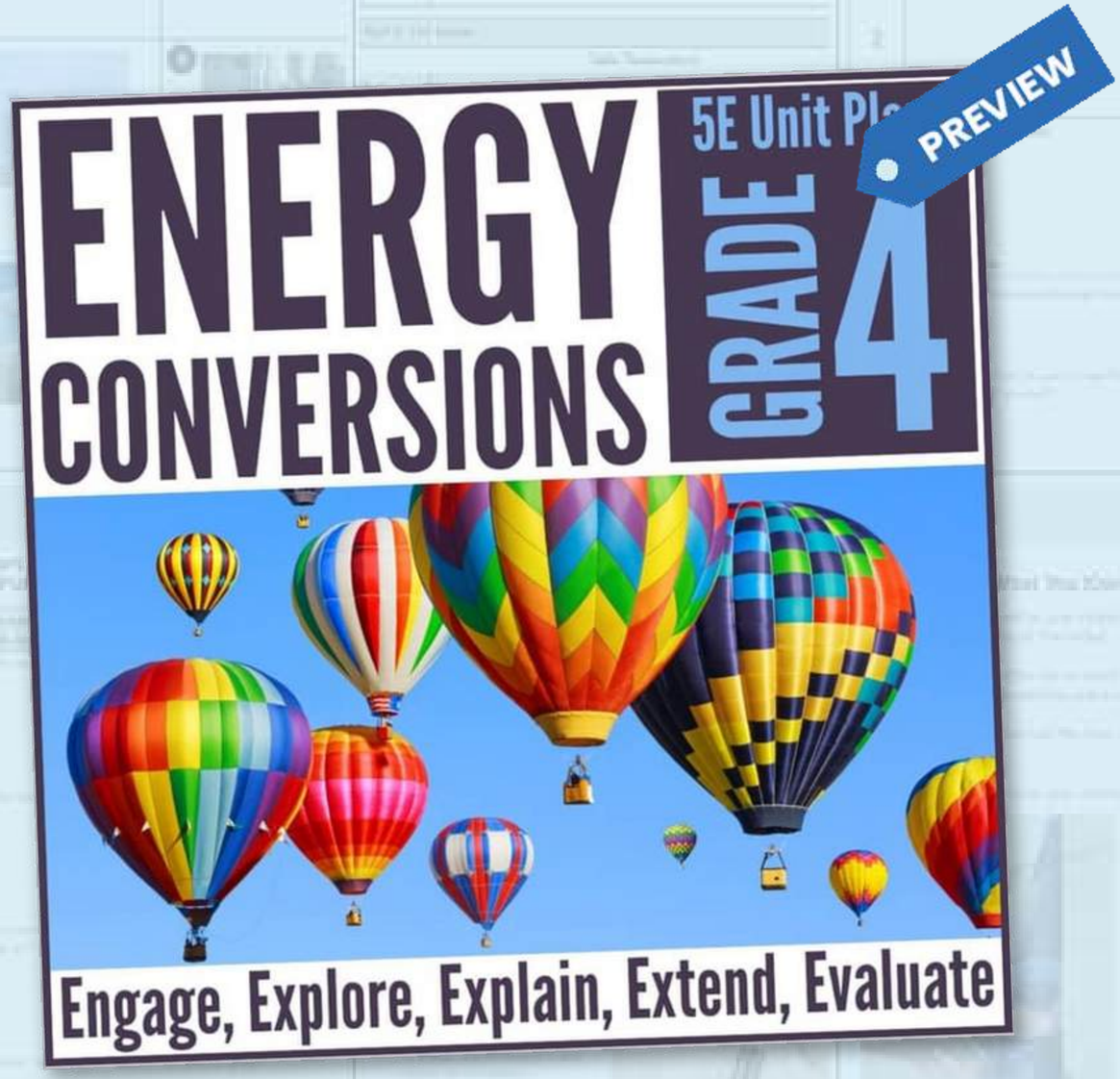


A Complete 5E Science Unit with Lesson Plans

4TH GRADE

ENERGY CONVERSIONS

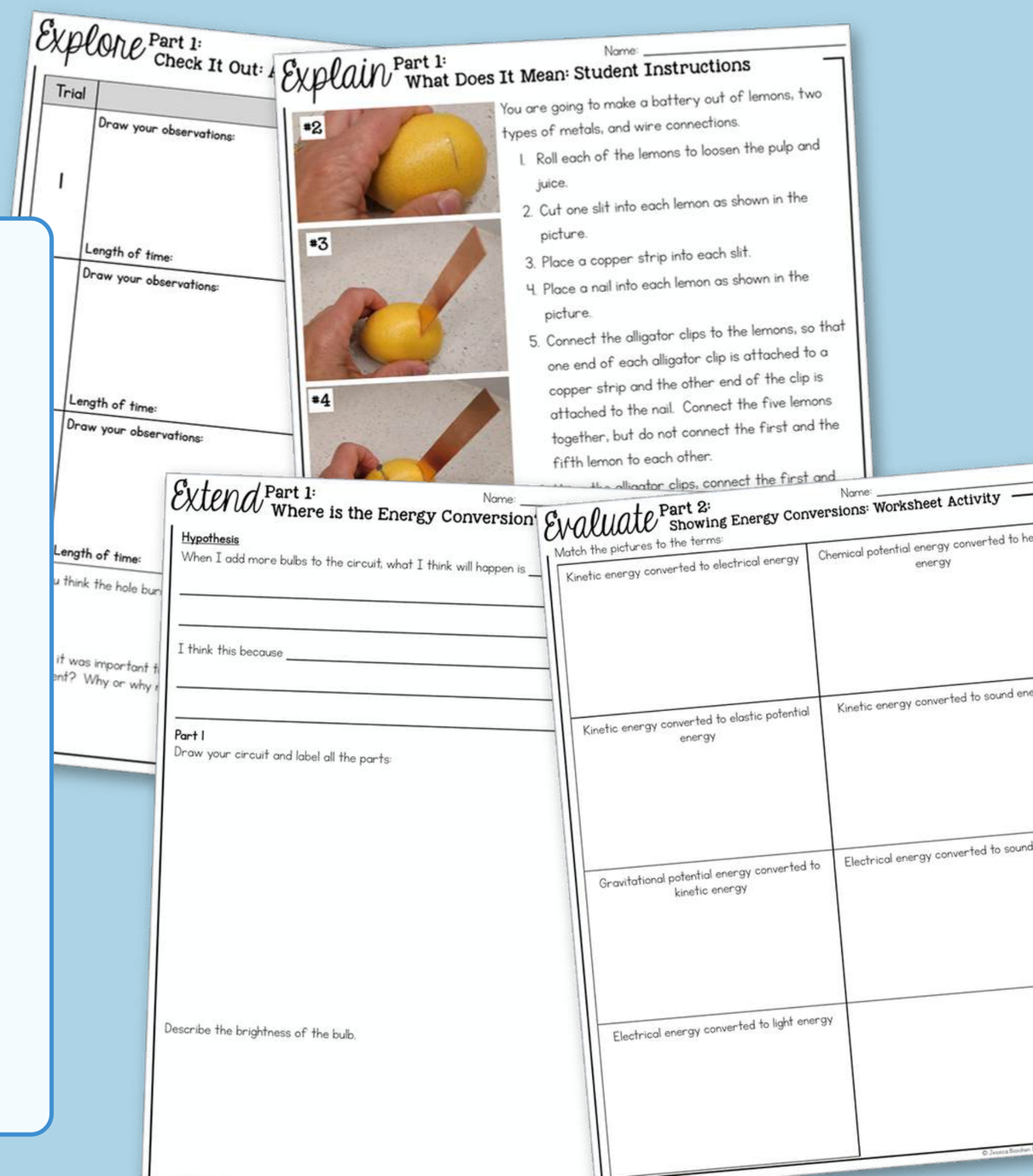
Engage, Explore, Explain, Extend, Evaluate
NGSS 4-PS3-4

