

A Complete 5E Science Unit with Lesson Plans

4TH GRADE

PROPERTIES OF WAVES

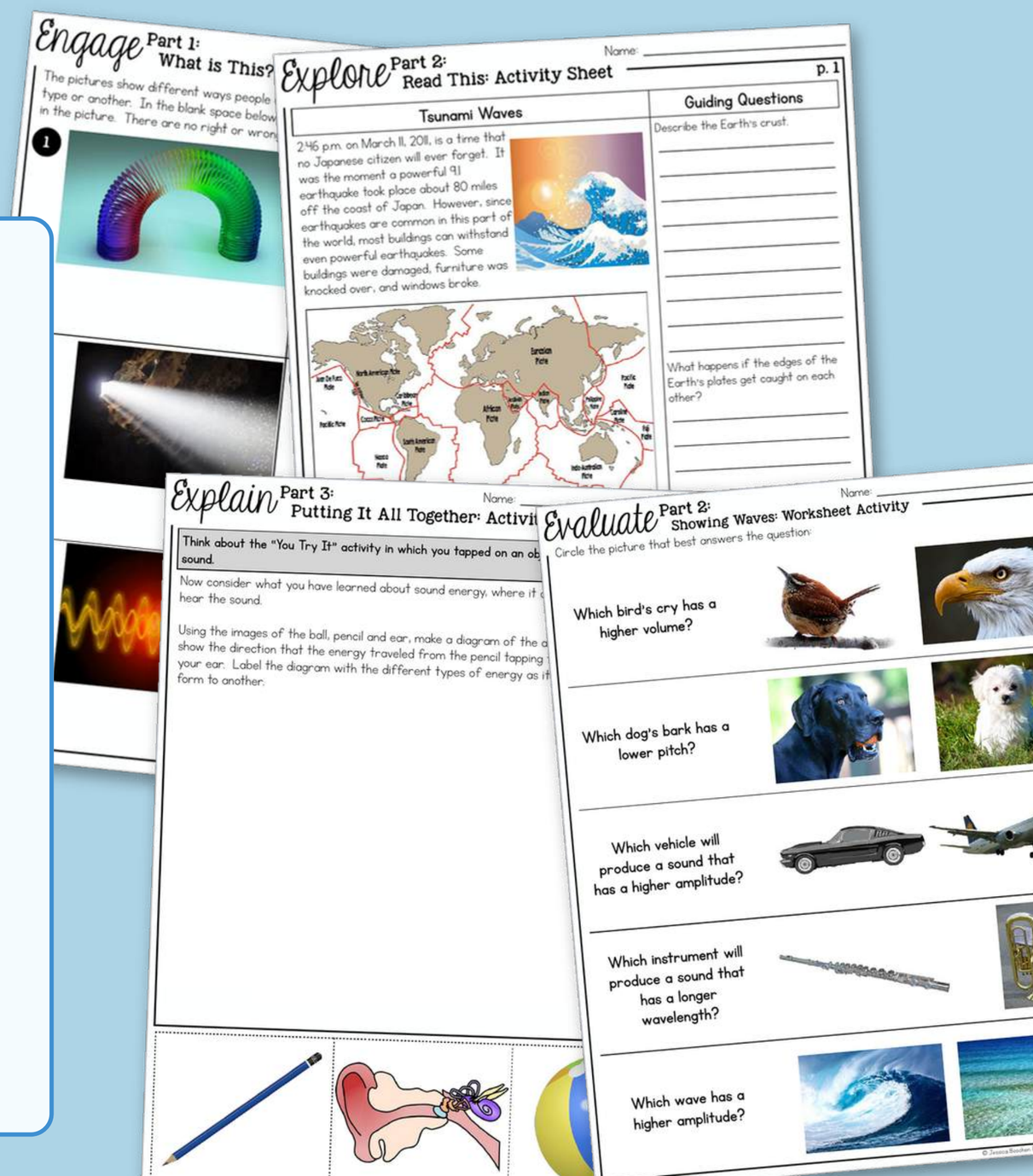
Engage, Explore, Explain, Extend, Evaluate
NGSS 4-PS4-1

KEEP SCROLLING TO SEE WHAT'S INSIDE!

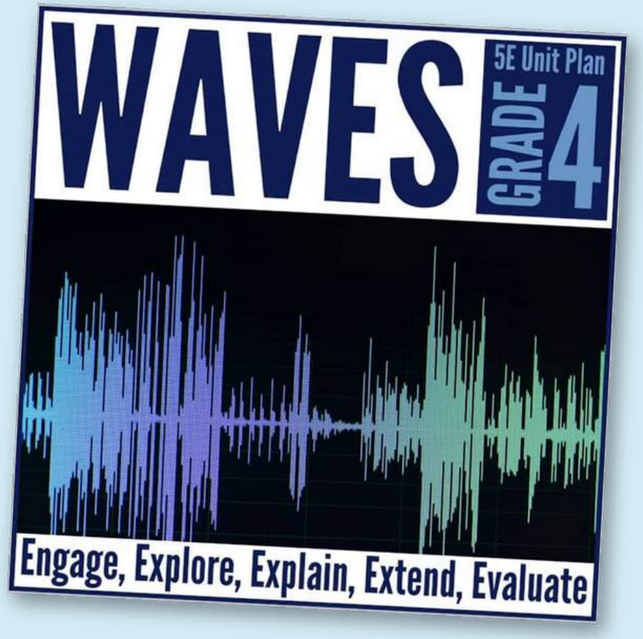
WHAT'S INCLUDED

5E PROPERTIES OF WAVES UNIT

- 210+ Page 5E Unit Plan
- Lesson Plans for All 5 Phases
- Teacher Notes and Misconceptions
- Materials Checklist and 4 Timelines
- Hands-On Wave Investigations
- Reading Passages on Waves and Sound
- Vocabulary Cards and Big Idea Posters
- Exit Tickets in 3 Formats
- Performance Assessment
- Answer Keys for Student Pages
- Google Slides and Google Forms Versions



UNIT AT A GLANCE



- Students tap jars, drop rocks in water, and build an instrument.
- Teacher background, lesson plans, and student pages in every phase.
- Aligned to NGSS 4-PS4-1.

