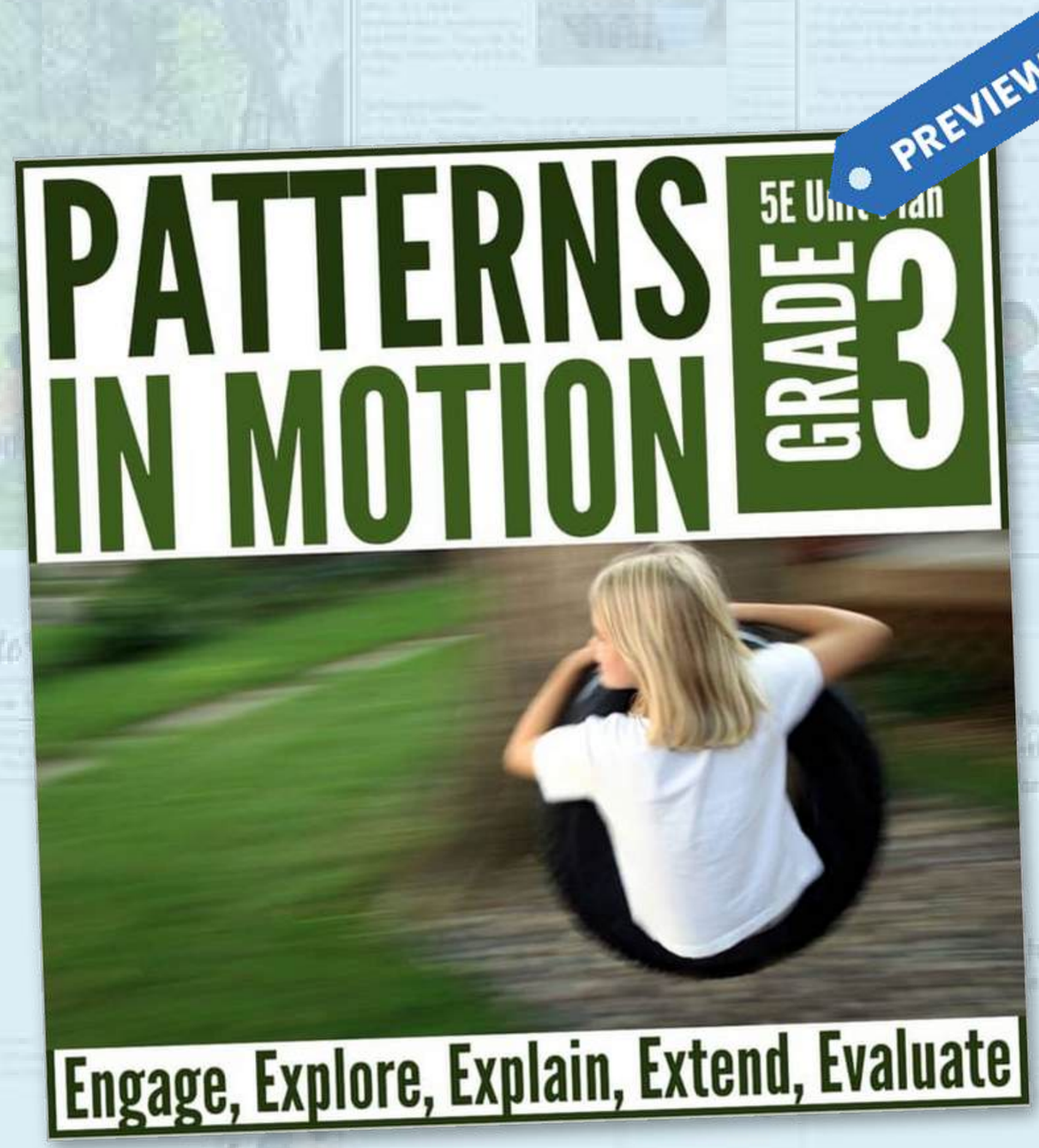


3RD GRADE

A Complete 5E Science Unit with Lesson Plans

PATTERNS IN MOTION

Engage, Explore, Explain, Extend, Evaluate NGSS 3-PS2-2

KEEP SCROLLING TO SEE WHAT'S INSIDE!

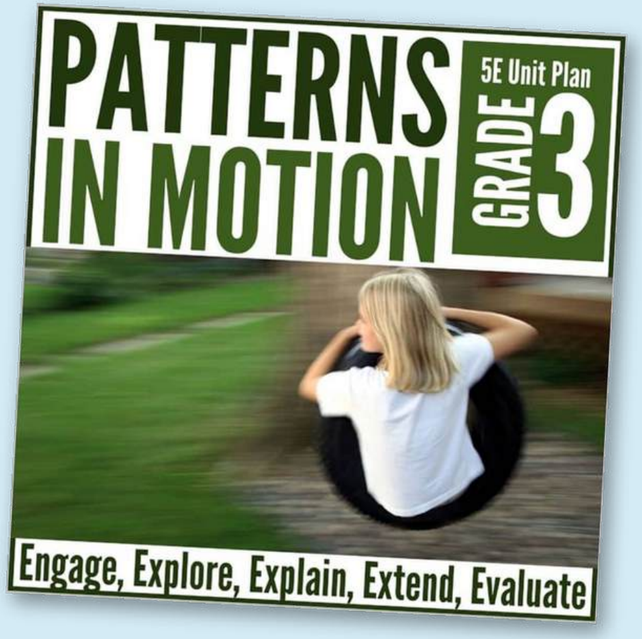
WHAT'S INCLUDED

5E PATTERNS IN MOTION UNIT

- 144-Page 5E Unit Plan
- Lesson Plans for All 5 Phases
- Teacher Notes and Misconceptions
- Materials Checklist and 4 Timelines
- Student Activity Sheets and Article
- Reading Passage in 3 Formats
- Vocabulary Cards and 5 Big Idea Posters
- 7 Exit Tickets in 3 Formats
- Performance Assessment and Review Game
- Answer Keys for Student Pages
- Free Digital Upgrade for Google



UNIT AT A GLANCE



- Students investigate patterns in motion and use them to predict what happens next.
- Teacher background, lesson plans, and student pages in every phase.
- Aligned to NGSS 3-PS2-2.

