do we now have evidence to support are in the water samples?

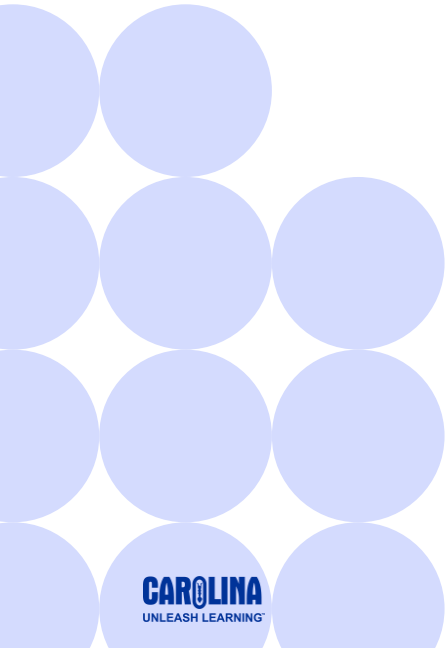


LESSON 6 • Notebook Sheet

Table 2: Test Results

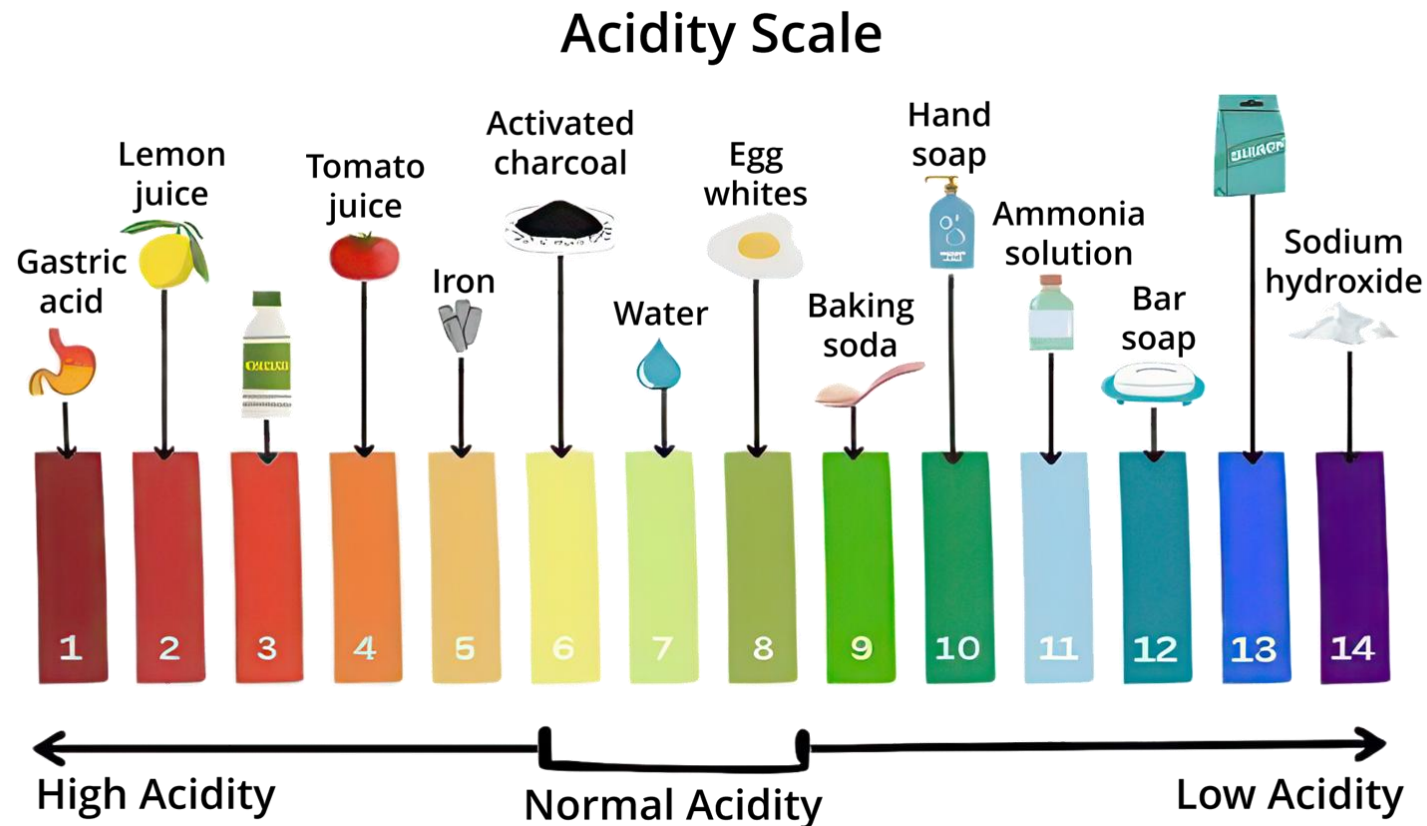
	Results									
	#1 Lake Water		#2 Pool Water		#3 Metallic Water		#4 Rain Water		#5 Drinking Water	
Does the sample have chlorine in it?	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
	How do you know?		How do you know?		How do you know?		How do you know?		How do you know?	
Does the sample have iron in it?	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
	How do you know?		How do you know?		How do you know?		How do you know?		How do you know?	
What is the acidity level of the sample?	High	Low	High	Low	High	Low	High	Low	High	Low
	Normal		Normal		Normal		Normal		Normal	
	How do you know?		How do you know?		How do you know?		How do you know?		How do you know?	

30 Carolina Certified Version of OpenSciEd Unit 5.2 Student Notebook • Lesson 6



Make Sense of Data

What do you notice about this acidity scale that can help you figure out what types of matter might be in our water samples?



Connect to Our Communities

When have you heard about people testing water in your community for unhealthy things?



WHAT'S IN YOUR STORMWATER

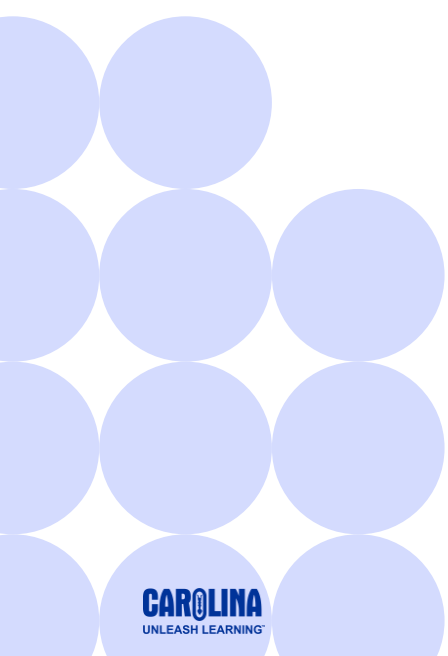
Find your water quality region on the map below and learn more at CleanWaterCA.com

KEY POLLUTANTS AND HOW YOU CAN HELP

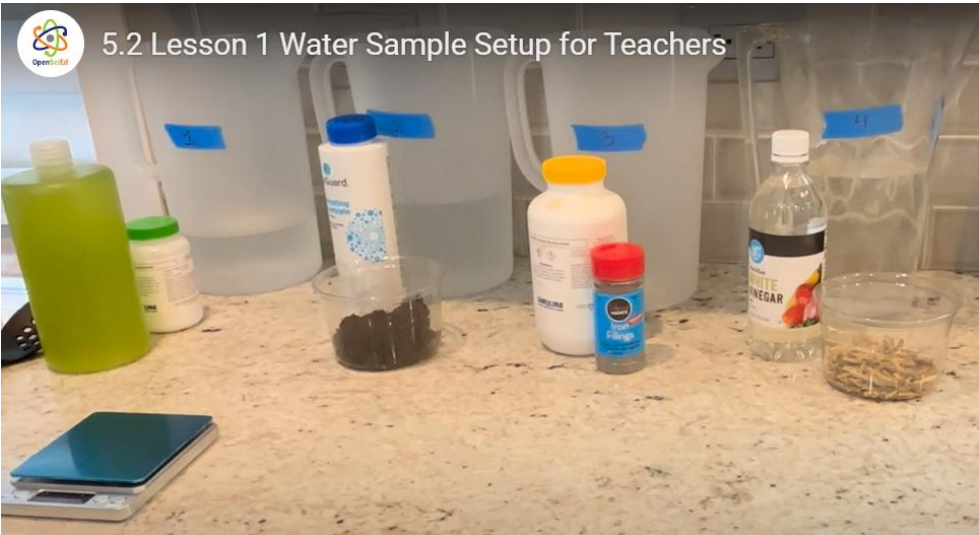
- TRASH** and litter accumulate on highways and make their way into waterways.
Action: Properly secure items in truck beds and put trash and recycling in the bin.
- NUTRIENTS** such as nitrogen and phosphorus are generated from fertilizers and vegetation waste.
Action: Avoid over fertilizing lawns and plants, and keep fallen leaves out of storm drains.
- SEDIMENTS** are released by soil erosion and can carry other pollutants of concern into waterways.
Action: Sweep driveways instead of hosing them off, use mulch in the garden, and plant trees and shrubs.
- BACTERIA** comes from pet waste and illegal disposal of RV waste.
Action: Pick up after your pet and use RV dumping stations.
- METALS** are generated by vehicle, tire, and brake wear.
Action: Regularly check tire pressure, change oil and fluids, and use commercial car washes.
- PESTICIDES** come from over application and improper disposal of chemicals.
Action: Use organic pesticides and properly dispose of unused portions.

