INTRODUCING STEM
+ BACK TO SCHOOL ACTIVITIES

CREATED BY BROOKE BROWN

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INTRODUCING STEM OR STEAM

When you are introducing STEM/STEAM to your students as well as the Engineering Design Process, here are some suggested read alouds and videos. You can see more read aloud suggestions in the Maker activities on page 42.

SUGGESTED READ ALOUDS

- Rosie Revere, Engineer
- Iggy Peck, Architect
- What Do You Do with a Problem?
- Jabari Tries
- The Most Magnificent Thing
- Made by Maxine
- Going Places
- Izzy Gizmo

SUGGESTED VIDEOS

What is STEM?

What is an Engineer?

Solve Problems: Be an Engineer

Think Like an Engineer

What's an Engineer?

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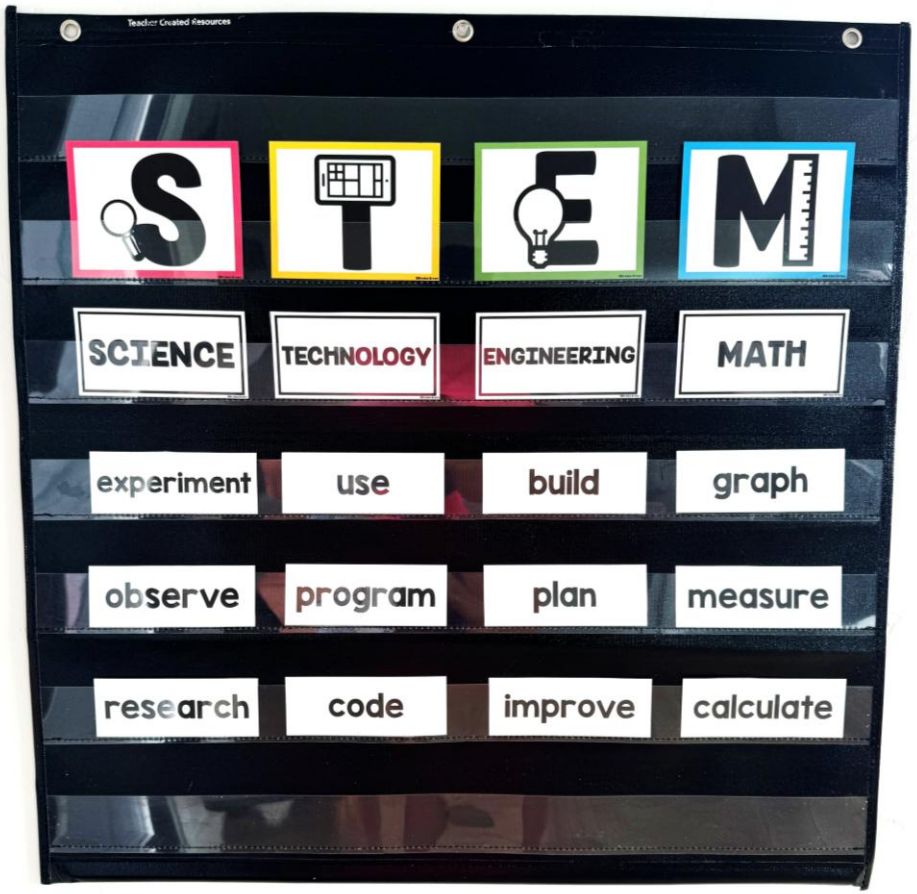
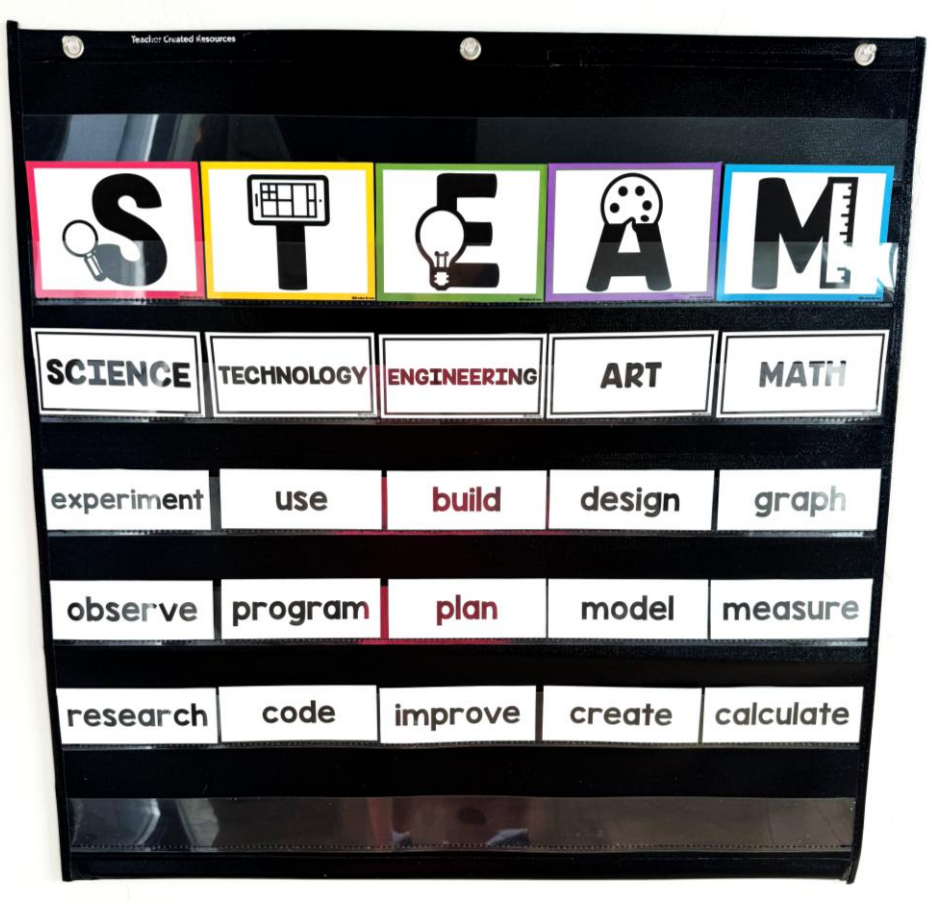
INTRODUCING STEM OR STEAM

Use the following cards in a pocket chart to guide a discussion with students about what the acronym STEM or STEAM means. Have students sort the action verbs into the subject area that best matches each action. See the examples below:





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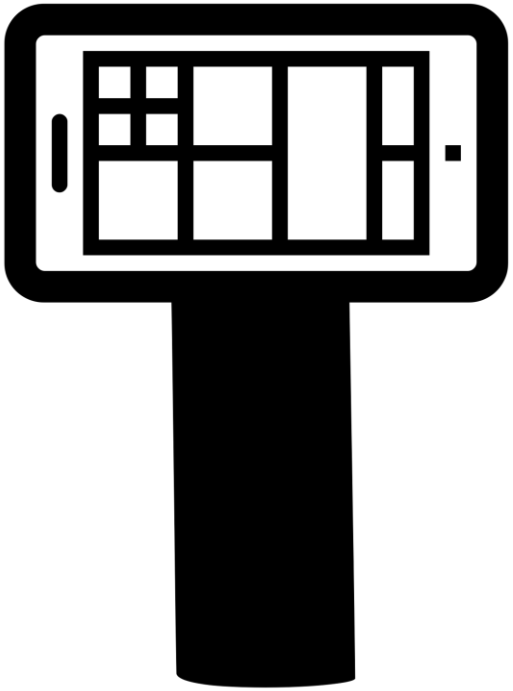

