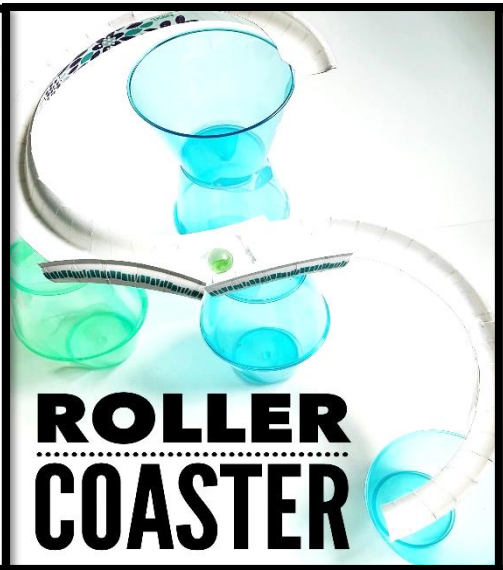
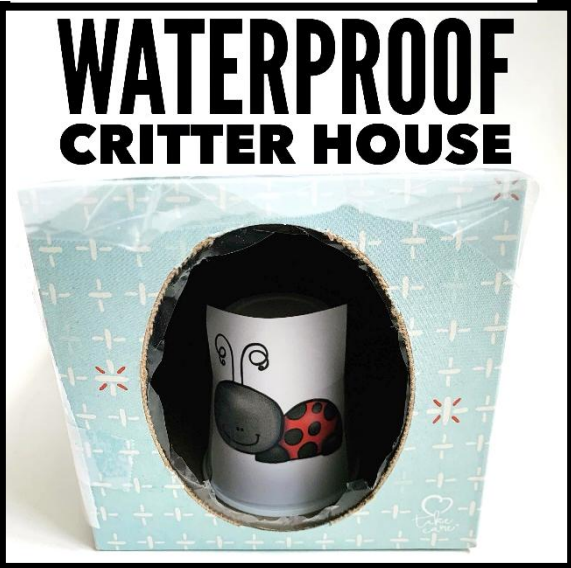
May