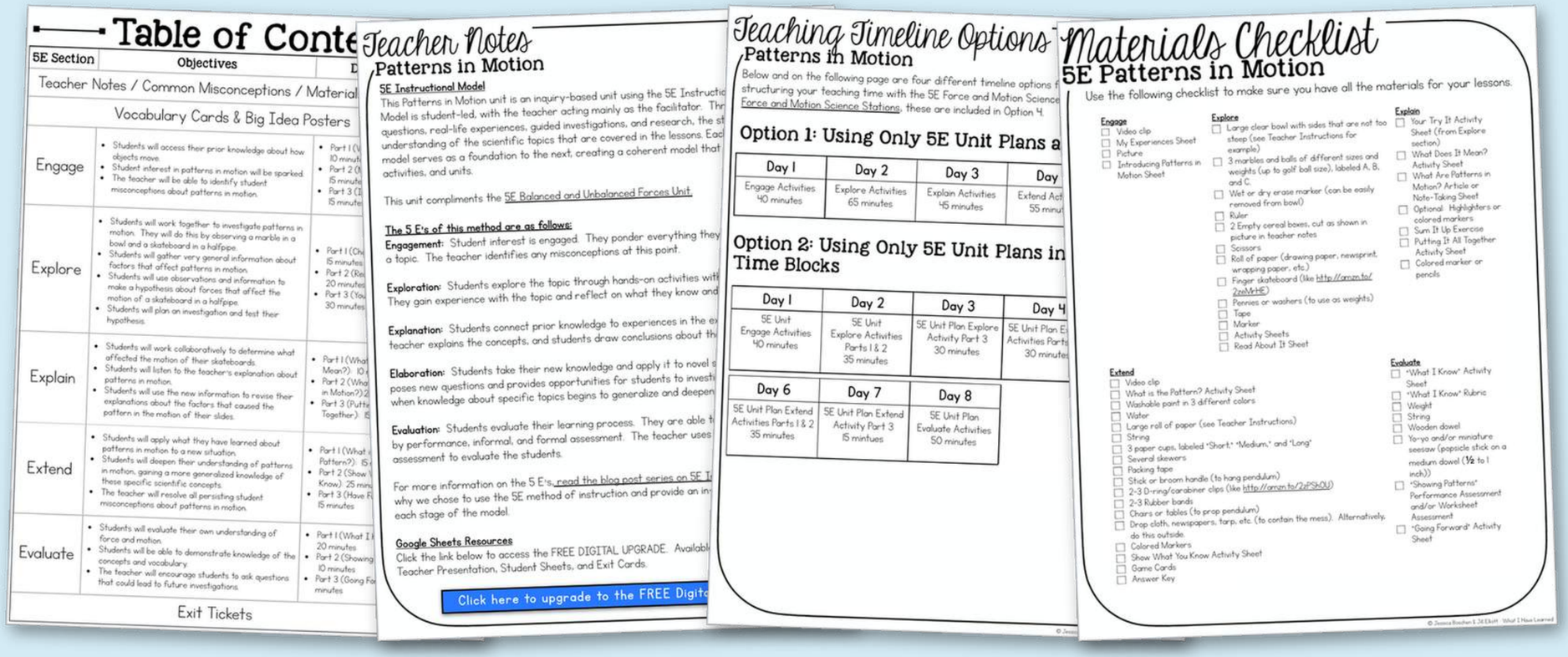


Table of Contents | **Teacher Notes** | **Timeline Options** | **Materials Checklist**

ENGAGE



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

E E E E E

Spark curiosity and uncover misconceptions

1 What Is This?

Students look at a photo of a child on a swing and predict what the next picture will show.