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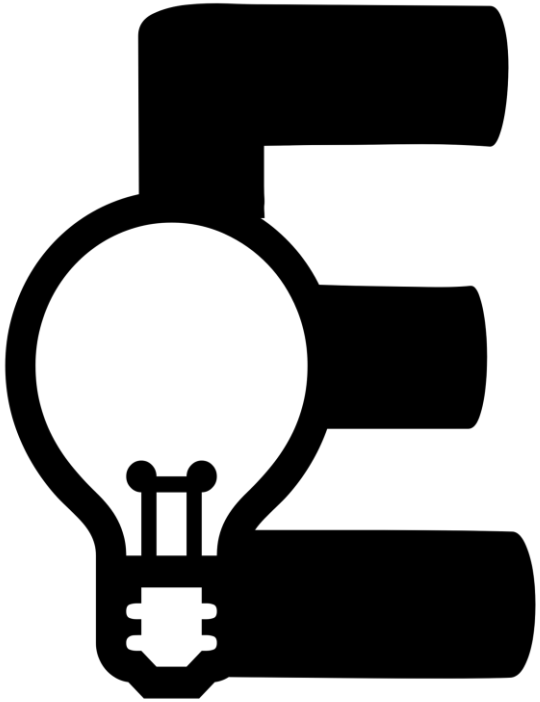

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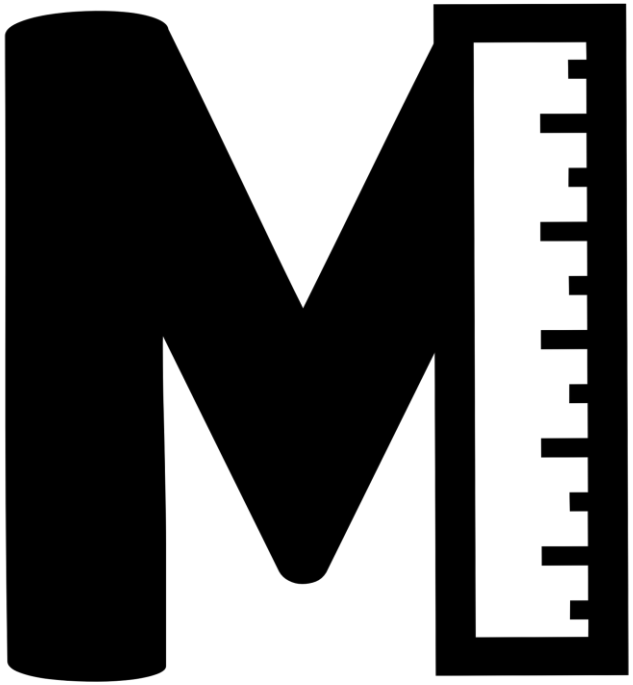

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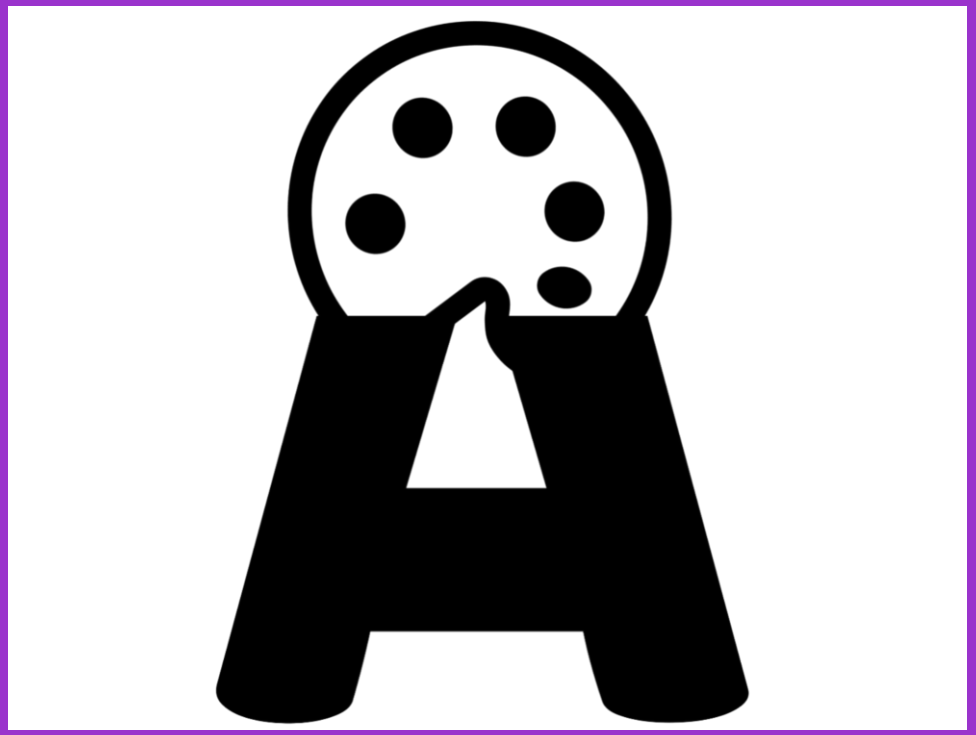

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SCIENCE

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TECHNOLOGY

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ENGINEERING

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MATH

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ART

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observe	experiment
research	use
code	program
plan	build

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improve	measure
calculate	graph
design	create
model	

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INTRODUCING STEM OR STEAM

Use the following STEM or STEAM templates to help your students create a flipbook. Copy templates FRONT TO BACK, then have students cut along the dashed lines and fold the flaps to create a flipbook. (For students in K-1st grade, copy only the front side. Students can draw pictures underneath each flap or write only the subject areas for the acronym.)

I would suggest modeling an example on a document camera as you guide discussions and help students complete their flipbooks. Suggested responses and examples are shown below:

Scientist - observes, researches, and experiments to learn more about the way the world works
Technician - uses tools such as technology, school supplies, and measurement tools to make work easier
Artist - uses shapes and designs to create a variety of art forms and models
Engineer - designs, constructs, tests, and improves structures
Mathematician - uses numbers to solve problems, measure test results, and collect data

<u>TOOLS:</u>
Scientist: microscope, beaker, test tube, goggles, magnifying glass
Technician: tablet, computer, robot, scissors, tape
Engineer: blueprint paper, LEGO, wooden blocks, bricks, steel
Artist: paint, paper, markers, crayons, playdough
Mathematician: meterstick, tape measure, scale, calculator, graph paper