STEM

LOW PREP

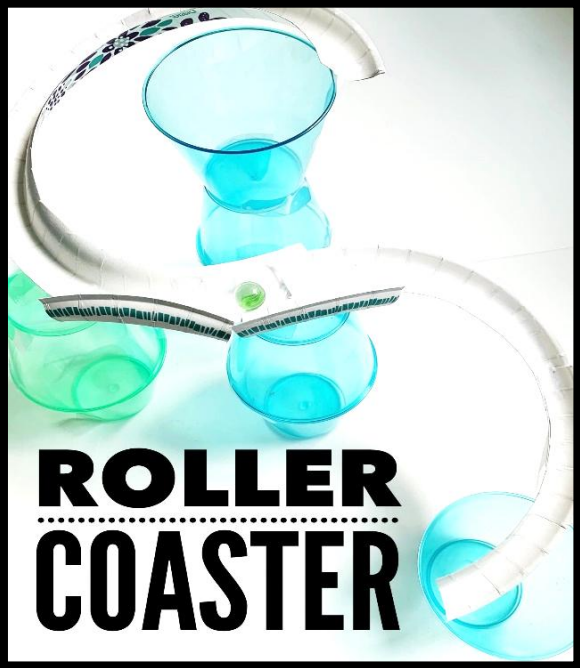
End of the Year Challenges

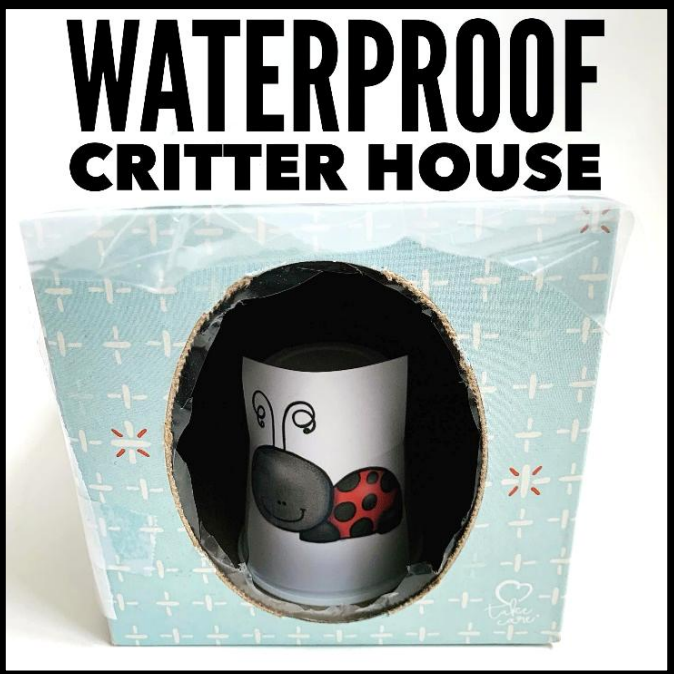




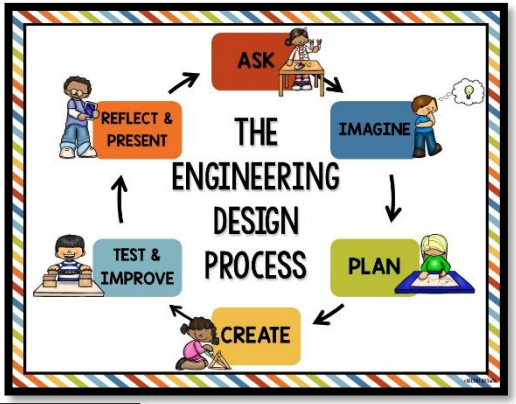
CREATED BY BROOKE BROWN

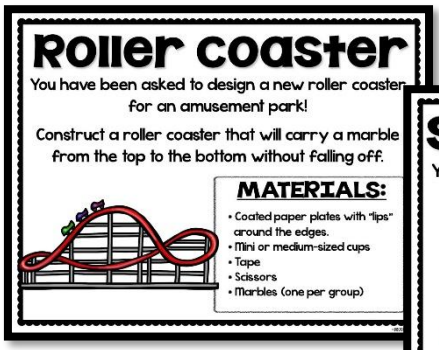
3 LOW PREP STEM CHALLENGES + BONUS BRAINBUILDER ACTIVITY

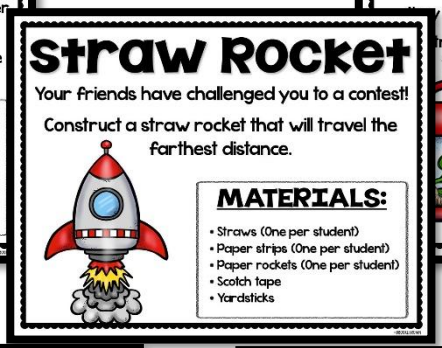


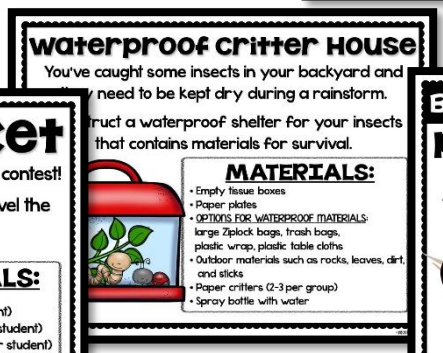


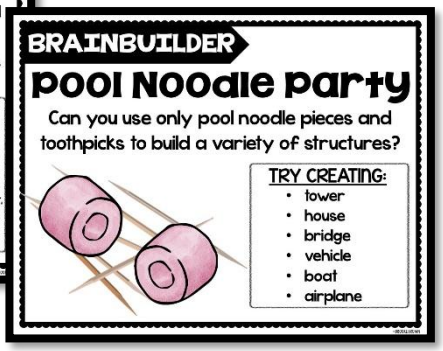
- ✓ SIMPLE SUPPLIES
- ✓ INTERACTIVE ANCHOR CHARTS
- ✓ VISUAL VOCABULARY
- ✓ QR CODE RESEARCH

