

Tallest Tree

STEM

**TALLEST
TREE**



**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

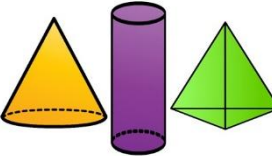
Tallest Tree

REAL WORLD EXAMPLES



What is similar? What is different?

Common 3D Shapes found in Trees



REAL WORLD EXAMPLES



What is similar? What is different?

Common 3D Shapes found in Buildings

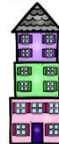


WORDS TO KNOW

architect structure



a person who designs buildings



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



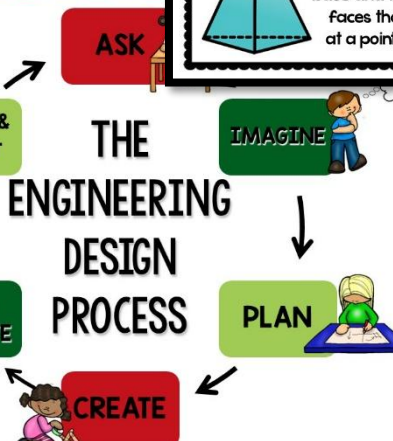
WORLD'S TALLEST TREE



CHRISTMAS 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

Tallest 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.

©BROOKE BROWN

UPPER GRADES

Tallest Tree

Name: _____

BLUEPRINT

1

HEIGHT: _____

BLUEPRINT

2

HEIGHT: _____

BLUEPRINT

3

HEIGHT: _____

Which design worked best?

Why do you think it worked best?

What 3D shapes did you use in your design?

©BROOKE BROWN

DIGITAL GOOGLE SLIDES NOTEBOOK

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

©BROOKE BROWN

| STEM Challenge Assessment Rubric | | |
|---|---|--|
| Challenge: _____ | | |
| Date: _____ | | |
| Student Name: _____ | | |
| 3 | 2 | 1 |
| Student followed all instructions for challenge. | Student followed some instructions for challenge. | Student did not follow instructions for challenge. |
| Student used best effort and perseverance on challenge. | Student used some effort and perseverance on challenge. | Student did not show effort or perseverance on challenge. |
| Student completed assigned blueprint and reflection sheet. | Student partially completed assigned blueprint and reflection sheet. | Student did not complete assigned blueprint and recording sheet. |
| Student showed accuracy in testing, calculating, and measuring. | Student showed some accuracy in testing, calculating, and measuring. | Student did not show accuracy in testing, calculating, or measuring. |
| Student fully cooperated with group members and contributed fairly. | Student partially cooperated with group members and contributed fairly. | Student struggled to cooperate with group members and/or failed to contribute. |
| Student fully participated in class discussions. | Student somewhat participated in class discussions. | Student did not participate in class discussions. |
| TOTAL POINTS: _____ /18 | | |
| Comments: _____ | | |

We Need STEM Supplies!

Dear Families: We are learning all about Science, Technology, Engineering, and Math through STEM lessons, and we need your help! If you are able to donate any of the following supplies for our STEM Challenges, please detach and return the form below and send back to school with your child. We greatly appreciate your support and generosity!

We are in need of the following items by _____:

Thank you so much for helping to make our STEM lessons possible!
Please contact me at _____ with any questions.

Sincerely, _____

If you are able to donate, please detach and return the form below:

Parent Name(s): _____

Child's Name: _____

I am able to donate: _____

©BROOKE BROWN

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 | <p>K-2-ETS1 Engineering Design: K-2-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3</p> <p>3-5-ETS1 Engineering Design: 3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3</p> | <p>2. Structure and Properties of Matter</p> <p>• Action/Reaction forces, tension and compression forces, weight, balance, stability</p> | <p>MP1: Make sense of problems and persevere in solving them.</p> <p>MP2: Reason abstractly and quantitatively.</p> <p>MP3: Model with mathematics.</p> <p>MP5: Use appropriate tools strategically.</p> <p>MP6: Attend to precision.</p> <p>MP7: Look for and make use of structure.</p> |

SUPPLIES CHECKLIST & STANDARDS ALIGNMENT

CHALLENGE OVERVIEW

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

KEY SKILLS

MATERIALS

STEP BY STEP INSTRUCTIONS

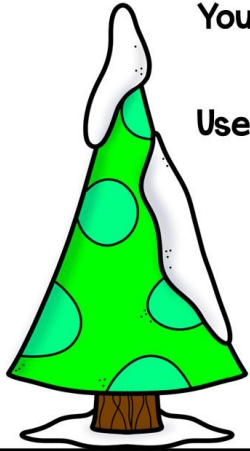
LESSON PLAN

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.

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)



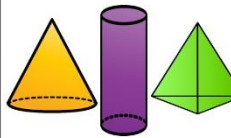
winter tree

REAL WORLD EXAMPLES



What is similar? What is different?

Common 3D Shapes found in Trees

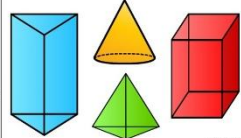


REAL WORLD EXAMPLES



What is similar? What is different?

Common 3D Shapes found in Towers



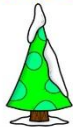
EXPLORE TREES

EXCELLENT EVERGREENS



TREE FARMS

WORLD'S TALLEST TREE



CUP TOWERS

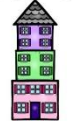


WORDS TO KNOW

architect structure



a person who designs buildings



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

winter tree

Name: _____

BLUEPRINT

1
HEIGHT: _____

BLUEPRINT

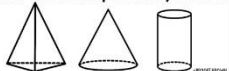
2
HEIGHT: _____

BLUEPRINT

3
HEIGHT: _____

Which design worked best?

1 2 3
Color the 3D shapes that you used.



winter tree

Name: _____

BLUEPRINT

1
HEIGHT: _____

BLUEPRINT

2
HEIGHT: _____

BLUEPRINT

3
HEIGHT: _____

Which design worked best?

Why do you think it worked best?

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?