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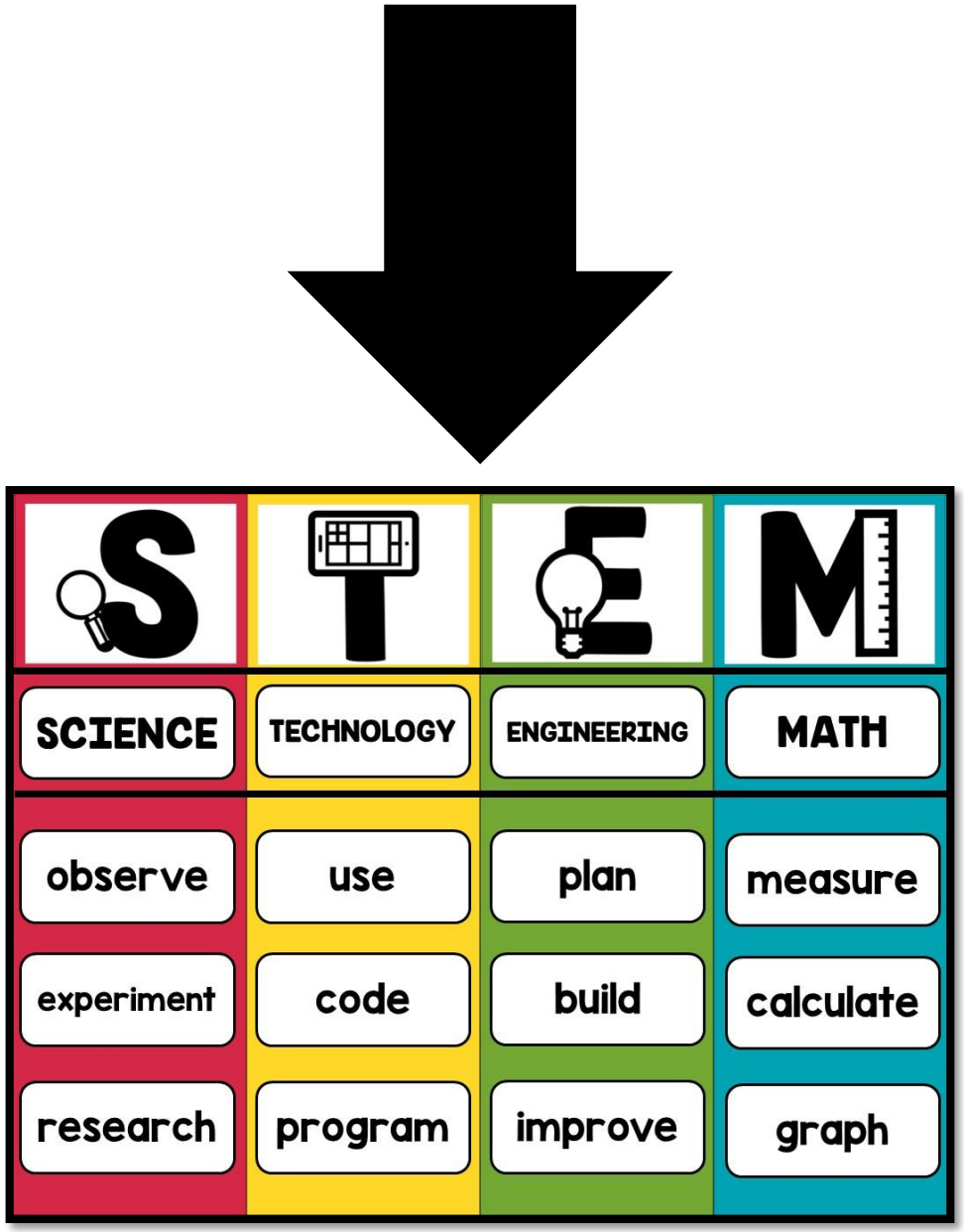
INTRODUCING STEM OR STEAM

Click to below to access an interactive Google Slides file for introducing STEM or STEAM.



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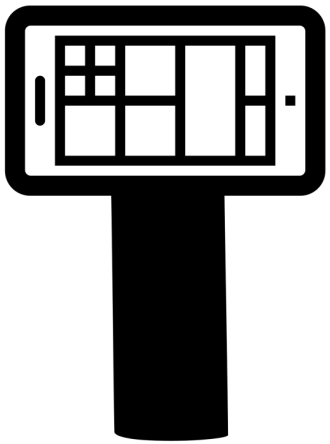


Me as an Engineer

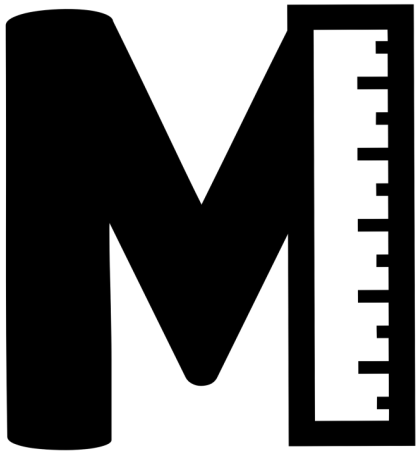
Draw a picture of you as an engineer.

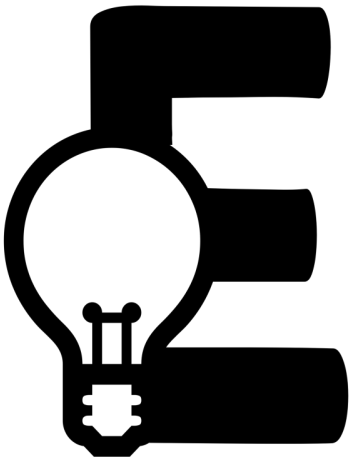
FOLD

FOLD

FOLD

FOLD





Name: _____

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S stands for

Draw some tools that SCIENTISTS use:

What does a SCIENTIST do?

FOLD

What does a TECHNICIAN do?

FOLD

T stands for

Draw some tools that TECHNICIANS use:

E stands for

Draw some tools that ENGINEERS use:

What does an ENGINEER do?

FOLD

What does a MATHEMATICIAN do?

FOLD

M stands for

Draw some tools that MATHEMATICIANS use:

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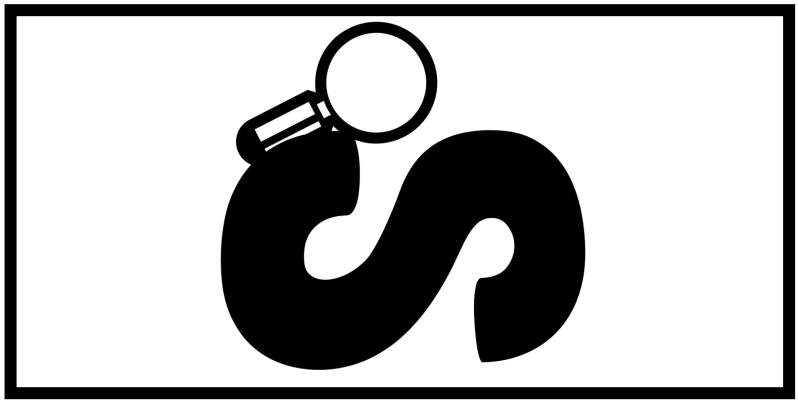