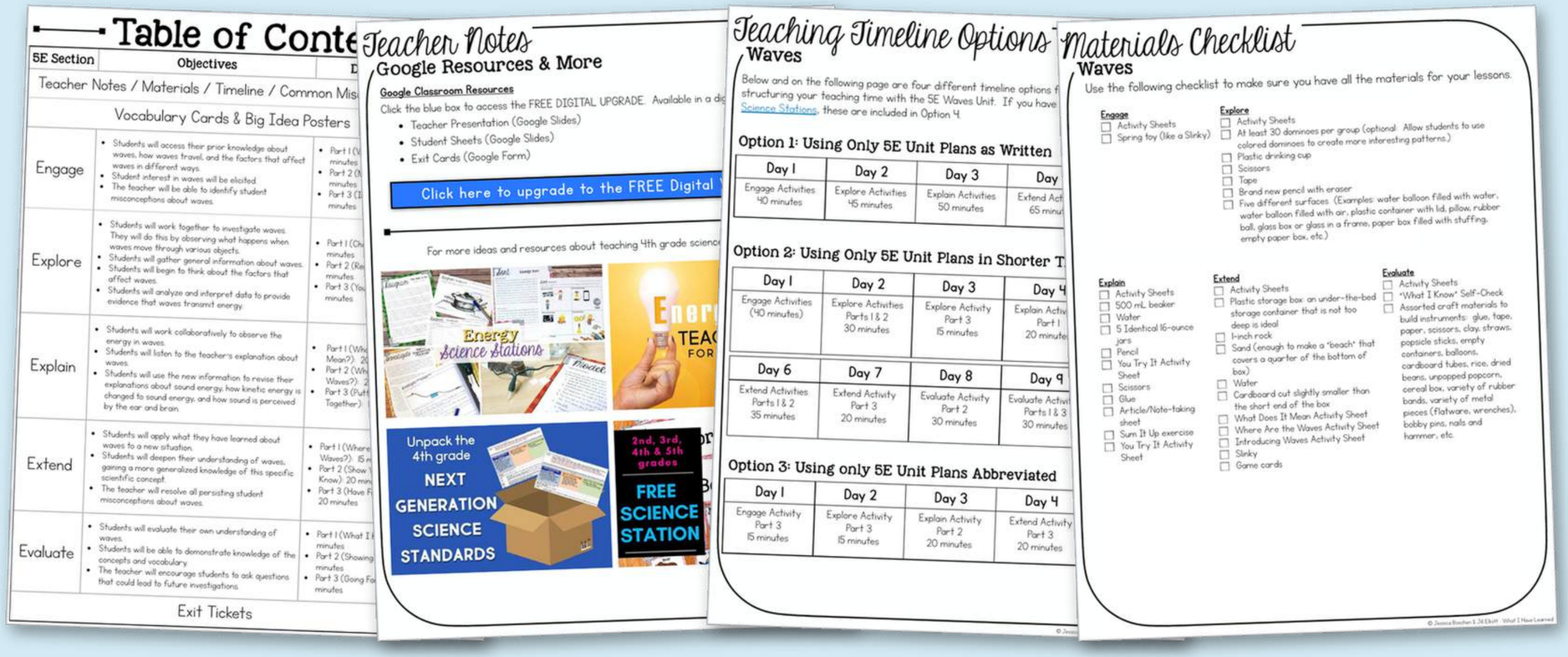
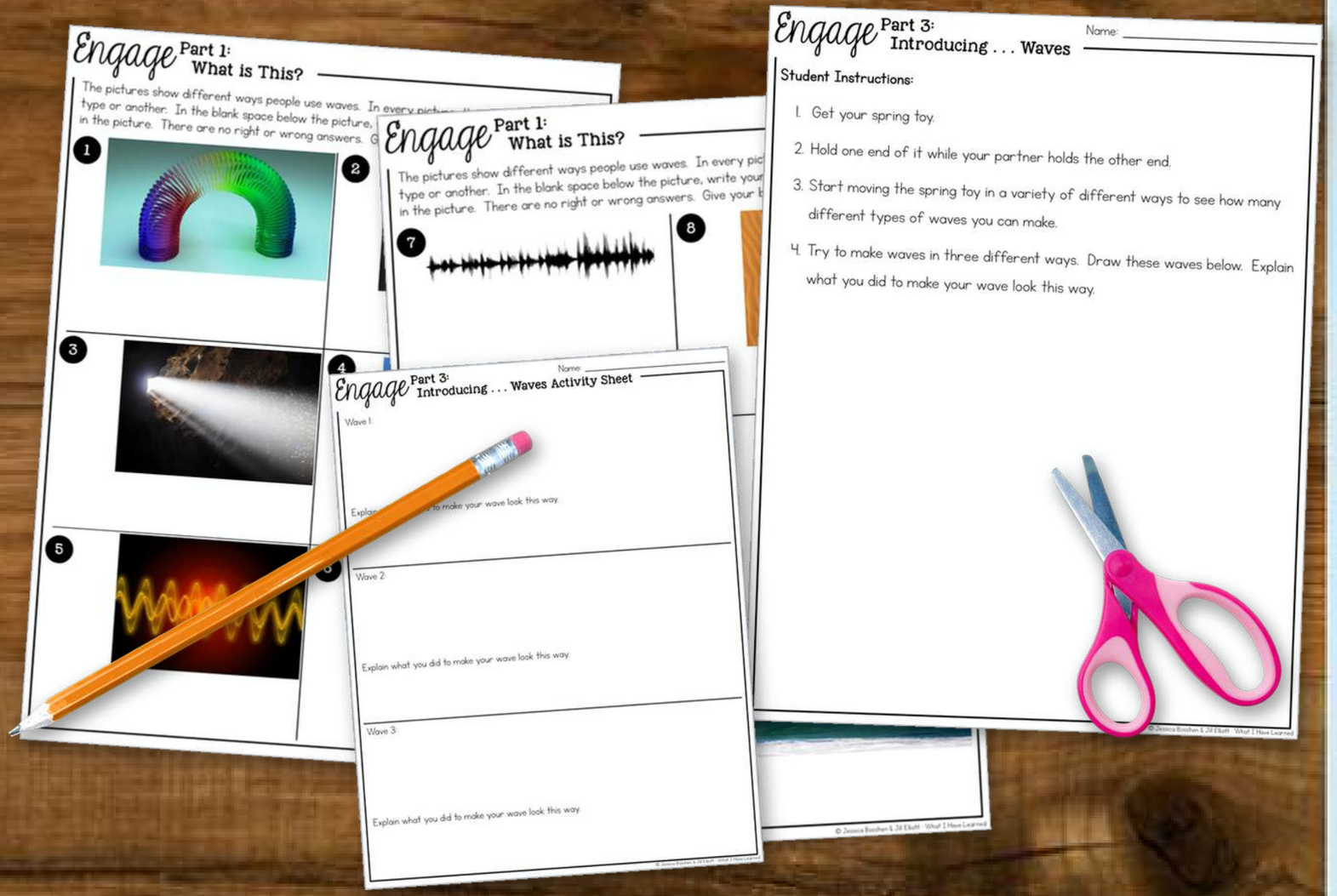


Table of Contents | **Teacher Notes** | **Timeline Options** | **Materials Checklist**

ENGAGE



Teacher background, lesson plans, student pages, and answer key

E E E E E

Spark curiosity with a spring toy

1 What Is This?

Students write observations about six pictures of waves, from a spring toy to ocean waves.