CleanWaterCA.com
Stormwater Program

THE CALIFORNIA STORMWATER PROGRAM WORKS TO PREVENT WATER POLLUTION, ESPECIALLY ALONG CALIFORNIA HIGHWAYS AND HIGHWAYS. THE PROGRAMS BEGINS AFTER THE STATE WATER RESOURCES CONTROL BOARD, WHICH IS MADE UP OF STATE AND LOCAL WATER QUALITY REGIONAL PLANS AND IS THE MAIN TISSUE, MANAGE AND PREVENT OUR SOCIETY'S WATERWAYS.



5.2 Matter Properties



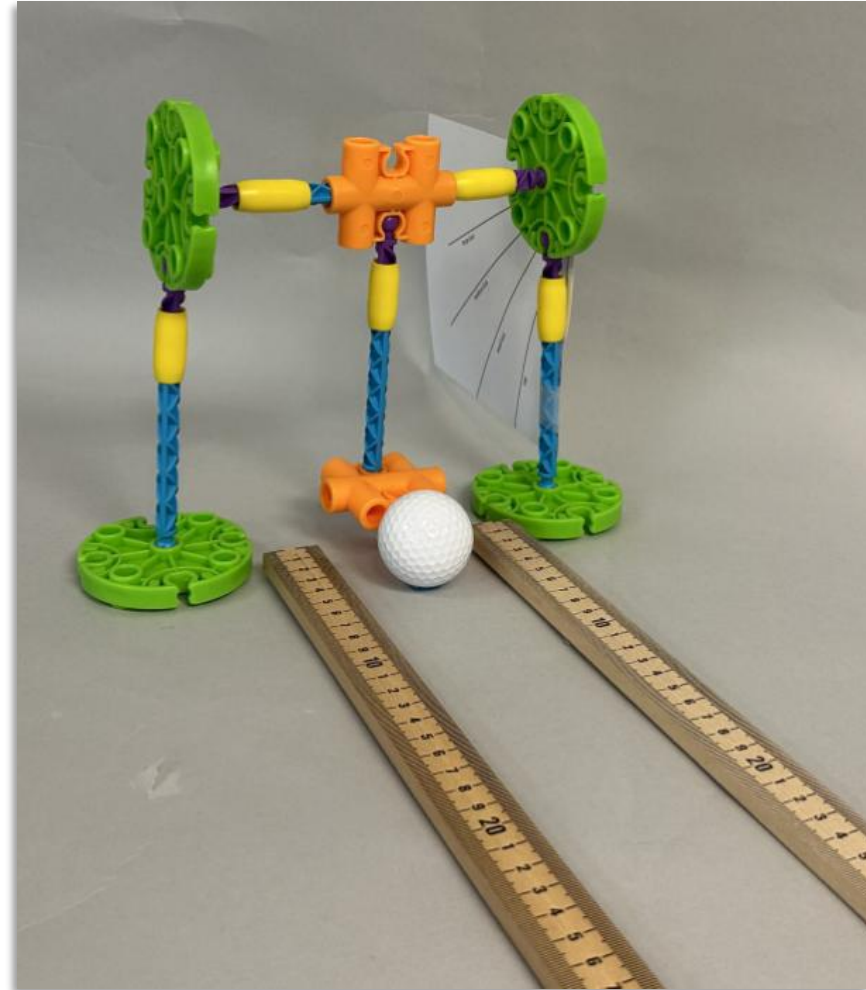
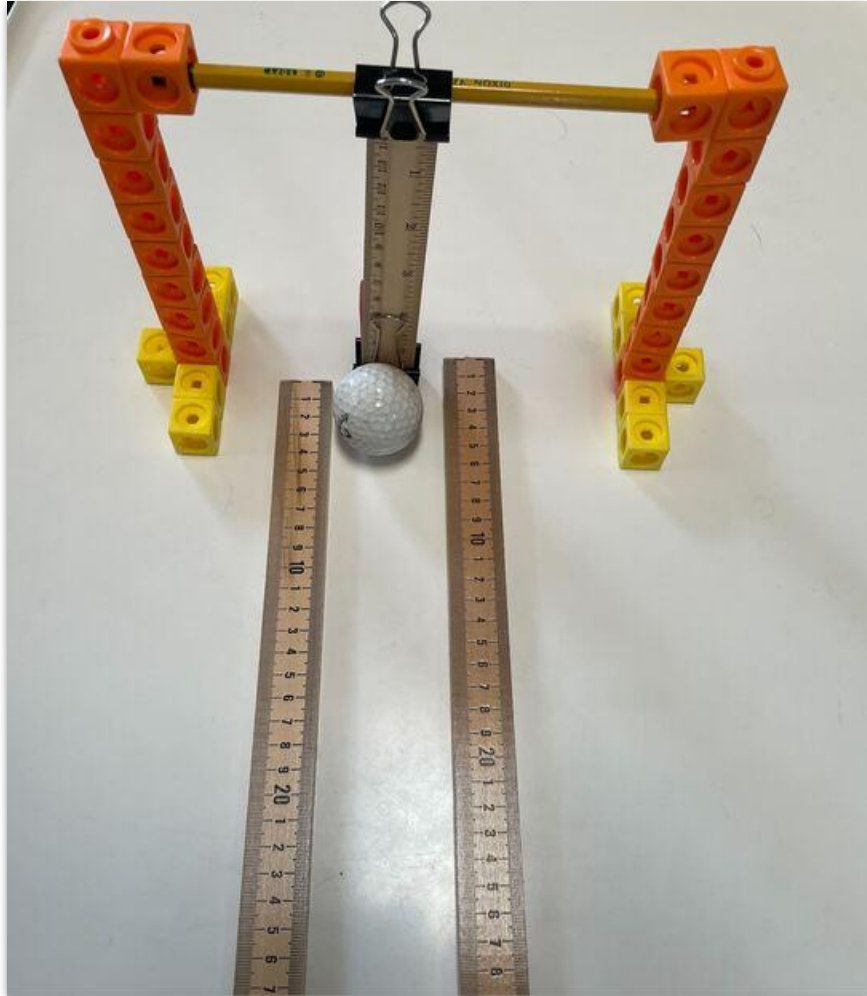
- Requires teachers to prepare exact measurements
- Teacher prep ~20 mins per group (2.5–3 hours total)



