

Halloween

STEM

candy

Tower

challenge



CREATED BY BROOKE BROWN

contents

Page 3: How to Use/Components

Page 4: [Google Slides Digital Notebook](#)

Page 5: Engineering Design Process

Page 6: Supplies Checklist & Standards Alignment

Pages 7-15: Candy Tower STEM Challenge

Pages 16-17: Grading Rubric (STEM/STEAM)

Pages 18-19: Parent Supply Request Letter (STEM/STEAM)

Page 20: Credits

How to Use

The following STEM/STEAM challenge is designed to be completed with partners and will take about 45-60 minutes. Needed supplies are inexpensive and can be found in your classroom or at most craft stores.

Components

LESSON PLAN

- Overview
- Read Aloud Ideas
- Skills
- Supplies

STUDENT INSTRUCTIONS

QR CODE WEBSITES & VIDEOS

TEACHER ANCHOR CHART

STEM CHALLENGE: candy tower

OVERVIEW: Creativity and perseverance are key skills for this challenge! Hard (seeded) pumpkins are more difficult to manipulate than gummy pumpkins or pumpkin marshmallows, but offer a challenge for older students. Before beginning, model how to gently attach a pumpkin and toothpick without breaking the candy, with the bases of the pumpkins facing down. Students will attempt to build the tallest possible tower using the given materials and will measure the height three times in 5 minute intervals. Students will most likely discover that triangular prisms, hexagonal prisms, and pyramids are more durable than cubes and rectangular prisms.

KEY SKILLS: Three-dimensional shapes and structures, Engineering towers/skyscrapers, Measurement

SUGGESTED READ ALOUDS: *Iggy Peck, Architect* by Andrea Beaty, *Skyscrapers* by Libby Romero, *Dreaming Up* by Christy Hale

MATERIALS PER GROUP: 20 candy pumpkins, gummy pumpkins, or pumpkin marshmallows, 20 toothpicks, ruler

LESSON PLAN

1. Activate students' prior knowledge by asking them to share what they already know about towers and what shapes are used to build towers. Ask them to predict which 3D shapes might be strongest and why.
2. Share and discuss the videos/websites on "Explore Structures".
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 15 minutes with partners or small groups to construct their towers and measure the heights after three 5 minute intervals.
8. Hold a whole class discussion and reflection, allowing students to share their tower designs. Use the "Let's Reflect" poster to guide the discussion.

pumpkin catapult

You need to send a pumpkin over the fence to your neighbor.

Construct a catapult that will launch your pumpkin the farthest distance.

MATERIALS:

- Jumbo popsicle sticks (12 per group)
- Rubber bands (8 per group)
- Masking tape (3 ft. per group)
- Plastic spoons (1-2 per group)
- Mini pumpkins
- Tape measure or yardstick

EXPLORE STRUCTURES

STRONG STRUCTURES

TALLEST BUILDINGS

SKYSCRAPERS

3D SHAPES

candy tower

REAL WORLD EXAMPLES

Other Famous Towers or Skyscrapers

What is similar? What is different?

Common 2D Shapes Found in Towers

Common 3D Shapes Found in Towers

KEY VOCABULARY

K-2nd RECORDING SHEET

3rd-5th RECORDING SHEET

REFLECTION DISCUSSION QUESTIONS

WORDS TO KNOW

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

cube a three-dimensional solid made up of six equal squares

prism a three-dimensional solid with congruent, polygonal bases and rectangular faces

joint a point at which parts of a structure are joined

candy tower Name: _____

MY BLUEPRINT

COLOR the shapes that you used in your design. CIRCLE the shapes that were strongest.

Draw a picture of your tower.

Measure the height of your tower:

TEST 1 (5 min.)

TEST 2 (30 min.)

TEST 3 (15 min.)

candy tower Name: _____

BLUEPRINT

Measure the height of your tower:

TEST 1 (5 min.)

TEST 2 (30 min.)

TEST 3 (15 min.)

Circle the shapes that were strongest. Why do you think they were strongest?

LET'S REFLECT!