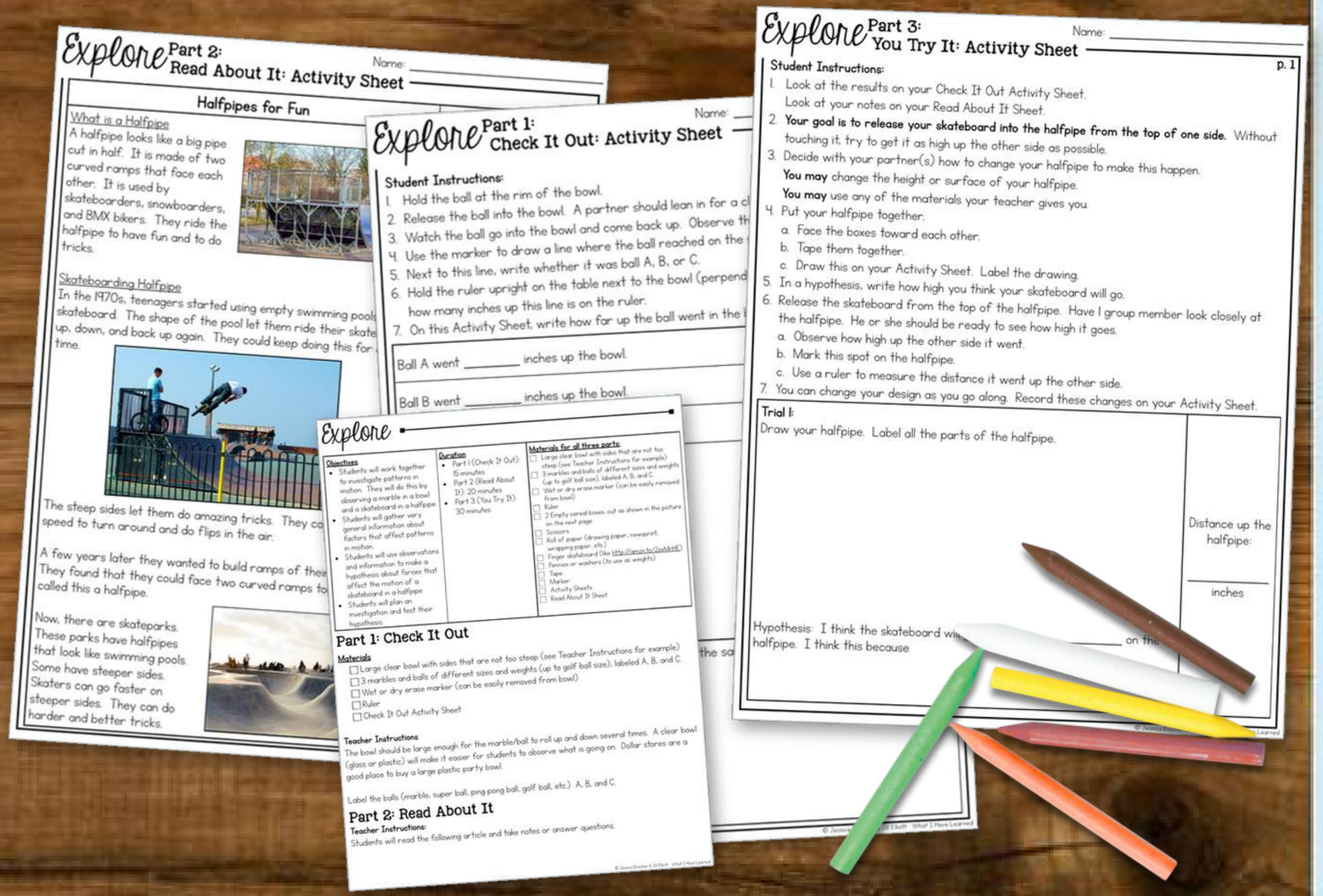
2 My Experiences

Students watch a skateboarding video and describe what made the skateboarder move.

3 Introducing Patterns in Motion

Students brainstorm what they already know about patterns in motion on a mind map.

EXPLORE



Teacher background, lesson plans, student sheets, and teacher reflection

E E E E E

Investigate motion with marbles and halfpipes

1 Check It Out

Students release balls into a bowl, measure how high each one goes, and record what happens.

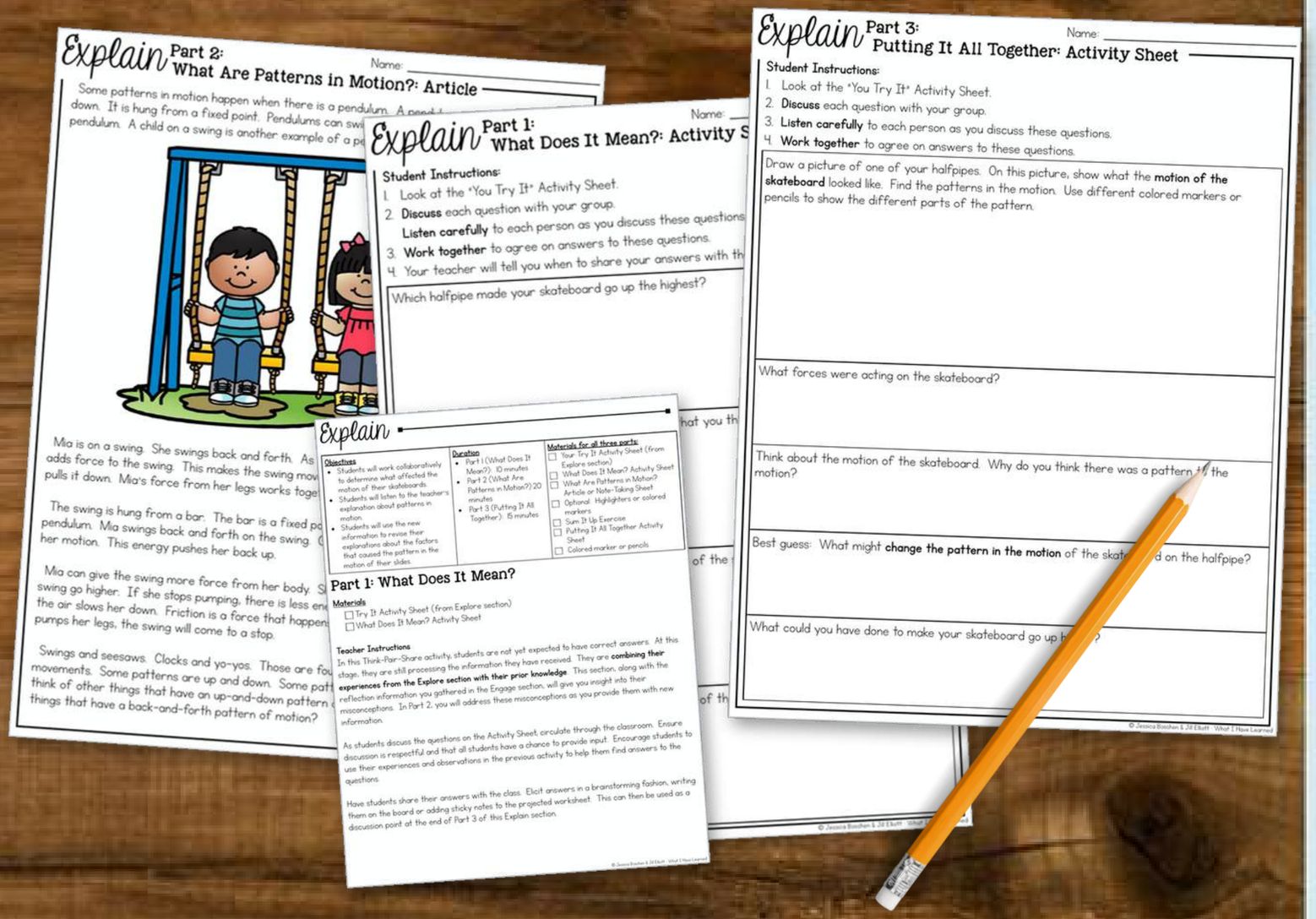
2 Read About It

Students read about halfpipes and record notes on the Read About It sheet.