KEEP SCROLLING TO SEE WHAT'S INSIDE!

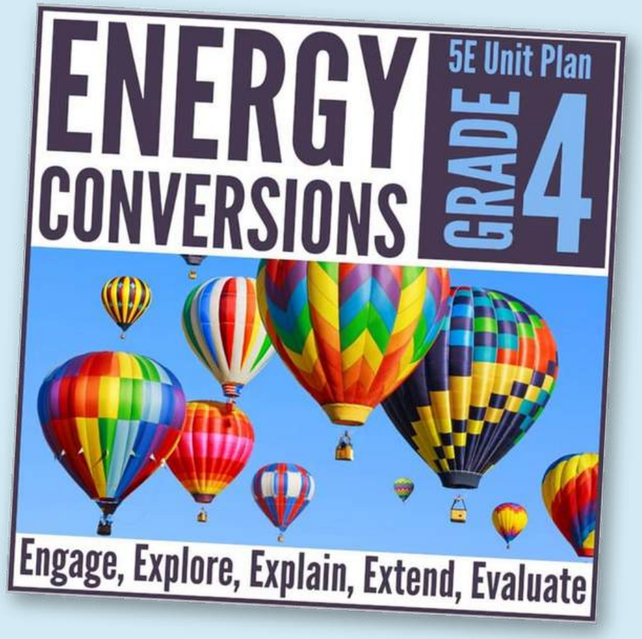
WHAT'S INCLUDED

5E ENERGY CONVERSIONS UNIT

- 210+ Page 5E Unit Plan
- Lesson Plans for All 5 Phases
- Teacher Notes and Misconceptions
- Materials Checklist and 4 Timelines
- Hands-On Energy Investigations
- Reading Passages on Energy Conversions
- 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 burn paper with a magnifying glass, power a bulb with lemons, and launch a stomp rocket.
- Teacher background, lesson plans, and student pages in every phase.
- Aligned to NGSS 4-PS3-4.