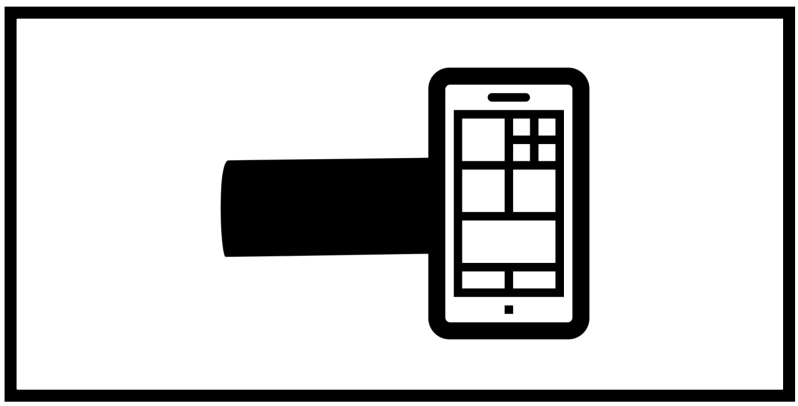

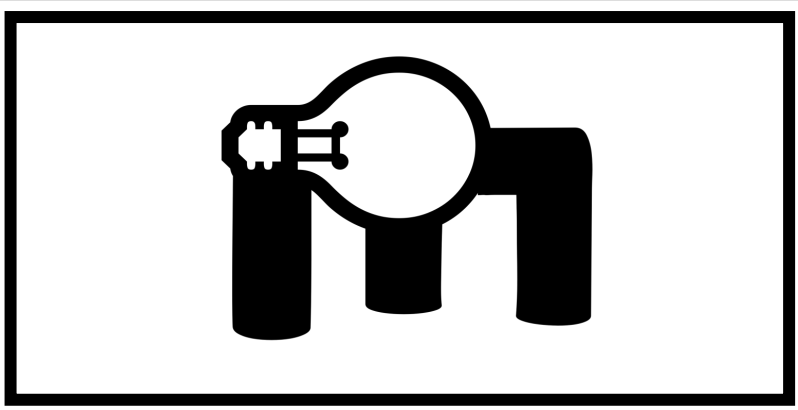

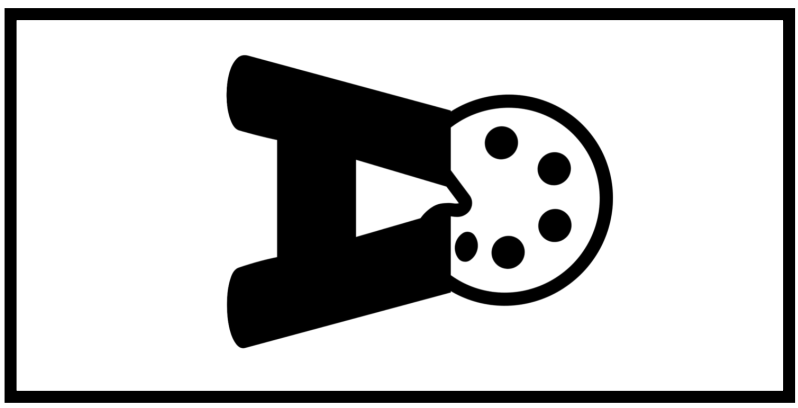

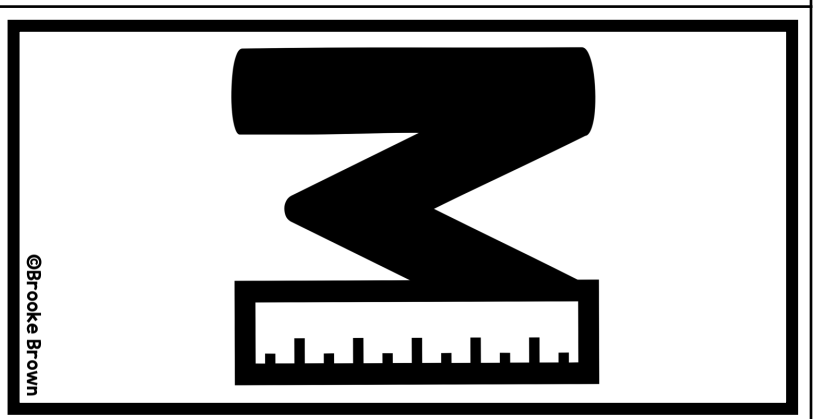

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Me as an Engineer

Draw a picture of you as an engineer.

S
stands for

Draw some tools that SCIENTISTS use:

What does a SCIENTIST do?

T
stands for

Draw some tools that TECHNICIANS use:

What does a TECHNICIAN do?

E
stands for

Draw some tools that ENGINEERS use:

What does an ENGINEER do?

A
stands for

Draw some tools that ARTISTS use:

What does an ARTIST do?

M
stands for

Draw some tools that MATHEMATICIANS use:

What does a MATHEMATICIAN do?

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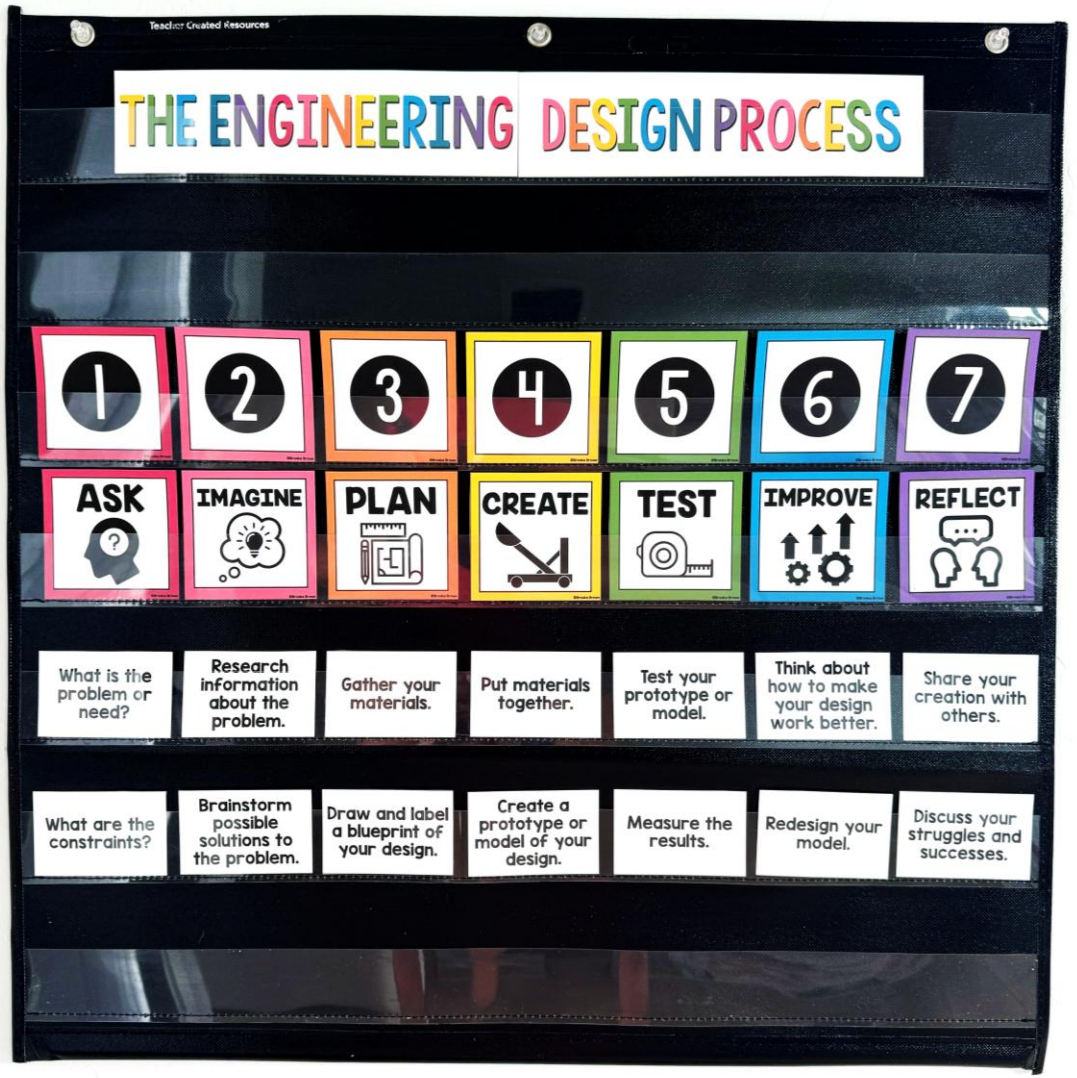
THE ENGINEERING DESIGN PROCESS

Use the following cards in a pocket chart to guide a discussion with students about each step of The Engineering Design Process.
Have students sort the statements underneath each step.

See the example below:



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THE ENGINEERING DESIGN PROCESS