3 You Try It

Students build a halfpipe from cereal boxes, test a finger skateboard, and change one factor.

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 think, pair, and share what affected the motion of their skateboards.

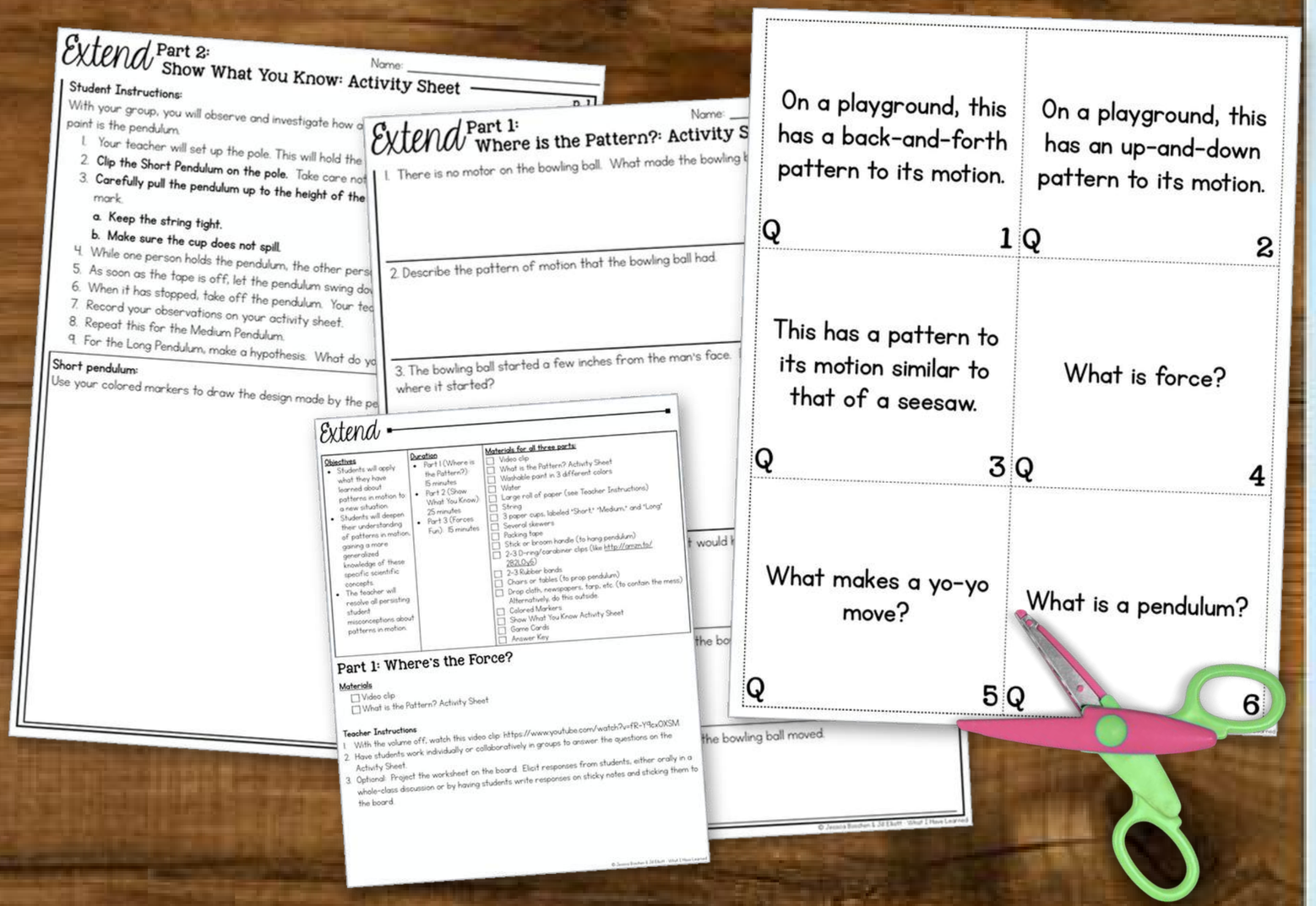
2 What Are Patterns in Motion?

Students read an article about a yo-yo, a clock, and a swing, with three formats to choose from.

3 Putting It All Together

Students revise their explanations of what caused the pattern in their halfpipe motion.

EXTEND



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

E E E E E

Apply patterns to new situations

1 Where Is the Pattern?

Students watch a bowling ball pendulum video and describe the pattern, gravity, and friction.

2 Show What You Know

Students release paint-filled pendulums of three lengths and compare the patterns they leave.

3 Have Fun With It

Students play a Concentration-style review game to match questions and answers.

EVALUATE



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

E E E E E

Check understanding with evidence

1 What I Know

Students describe patterns in photos using the vocabulary, then score themselves with a rubric.