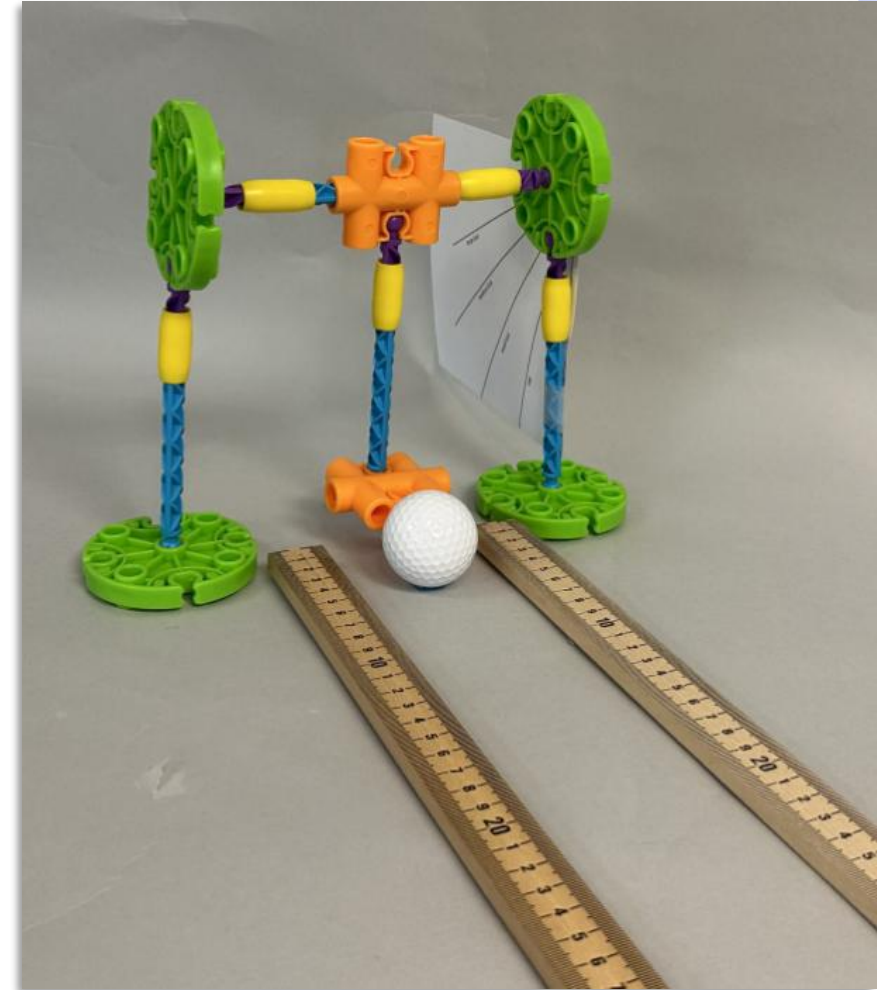
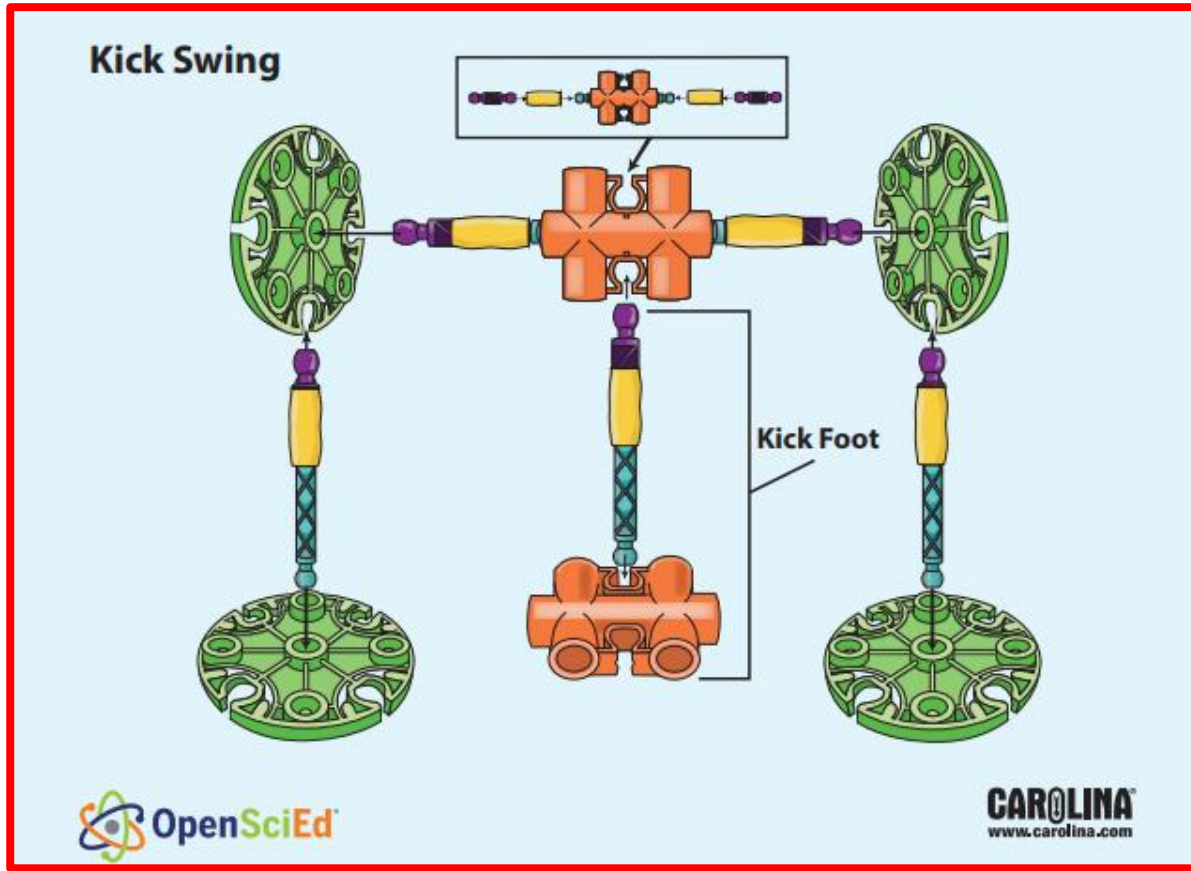
- Water Sample Kit
- Pre-measured amounts
- 1-minute prep time