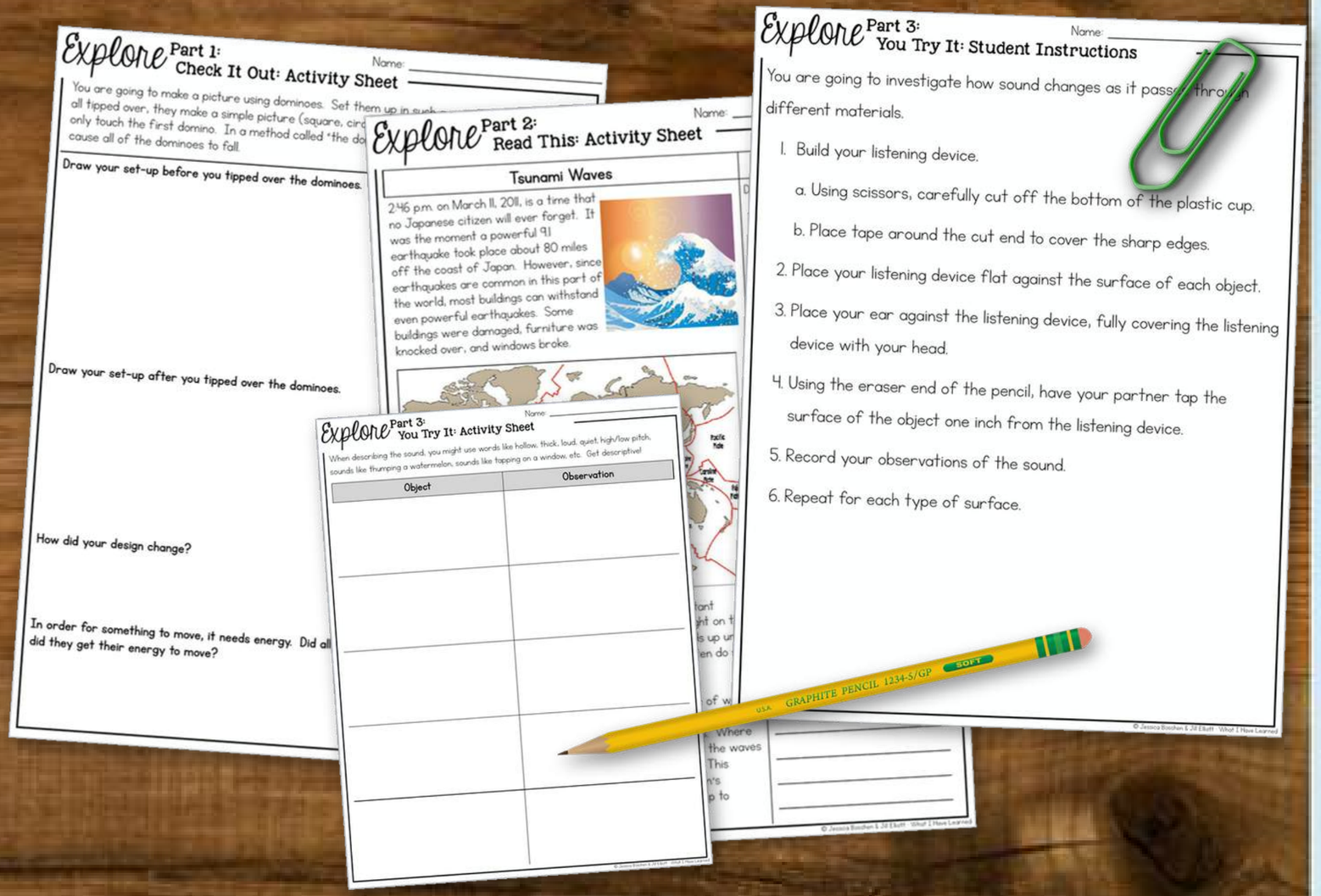
2 My Experiences

Students list the ways they have experienced waves at home, at school, and outside.

3 Introducing Waves

Students make waves with a spring toy and draw three different kinds.

EXPLORE



Teacher background, lesson plans, student pages, and answer key

E E E E E

Investigate how waves move energy

1 Check It Out

Students set up dominoes to make a picture, tip them over, and see how energy travels.