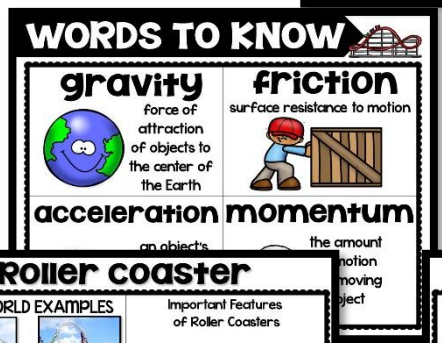


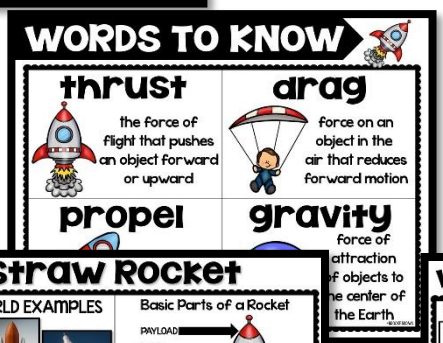


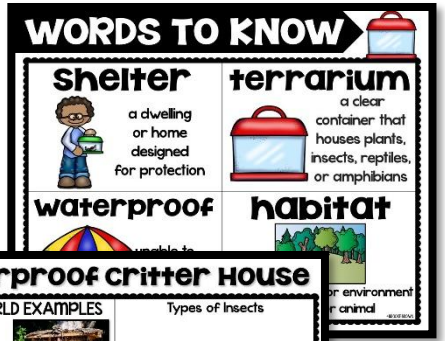


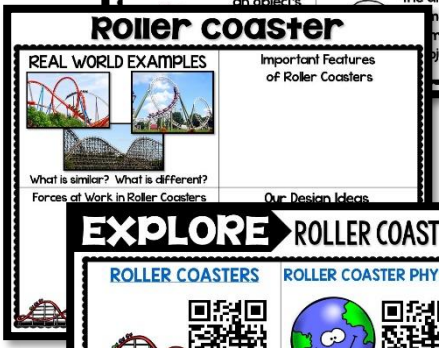


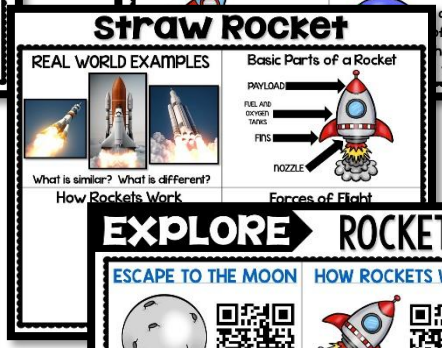


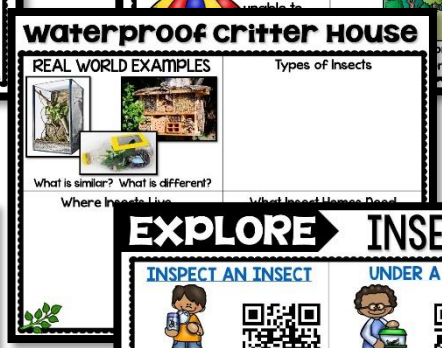


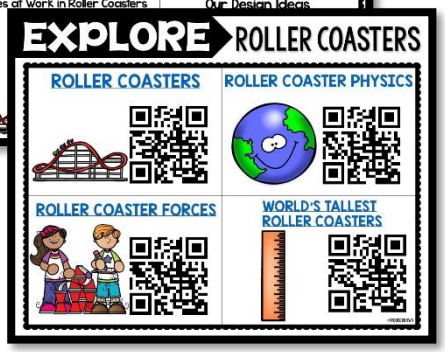


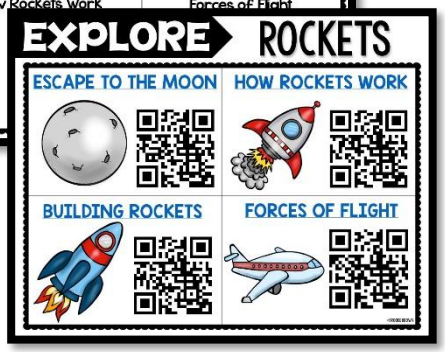


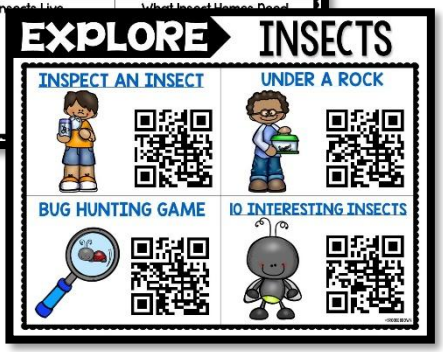




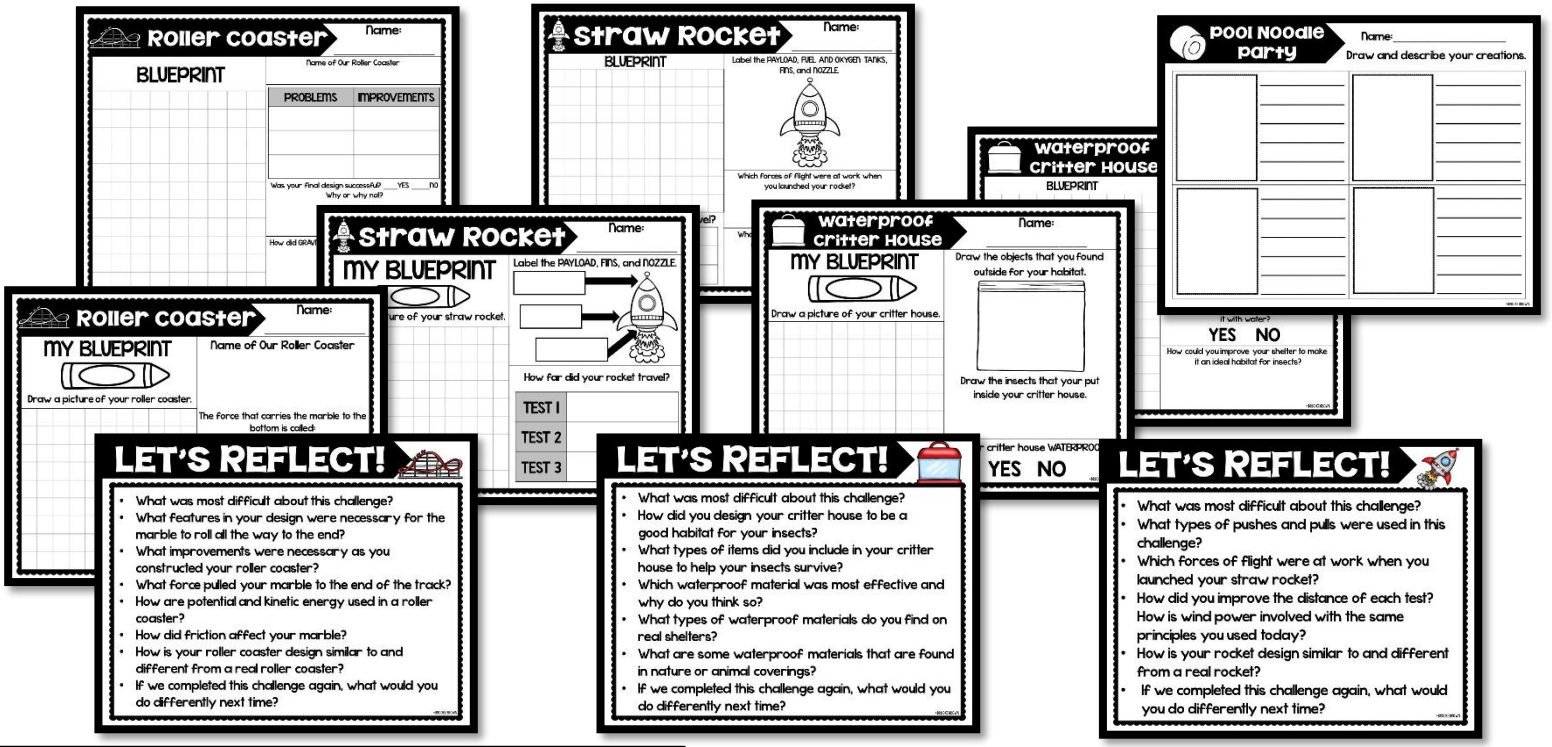




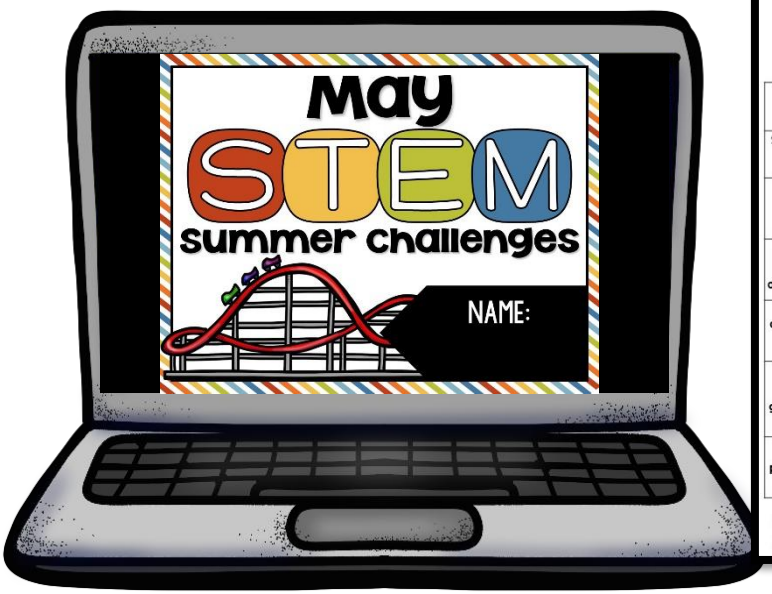


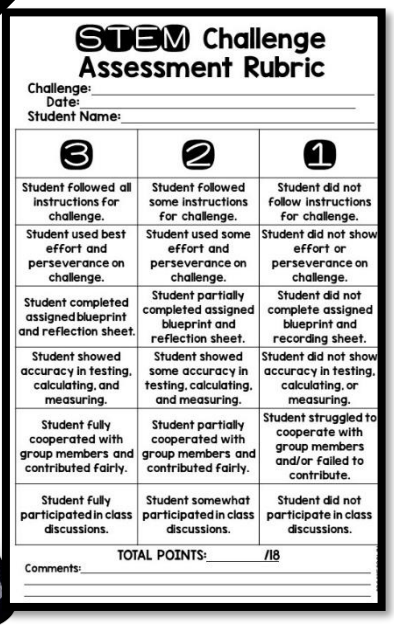


