Rainbow Arch Bridge

STEM

LOW PREP
ST. PATRICK'S DAY
STEM CHALLENGE

K-5TH GRADE

CREATED BY BROOKE BROWN

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

Rainbow Arch

The leprechaun wants to keep his pot of gold safe and out of reach.

Construct an arched bridge that will hold the heaviest pot of gold without falling off.

MATERIALS:

- Pipe cleaners
- Playdough
- Mini cup
- Pennies

WORDS TO KNOW

piers

supports on the end of a bridge that withstand vertical pressure

deck

the main horizontal surface of a bridge

arch

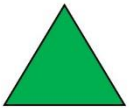
a curved structure that goes over an opening

support

to hold weight

EXPLORE BRIDGES

STRONG BRIDGES



TYPES OF BRIDGES

FAMOUS BRIDGES

THE ARCH

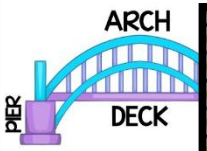
Rainbow Arch

REAL WORLD EXAMPLES

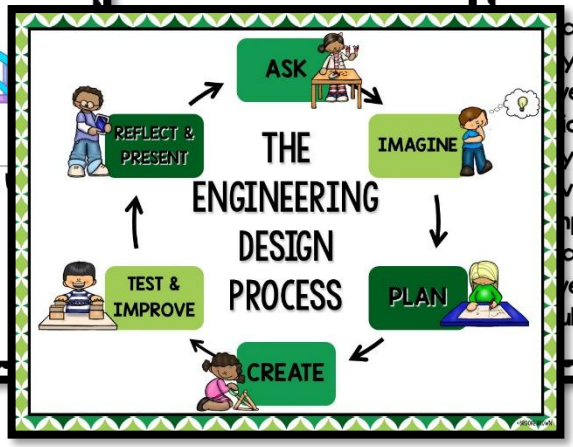
What is similar? What is different?

Types of Bridges

Main Parts of a Bridge



How Bridges are

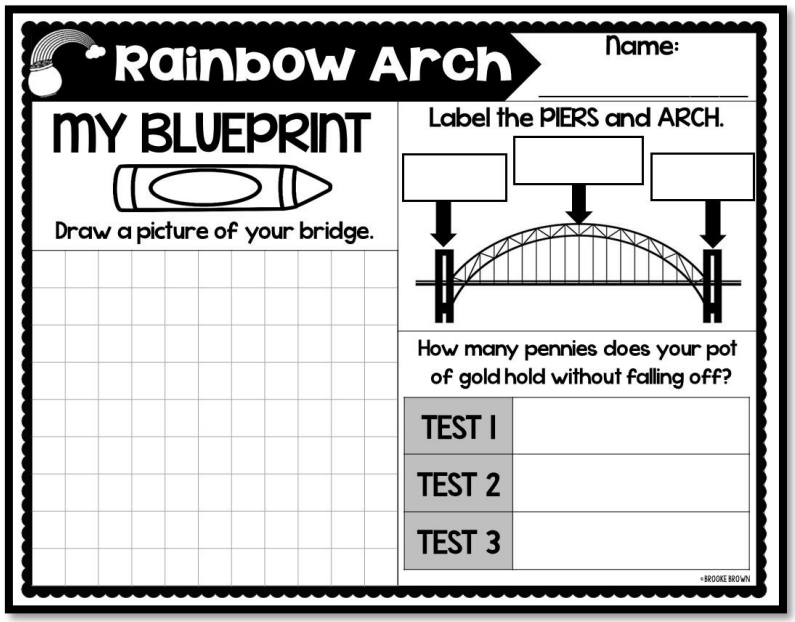


LET'S REFLECT!

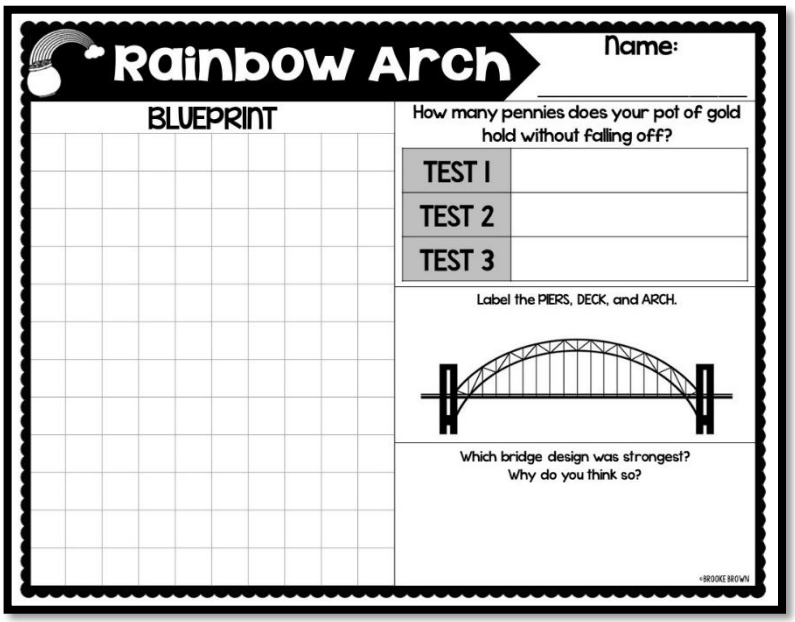
- at was most difficult about this challenge?
- y are bridges important and how do they e problems?
- ch bridge styles hold the most weight and y do you think so?
- does the bridge that you constructed pare to a real bridge?
- at other types of structures use arches?
- e completed this challenge again, what ld you do differently next time?