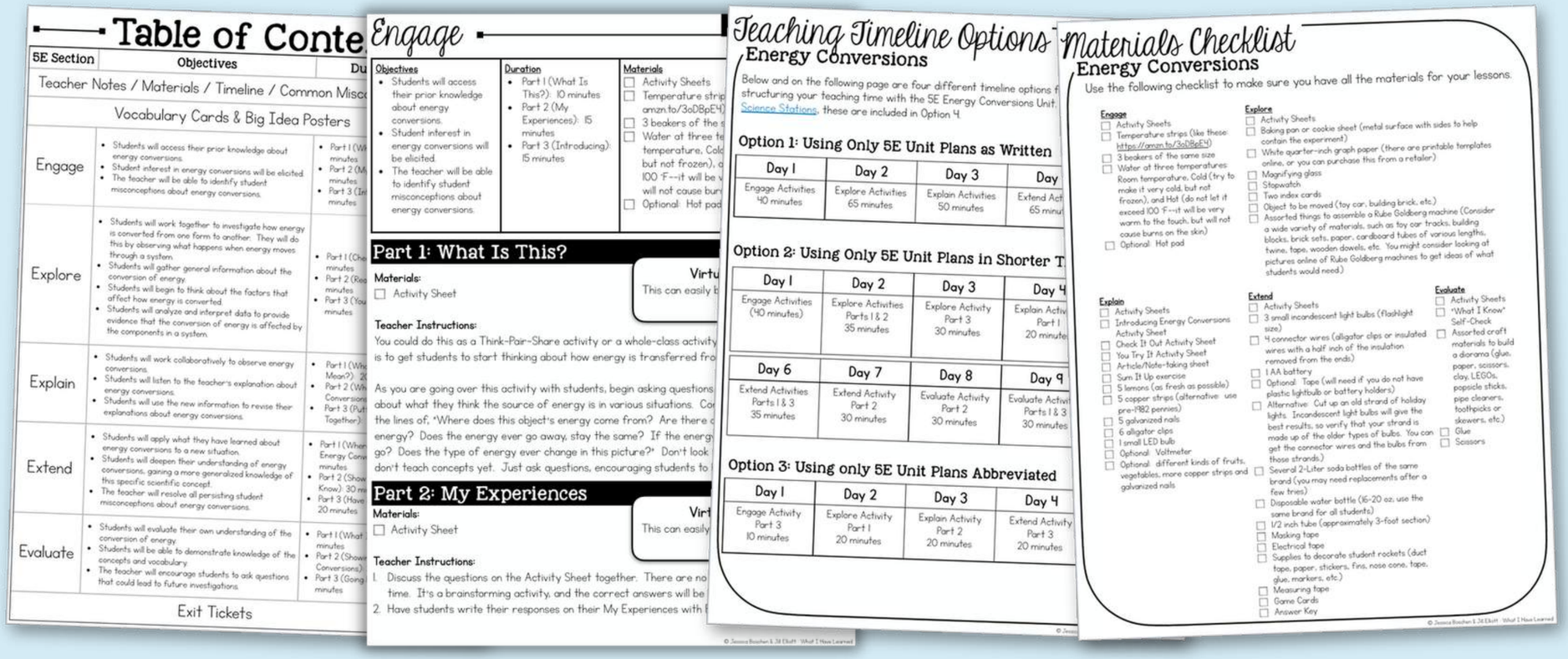
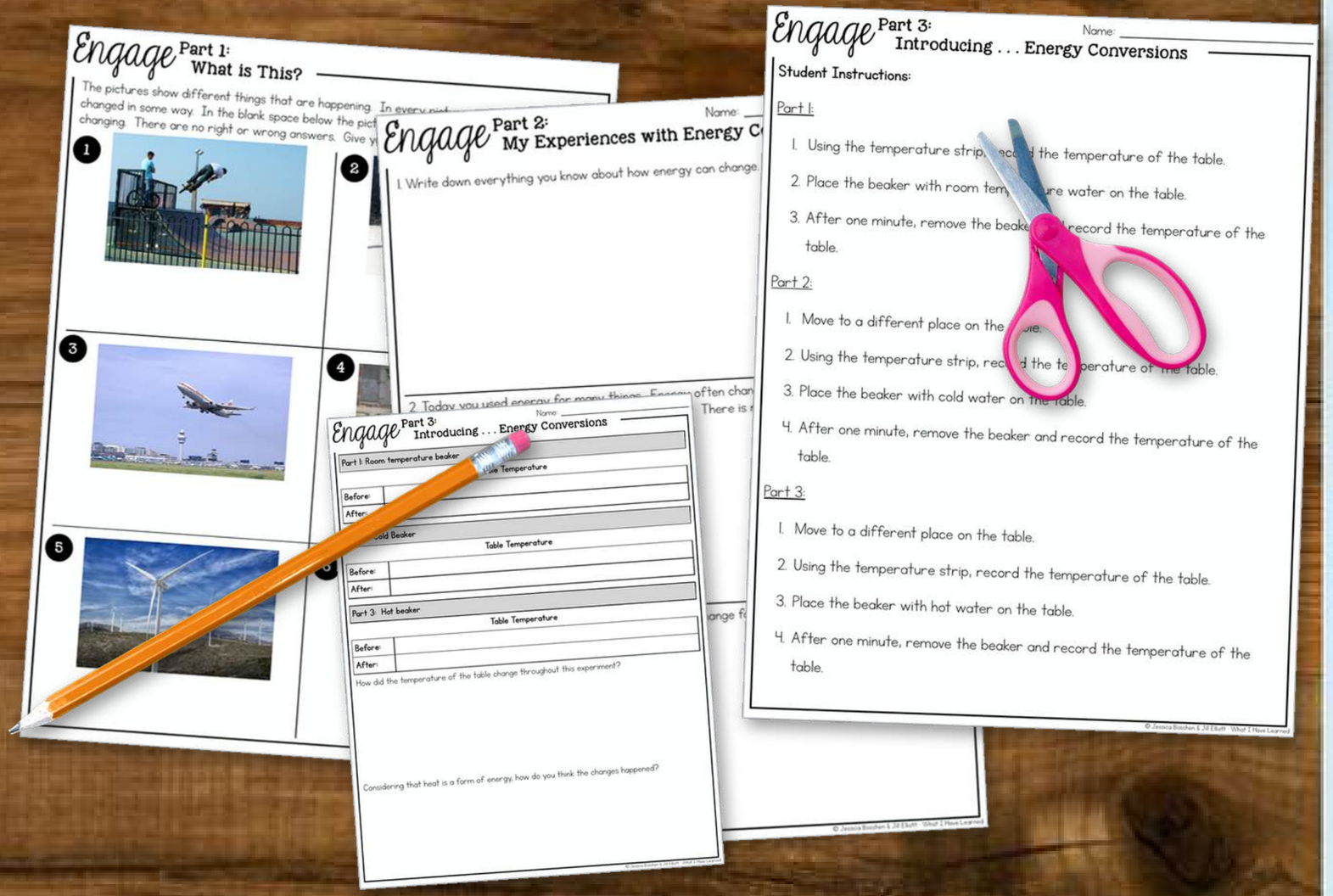


Table of Contents **Teacher Notes** **Timeline Options** **Materials Checklist**

ENGAGE



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

E E E E E

Spark curiosity with hot and cold water

1 What Is This?

Students look at pictures of things changing and tell how energy is changing.