2 Showing Patterns

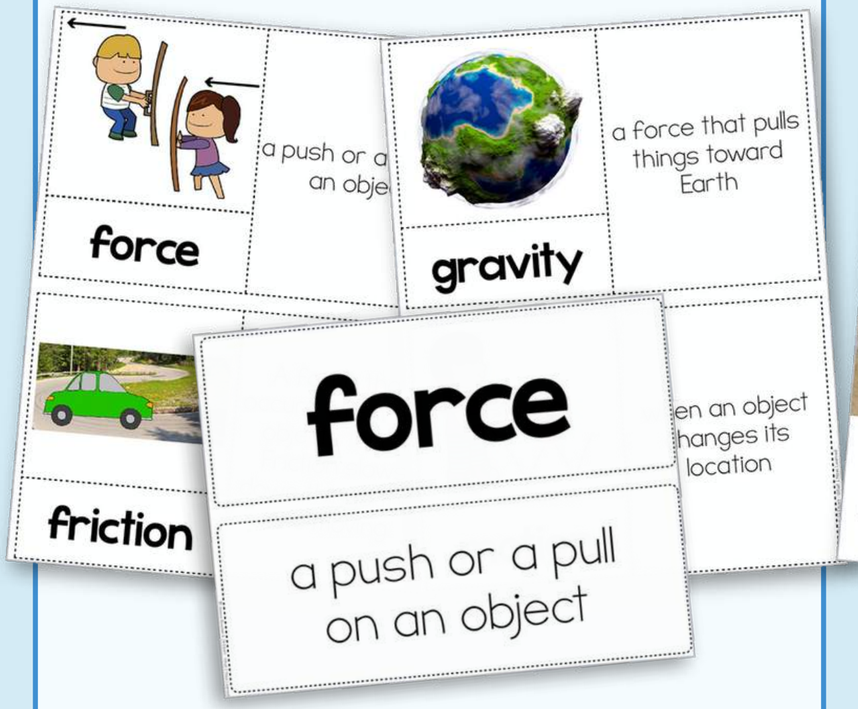
Students show patterns with a pendulum, yo-yo, or seesaw in a performance or worksheet assessment.

3 Going Forward

Students write a new question and hypothesis and plan an experiment.

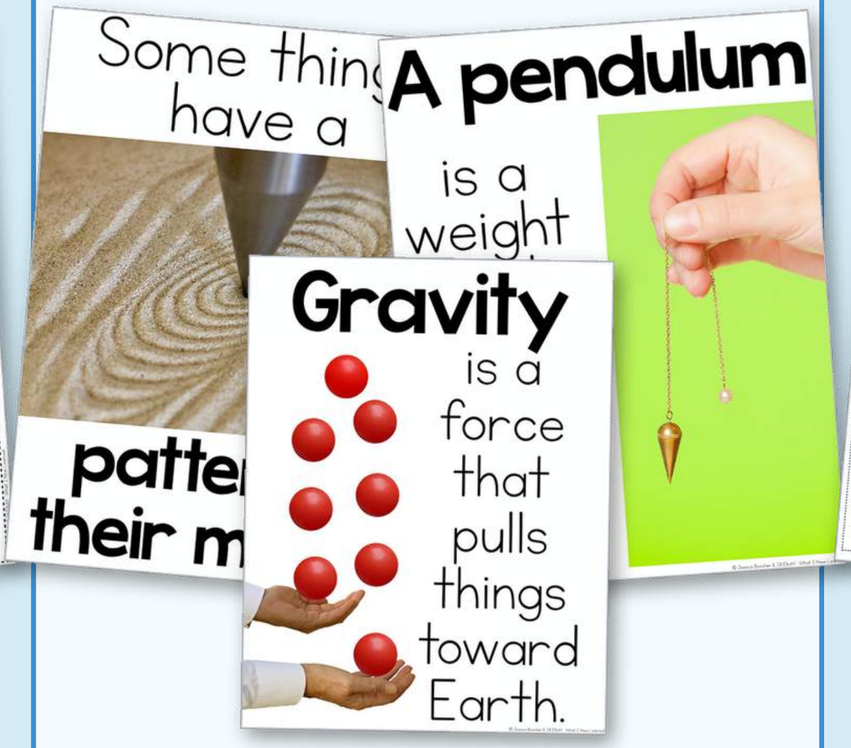
VOCABULARY, POSTERS & EXIT TICKETS

VOCABULARY CARDS



Picture cards and word cards for force, friction, gravity, and motion.

BIG IDEA POSTERS



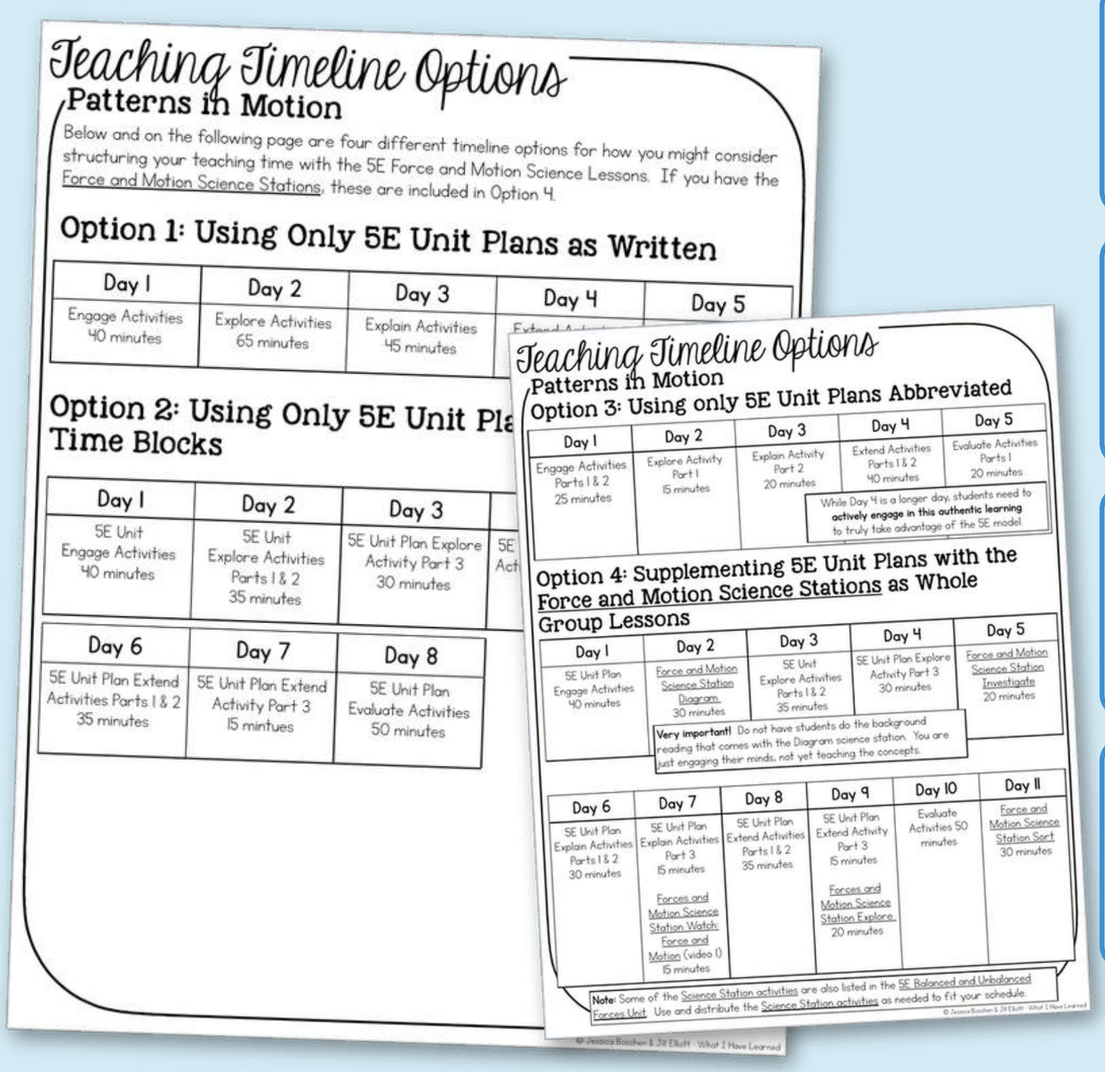
Five posters on force, patterns in motion, pendulums, friction, and gravity.