- What was most difficult about this challenge?
- What types of two-dimensional and three-dimensional shapes did you use in your design?
- How do you think the shapes and patterns might relate to the strength of your tower?
- Which design was the highest and why do you think so?
- What parts of your tower were most important for it to be the most balanced and stable?
- How are real tower designs similar to and different from your design?
- If we completed this challenge again, what would you do differently next time?

Optional Google Slides Notebook

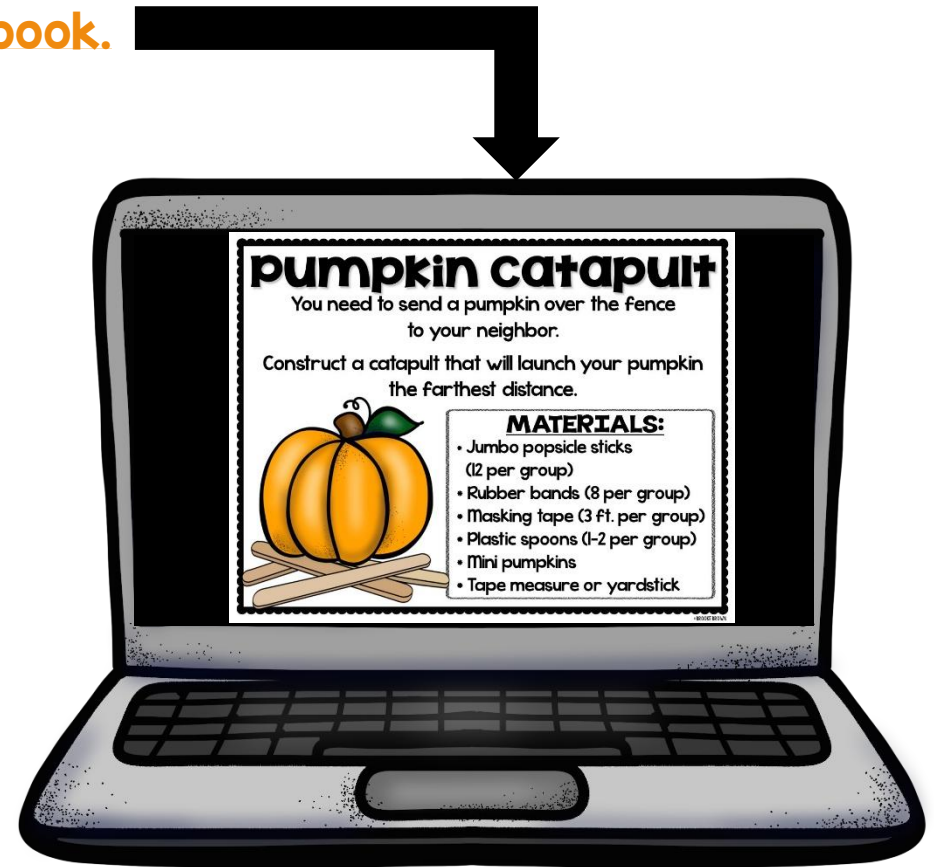
1. Download [Link for the Google Slides Notebook](#).
2. Sign into your Google Account.
3. **MAKE A COPY** of the notebook.

Each student will need their own Google account if they will be working on their own Digital Interactive notebook using Google Slides. If your students will be using iPads, they will also need to download the [Free Google Slides App](#) for the digital notebook to work properly.



Before you and your students begin editing/filling in your digital notebook, it is **VERY** important to first save a copy of the file on your own Google Drive, and then edit the copy. Your students will follow these same steps when you share the file with them.

YOU DO NOT WANT YOUR STUDENTS TO EDIT THE ORIGINAL FILE.