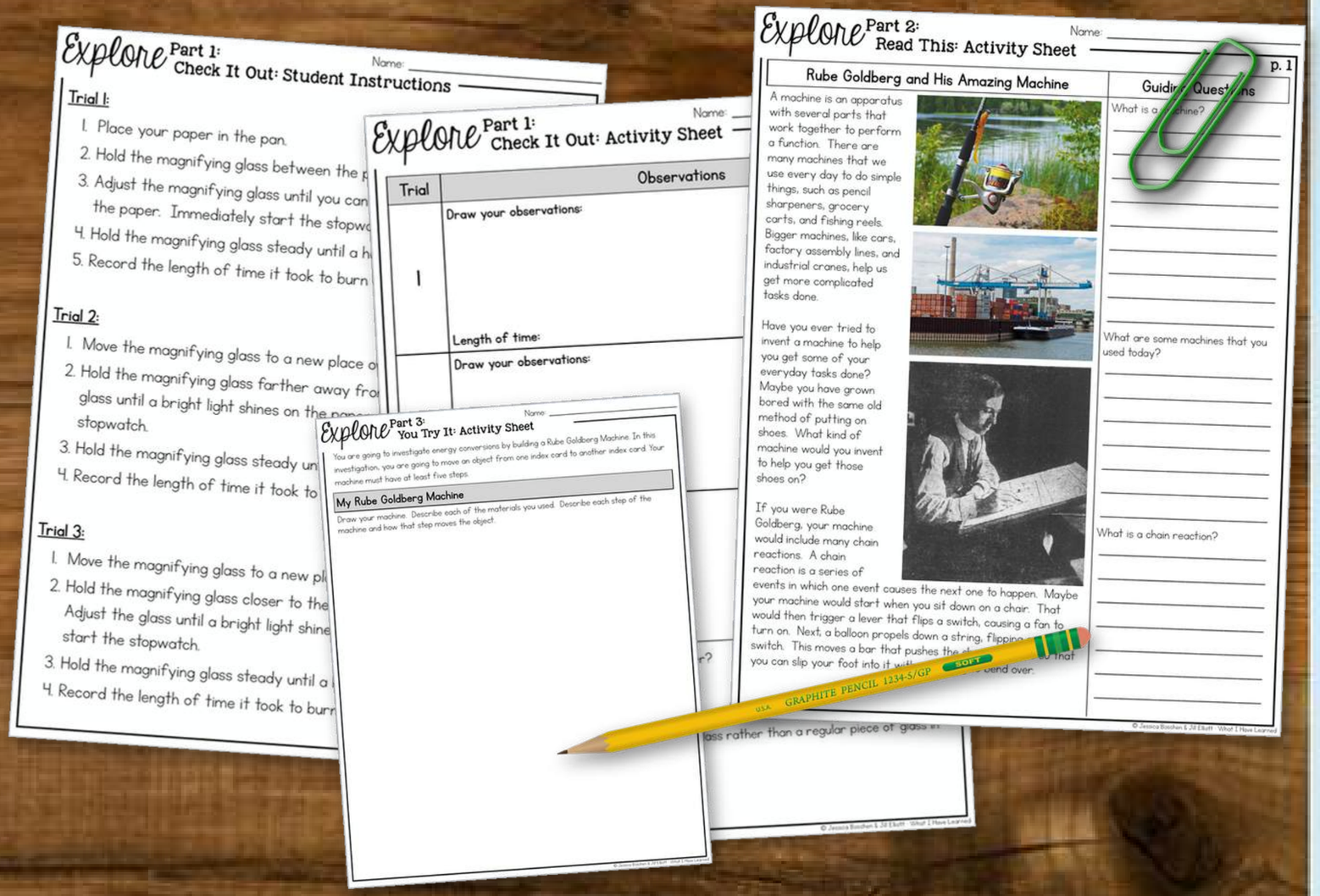
2 My Experiences

Students write what they know about energy changing forms.

3 Introducing Energy Conversions

Students set beakers of room temperature, cold, and hot water on a table and track the temperature.

EXPLORE



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

E E E E E

Investigate how energy changes form

1 Check It Out

Students use a magnifying glass in the sun to burn a hole in paper and time it.

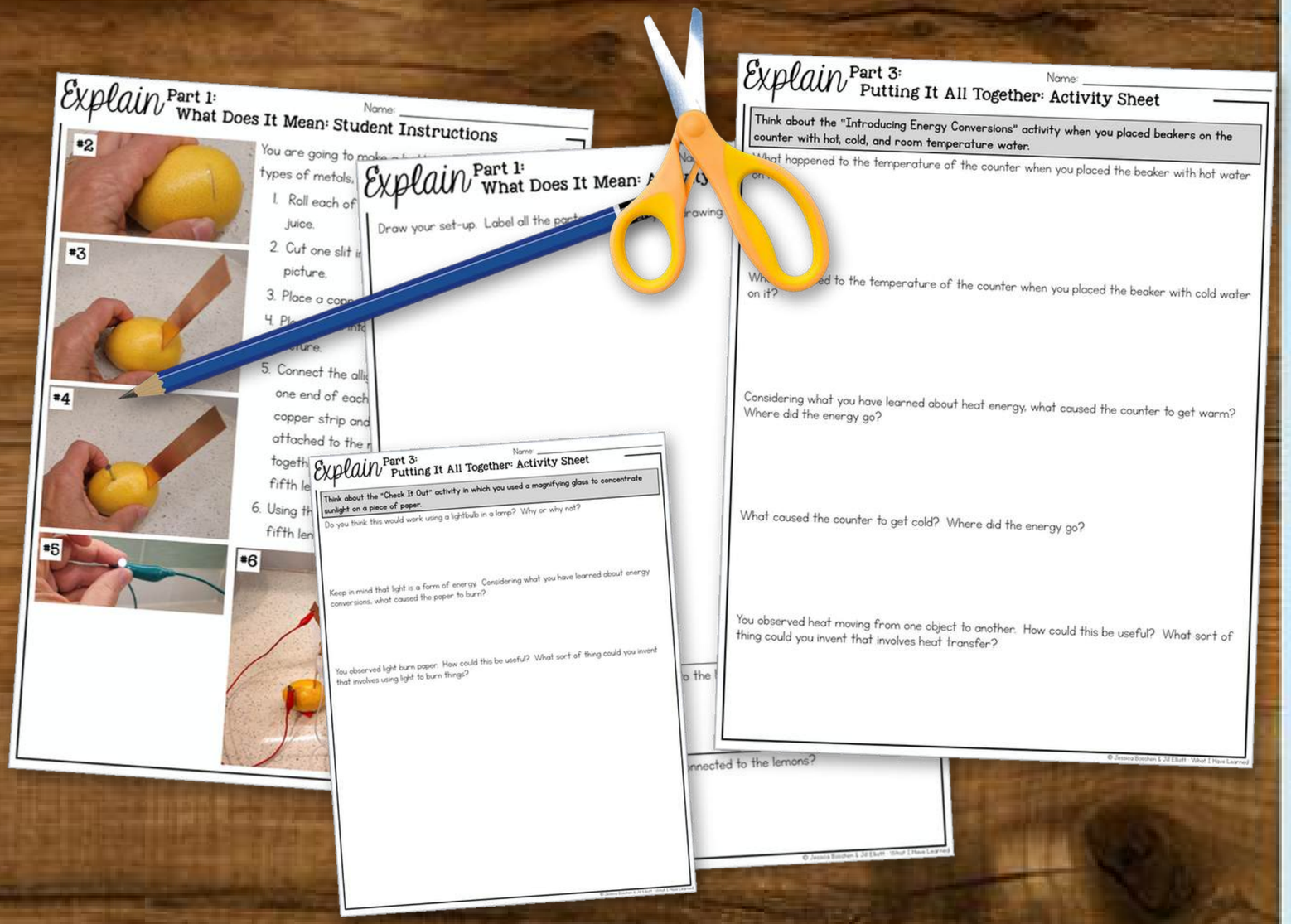
2 Read This

Students read about Rube Goldberg and his amazing machines.

3 You Try It

Students build a Rube Goldberg machine that moves an object from one index card to another.

