Tallest Tree STEM

LOW PREP
CHRISTMAS
STEM CHALLENGE

K-5TH GRADE

CREATED BY BROOKE BROWN

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

Tallest Tree

You have been asked to create a decorative tree for the holiday parade.

Use cups to construct the tallest tree possible.

MATERIALS:

- Cups
- Popsicle sticks
- Paper ornaments and tape to decorate cups (OPTIONAL)
- Yardstick

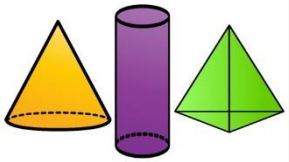
Tallest Tree

REAL WORLD EXAMPLES

REAL WORLD EXAMPLES

What is similar? What is different?

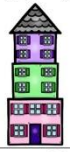
Common 3D Shapes found in Trees



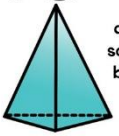
WORDS TO KNOW

architect — a person who designs buildings

structure — something that is built or constructed



pyramid — a three-dimensional solid with a polygonal base and triangular faces that meet at a point (apex)



cone — a three-dimensional solid that tapers from a circular base to a point

EXPLORE TREES

EXCELLENT EVERGREENS

WORLD'S TALLEST TREE

HRISTMAS TREE FARMS

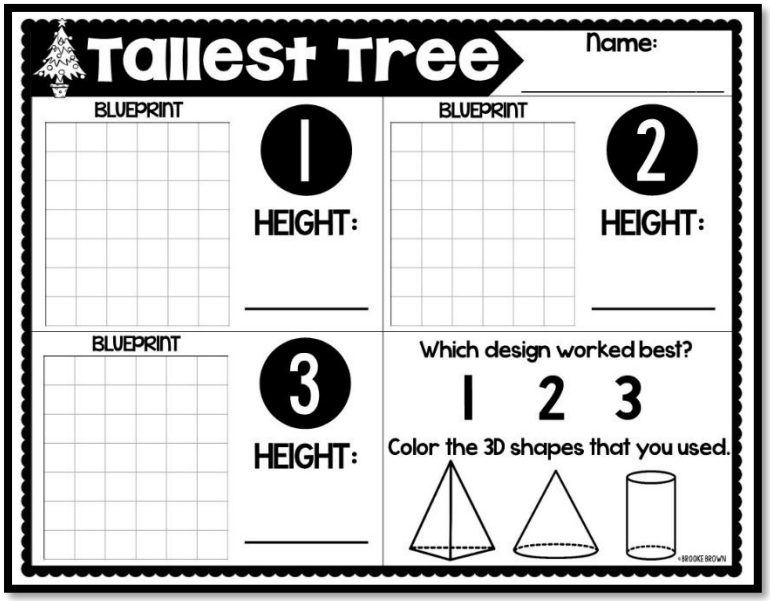
CUP TOWERS

LET'S REFLECT!

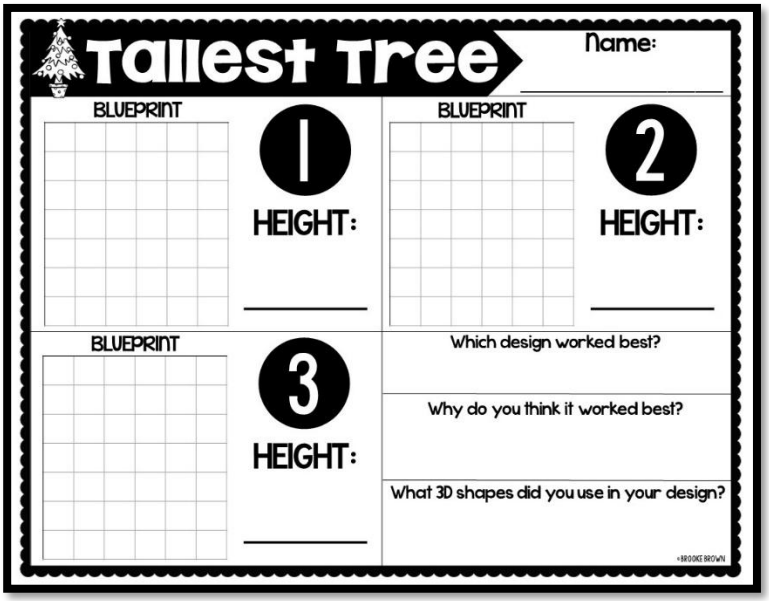
- What was most difficult about this challenge?
- Which tree design was the tallest and why do you think so?
- How does the design of your tree affect its balance and stability?
- How are buildings designed using these same concepts?
- Which three-dimensional shapes are represented in your tree tower?
- If we completed this challenge again, what would you do differently next time?