- ✓ Fewer materials
- ✓ Cut prep time
- ✓ Better storage option

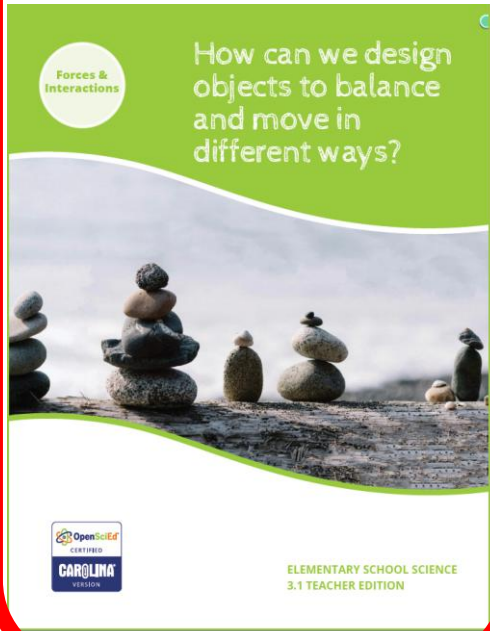
4.1 Energy Transfer: Collisions



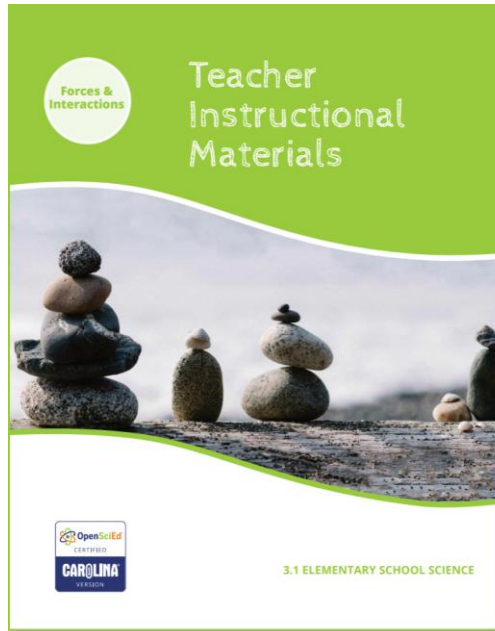
4.1 Energy Transfer: Collisions



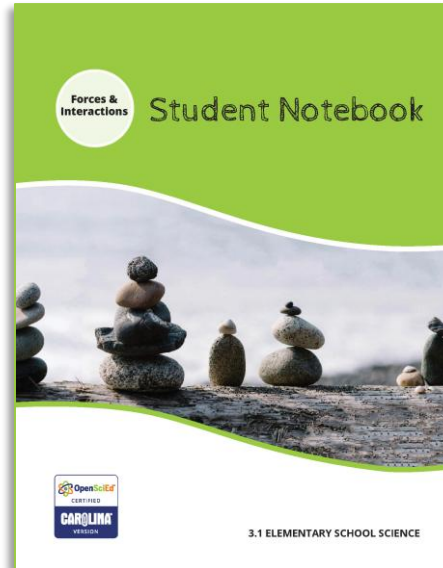
Teacher Edition



Teacher Instructional Materials



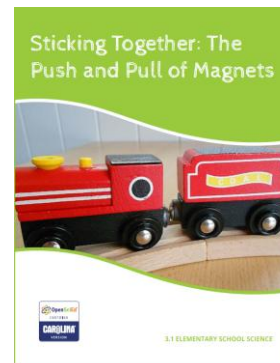
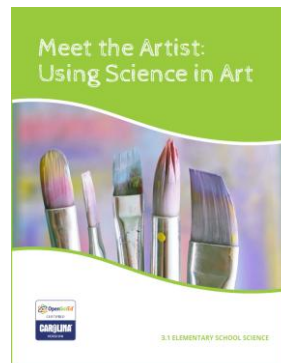
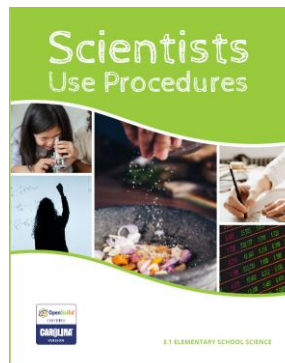
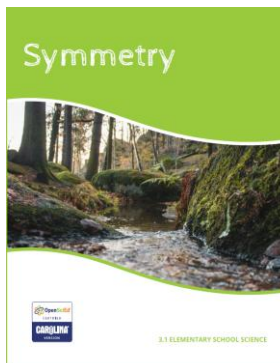
Student Notebook



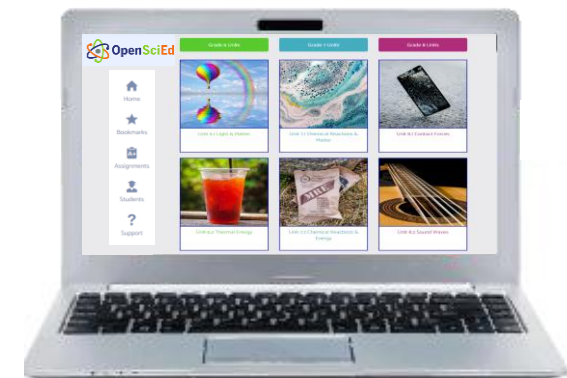
Science Kits



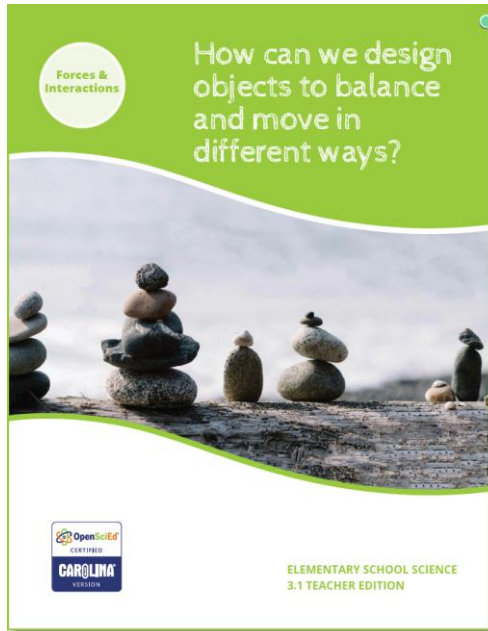
Student Readers



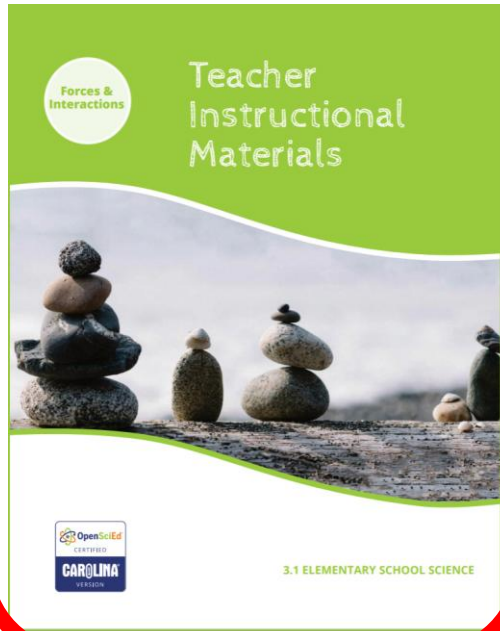
Digital



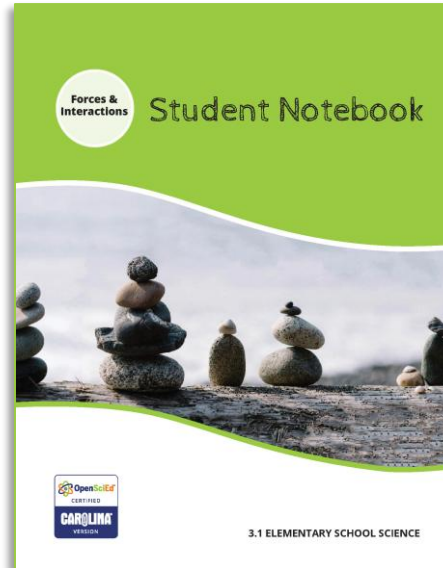
Teacher Edition



Teacher Instructional Materials



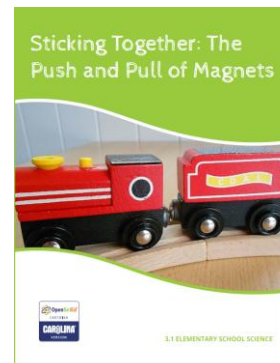
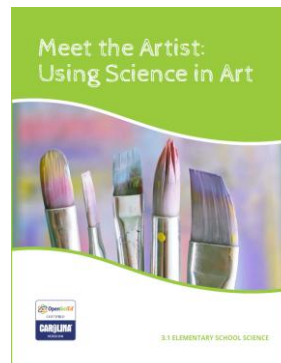
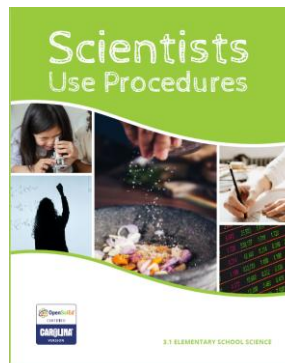
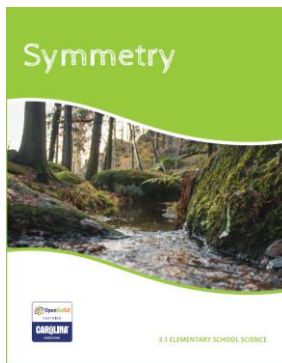
Student Notebook