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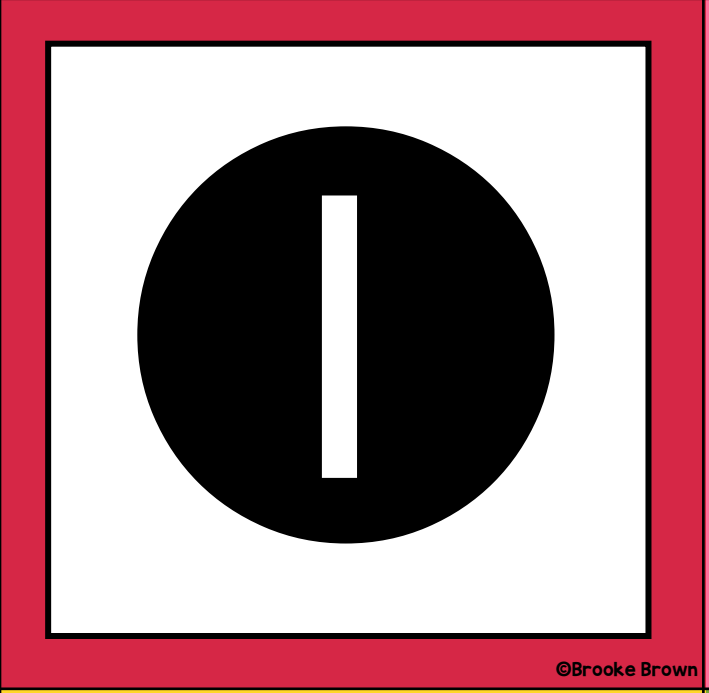
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2
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3
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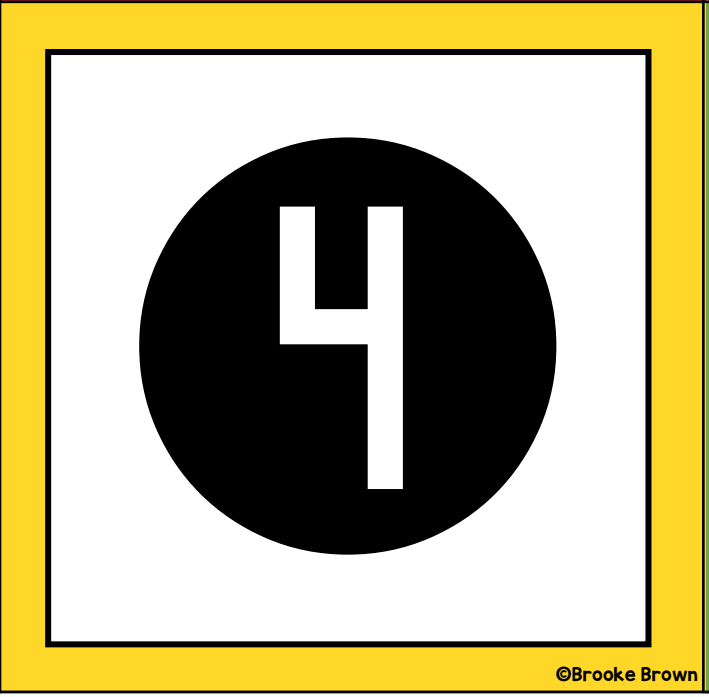
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5
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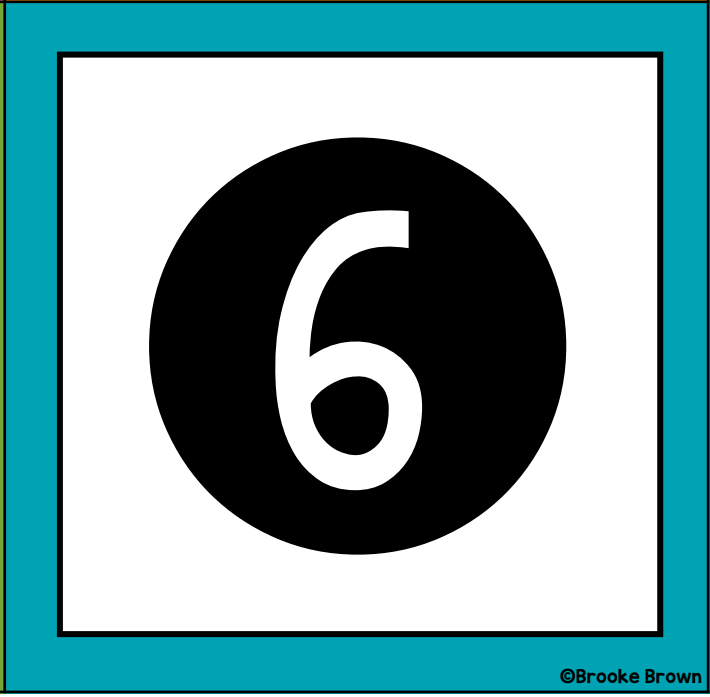
6
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7

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ASK

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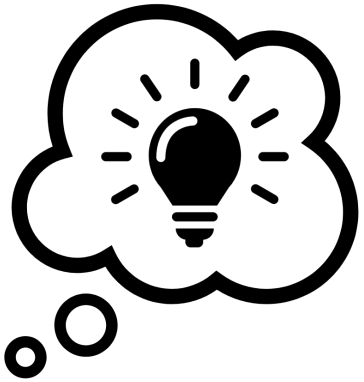
IMAGINE



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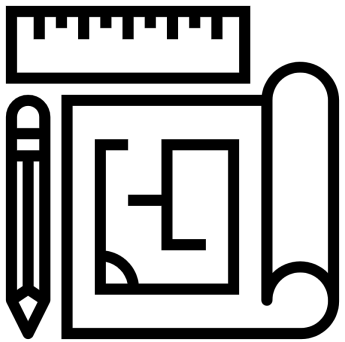
PLAN



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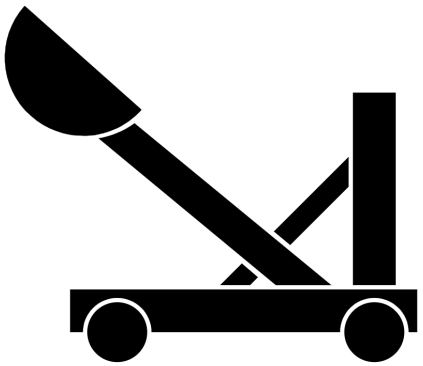
CREATE



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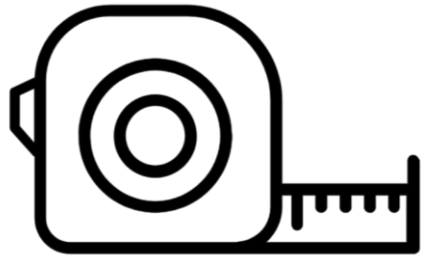
TEST



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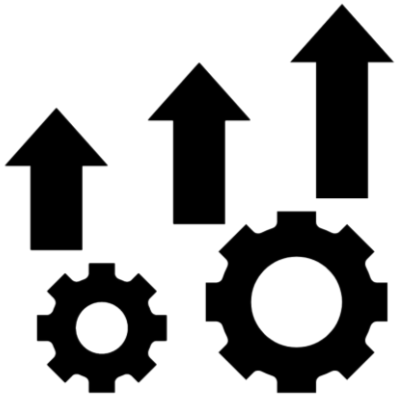
IMPROVE



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REFLECT

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What is the problem or need?	What are the constraints?	Research information about the problem.
Brainstorm possible solutions to the problem.	Draw and label a blueprint of your design.	Gather your materials.
Put materials together.	Create a prototype or model of your design.	Test your prototype or model.

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Measure the results.	Think about how to make your design work better.	Redesign your model.
Share your creation with others.	Discuss your struggles and successes.	

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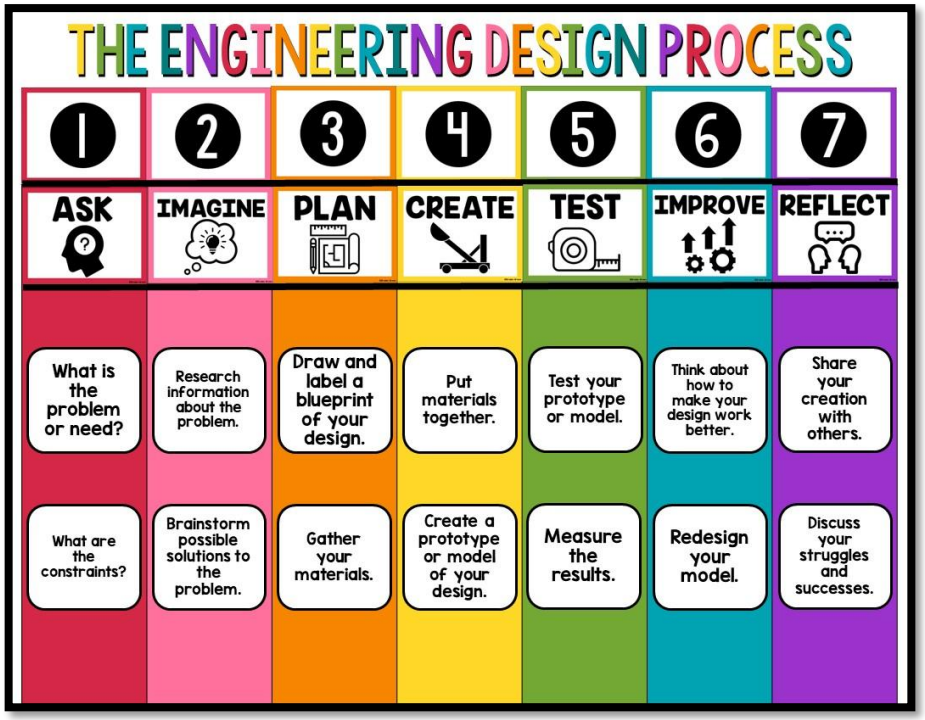
THE ENGINEERING DESIGN PROCESS