EXPLAIN



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

E E E E E

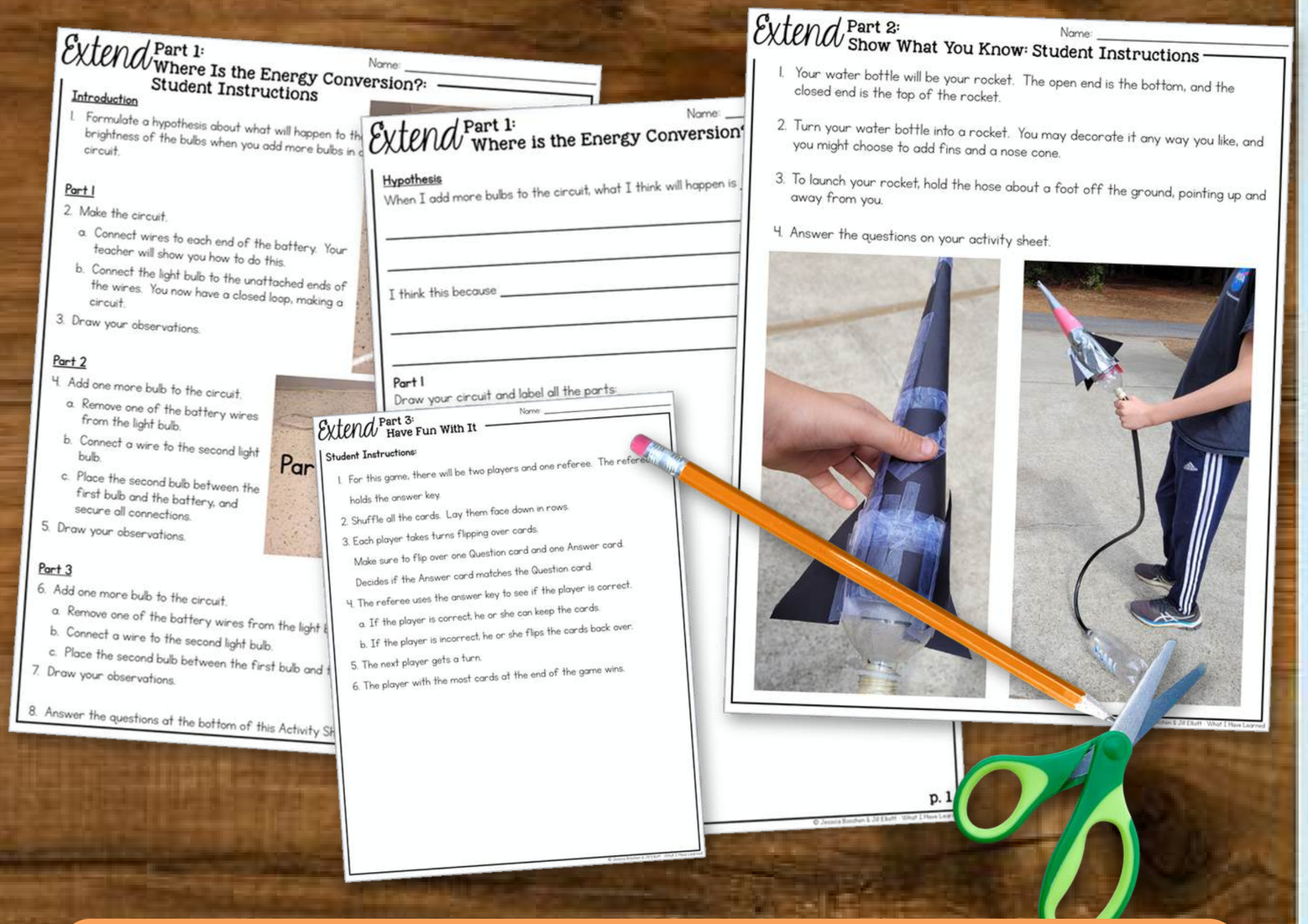
Build explanations from evidence

1 What Does It Mean?
Students build a lemon battery and light an LED bulb.

2 What Are Energy Conversions?
Students read how energy changes form and sum up what they learned.

3 Putting It All Together
Students explain the energy conversions in the hot water and magnifying glass activities.

EXTEND



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

E E E E E

Apply energy conversions to new situations

1

Where Is the Energy Conversion?

Students add light bulbs to a circuit and compare how bright they glow.

2

Show What You Know

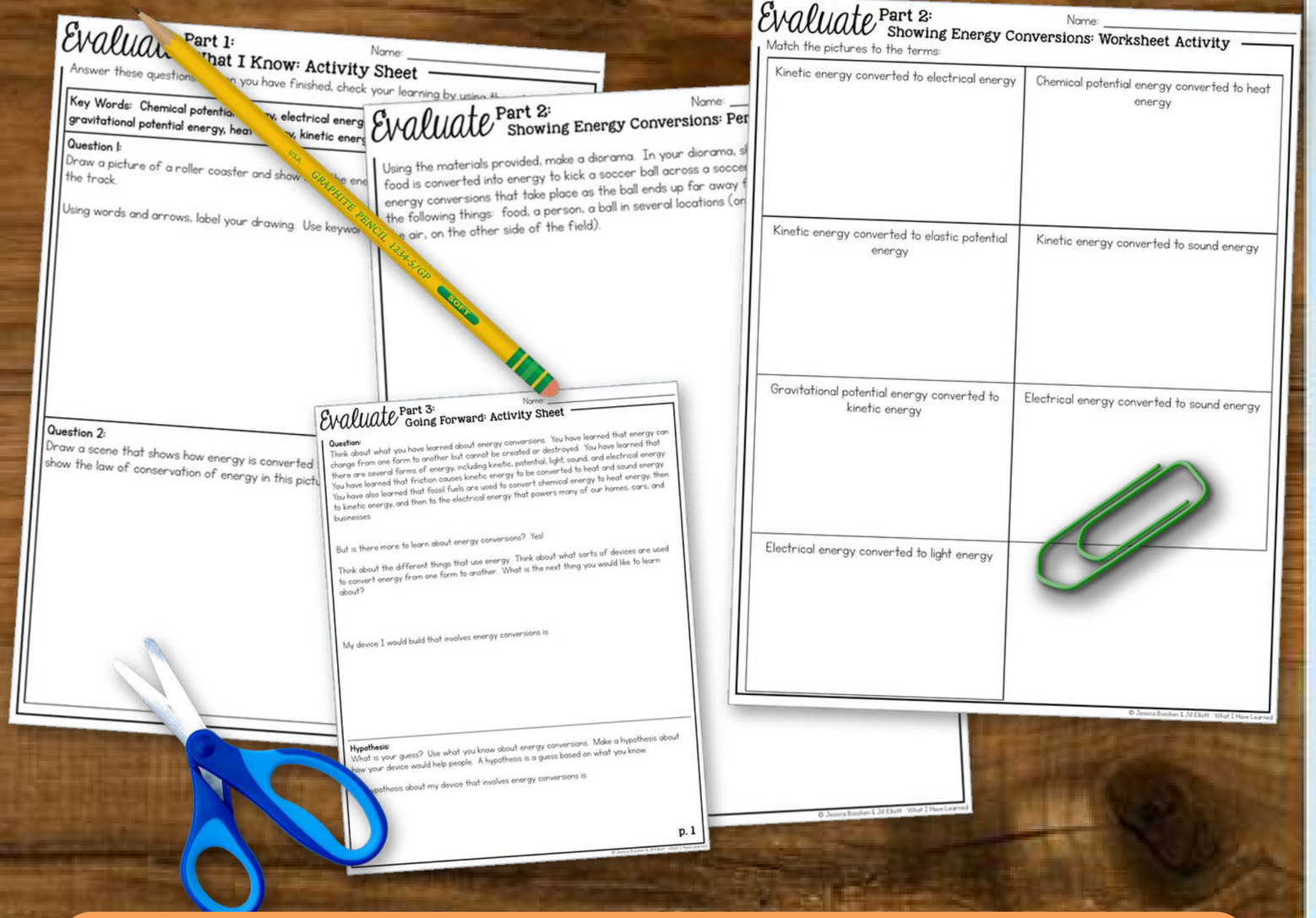
Students build a stomp rocket and measure how far it flies.