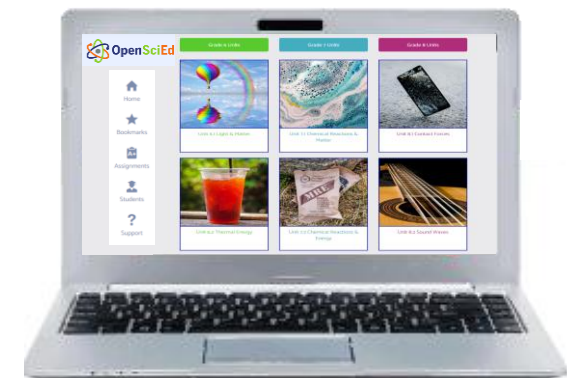
Science Kits



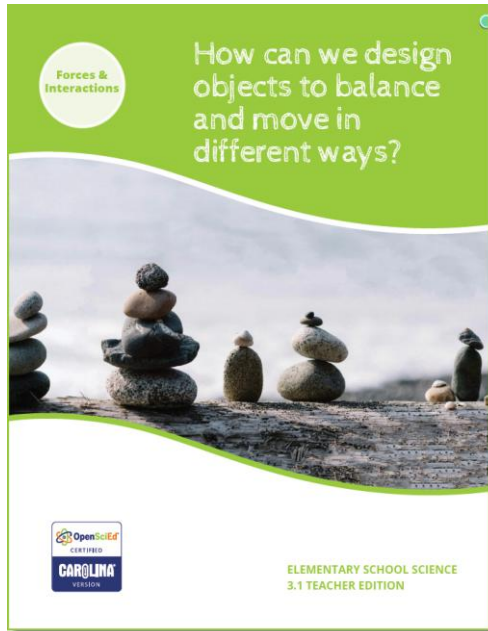
Student Readers



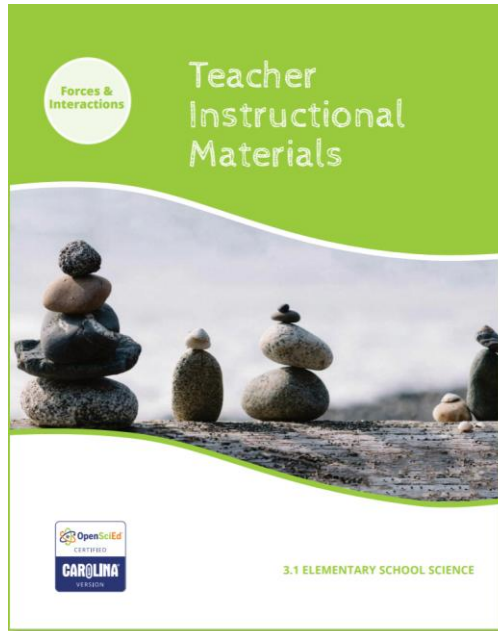
Digital



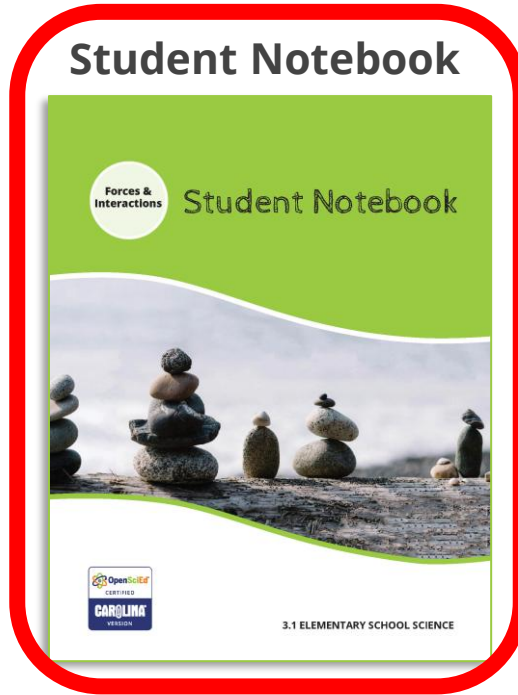
Teacher Edition



Teacher Instructional Materials



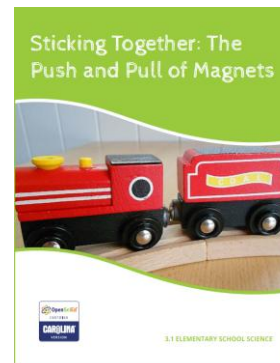
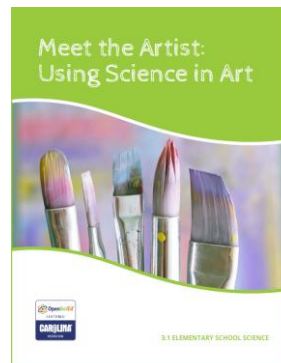
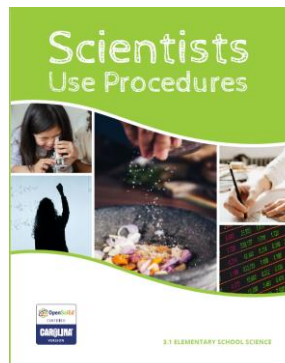
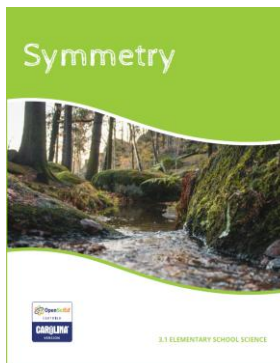
Student Notebook



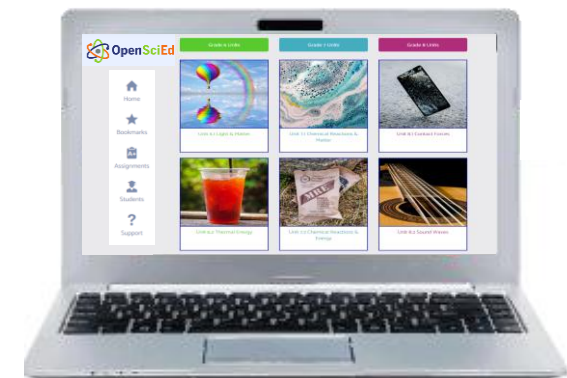
Science Kits



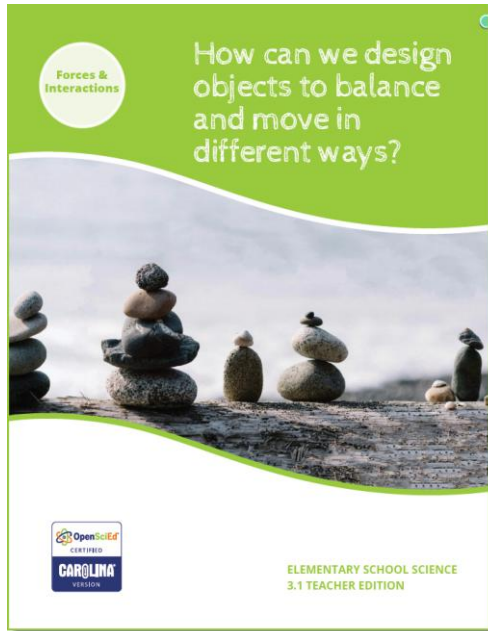
Student Readers



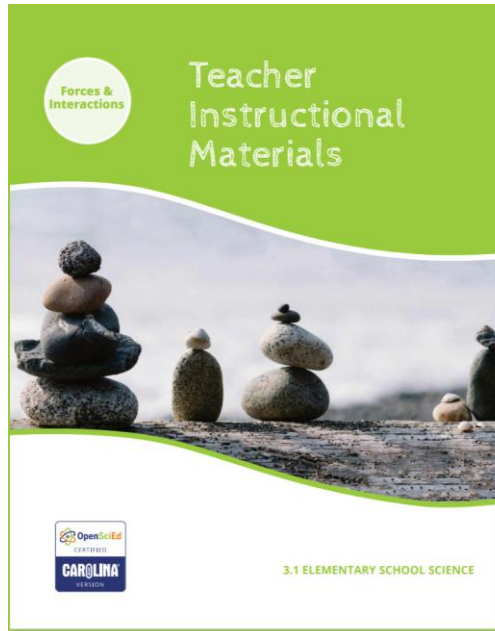
Digital



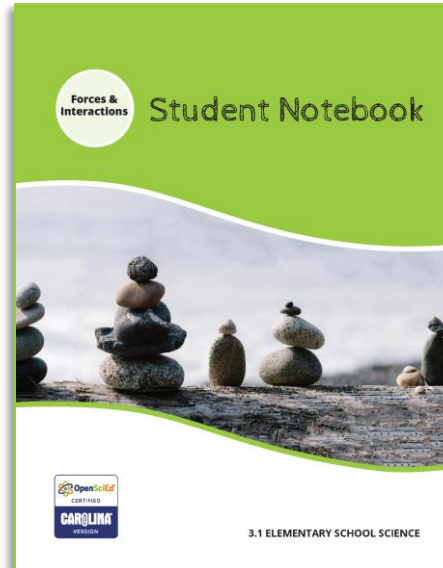
Teacher Edition



Teacher Instructional Materials



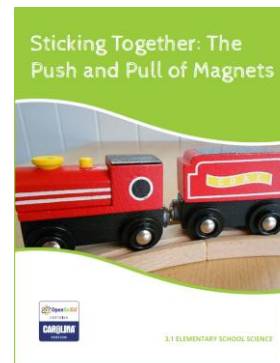
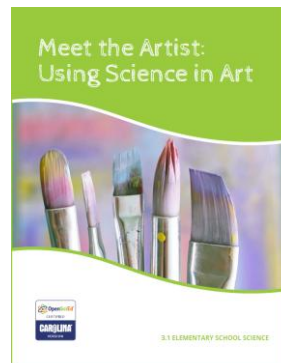
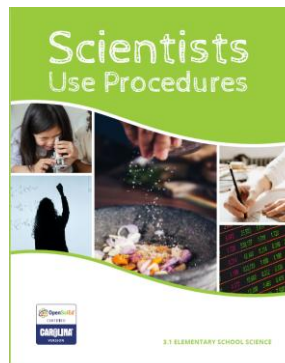
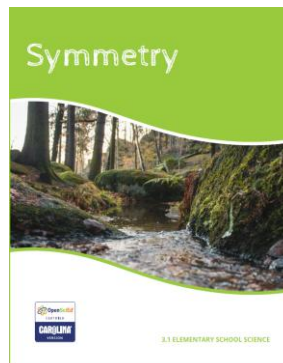
Student Notebook



