Spider Web Bridge

STEM

LOW PREP
HALLOWEEN
STEM CHALLENGE

K-5TH GRADE

CREATED BY BROOKE BROWN

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

Spider Web Bridge

The spiders need to cross the river without falling in.

Construct a bridge that holds as many spiders as possible.

MATERIALS:

- Cups (4 per group)
- Yarn (2-3 yards per group)
- Masking tape (3 feet per group)
- Linking cubes (spiders)

Spider Web Bridge

REAL WORLD EXAMPLES

What is similar? What is different?

Main Parts of a Bridge

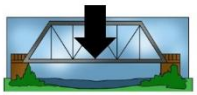
Types of Bridges

WORDS TO KNOW

piers

supports on the end of a bridge stand vertical pressure

deck

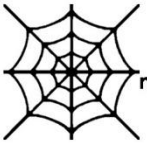


the main horizontal surface of a bridge

ension

the act of stretching or straining

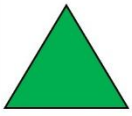
intersect



when two lines meet or cross each other

EXPLORE BRIDGES

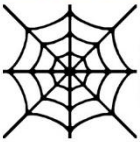
STRONG BRIDGES



TYPES OF BRIDGES

FAMOUS BRIDGES

STRONG SPIDER

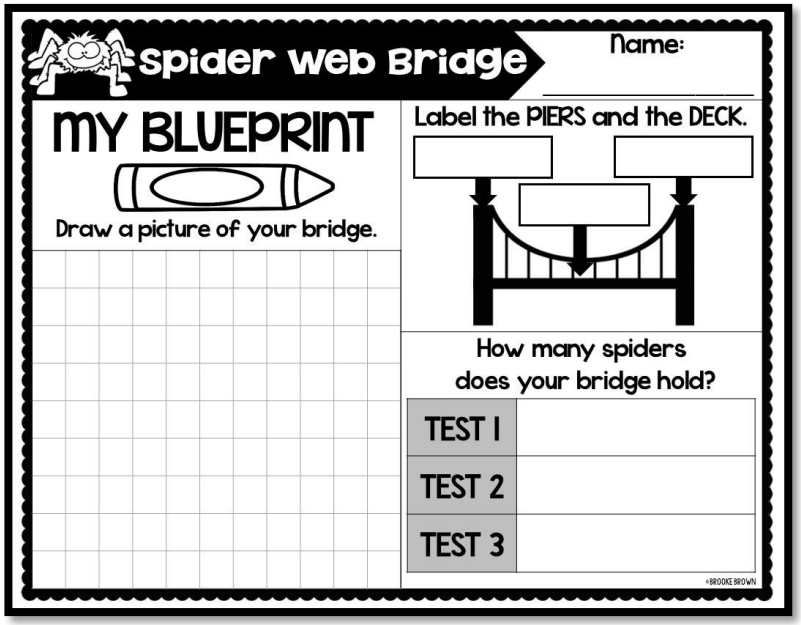


LET'S REFLECT!

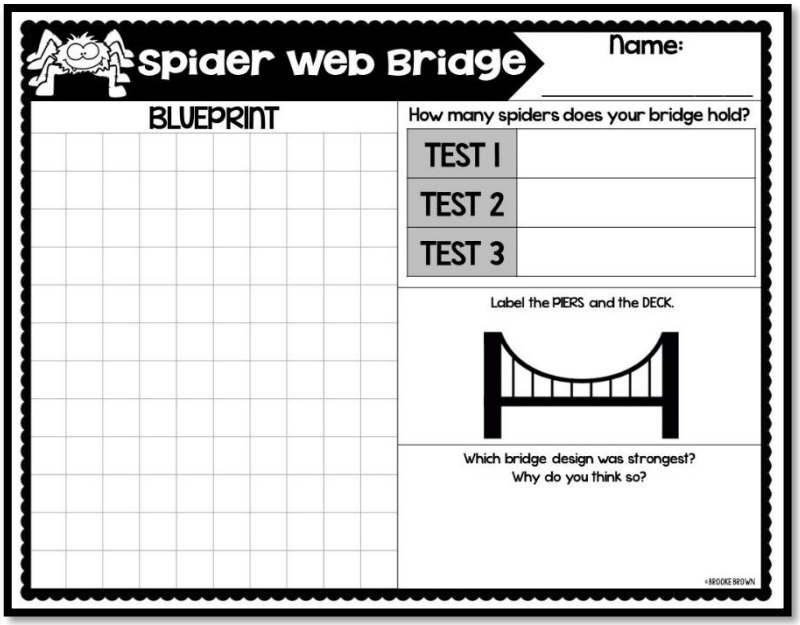
- What was most difficult about this challenge?
- Why are bridges important?
- What are some different types of bridges?
- How did you make the deck (horizontal section) as strong as possible?
- How did you make the piers (vertical columns) as strong as possible?
- Which design held the most blocks (spiders) and why do you think so?
- How is the deck similar to a real spider web?
- If we completed this challenge again, what would you do differently next time?