ASK



IMAGINE

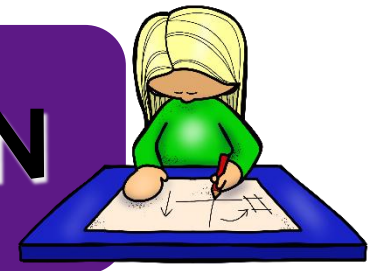


**THE
ENGINEERING
DESIGN
PROCESS**

**REFLECT &
PRESENT**



PLAN



**TEST &
IMPROVE**



CREATE



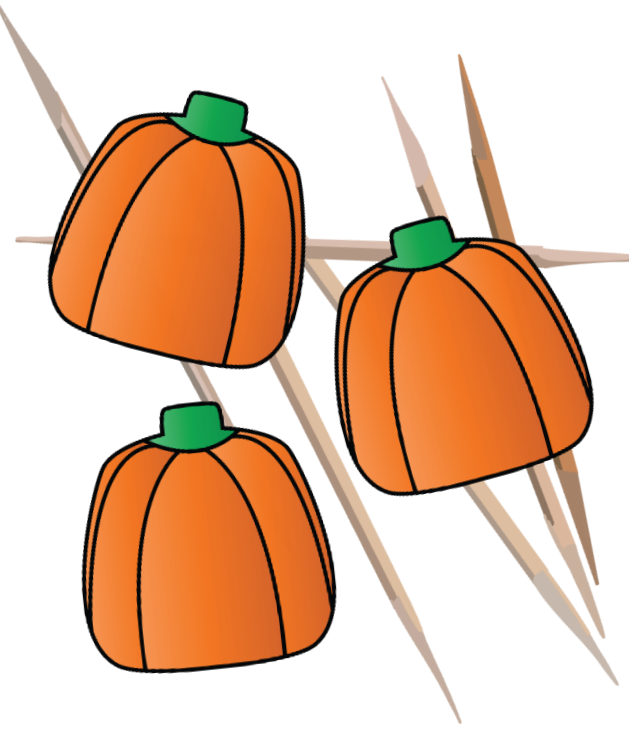
SUPPLIES CHECKLIST

CHALLENGE	ITEM	NUMBER PER GROUP	I HAVE IT
Candy Tower	candy such as candy pumpkins (most difficult), gummy candy, or pumpkin shaped marshmallows	24	
	toothpicks	20	
	rulers	1	

STANDARDS ALIGNMENT

CHALLENGE	ENGINEERING	SCIENCE	MATH
Candy Tower	<p>K-2-ETSI Engineering Design: K-2-ETSI-1, 3-5 ETSI-2, 3-5 ETSI-3</p> <p>3-5-ETSI Engineering Design: 3-5-ETSI-1, 3-5 ETSI-2, 3-5 ETSI-3</p>	<p>2. Structure and Properties of Matter</p> <p>*tension and compression forces, weight and balance, stability</p>	<p>MP1: Make sense of problems and persevere in solving them</p> <p>MP2: Reason abstractly and quantitatively</p> <p>MP4: 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>

STEM CHALLENGE: candy tower



OVERVIEW: Creativity and perseverance are key skills for this challenge! Hard (mellowcreme) pumpkins are more difficult to manipulate than gummy pumpkins or pumpkin marshmallows, but offer a challenge for older students. Before beginning, model how to gently attach a pumpkin and toothpick without breaking the candy, with the bases of the pumpkins facing down. Students will attempt to build the tallest possible tower using the given materials and will measure the height three times in 15 minute intervals. Students will most likely discover that triangular prisms, hexagonal prisms, and pyramids are more durable than cubes and rectangular prisms.

KEY SKILLS: Three-dimensional shapes and structures, Engineering towers/skyscrapers, Measurement

SUGGESTED READ ALOUDS: [Iggy Peck, Architect by Andrea Beaty](#), [Skyscrapers by Libby Romero](#), [Dreaming Up by Christy Hale](#)

MATERIALS PER GROUP: 24 candy pumpkins, gummy pumpkins, or pumpkin marshmallows, 20 toothpicks, ruler

LESSON PLAN

1. Activate students' prior knowledge by asking them to share what they already know about towers and what shapes are used to build towers. Ask them to predict which 3D shapes might be strongest and why.
2. Share and discuss the videos/websites on "Explore Structures"
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 minutes with partners or small groups to construct their towers and measure the heights after three 15 minute intervals.
8. Hold a whole class closing discussion and reflection, allowing students to share their tower designs. Use the "Let's Reflect" poster to guide the discussion.