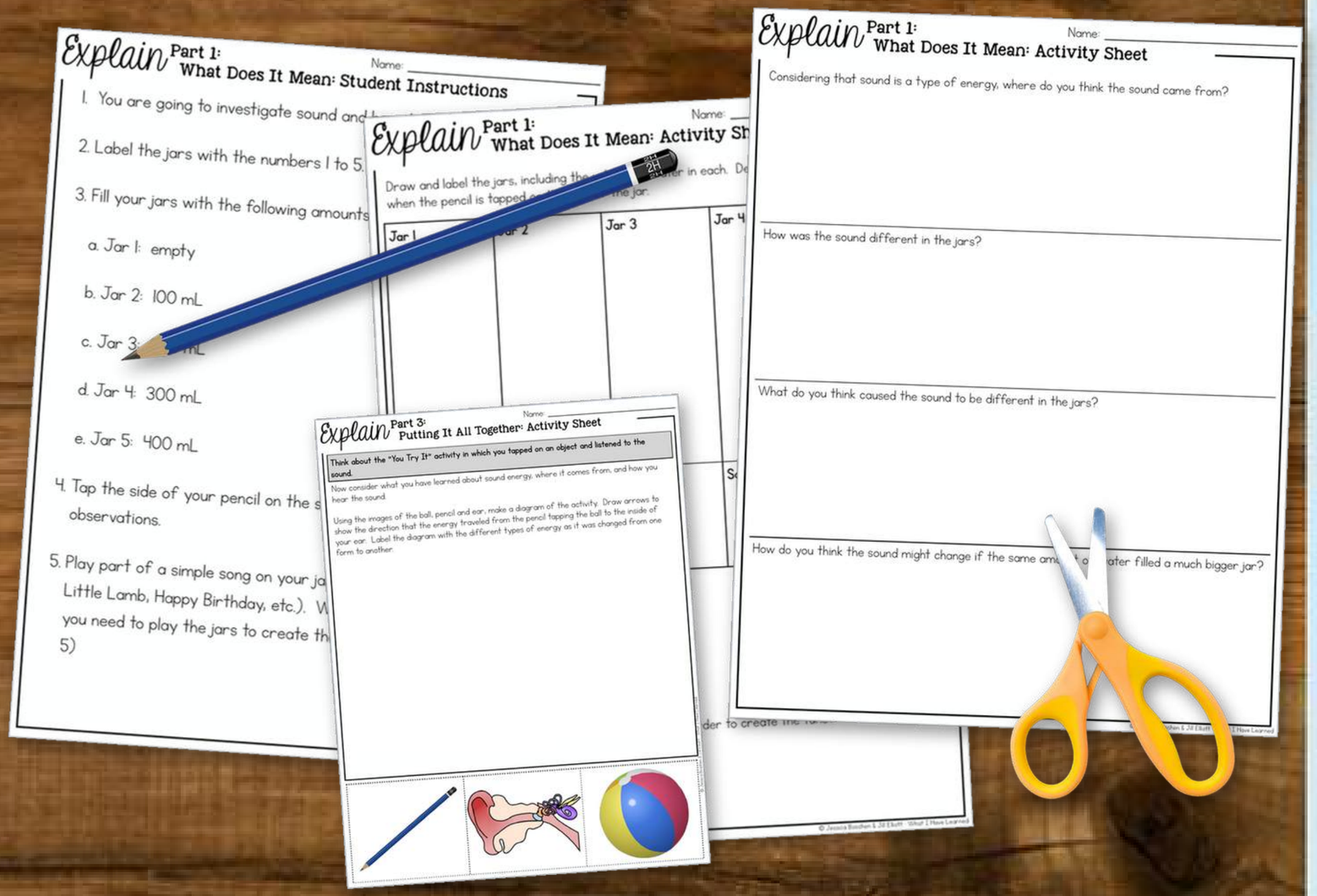
2 Read This

Students read about the 2011 tsunami and answer guiding questions.

3 You Try It

Students build a listening device from a cup and describe how sound changes through different materials.

EXPLAIN



Teacher background, lesson plans, student pages, and answer key

E E E E E

Build explanations from evidence

1 What Does It Mean?

Students tap jars with different amounts of water and explain how the sound changes.

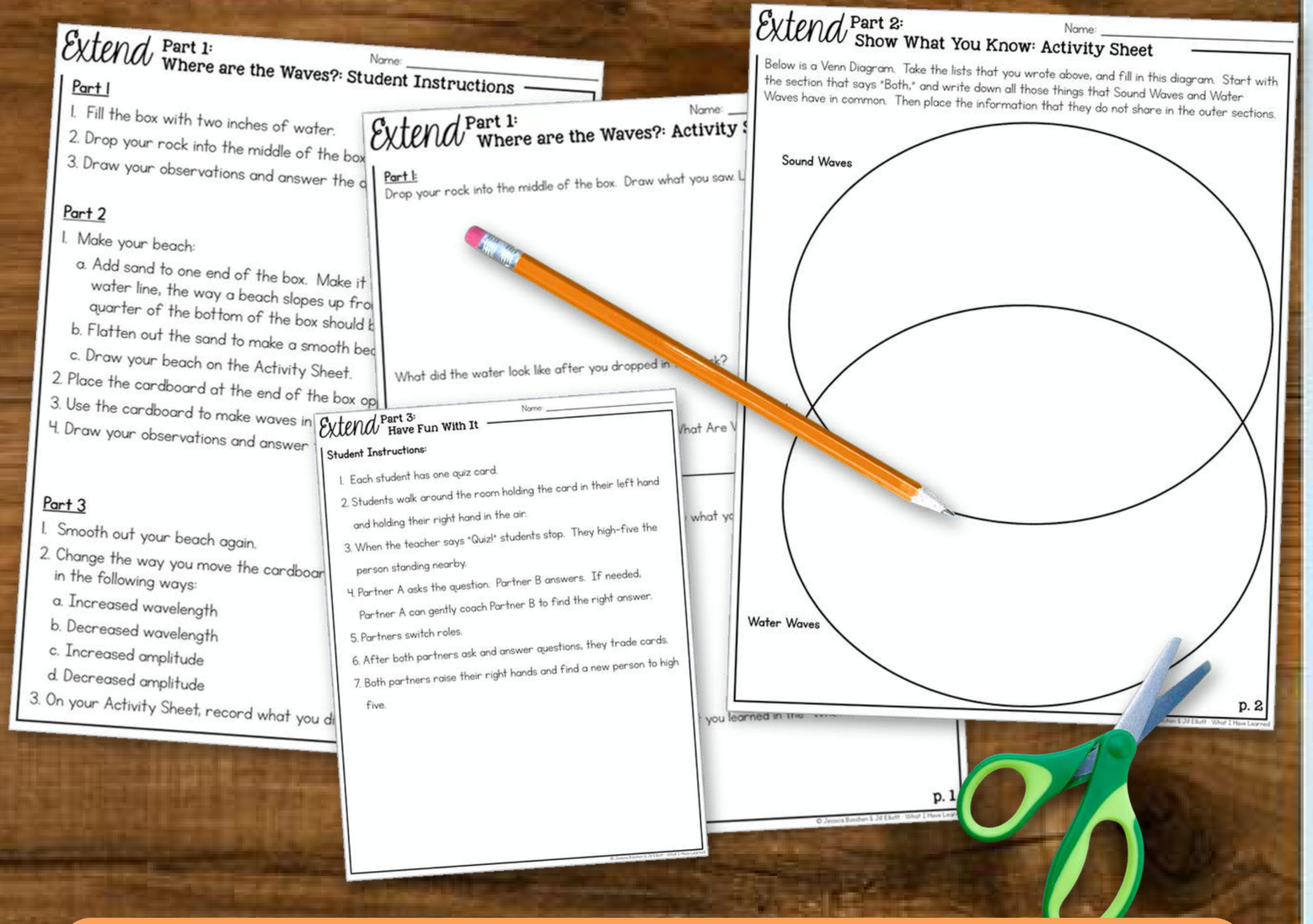
2 What Are Waves?

Students read about waves and sum up what they learned.

3 Putting It All Together

Students diagram where sound energy comes from and how we hear it.

EXTEND



Teacher background, lesson plans, student pages, and answer key

E E E E E

Apply waves to new situations

1 Where Are the Waves?

Students drop a rock into a box of water and build a beach to see how waves change.