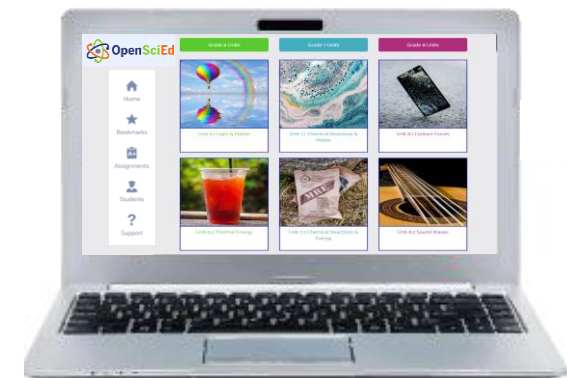
Science Kits



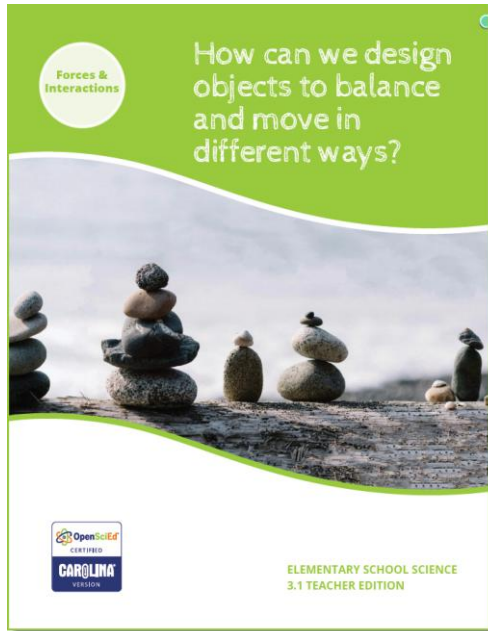
Student Readers



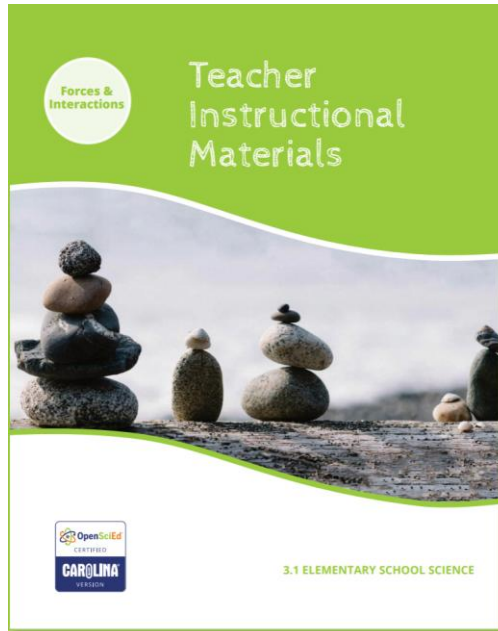
Digital



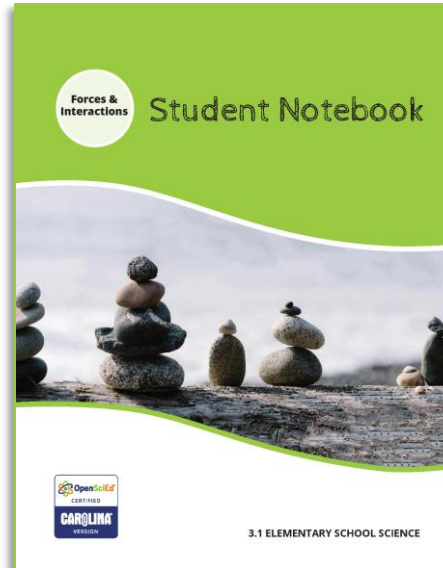
Teacher Edition



Teacher Instructional Materials



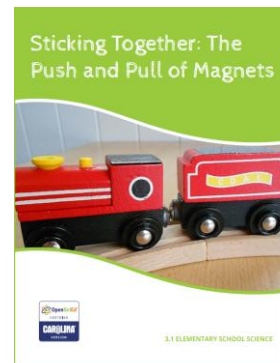
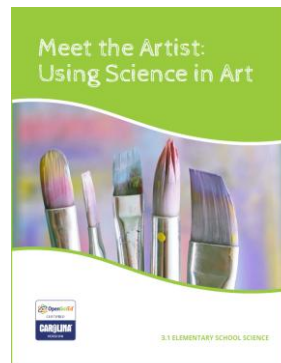
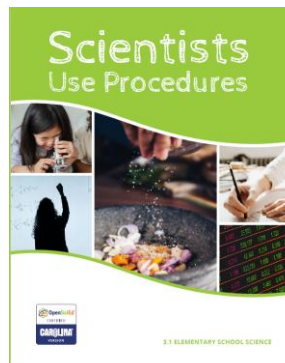
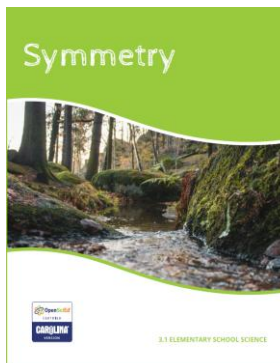
Student Notebook