3

Have Fun With It

Students play a card game with question and answer cards.

EVALUATE



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

E E E E E

Check understanding with evidence

1 What I Know

Students draw the energy changes on a roller coaster and score themselves with a rubric.

2 Showing Energy Conversions

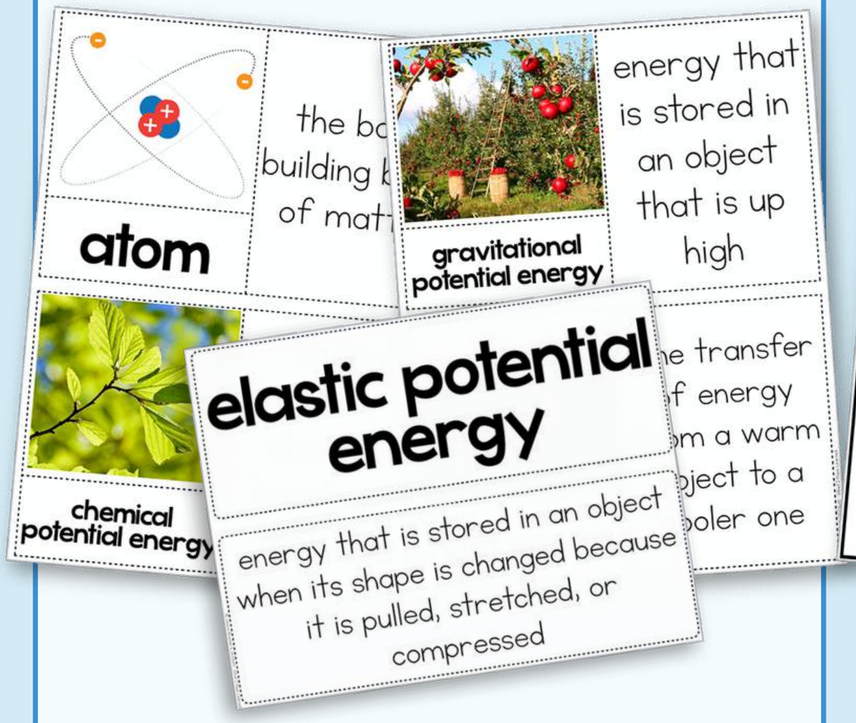
Students build a diorama and match pictures to each energy conversion.

3 Going Forward

Students write a new question and hypothesis about energy conversions.

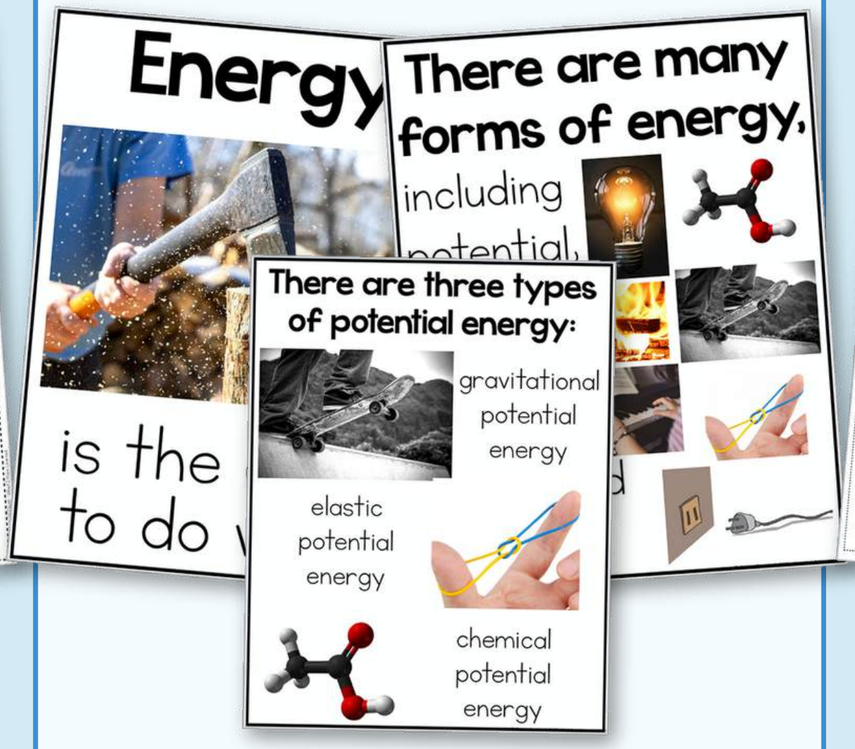
VOCABULARY, POSTERS & EXIT TICKETS

VOCABULARY CARDS



Picture cards and word cards for atom, heat energy, potential energy, and more.