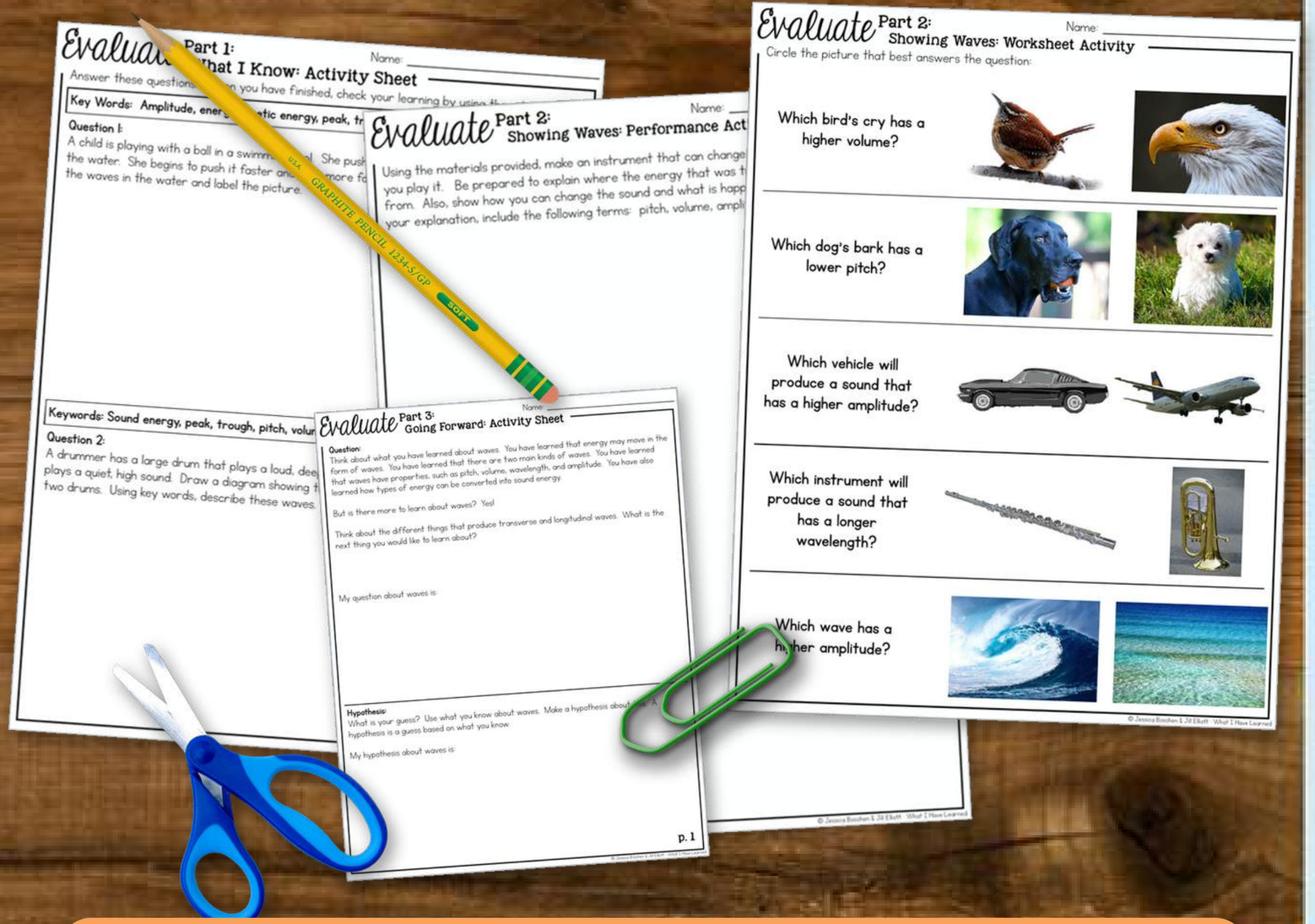
2 Show What You Know

Students use a Venn diagram to compare sound waves and water waves.

3 Have Fun With It

Students play a quiz game, high-fiving partners to swap questions.

EVALUATE



Teacher background, lesson plans, student pages, and answer key

E E E E E

Check understanding with evidence

1 What I Know

Students answer questions with key words, then score themselves with a rubric.

2 Showing Waves

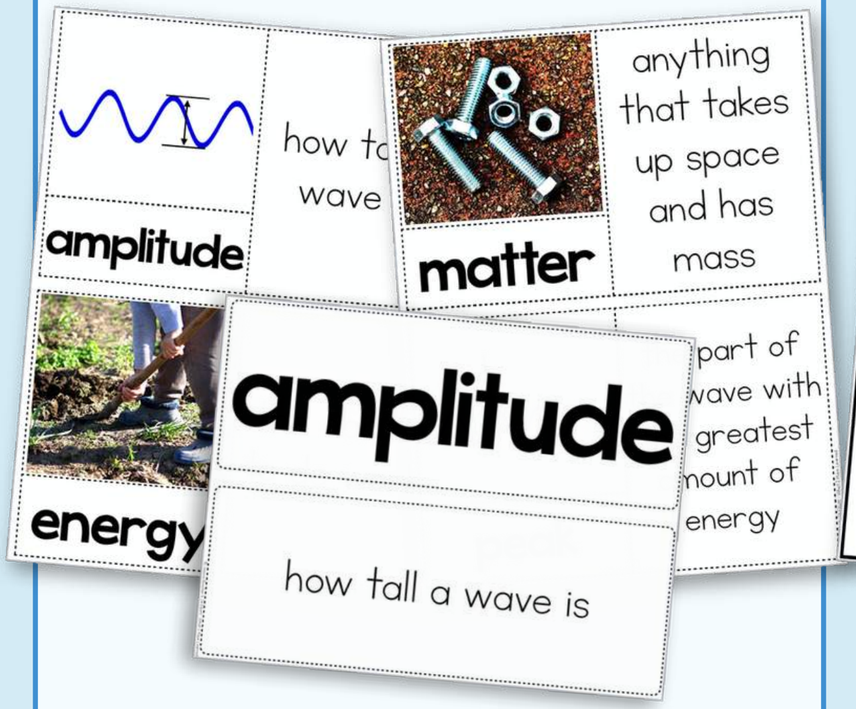
Students build an instrument that changes its sound and explain the energy.

3 Going Forward

Students write a new question and hypothesis about waves.

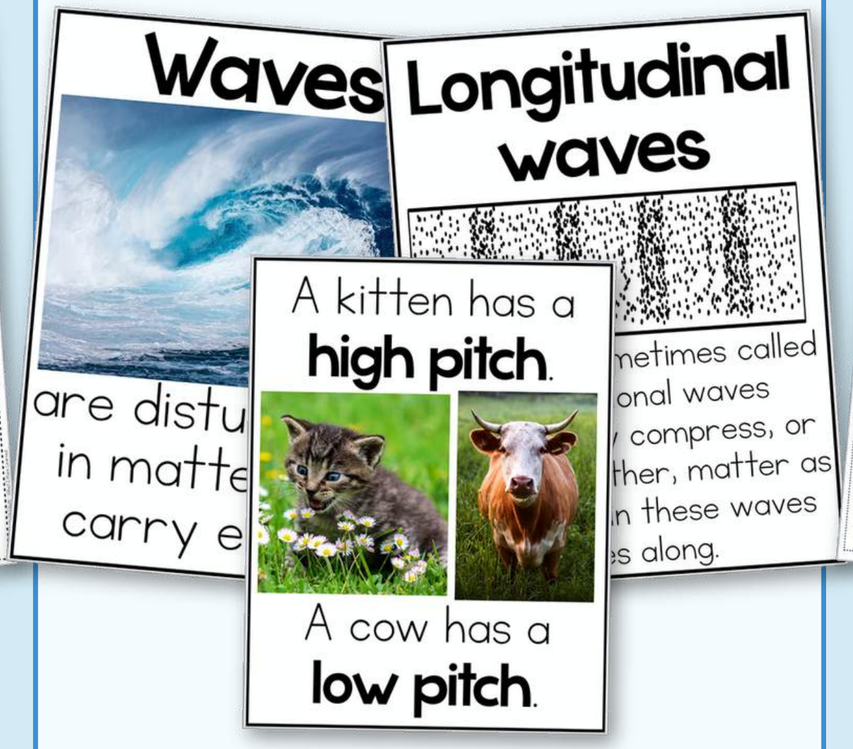
VOCABULARY, POSTERS & EXIT TICKETS

VOCABULARY CARDS



Picture cards and word cards for amplitude, energy, matter, peak, pitch, wavelength, and more.