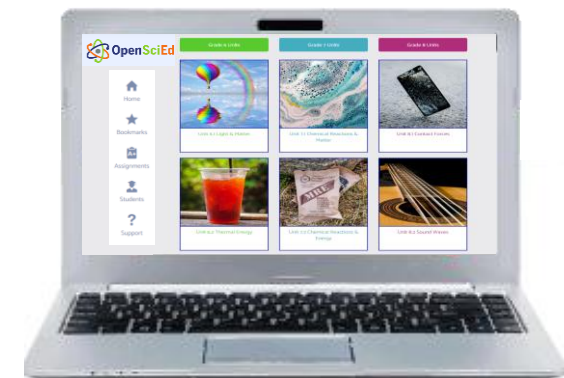
Science Kits



Student Readers



Digital





Enhanced Kits and Materials

EQUIPMENT KITS

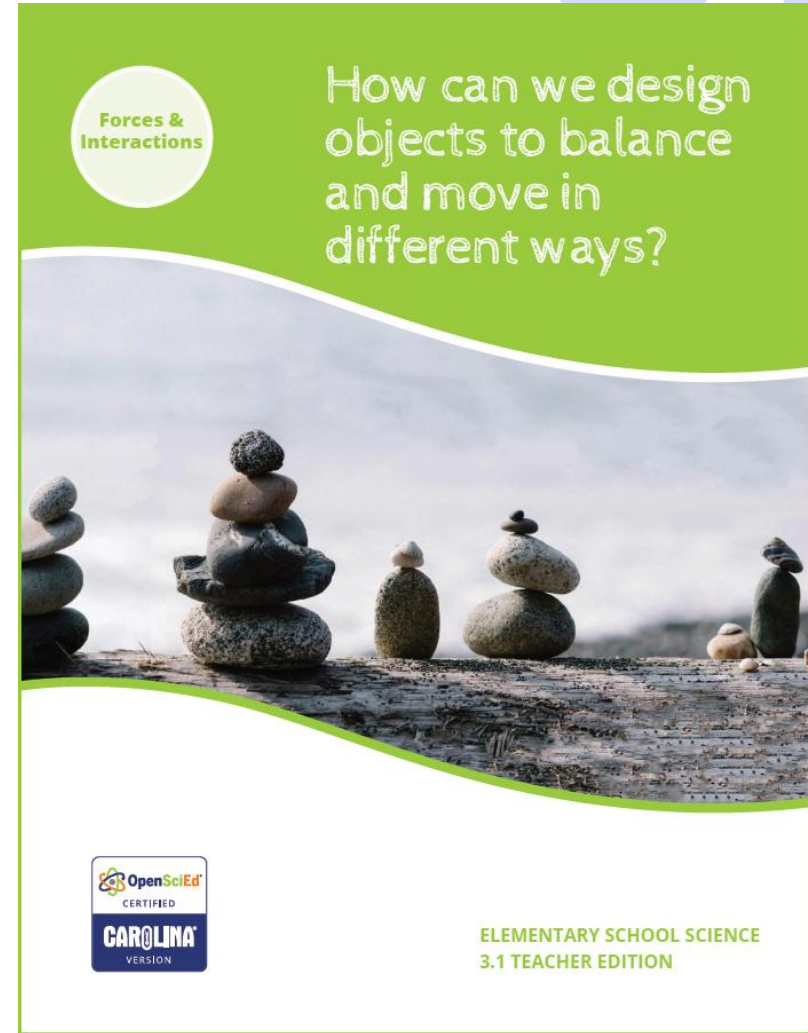
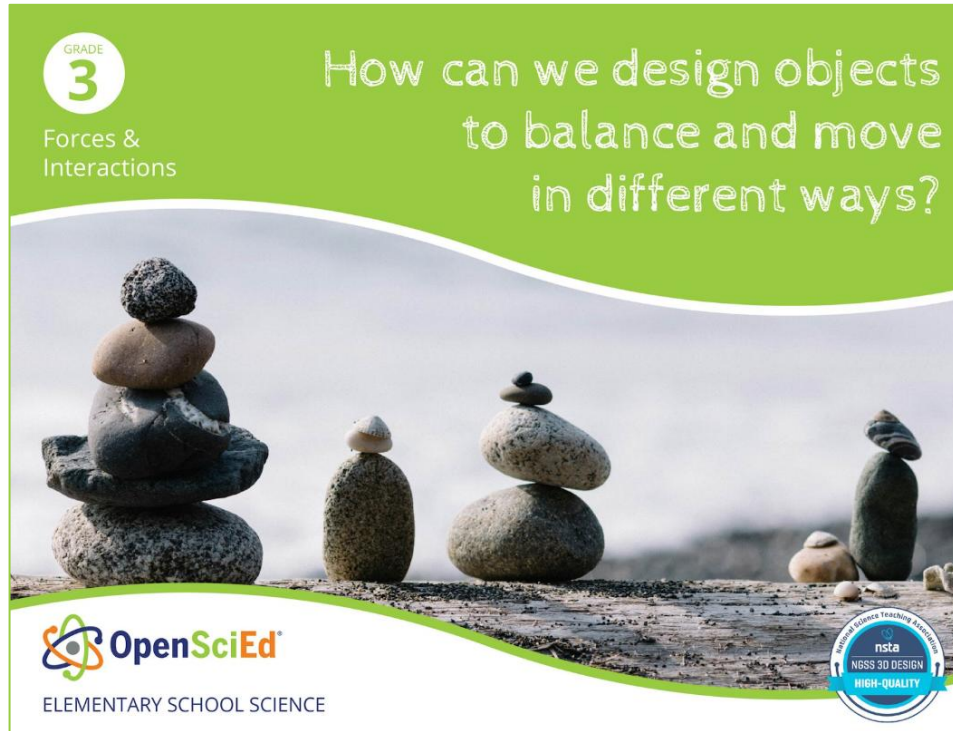
- Kits include all **consumable and non-consumable** materials for **8 lab groups** per class to allow for maximum student participation
- Kits are available in two configurations:
 - **1-class** for up to 32 students
 - **5-classes** for up to 160 students
- Kits are easily refurbished with 1-class or 5-class refurbishment sets
 - Prepaid vouchers are available for future refurbishments