BIG IDEA POSTERS



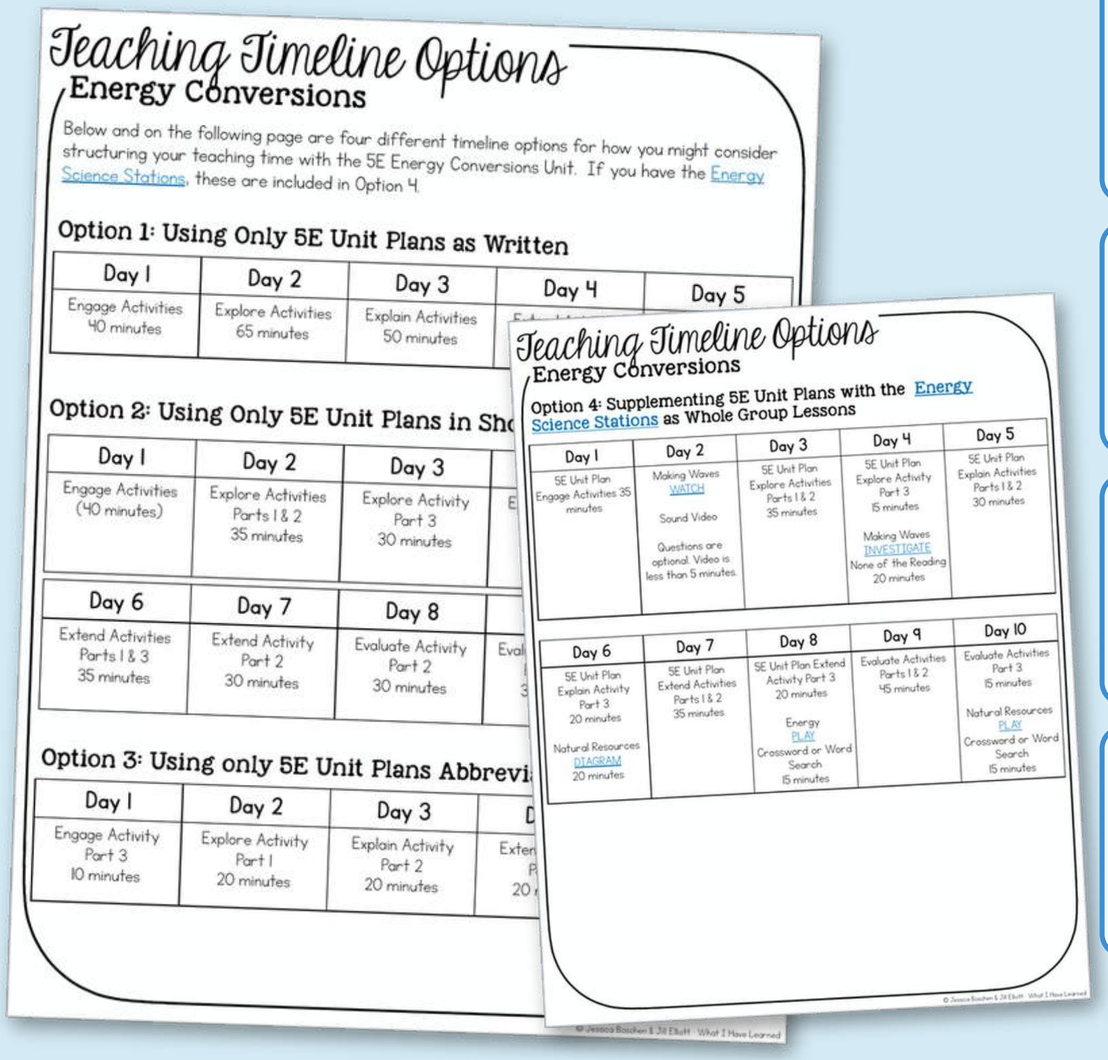
Posters on energy, forms of energy, and types of potential energy.

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

Energy Conversions

Below and on the following page are four different timeline options for how you might consider structuring your teaching time with the 5E Energy Conversions Unit. If you have the Energy 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 65 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 35 minutes	Explore Activity Part 3 30 minutes	

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

Option 3: Using only 5E Unit Plans Abbrevi

Day 1	Day 2	Day 3	
Engage Activity Part 3 10 minutes	Explore Activity Part 1 20 minutes	Explain Activity Part 2 20 minutes	Exten

Teaching Timeline Options

Energy Conversions

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

Day 1	Day 2	Day 3	Day 4	Day 5
5E Unit Plan Engage Activities 35 minutes	Making Waves WATCH Sound Video Questions are optional. Video is less than 5 minutes.	5E Unit Plan Explore Activities Parts 1 & 2 35 minutes	5E Unit Plan Explore Activity Part 3 15 minutes Making Waves INVESTIGATE None of the Reading 20 minutes	5E Unit Plan Explain Activities Parts 1 & 2 30 minutes

Day 6	Day 7	Day 8	Day 9	Day 10
5E Unit Plan Explain Activity Part 3 20 minutes Natural Resources DIAGRAM 20 minutes	5E Unit Plan Extend Activities Parts 1 & 2 35 minutes	5E Unit Plan Extend Activity Part 3 20 minutes Energy PLAY Crossword or Word Search 15 minutes	Evaluate Activities Parts 1 & 2 45 minutes	Evaluate Activities Part 3 15 minutes Natural Resources 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 Energy 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	65 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 & 3**	**Extend 2**	**Evaluate 2**	**Evaluate 1 & 3**
40 min	35 min	30 min	20 min	30 min	35 min	30 min	30 min	30 min

Option 3 — 5 days
Abbreviated

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

Option 4 — 10 days
With Science Stations

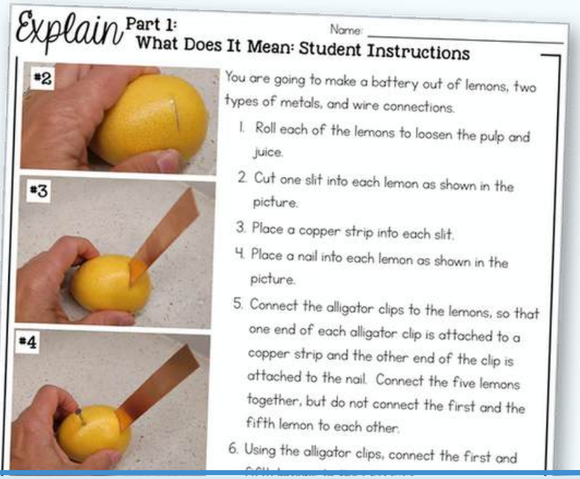
Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
Engage	**Watch**	**Explore 1–2**	**Explore 3**	**Explain 1**	**Explain 2–3**	**Extend 1 & 3**	**Extend 2**	**Evaluate 1–2**	**Evaluate 3**
40 min	5 min	35 min	30 min +20 station	20 min	30 min +20 station	35 min +15 station	30 min	45 min	15 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 light a bulb with lemons and launch a stomp rocket, so energy conversions make sense.


Explain Part 1: What Does It Mean: Student Instructions

Name: _____

#2

#3

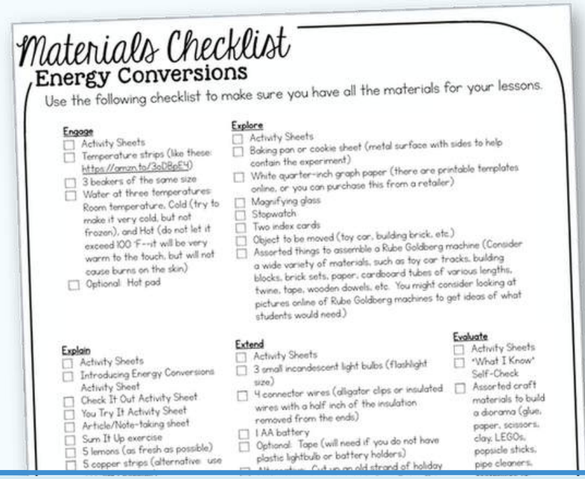
#4

You are going to make a battery out of lemons, two types of metals, and wire connections.