BIG IDEA POSTERS



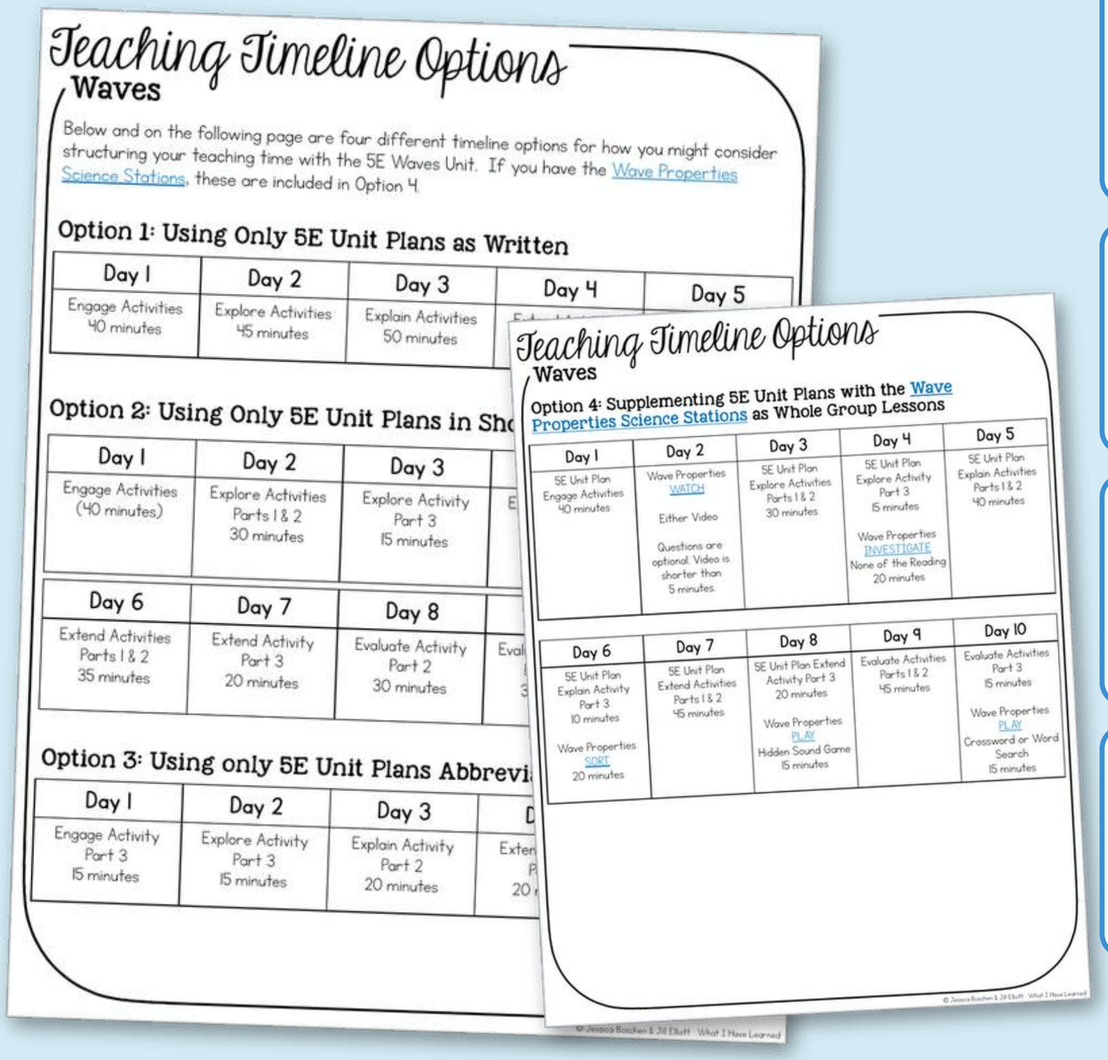
Big idea posters on energy, transverse and longitudinal waves, amplitude, pitch, and peak and trough.

EXIT TICKETS



10 exit tickets, each in short answer, fill-in-the-blank, and multiple choice formats.

WAYS TO USE IN YOUR CLASSROOM



Teaching Timeline Options

Waves

Below and on the following page are four different timeline options for how you might consider structuring your teaching time with the 5E Waves Unit. If you have the Wave Properties Science Stations, these are included in Option 4.

Option 1: Using Only 5E Unit Plans as Written

Day 1	Day 2	Day 3	Day 4	Day 5
Engage Activities 40 minutes	Explore Activities 45 minutes	Explain Activities 50 minutes		

Option 2: Using Only 5E Unit Plans in Sh

Day 1	Day 2	Day 3	
Engage Activities (40 minutes)	Explore Activities Parts 1 & 2 30 minutes	Explore Activity Part 3 15 minutes	E

Day 6	Day 7	Day 8	
Extend Activities Parts 1 & 2 35 minutes	Extend Activity Part 3 20 minutes	Evaluate Activity Part 2 30 minutes	Eval 3

Option 3: Using only 5E Unit Plans Abbrevi

Day 1	Day 2	Day 3	D
Engage Activity Part 3 15 minutes	Explore Activity Part 3 15 minutes	Explain Activity Part 2 20 minutes	Exten P 20

Teaching Timeline Options

Waves

Option 4: Supplementing 5E Unit Plans with the Wave Properties Science Stations as Whole Group Lessons

Day 1	Day 2	Day 3	Day 4	Day 5
5E Unit Plan Engage Activities 40 minutes	Wave Properties WATCH Either Video Questions are optional. Video is shorter than 5 minutes.	5E Unit Plan Explore Activities Parts 1 & 2 30 minutes	5E Unit Plan Explore Activity Part 3 15 minutes Wave Properties INVESTIGATE None of the Reading 20 minutes	5E Unit Plan Explain Activities Parts 1 & 2 40 minutes

Day 6	Day 7	Day 8	Day 9	Day 10
5E Unit Plan Explain Activity Part 3 10 minutes Wave Properties SORT 20 minutes	5E Unit Plan Extend Activities Parts 1 & 2 45 minutes	5E Unit Plan Extend Activity Part 3 20 minutes Wave Properties PLAY Hidden Sound Game 15 minutes	Evaluate Activities Parts 1 & 2 45 minutes	Evaluate Activities Part 3 15 minutes Wave Properties PLAY Crossword or Word Search 15 minutes

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1

Whole-Class 5E Unit

Teach one phase a day over 5 days as written, with 40 to 65 minutes per phase.