candy tower

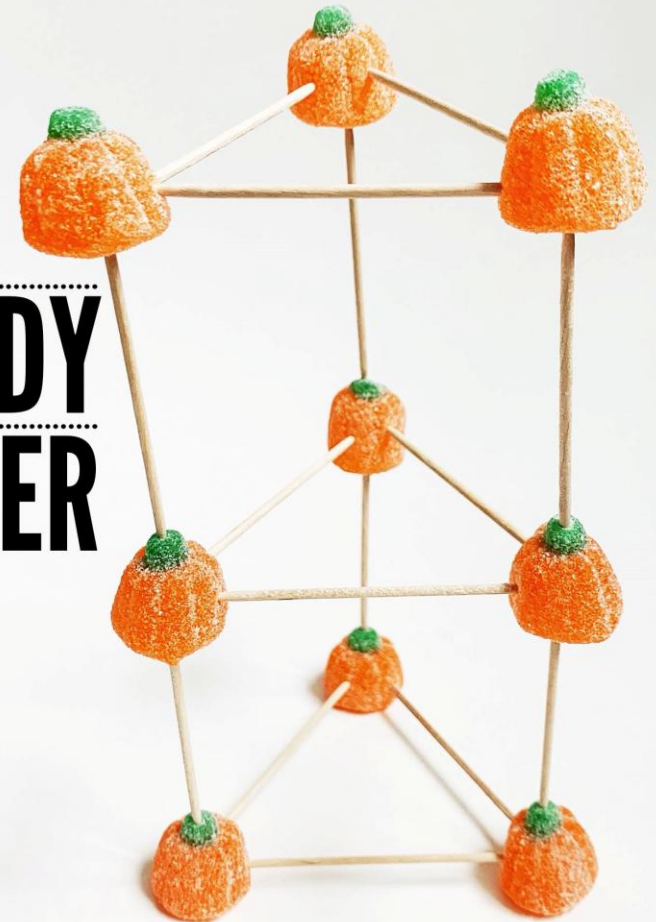
POSSIBLE PRODUCTS

(for teacher reference only)

CANDY TOWER



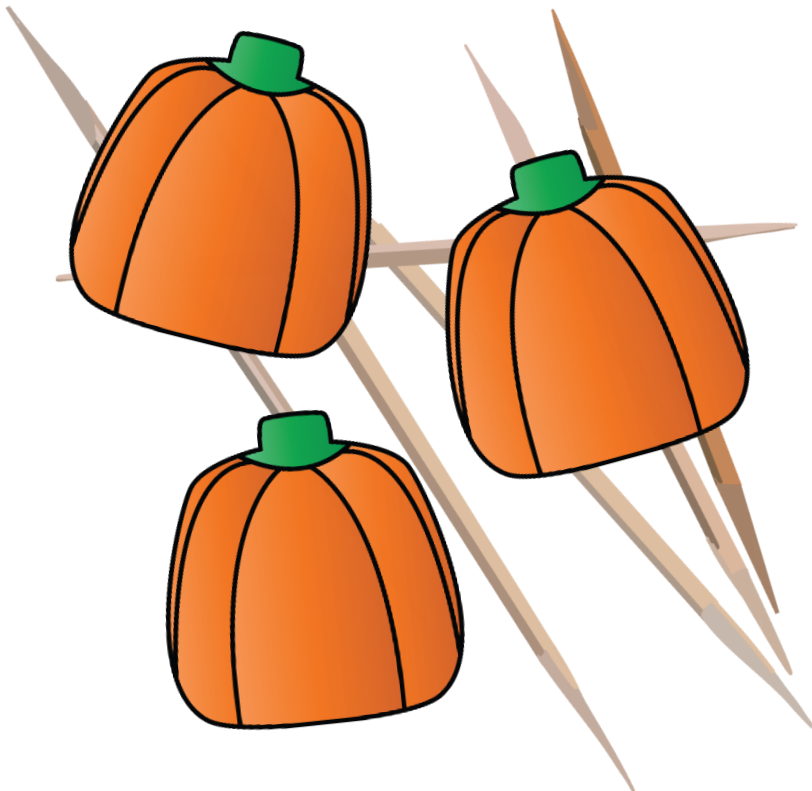
CANDY TOWER



candy Tower

You've been asked to create a special centerpiece for a Halloween party.