DIFFERENTIATED RECORDING SHEETS FOR K-5TH GRADE

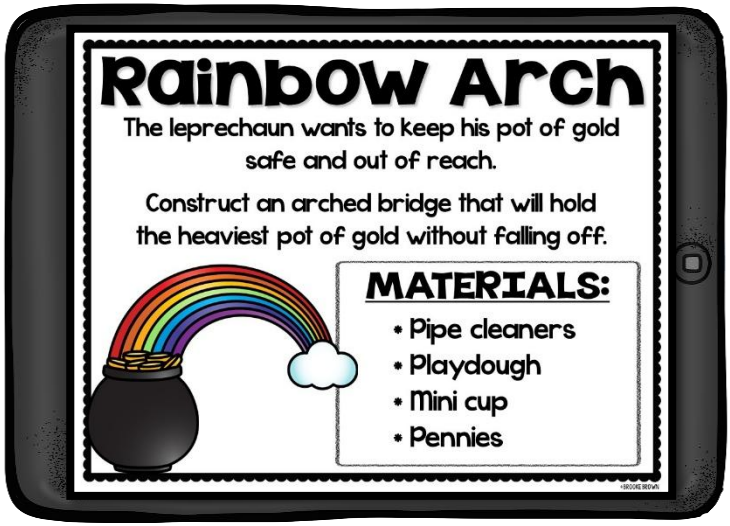
LOWER GRADES

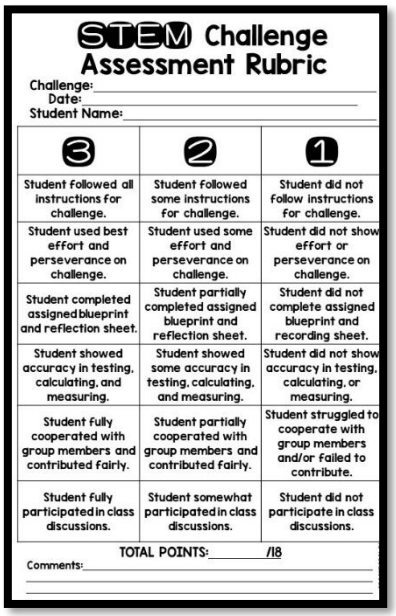


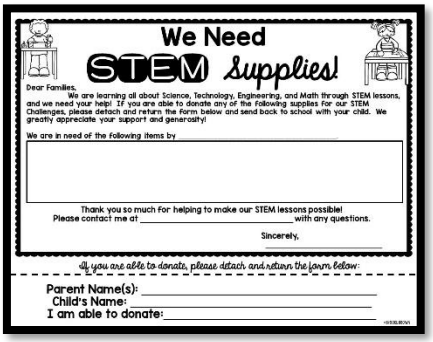
UPPER GRADES



DIGITAL GOOGLE SLIDES NOTEBOOK







SAY *Hello* TO STRESS-FREE STEM!

SUPPLIES CHECKLIST

STEM CHALLENGE	ITEM	NUMBER PER GROUP	I HAVE IT
Rainbow Arch	playdough	one 4 oz. or two 3 oz.	
	pipe cleaners	10	
	mini cup	1	
	pennies	30	

STANDARDS ALIGNMENT

CHALLENGE	ENGINEERING	SCIENCE	MATH
Rainbow Arch	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	Tension and compression forces, measuring weight, balance and stability	MP1: Make sense of problems and persevere in solving them MP2: Reason abstractly and quantitatively MP4: Model with mathematics MP5: Use appropriate tools strategically

©BROOKE BROWN

SUPPLIES CHECKLIST & STANDARDS ALIGNMENT

CHALLENGE OVERVIEW

MATERIALS

STEP BY STEP INSTRUCTIONS

STEM CHALLENGE: Rainbow Arch

OVERVIEW: Students will discover the strength of arched bridges by constructing a rainbow-shaped bridge out of pipe cleaners and playdough. They will attempt to balance a "pot of gold" (mini cup) on top of the arch and add pennies to the cup to test the strength of their bridge.

KEY SKILLS: Engineering arched bridges, Weight distribution, Balance, Nonstandard weight measurement

SUGGESTED READ ALOUDS: Building Bridges by Terry Enz, Bridges! Amazing Structures by Carol A. Johnman, A Book of Bridges by Cheryl Keely

MATERIALS PER GROUP: playdough (one 4 oz. or two 3 oz. cans), 10 pipe cleaners, mini cup, 30 pennies

LESSON PLAN

1. Activate students' prior knowledge by asking them to share what they already know about bridges. Ask them to share different styles of bridges they've seen and how the arched bridge might hold weight differently.
2. Share and discuss the videos on "Explore Bridges."
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 30-45 minutes with partners or small groups to construct their arched bridges and test their balance and strength with the pot of gold/pennies on the top.
8. Hold a whole class closing discussion and reflection, allowing students to share their arched bridge designs. Use the Let's Reflect" poster to guide the discussion.

©BROOKE BROWN

KEY SKILLS

SUGGESTED READ ALOUDS