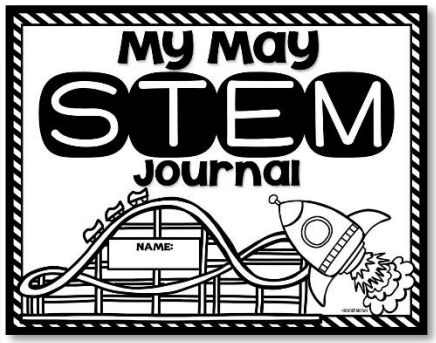
DIFFERENTIATED RECORDING SHEETS FOR K-5TH GRADE

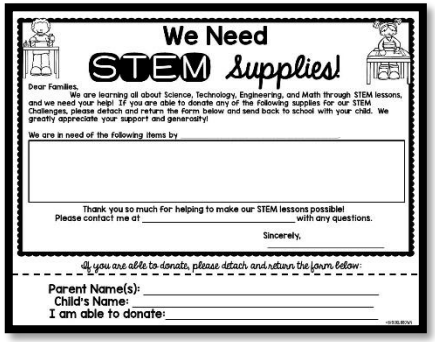


DIGITAL GOOGLE SLIDES NOTEBOOK









SAY *Hello* TO STRESS-FREE STEM!

SUPPLIES CHECKLIST

MAY SUPPLIES CHECKLIST

STEM CHALLENGE	ITEM	NUMBER PER GROUP	I HAVE IT
Roller Coaster	cups (mini or medium-sized work best)	12	
	coated paper plates with "lips" around the edges	6	
	tape	1 roll	
	scissors	2	
	marble	1	
	9" x 12" sheet of construction paper	1-2	
Straw Rocket	straws	1 per student	
	blank paper rectangle	1 per student	
	paper rocket	1 per student	
	scissors and tape	1 per pair of students	
	yardstick	1	
Waterproof Critter House	empty tissue box	1	
	OPTIONS for waterproof materials: gallon ziplock bags, trash bags, plastic tablecloths, plastic wrap	variety	
	paper plates	1	
	scissors	1	
	tape	3 feet	
	mini cups with paper critters taped to the front	1 set	
	spray bottle with water	1	
BONUS BRAINBUILDER: Pool Noodle Party	pool noodles sliced into a variety of shapes and sizes	1 large tub per class	
	toothpicks	30 per group	