DIFFERENTIATED RECORDING SHEETS FOR K-5TH GRADE

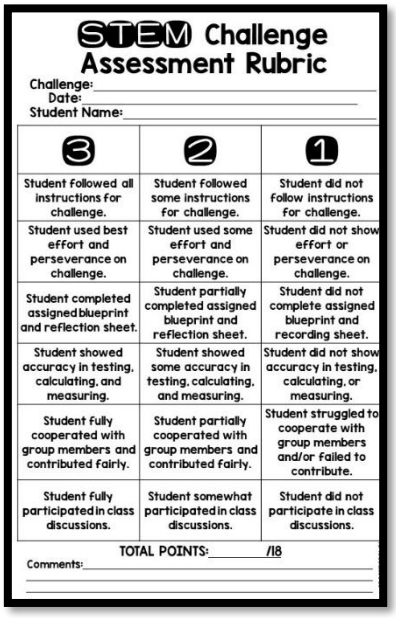
LOWER GRADES

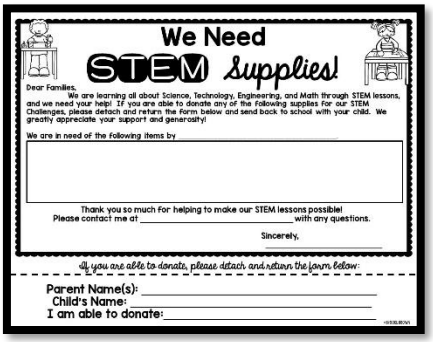


UPPER GRADES



DIGITAL GOOGLE SLIDES NOTEBOOK





SAY *Hello* TO STRESS-FREE STEM!

SUPPLIES CHECKLIST

STEM CHALLENGE	ITEM	NUMBER PER GROUP	I HAVE IT
Tallest Tree	green cups (large or mini) - found at most party supply stores	24	
	popsicle sticks	18	
	OPTIONAL: ornament cutouts with tape	1 set	
	OPTIONAL: pom poms and jingle bells	10-12	
	yardstick	1	

STANDARDS ALIGNMENT

CHALLENGE	ENGINEERING	SCIENCE	MATH
Tallest Tree	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 •Action/Reaction forces, tension and compression forces, 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 MP6: Attend to precision MP7: Look For and make use of structure

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SUPPLIES CHECKLIST & STANDARDS ALIGNMENT

CHALLENGE OVERVIEW

MATERIALS

STEP BY STEP INSTRUCTIONS

STEM CHALLENGE: Tallest Tree

OVERVIEW: Students will work together to stack cups and construct the tallest "tree" possible. Allow creativity and time for exploration, as some groups may choose to build more linear, pyramid-shaped trees while others might choose to build more cone-like structures with circular bases. Cups can be flipped and stacked on both ends. Optional ornament cutouts are provided for students to tape to the cups and "decorate" their trees. Students will use yardsticks to measure the heights of three different tree designs and they will compare and contrast the different styles.

KEY SKILLS: Three-dimensional shapes and structures (natural and manmade), Engineering towers/skyscrapers, Measurement

SUGGESTED READ ALOUDS: The Biggest Christmas Tree Ever by Steven Kroll, A Wish to be a Christmas Tree by Colleen Monroe, Red and Lulu by Matt Tavares

MATERIALS PER GROUP: 24 green cups, 18 popsicle sticks, yardstick, optional paper ornaments and tape, optional pom poms and jingle bells

LESSON PLAN

1. Activate students' prior knowledge by asking them to share what they already know about trees. Ask them to share what shapes and structures they see in trees (pine, fir, spruce) that are similar to manmade towers.
2. Share and discuss the videos on "Explore Trees."
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 three different styles of tree towers and measure the heights.
8. Hold a whole class closing discussion and reflection, allowing students to share their final tree tower designs OR create a whole class tree. Use the "Let's Reflect" poster to guide the discussion.

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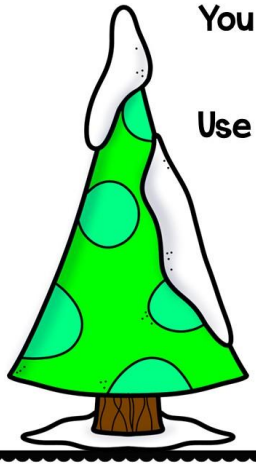
KEY SKILLS

SUGGESTED READ ALOUDS

ALTERNATIVE WINTER CHALLENGE

Winter Tree



You would like to decorate your home for winter.

Use cups to construct the tallest tree possible.

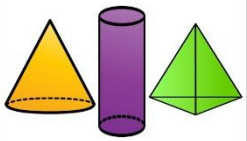
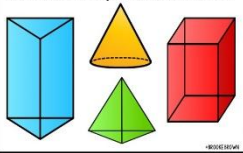
MATERIALS:

- Cups
- Popsicle sticks
- Paper snowflakes and tape (OPTIONAL)
- Yardstick

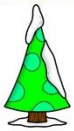
Winter Tree Challenge

(optional snowflakes to tape onto cups)

Winter Tree

REAL WORLD EXAMPLES	REAL WORLD EXAMPLES
	
What is similar? What is different?	What is similar? What is different?
Common 3D Shapes found in Trees	Common 3D Shapes found in Towers
	

EXPLORE TREES

EXCELLENT EVERGREENS	WORLD'S TALLEST TREE
	
TREE FARMS	CUP TOWERS
	

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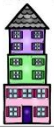

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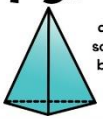

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Winter Tree

Name:

BLUEPRINT

1

HEIGHT:

BLUEPRINT

2

HEIGHT:

BLUEPRINT

3

HEIGHT:

Which design worked best?

Why do you think it worked best?

Winter Tree

Name:

BLUEPRINT

1

HEIGHT:

BLUEPRINT

2

HEIGHT:

BLUEPRINT

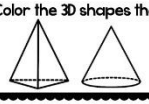
3

HEIGHT:

Which design worked best?

1 2 3

Color the 3D shapes that you used.



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