Click to below to access an interactive Google Slides file for introducing the EDP:



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THE ENGINEERING DESIGN PROCESS

Have your students create an Engineering Design Process wheel. They can use this reference tool throughout the year as they navigate each step of the EDP. I would suggest modeling an example on a document camera as you guide discussions and help students complete their wheels.

See the example below:

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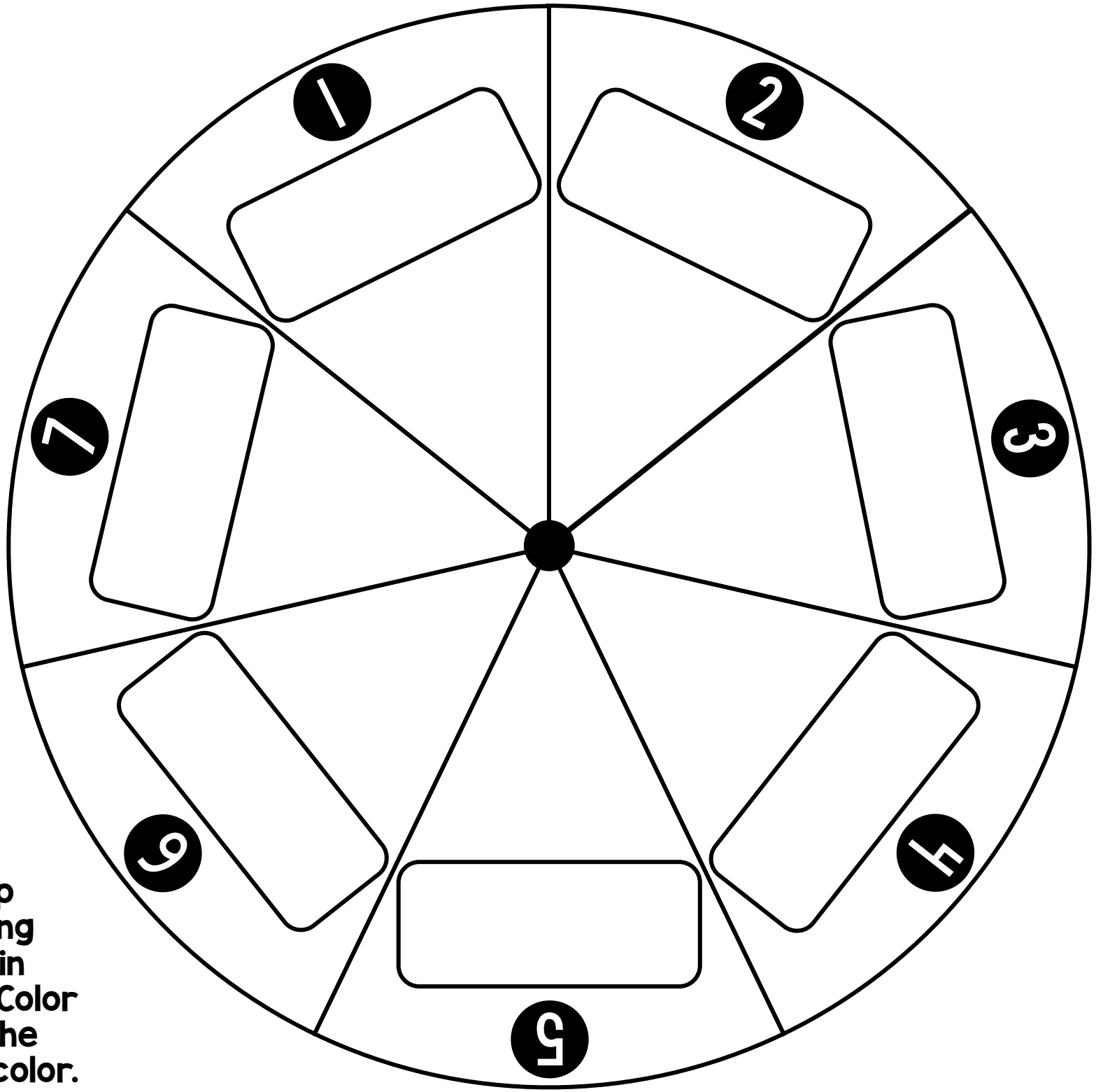
ENGINEERING DESIGN PROCESS WHEEL

Each student needs one large wheel and one center circle on the following page. The large wheel will go behind the center circle with a brad going through the black dots.



DIRECTIONS:
Write each step of the Engineering Design Process in the empty boxes. Color each section of the wheel a different color.

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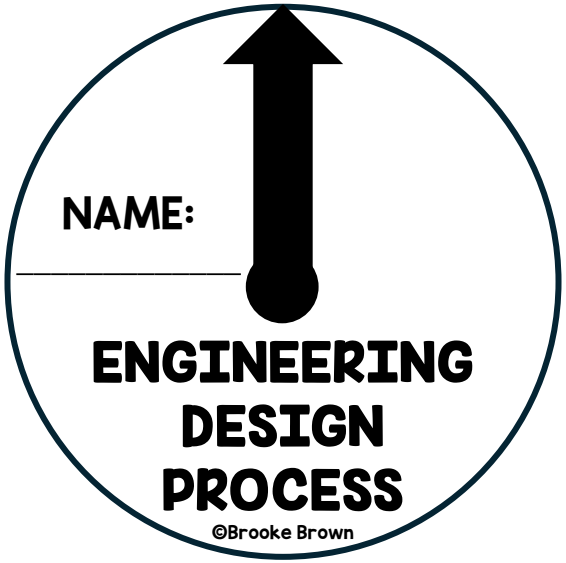
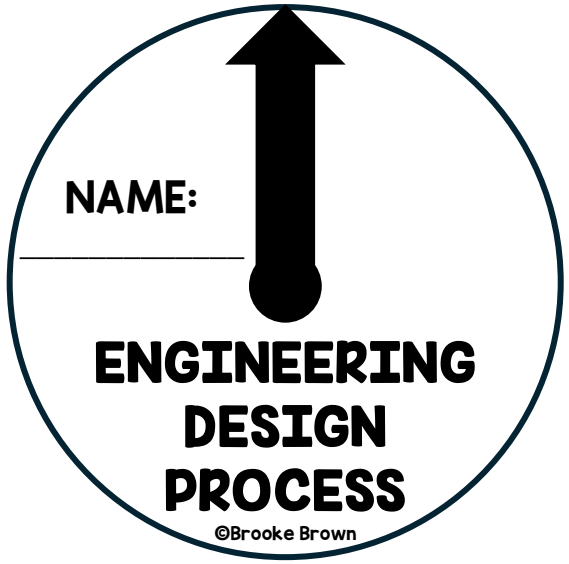
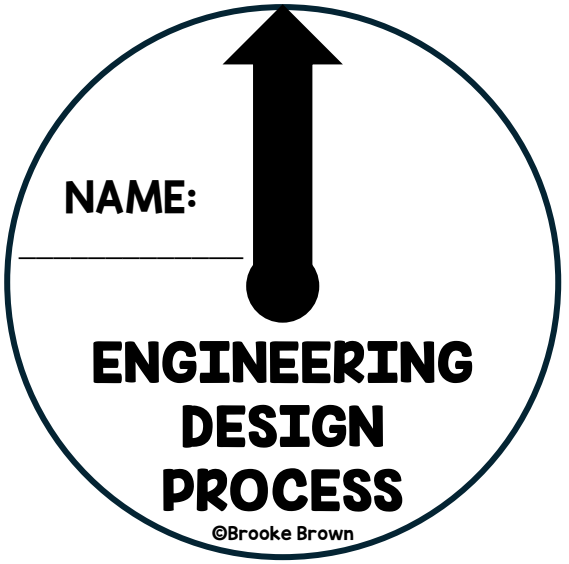
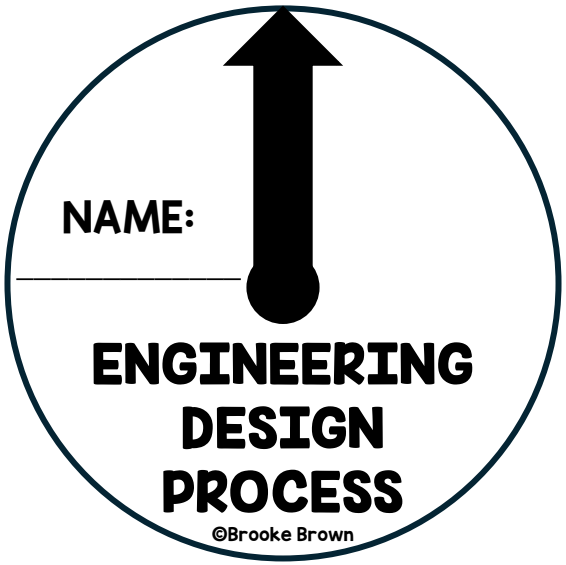
ENGINEERING DESIGN PROCESS WHEEL (CENTER)