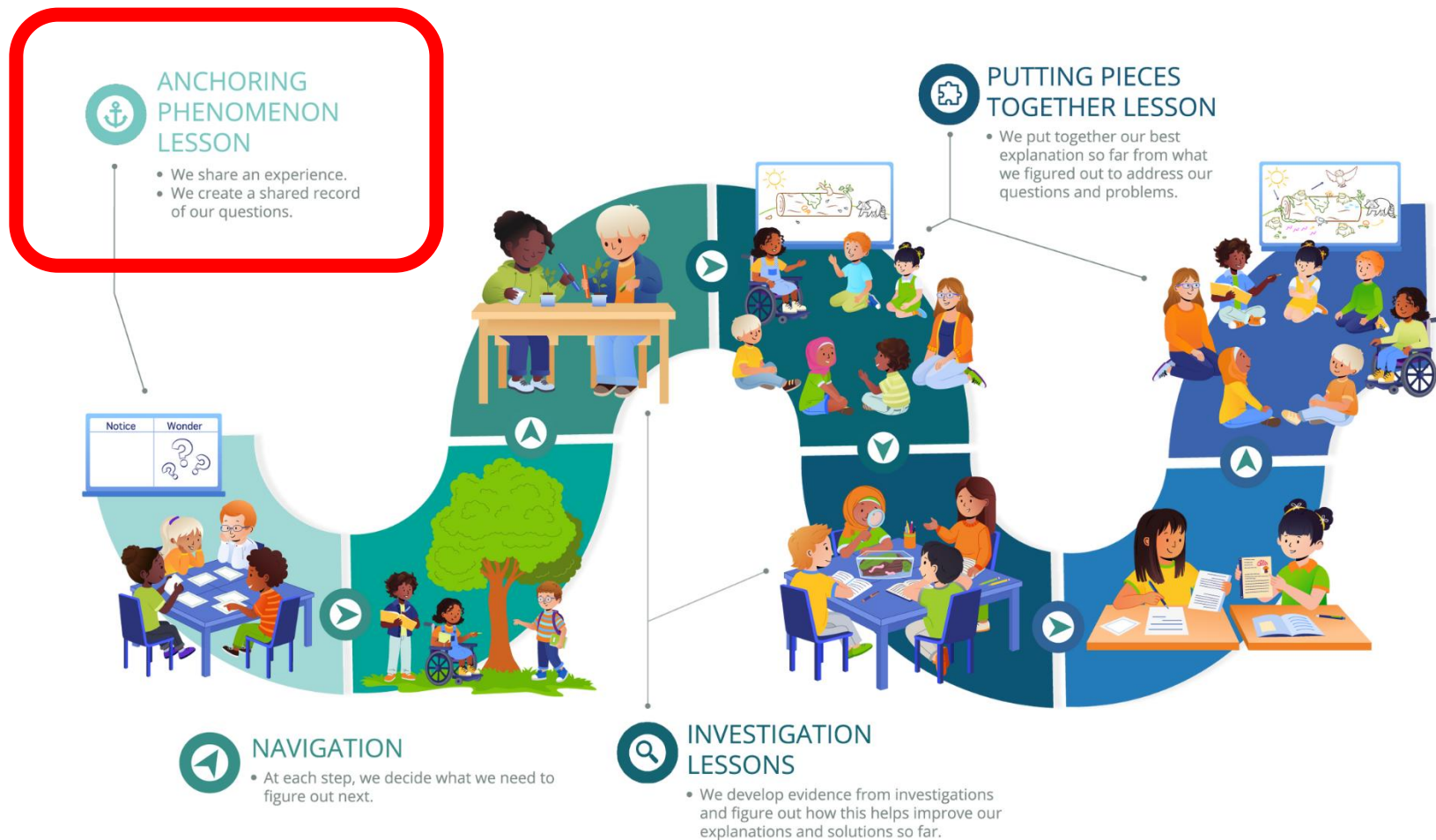


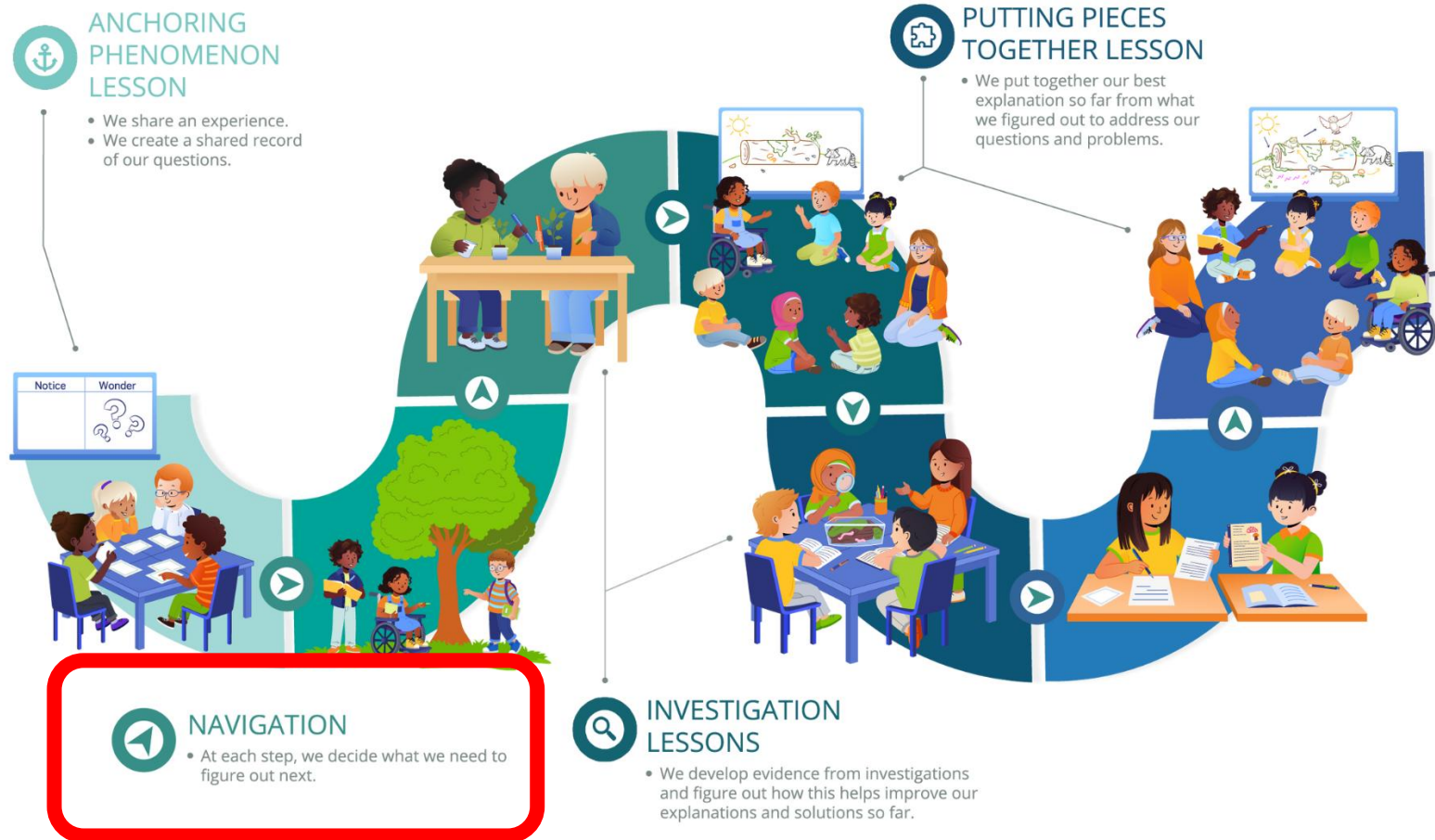
Kits are packed and shipped in durable, stackable totes and cardboard boxes.



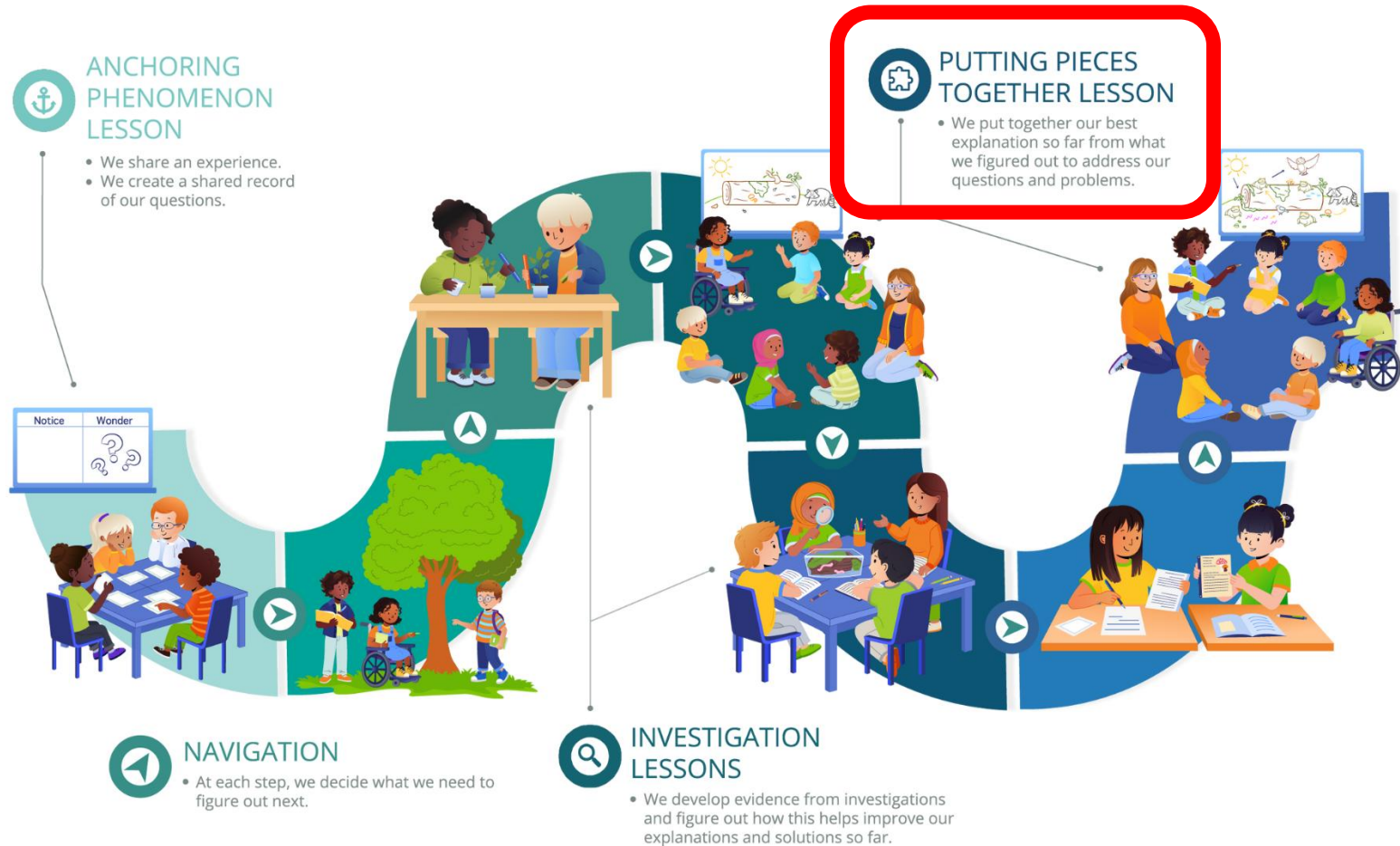
Redesigned Teacher Guide











Instructional Elements

Phenomena Based

Centered around figuring out phenomena or solving problems

Coherent for Students

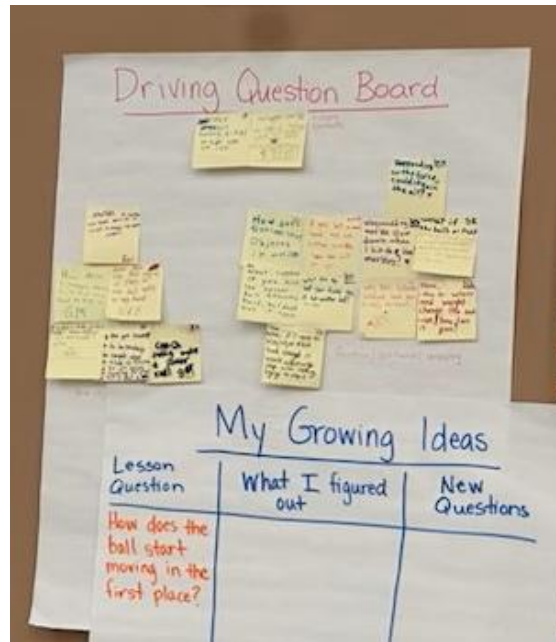
Driven by students' questions and ideas

Driven by Evidence

Incremental building and revision of ideas based on evidence

Collaborative

WE figure out ideas together



Join us on social media to stay up to date with new kits and free lessons!

 **YouTube** @CarolinaScience

 @CarolinaScience

LinkedIn  Carolina[®] Science

 @carolinascience