2

Shorter Science Blocks

Spread the unit across 9 days in shorter time blocks when science minutes are limited.

3

Alongside Science Stations

Add the Wave Properties Science Stations for a 10-day plan.

4

Formative Checks

Use the exit tickets throughout the unit to see who needs reteaching before the performance activity.

TEACHING TIMELINE OPTIONS

Option 1 — 5 days
As Written

Day 1	Day 2	Day 3	Day 4	Day 5
Engage	**Explore**	**Explain**	**Extend**	**Evaluate**
40 min	45 min	50 min	65 min	60 min

Option 2 — 9 days
Shorter Time Blocks

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9
Engage	**Explore 1–2**	**Explore 3**	**Explain 1**	**Explain 2–3**	**Extend 1–2**	**Extend 3**	**Evaluate 2**	**Evaluate 1 & 3**
40 min	30 min	15 min	20 min	30 min	35 min	20 min	30 min	30 min

Option 3 — 5 days
Abbreviated

Day 1	Day 2	Day 3	Day 4	Day 5
Engage 3	**Explore 3**	**Explain 2**	**Extend 3**	**Evaluate 1**
15 min	15 min	20 min	20 min	15 min

Option 4 — 10 days
With Science Stations

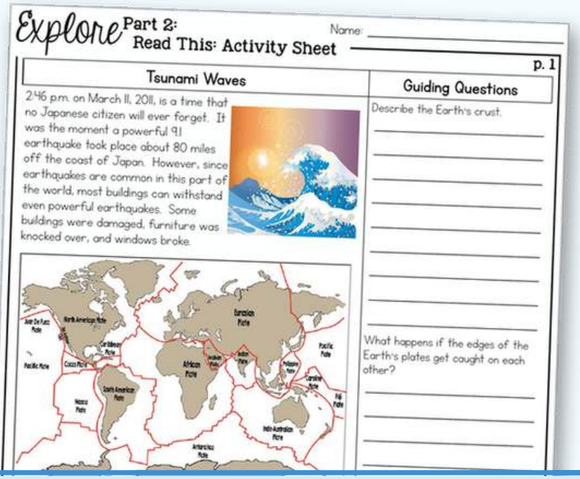
Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
Engage	**Explore 1–2**	**Explore 3**	**Explain 1–2**	**Station**	**Explain 3**	**Extend 1–2**	**Extend 3**	**Evaluate 1–2**	**Evaluate 3**
40 min	30 min +5 watch	15 min +20 station	40 min	20 min	10 min +20 station	45 min	20 min +15 station	45 min	15 min +15 station

Orange days are Science Station lessons. Magenta notes are extra station activities you can add that day.

YOU WILL LOVE THIS BECAUSE

Hands-On From Day One

Students tap jars, drop rocks in water, and build instruments, so waves make sense.


Explore Part 2: Read This: Activity Sheet

Name: _____

p. 1

Tsunami Waves

2:46 p.m. on March 11, 2011, is a time that no Japanese citizen will ever forget. It was the moment a powerful 9.1 earthquake took place about 80 miles off the coast of Japan. However, since earthquakes are common in this part of the world, most buildings can withstand even powerful earthquakes. Some buildings were damaged, furniture was knocked over, and windows broke.

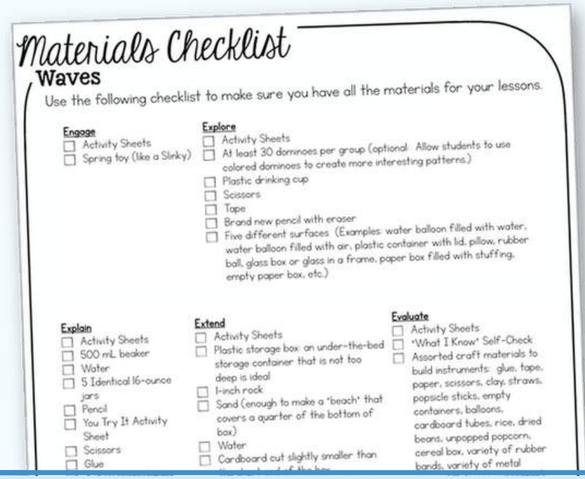
Guiding Questions

Describe the Earth's crust.

What happens if the edges of the Earth's plates get caught on each other?

Planned and Ready to Teach

Teacher notes, a misconceptions guide, a materials checklist, and answer keys are done for you.


Materials Checklist

Waves

Use the following checklist to make sure you have all the materials for your lessons.

Engage
- ☐ Activity Sheets
- ☐ Spring toy (like a Slinky)

Explore
- ☐ Activity Sheets
- ☐ At least 30 dominoes per group (optional. Allow students to use colored dominoes to create more interesting patterns.)
- ☐ Plastic drinking cup
- ☐ Scissors
- ☐ Tape
- ☐ Brand new pencil with eraser
- ☐ Five different surfaces (Examples: water balloon filled with water, water balloon filled with air, plastic container with lid, pillow, rubber ball, glass box or glass in a frame, paper box filled with stuffing, empty paper box, etc.)

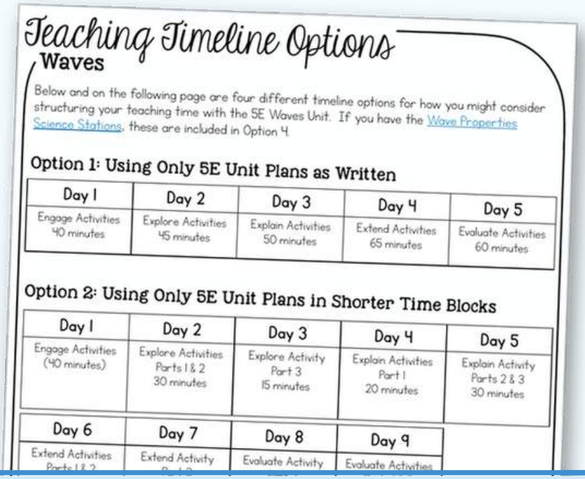
Explain
- ☐ Activity Sheets
- ☐ 500 mL beaker
- ☐ Water
- ☐ 5 Identical 16-ounce jars
- ☐ Pencil
- ☐ You Try It Activity Sheet
- ☐ Scissors
- ☐ Glue

Extend
- ☐ Activity Sheets
- ☐ Plastic storage box: an under-the-bed storage container that is not too deep is ideal
- ☐ 1-inch rock
- ☐ Sand (enough to make a "beach" that covers a quarter of the bottom of box)
- ☐ Water
- ☐ Cardboard cut slightly smaller than

Evaluate
- ☐ Activity Sheets
- ☐ "What I Know" Self-Check
- ☐ Assorted craft materials to build instruments: glue, tape, paper, scissors, clay, straws, popsicle sticks, empty containers, balloons, cardboard tubes, rice, dried beans, unpopped popcorn, cereal box, variety of rubber bands, variety of metal

Fits Your Schedule

Choose from 4 timeline options, and use the Google Slides and Google Forms versions for a print or digital classroom.