EXIT TICKETS



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

WAYS TO USE IN YOUR CLASSROOM



Teaching Timeline Options

Patterns in Motion

Below and on the following page are four different timeline options for how you might consider structuring your teaching time with the 5E Force and Motion Science Lessons. If you have the Force and Motion 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 45 minutes		

Option 2: Using Only 5E Unit Pla
Time Blocks

Day 1	Day 2	Day 3	
5E Unit Engage Activities 40 minutes	5E Unit Explore Activities Parts 1 & 2 35 minutes	5E Unit Plan Explore Activity Part 3 30 minutes	5E Act

Day 6	Day 7	Day 8
5E Unit Plan Extend Activities Parts 1 & 2 35 minutes	5E Unit Plan Extend Activity Part 3 15 mintues	5E Unit Plan Evaluate Activities 50 minutes

Teaching Timeline Options

Patterns in Motion

Option 3: Using only 5E Unit Plans Abbreviated

Day 1	Day 2	Day 3	Day 4	Day 5
Engage Activities Parts 1 & 2 25 minutes	Explore Activity Part 1 15 minutes	Explain Activity Part 2 20 minutes	Extend Activities Parts 1 & 2 40 minutes	Evaluate Activities Parts 1 20 minutes

While Day 4 is a longer day, students need to **actively engage in this authentic learning** to truly take advantage of the 5E model.

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

Day 1	Day 2	Day 3	Day 4	Day 5
5E Unit Plan Engage Activities 40 minutes	Force and Motion Science Station Diagram. 30 minutes	5E Unit Explore Activities Parts 1 & 2 35 minutes	5E Unit Plan Explore Activity Part 3 30 minutes	Force and Motion Science Station Investigate 20 minutes

Very important! Do not have students do the background reading that comes with the Diagram science station. You are just engaging their minds, not yet teaching the concepts.

Day 6	Day 7	Day 8	Day 9	Day 10	Day 11
5E Unit Plan Explain Activities Parts 1 & 2 30 minutes	5E Unit Plan Explain Activities Part 3 15 minutes Forces and Motion Science Station Watch: Force and Motion (video 1) 15 minutes	5E Unit Plan Extend Activities Parts 1 & 2 35 minutes	5E Unit Plan Extend Activity Part 3 15 minutes Forces and Motion Science Station Explore. 20 minutes	Evaluate Activities 50 minutes	Force and Motion Science Station Sort 30 minutes

Note: Some of the Science Station activities are also listed in the 5E Balanced and Unbalanced Forces Unit. Use and distribute the Science Station activities as needed to fit your schedule.

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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 8 days in shorter time blocks when science minutes are limited.

3 Alongside Science Stations

Add the Force and Motion Science Stations for an 11-day plan.

4 Formative Checks

Use the 7 exit tickets throughout the unit to see who needs reteaching before the performance assessment.

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	45 min	55 min	50 min

Option 2 — 8 days
Shorter Time Blocks

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8
Engage	**Explore 1-2**	**Explore 3**	**Explain 1-2**	**Explain 3**	**Extend 1-2**	**Extend 3**	**Evaluate**
40 min	35 min	30 min	30 min	15 min	35 min	15 min	50 min

Option 3 — 5 days
Abbreviated

Day 1	Day 2	Day 3	Day 4	Day 5
Engage 1-2	**Explore 1**	**Explain 2**	**Extend 1-2**	**Evaluate 1**
25 min	15 min	20 min	40 min	20 min

Option 4 — 11 days
With Science Stations

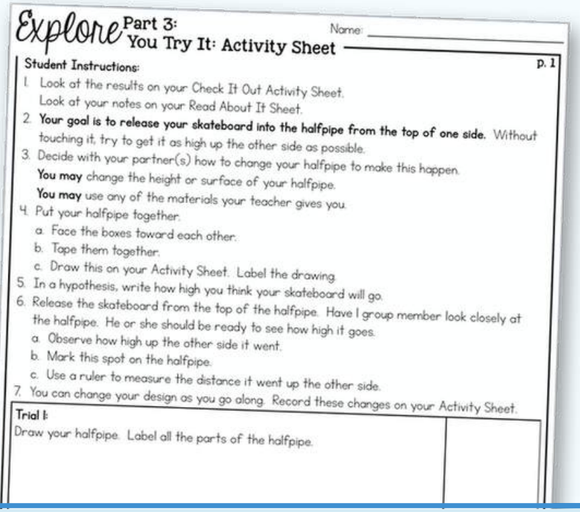
Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11
Engage	**Diagram**	**Explore 1-2**	**Explore 3**	**Investigate**	**Explain 1-2**	**Explain 3**	**Extend 1-2**	**Extend 3**	**Evaluate**	**Sort**
40 min	30 min	35 min	30 min	20 min	30 min	15 min +15 video	35 min	15 min +20 station	50 min	30 min

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

YOU WILL LOVE THIS BECAUSE

Students Build the Ideas Themselves

Students roll, release, and predict with marbles, halfpipes, and pendulums, so patterns in motion make sense through evidence.