Construct the tallest possible tower for the table that stands on its own.



MATERIALS:

- * Candy pumpkins, gummy pumpkins, or pumpkin marshmallows (24 per group)
- * Toothpicks (20 per group)
- * Ruler

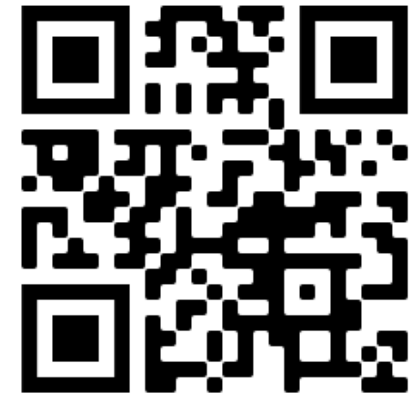
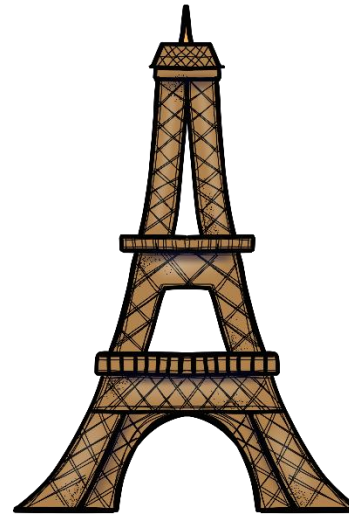
EXPLORE