Teaching Timeline Options

Waves

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Option 2: Using Only 5E Unit Plans in Shorter Time Blocks

Day 1	Day 2	Day 3	Day 4	Day 5
Engage Activities (40 minutes)	Explore Activities Parts 1 & 2 30 minutes	Explore Activity Part 3 15 minutes	Explain Activities Part 1 20 minutes	Explain Activity Parts 2 & 3 30 minutes

Day 6	Day 7	Day 8	Day 9
Extend Activities Parts 1 & 2	Extend Activity	Evaluate Activity	Evaluate Activities

TEACHERS LOVE IT!

★★★★★

This resource helped my students gain a clear and deep understanding of waves. They were engaged and really enjoyed this unit.

Natalie R.

★★★★★

This is a great resource for those of us who like science and do not have enough science background to teach it effectively to young children.

Heather Zybas

★★★★★

This is an awesome resource and my students are so engaged and are actually enjoying learning.

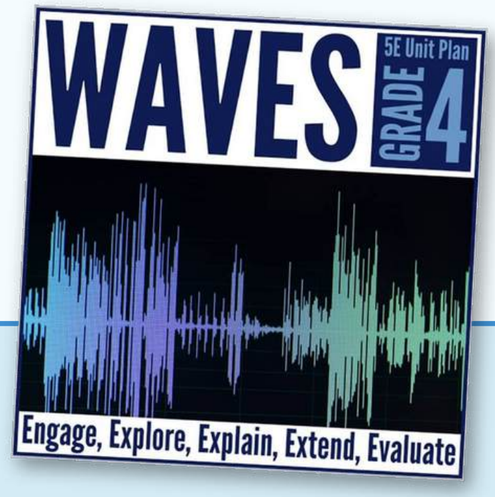
Melissa Guerra





READY FOR YOUR CLASSROOM

- **Instant digital download**
- **Print and use the activities**
- **Google Slides and Forms versions**

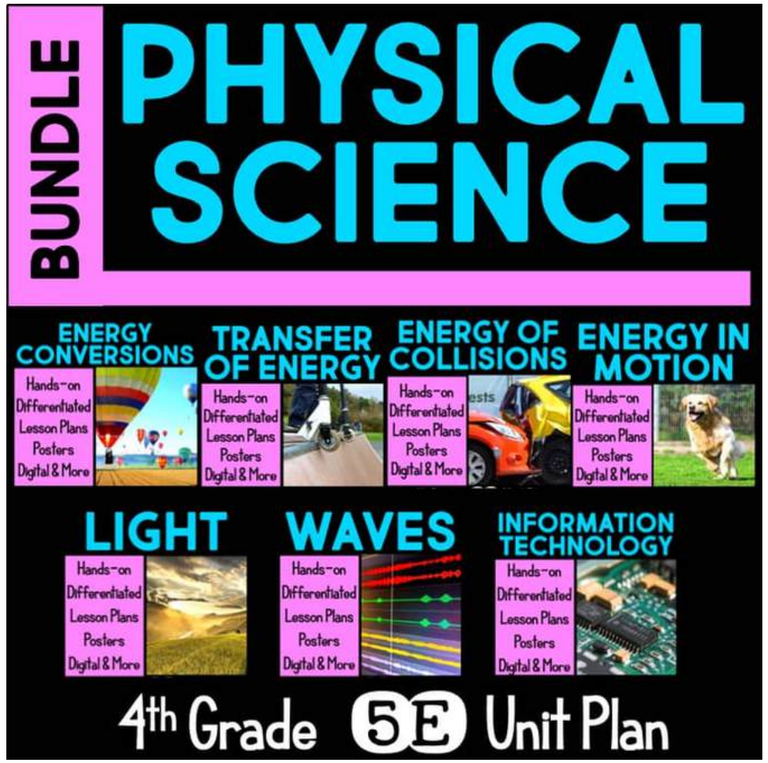


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TOPIC BUNDLE

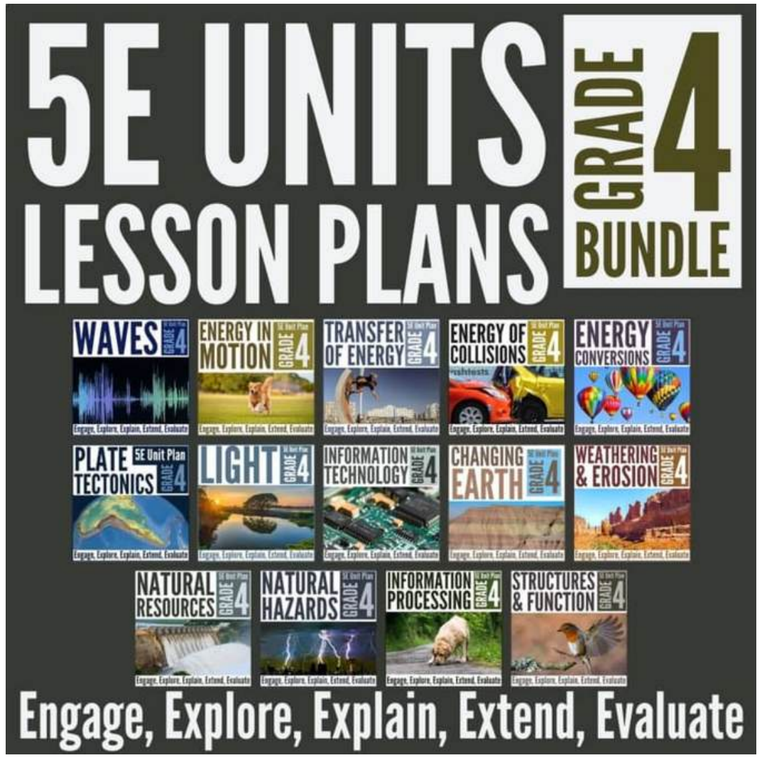
GOOD VALUE



SEE THE BUNDLE

FULL-YEAR BUNDLE

BEST VALUE



SEE THE BUNDLE

My passion is making learning accessible to all students.
I love scaffolding learning, breaking down the concepts and building them up so that students can see the connections.
I love figuring out the small components that build up to the big ideas and helping students see it all.



teach MATH | teach SCIENCE | teach READING | teach WRITING

What I have LEARNED