Explore Part 3: You Try It: Activity Sheet

Name: _____

p. 1

Student Instructions:

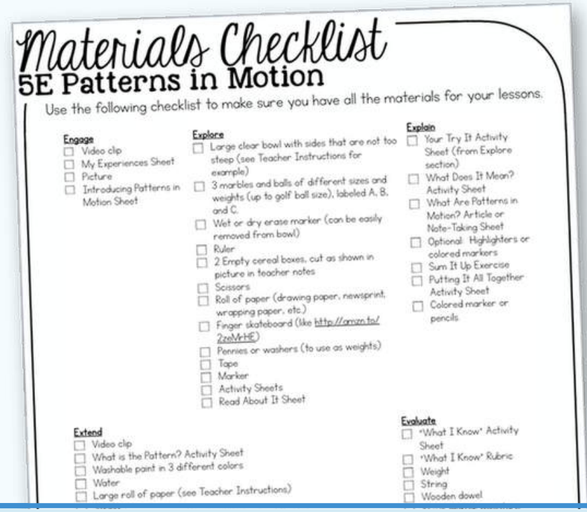
1. Look at the results on your Check It Out Activity Sheet.
   Look at your notes on your Read About It Sheet.
2. **Your goal is to release your skateboard into the halfpipe from the top of one side.** Without touching it, try to get it as high up the other side as possible.
3. Decide with your partner(s) how to change your halfpipe to make this happen.
   You may change the height or surface of your halfpipe.
   You may use any of the materials your teacher gives you.
4. Put your halfpipe together.
   a. Face the boxes toward each other.
   b. Tape them together.
   c. Draw this on your Activity Sheet. Label the drawing.
5. In a hypothesis, write how high you think your skateboard will go.
6. Release the skateboard from the top of the halfpipe. Have I group member look closely at the halfpipe. He or she should be ready to see how high it goes.
   a. Observe how high up the other side it went.
   b. Mark this spot on the halfpipe.
   c. Use a ruler to measure the distance it went up the other side.
7. You can change your design as you go along. Record these changes on your Activity Sheet.

Trial 1:

Draw your halfpipe. Label all the parts of the halfpipe.

Planned and Ready to Teach

Teacher notes, a misconceptions guide, a materials checklist, and answer keys are done for you. Your prep is gathering everyday materials.



Materials Checklist

5E Patterns in Motion

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

Engage
- ☐ Video clip
- ☐ My Experiences Sheet
- ☐ Picture
- ☐ Introducing Patterns in Motion Sheet

Explore
- ☐ Large clear bowl with sides that are not too steep (see Teacher Instructions for example)
- ☐ 3 marbles and balls of different sizes and weights (up to golf ball size), labeled A, B, and C
- ☐ Wet or dry erase marker (can be easily removed from bowl)
- ☐ Ruler
- ☐ 2 Empty cereal boxes, cut as shown in picture in teacher notes
- ☐ Scissors
- ☐ Roll of paper (drawing paper, newsprint, wrapping paper, etc.)
- ☐ Finger skateboard (like http://amzn.to/2zeMrHE)
- ☐ Pennies or washers (to use as weights)
- ☐ Tape
- ☐ Marker
- ☐ Activity Sheets
- ☐ Read About It Sheet

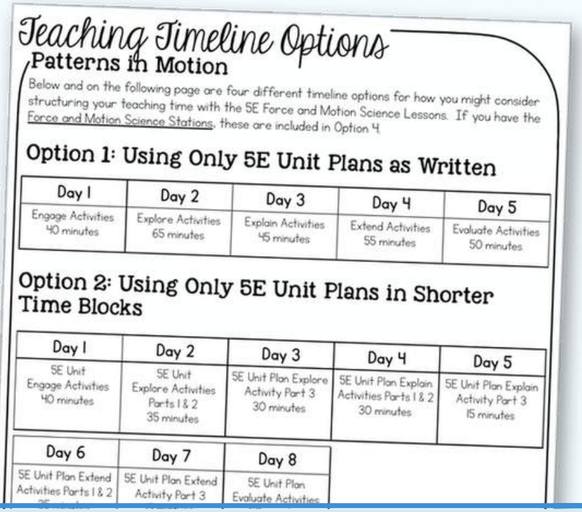
Explain
- ☐ Your Try It Activity Sheet (from Explore section)
- ☐ What Does It Mean? Activity Sheet
- ☐ What Are Patterns in Motion? Article or Note-Taking Sheet
- ☐ Optional: Highlighters or colored markers
- ☐ Sum It Up Exercise
- ☐ Putting It All Together Activity Sheet
- ☐ Colored marker or pencils

Extend
- ☐ Video clip
- ☐ What is the Pattern? Activity Sheet
- ☐ Washable paint in 3 different colors
- ☐ Water
- ☐ Large roll of paper (see Teacher Instructions)

Evaluate
- ☐ "What I Know" Activity Sheet
- ☐ "What I Know" Rubric
- ☐ Weight
- ☐ String
- ☐ Wooden dowel

Fits Your Schedule

Choose from 4 timeline options, and use the free digital upgrade for a print or digital classroom.