STRUCTURES

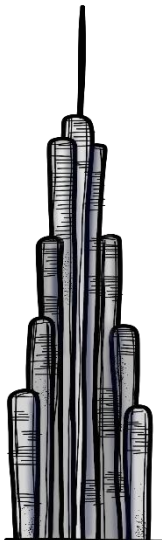
STRONG STRUCTURES



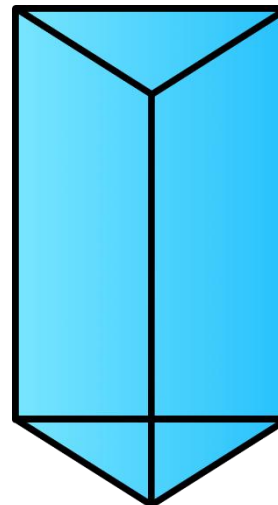
TALLEST BUILDINGS



SKYSCRAPERS



3D SHAPES



candy Tower

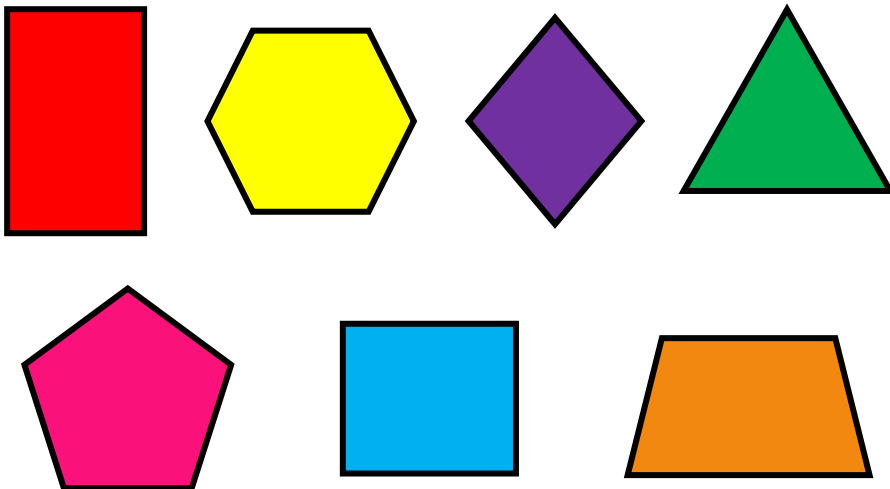
REAL WORLD EXAMPLES



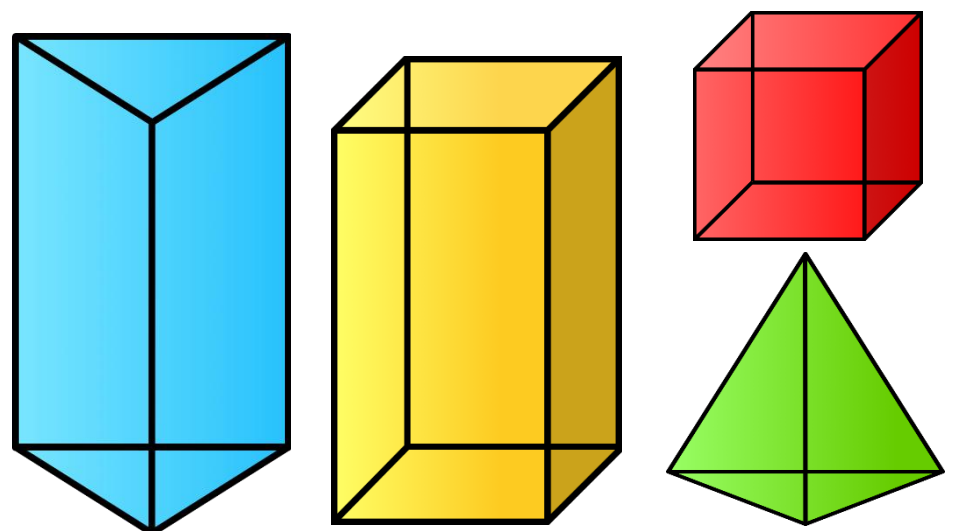
What is similar? What is different?

Other Famous Towers or Skyscrapers

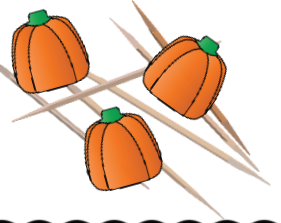
Common 2D Shapes found in Towers



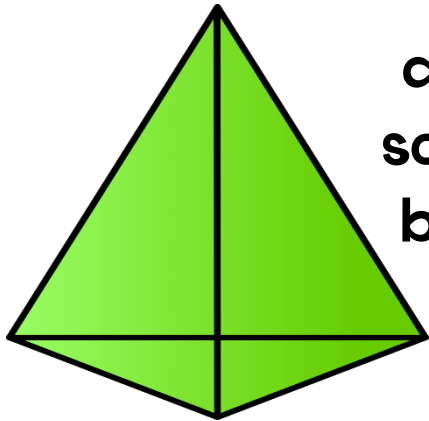
Common 3D Shapes found in Towers



WORDS TO KNOW

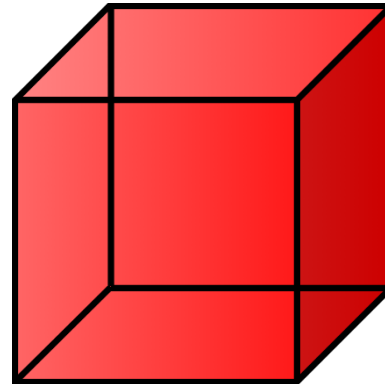


pyramid



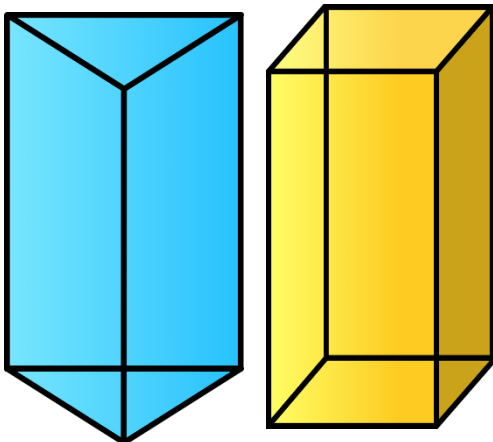
a three-dimensional solid with a polygonal base and triangular faces that meet at a point (apex)