STANDARDS ALIGNMENT

MAY STANDARDS ALIGNMENT

CHALLENGE	ENGINEERING	SCIENCE	MATH
Roller Coaster	K-2-ETS1 Engineering Design: K-2-ETS1-1, 3-5 ETS1-2, 3-5 ETS1-3 3-5-ETS1 Engineering Design: 3-5-ETS1-1, 3-5 ETS1-2, 3-5 ETS1-3	K-PS2 Motion and Stability: Forces and Interactions 3-PS2 Motion and Stability: Forces and Interactions 4-PS3 Energy 5-PS2 Motion and Stability: Forces and Interactions	MP1 Make sense of problems and persevere in solving them MP2 Reason abstractly and quantitatively. MP4 Model with mathematics MP5 Use appropriate tools strategically
Straw Rocket	K-2-ETS1 Engineering Design: K-2-ETS1-1, 3-5 ETS1-2, 3-5 ETS1-3 3-5-ETS1 Engineering Design: 3-5-ETS1-1, 3-5 ETS1-2, 3-5 ETS1-3	K-PS2 Motion and Stability: Forces and Interactions 3-PS2 Motion and Stability: Forces and Interactions 4-PS3 Energy 5-PS2 Motion and Stability: Forces and Interactions	MP1 Make sense of problems and persevere in solving them MP2 Reason abstractly and quantitatively MP4 Model with mathematics MP6 Attend to precision MP5 Use appropriate tools strategically
Waterproof Critter House	K-2-ETS1 Engineering Design: K-2-ETS1-1, 3-5 ETS1-2, 3-5 ETS1-3 3-5-ETS1 Engineering Design: 3-5-ETS1-1, 3-5 ETS1-2, 3-5 ETS1-3	K-LS1 From Molecules to Organisms: Structures and Processes K-ESS2 Earth's Systems LStructure, Function, and Information Processing 3-LS4 Biological Evolution: Unity and Diversity 3-ESS3 Earth and Human Activity	MP1 Make sense of problems and persevere in solving them MP2 Reason abstractly and quantitatively MP4 Model with mathematics MP5 Use appropriate tools strategically
BONUS BRAINBUILDER: Pool Noodle Party	K-2-ETS1 Engineering Design: K-2-ETS1-1, 3-5 ETS1-2, 3-5 ETS1-3 3-5-ETS1 Engineering Design: 3-5-ETS1-1, 3-5 ETS1-2, 3-5 ETS1-3	2.Structure and Properties of Matter 4Balance, stability	MP1 Make sense of problems and persevere in solving them MP4 Model with mathematics MP7 Look for and make use of structure.

CHALLENGE OVERVIEW

MATERIALS

STEP BY STEP INSTRUCTIONS

KEY SKILLS

SUGGESTED READ ALOUDS

STEM CHALLENGE: Roller Coaster

OVERVIEW: This challenge is perfect for the end of the year. It requires perseverance as well as constant testing and improvements, and is sure to bring cheers of success at the end! For best results, purchase coated paper plates with prominent "lips" around the outer edges that are not too thick for students to cut (not Styrofoam). Students will cut off the outer lips of the plates and crease them along the middle to make "tracks" for the marbles. They may also cut the tracks into different sizes so that they can turn their track different directions. The tracks should be taped to the top of mini or medium-sized plastic (cocktail) cups. The cups can be taped together in towers so that students can gradually reduce the height of the tracks from beginning to end.

HELPFUL TIPS:

1) Test each piece of the track before extending it to add another piece.
2) Tape the cup towers down to the construction paper to stabilize the roller coaster.
3) If any drops in the roller coaster are too steep, the marble may fall out. Tape small pieces of paper plate to the tracks to act as "bumpers" to block the marble from falling out.

After students achieve a successful roller coaster design, encourage them to give it an exciting name and decorate their poster with signs and details.

KEY SKILLS: Engineering roller coasters, Potential and Kinetic Energy, Acceleration and Momentum, Gravity

SUGGESTED READ ALOUDS: Roller Coaster by Marla Frazee, Roller Coasters (How it Works) by Precious Mckenzie, Building a Roller Coaster by Karen Latchana Kenney

MATERIALS PER GROUP: marble, 12 mini or medium-sized cups, 6 coated paper plates with "lips" around the edges, 1-2 sheets of 9" x 12" construction paper, scissors, 1 roll of tape

LESSON PLAN

1. Activate students' prior knowledge by asking them to share what they already know about roller coasters and the forces at work during a roller coaster ride.
2. Share and discuss the videos on "Explore Roller Coasters."
3. Hold a class discussion, using the teacher chart and real world examples to guide student thinking. (You can project the chart on an interactive whiteboard or document camera.) Record their ideas on the teacher chart.
4. Introduce the STEM challenge and permitted materials.
5. Introduce and discuss key vocabulary cards related to the challenge.
6. Have students sketch blueprints of their designs on their recording sheets.
7. Distribute materials and allow students 60-90 minutes to construct their roller coasters and test them with marbles.
8. Hold a whole class closing discussion and reflection, allowing students to share, compare, and contrast their roller coaster designs. Use the "Let's Reflect" poster to guide the discussion.