Teaching Timeline Options

Patterns in Motion

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

Option 1: Using Only 5E Unit Plans as Written

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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
5E Unit Engage Activities 40 minutes	5E Unit Explore Activities Parts 1 & 2 35 minutes	5E Unit Plan Explore Activity Part 3 30 minutes	5E Unit Plan Explain Activities Parts 1 & 2 30 minutes	5E Unit Plan Explain Activity Part 3 15 minutes

Day 6	Day 7	Day 8
5E Unit Plan Extend Activities Parts 1 & 2	5E Unit Plan Extend Activity Part 3	5E Unit Plan Evaluate Activities

TEACHERS LOVE IT!

★★★★★

My students loved the connection of skateboarding to motion. Every part of the lesson plan was easy to use with my students.

Susan B.



★★★★★

Excellent, excellent unit plan! Engaging, rigorous, and thoroughly covered the standard I wanted to teach...

Candace W.

★★★★★

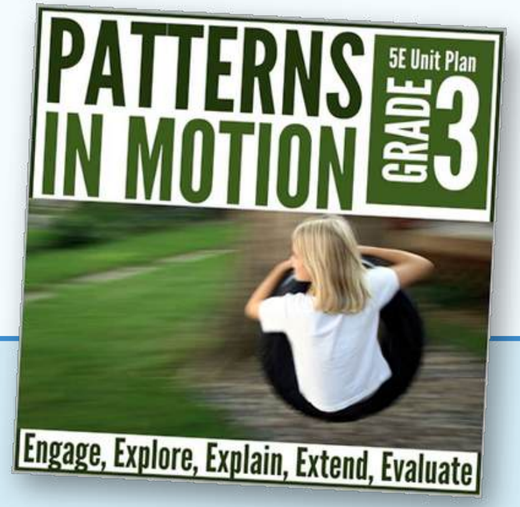
Great resource with detailed lesson plans and hands on engaging activities

Sarah F.



READY FOR YOUR CLASSROOM

- **Instant digital download**
- **Print and use the activities**
- **Free digital upgrade included**

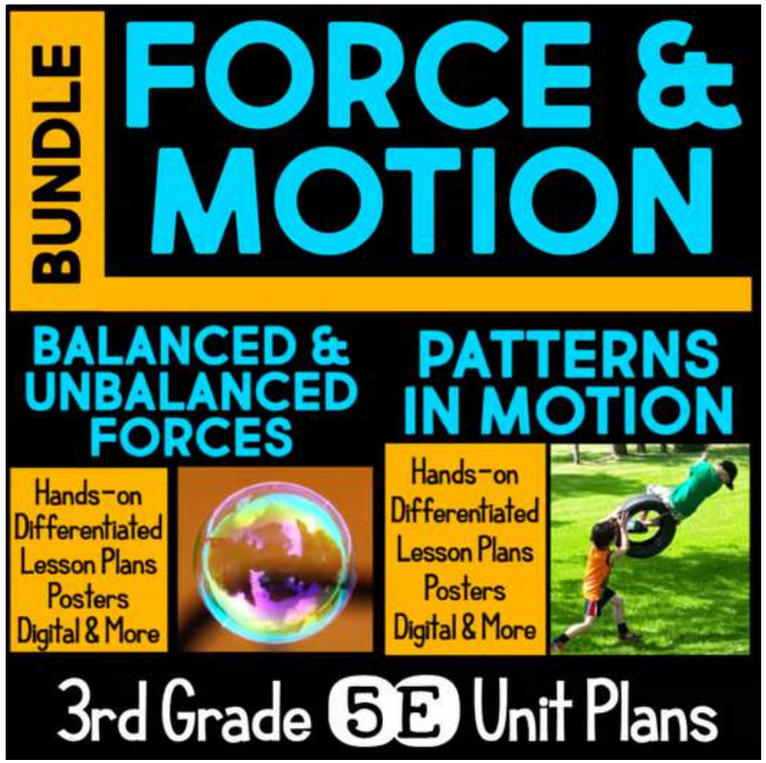


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Save with a topic bundle or the full-year bundle.

TOPIC BUNDLE

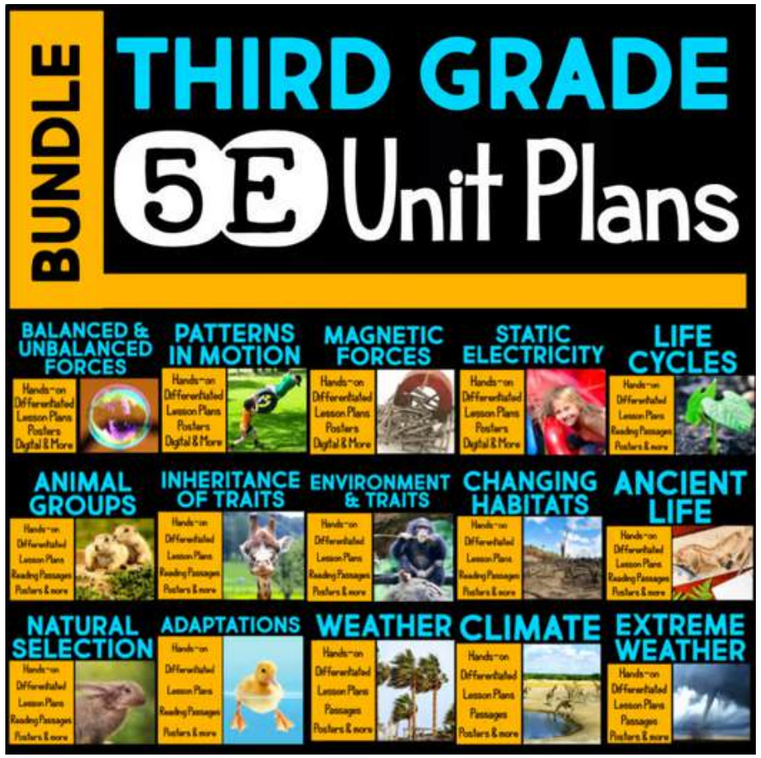
GOOD VALUE



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.





What I have LEARNED