cube



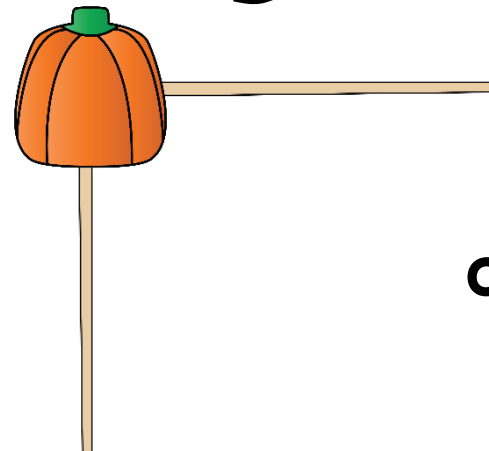
a three-dimensional solid made up of six equal squares

prism



a three-dimensional solid with congruent, polygonal bases and rectangular faces

joint



a point at which parts of a structure are joined



candy tower

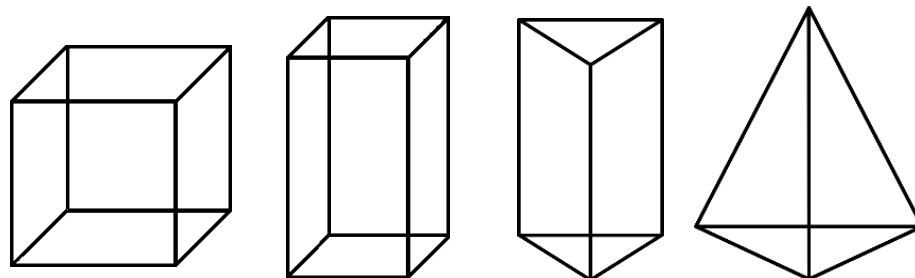
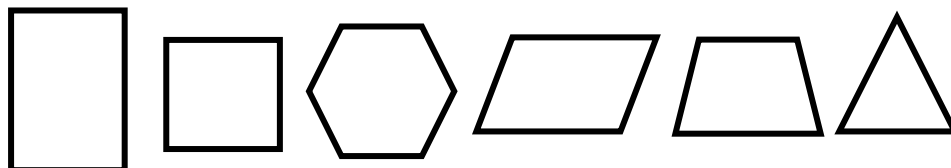
Name: _____

MY BLUEPRINT



Draw a picture of your tower.

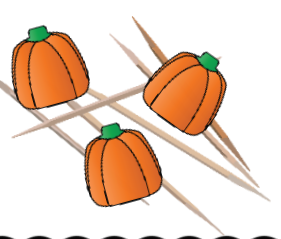
COLOR the shapes that you used in your design.
CIRCLE the shapes that were strongest.



Measure the height of your tower.

TEST 1 (15 min.)	
TEST 2 (30 min.)	
TEST 3 (45 min.)	

LET'S REFLECT!



- What was most difficult about this challenge?
- What types of two-dimensional and three-dimensional shapes did you use in your design?
- How do you think the shapes and patterns might relate to the strength of your tower?
- Which design was the highest and why do you think so?
- What parts of your tower were most important for it to be the most balanced and stable?
- How are real tower designs similar to and different from your design?
- If we completed this challenge again, what would you do differently next time?

STEM Challenge Assessment Rubric

Challenge: _____
 Date: _____
 Student Name: _____

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: _____

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.
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TOTAL POINTS: _____ /18

Comments: _____

STEAM 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.
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TOTAL POINTS: _____ /18

Comments: _____

STEAM 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.
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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: _____



We Need

STEAM Supplies!



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

Parent Name(s): _____

Child's Name: _____

I am able to donate: _____

credits

created by Brooke Brown

Thank you for your purchase!



Tim Sensei, TpT