1. Roll each of the lemons to loosen the pulp and juice.
2. Cut one slit into each lemon as shown in the picture.
3. Place a copper strip into each slit.
4. Place a nail into each lemon as shown in the picture.
5. Connect the alligator clips to the lemons, so that one end of each alligator clip is attached to a copper strip and the other end of the clip is attached to the nail. Connect the five lemons together, but do not connect the first and the fifth lemon to each other.
6. Using the alligator clips, connect the first and

Planned and Ready to Teach

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


Materials Checklist

Energy Conversions

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

Engage
- ☐ Activity Sheets
- ☐ Temperature strips (like these: https://amzn.to/3oU8qEN)
- ☐ 3 beakers of the same size
- ☐ Water at three temperatures: Room temperature, Cold (try to make it very cold, but not frozen), and Hot (do not let it exceed 100 °F--it will be very warm to the touch, but will not cause burns on the skin)
- ☐ Optional: Hot pad

Explore
- ☐ Activity Sheets
- ☐ Baking pan or cookie sheet (metal surface with sides to help contain the experiment)
- ☐ White quarter-inch graph paper (there are printable templates online, or you can purchase this from a retailer)
- ☐ Magnifying glass
- ☐ Stopwatch
- ☐ Two index cards
- ☐ Object to be moved (toy car, building brick, etc.)
- ☐ Assorted things to assemble a Rube Goldberg machine (Consider a wide variety of materials, such as toy car tracks, building blocks, brick sets, paper, cardboard tubes of various lengths, twine, tape, wooden dowels, etc. You might consider looking at pictures online of Rube Goldberg machines to get ideas of what students would need.)

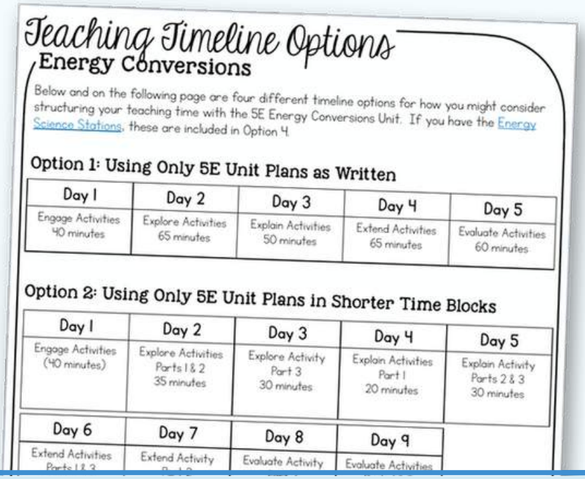
Explain
- ☐ Activity Sheets
- ☐ Introducing Energy Conversions Activity Sheet
- ☐ Check It Out Activity Sheet
- ☐ You Try It Activity Sheet
- ☐ Article/Note-taking sheet
- ☐ Sum It Up exercise
- ☐ 5 lemons (as fresh as possible)
- ☐ 5 copper strips (alternative: use

Extend
- ☐ Activity Sheets
- ☐ 3 small incandescent light bulbs (flashlight size)
- ☐ 4 connector wires (alligator clips or insulated wires with a half inch of the insulation removed from the ends)
- ☐ 1 AA battery
- ☐ Optional: Tape (will need if you do not have plastic lightbulb or battery holders)

Evaluate
- ☐ Activity Sheets
- ☐ "What I Know" Self-Check
- ☐ Assorted craft materials to build a diorama (glue, paper, scissors, clay, LEGOs, popsicle sticks, pipe cleaners,

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

Energy Conversions

Below and on the following page are four different timeline options for how you might consider structuring your teaching time with the 5E Energy Conversions Unit. If you have the Energy 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 65 minutes	Explain Activities 50 minutes	Extend Activities 65 minutes	Evaluate Activities 60 minutes

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 35 minutes	Explore Activity Part 3 30 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!

★★★★★

My students love the format of these lessons! They are easy to implement and very engaging.

Jayne M.



★★★★★

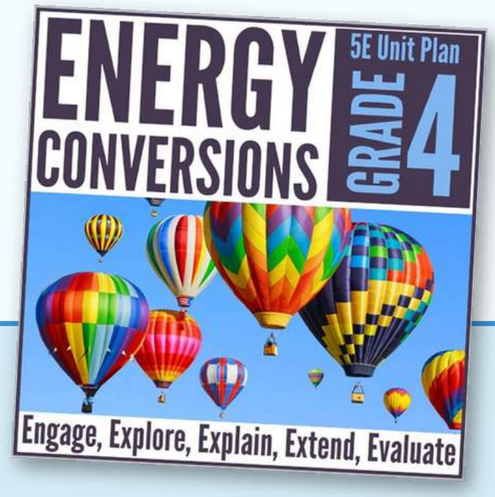
Great practice resource for my 5th grade students to use.

N T



READY FOR YOUR CLASSROOM

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



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Save with a topic bundle or the full-year bundle.

TOPIC BUNDLE

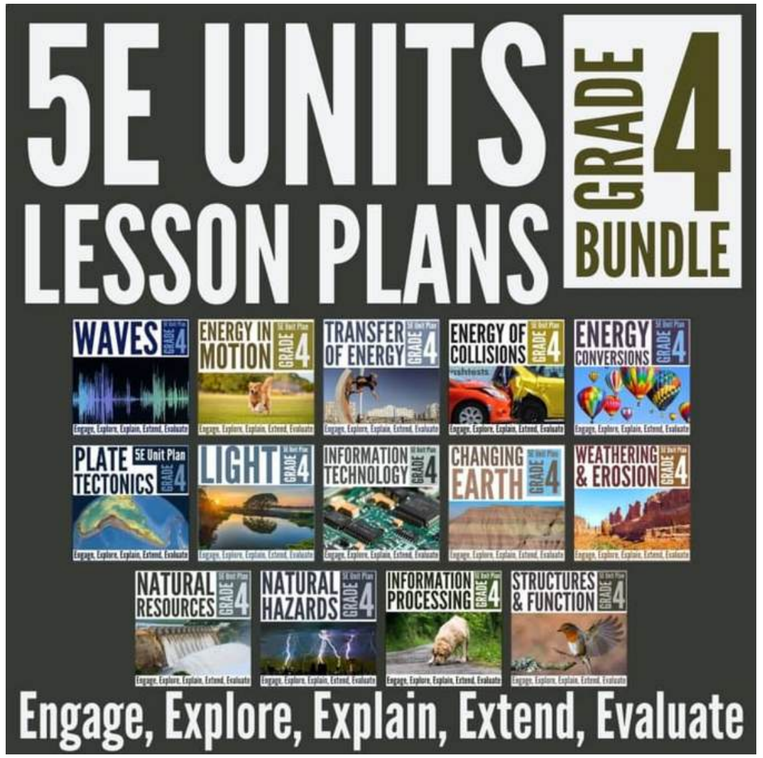
GOOD VALUE



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