DIFFERENTIATED RECORDING SHEETS FOR K-5TH GRADE

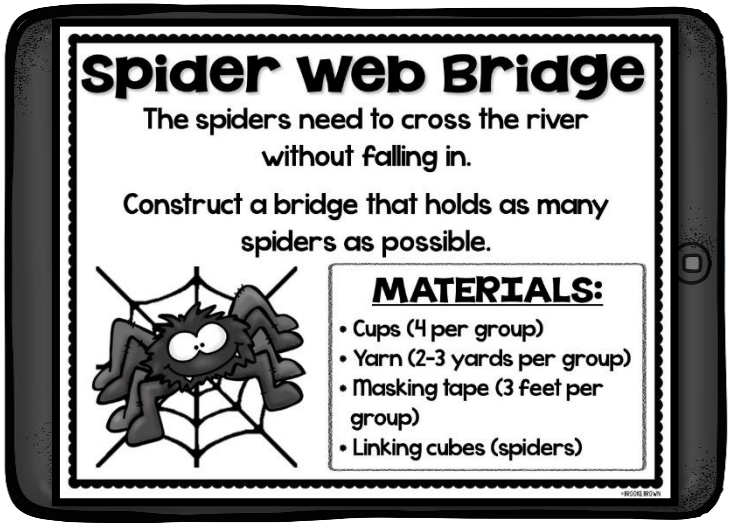
LOWER GRADES

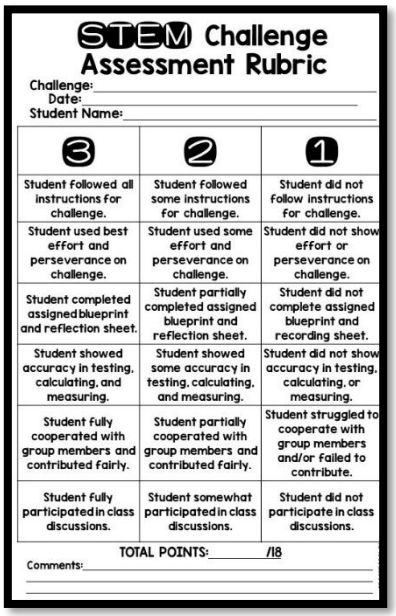


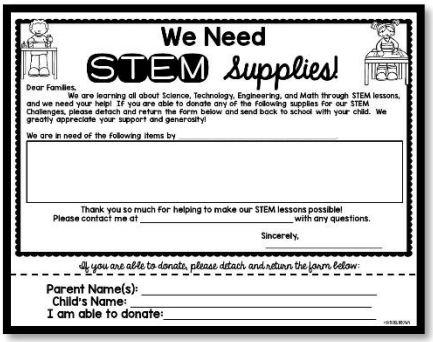
UPPER GRADES



DIGITAL GOOGLE SLIDES NOTEBOOK







SAY *Hello* TO STRESS-FREE STEM!

SUPPLIES CHECKLIST

CHALLENGE	ITEM	NUMBER PER GROUP	I HAVE IT
Spider Web Bridge	yarn	2-3 yards	
	plastic cups	4	
	masking tape	3-5 feet	
	linking cubes	12	

STANDARDS ALIGNMENT

CHALLENGE	ENGINEERING	SCIENCE	MATH
Spider Web Bridge	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	•Action/Reaction forces, tension and compression forces, measuring weight, balance, 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

SUPPLIES CHECKLIST & STANDARDS ALIGNMENT

CHALLENGE OVERVIEW

MATERIALS

STEP BY STEP INSTRUCTIONS

KEY SKILLS

SUGGESTED READ ALOUDS

STEM CHALLENGE: Spider Web Bridge

OVERVIEW: Students will use the cups as piers and an intersecting "web" of yarn as the deck. The biggest trick for this challenge is for students to tape the plastic cups down to the table or other surface, so as to hold more weight for the web between. Students may choose to use 2-4 cups in their design. Pieces of yarn can be lined up in parallel lines or intersected similar to a spider web. The more yarn used, and the tighter the yarn is pulled and taped down, the stronger the deck of the bridge and more blocks can be held.

KEY SKILLS: Engineering bridges, Weight distribution/Balance, Intersecting lines, Nonstandard Weight Measurement

SUGGESTED READ ALOUDS: A Book of Bridges by Cheryl Keely, Twenty-One Elephants and Still Standing by April Jones Prince, Walter's Wonderful Web by Tim Hopgood

MATERIALS PER GROUP: 4 plastic cups, 2-3 yards of yarn, masking tape, 12 linking cubes, plastic spiders (OPTIONAL)

LESSON PLAN

1. Activate students' prior knowledge by asking them to share what they already know about bridges. Ask them what purposes bridges serve, what styles they've seen, and what the important parts might be. Ask them to share how spider webs might be similar to bridges.
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 45-60 minutes with partners or small groups to construct their bridges and test how much weight they can hold.
8. Hold a whole class closing discussion and reflection, allowing students to share their bridge designs. Use the "Let's Reflect" poster to guide the discussion.