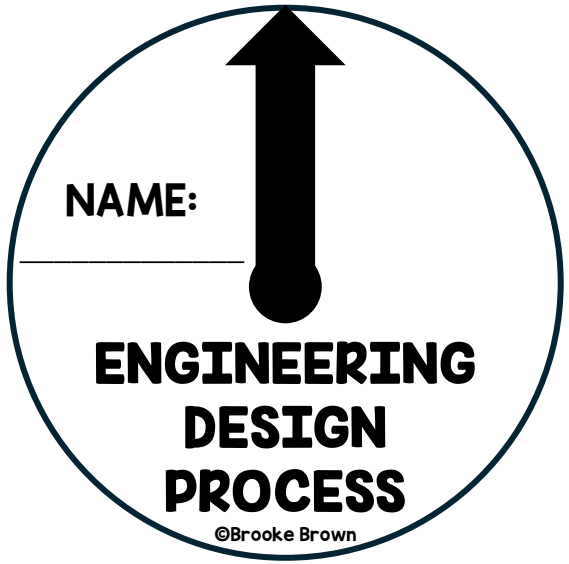
Each student needs one center. This piece will go on top of the large wheel with a brad going through the black dot.

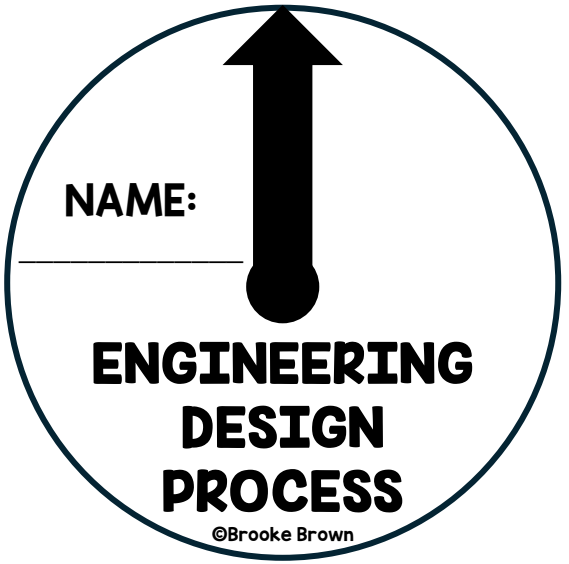






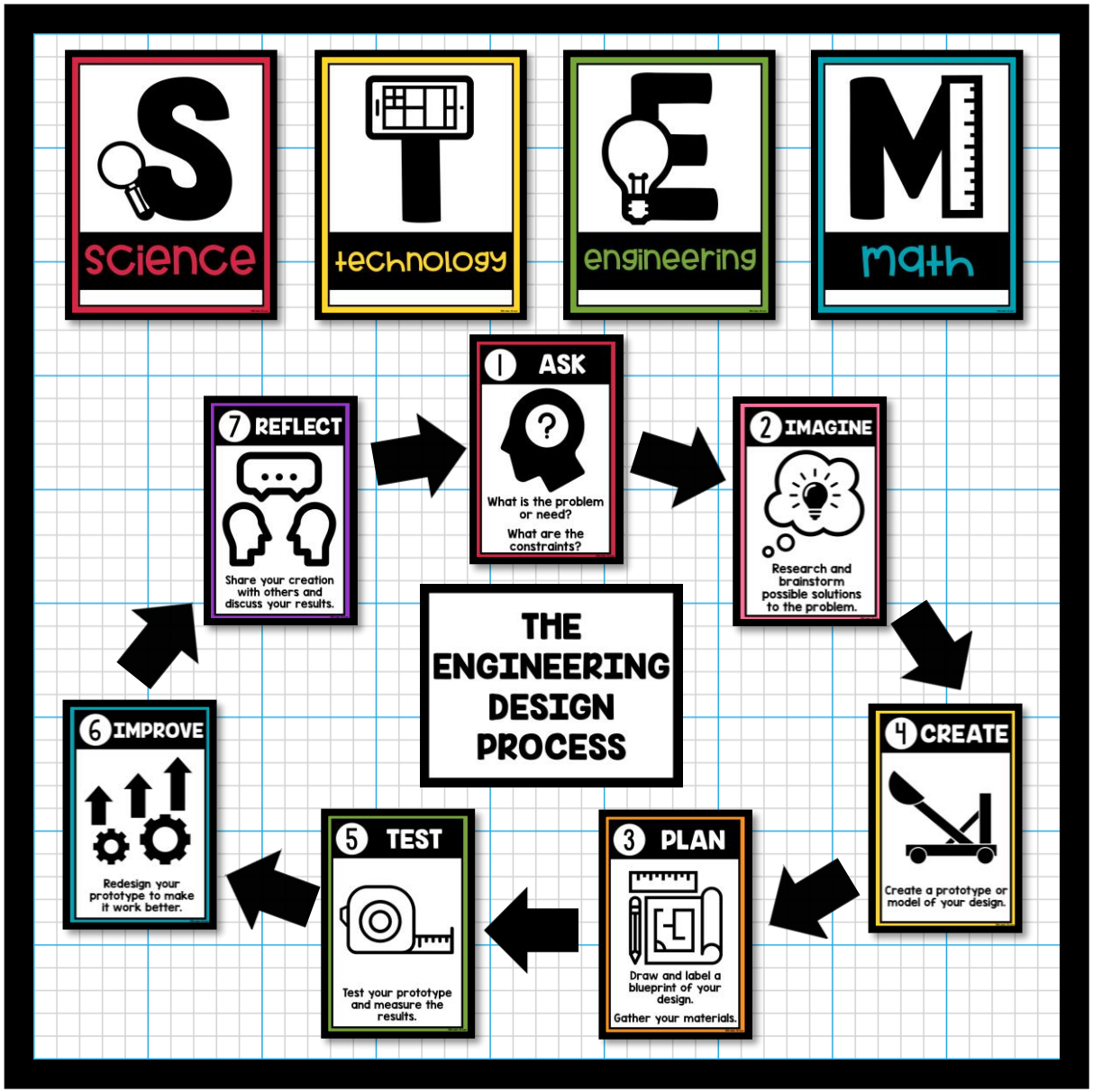






THE ENGINEERING DESIGN PROCESS

Use the following posters to create a bulletin board display that you and your students can refer to all year long. See the example below:



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science

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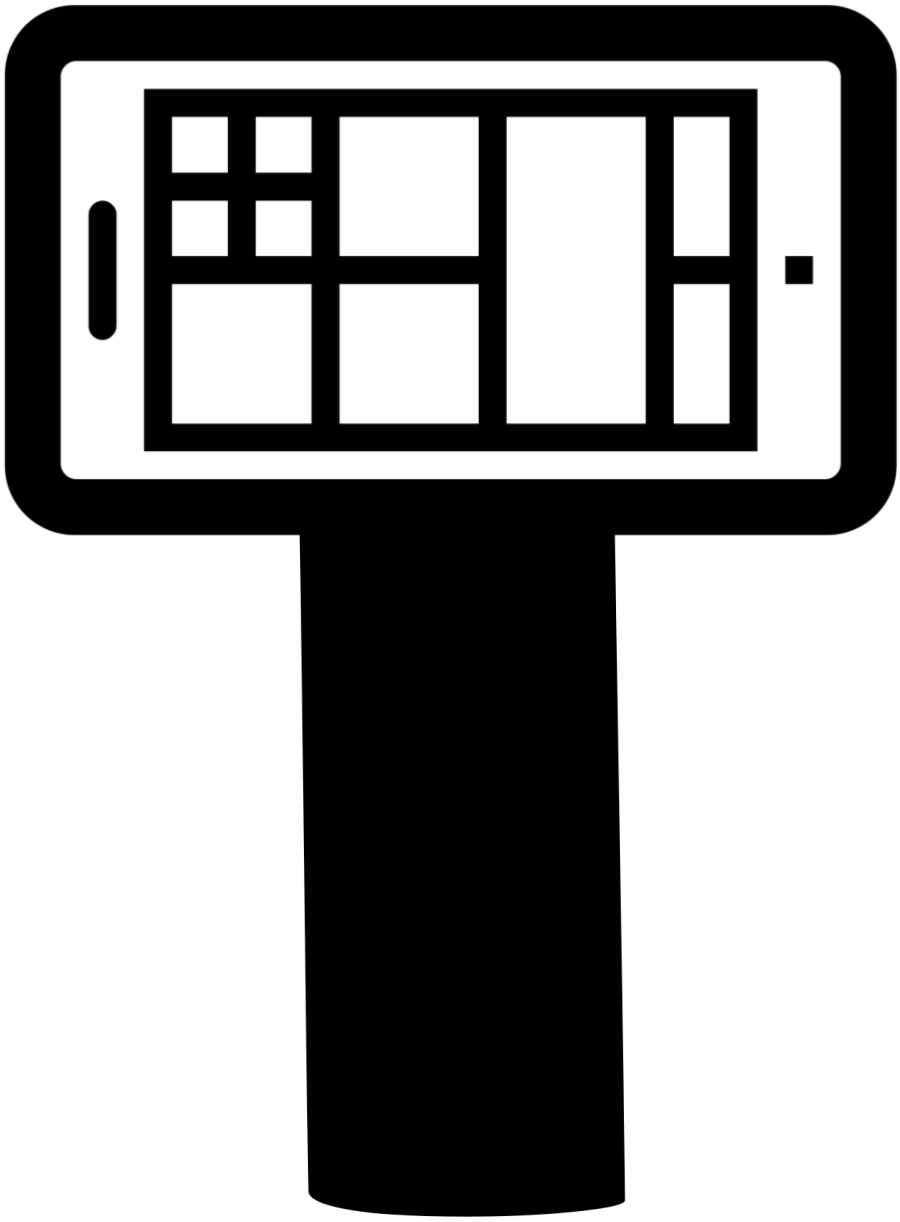

technology

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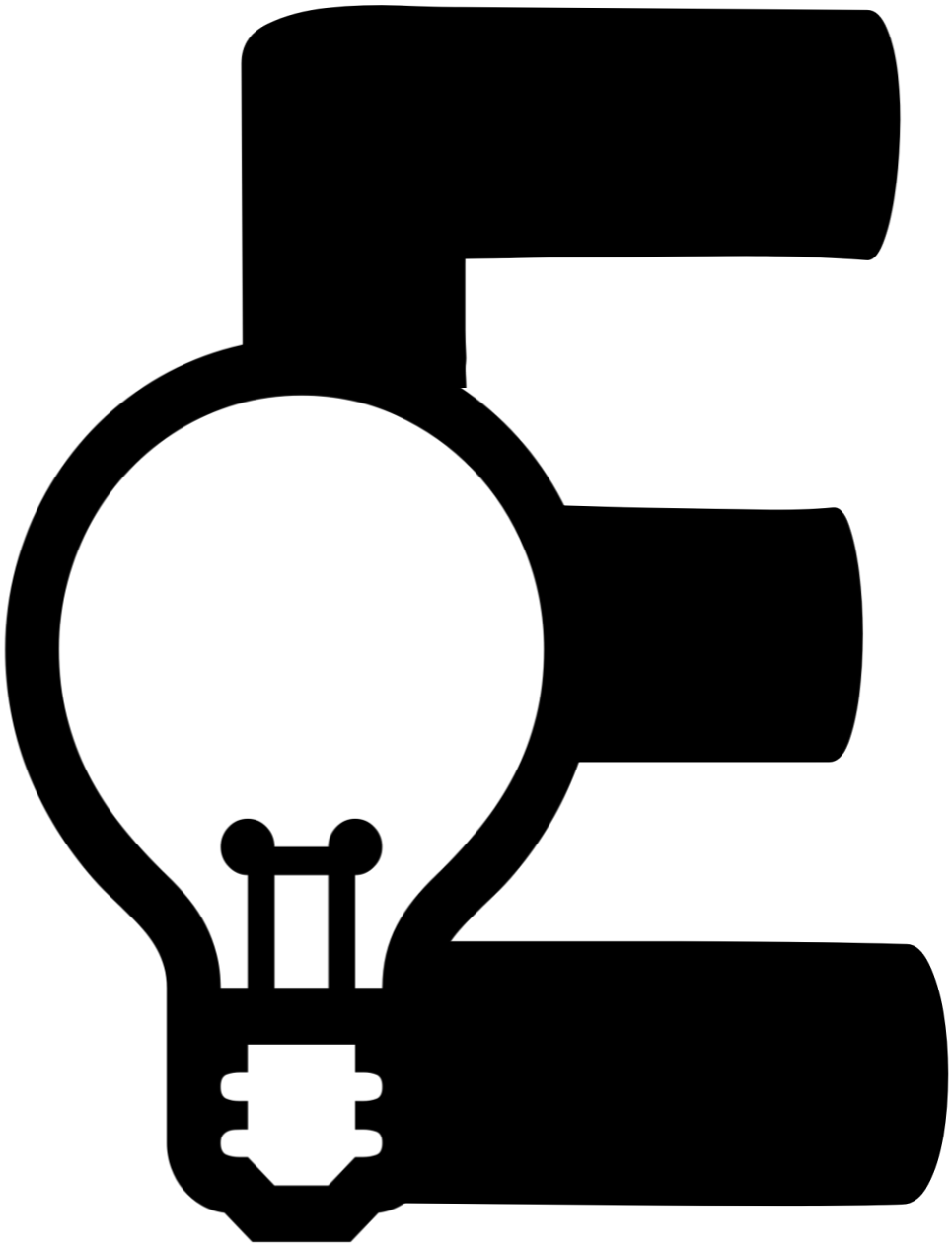

engineering

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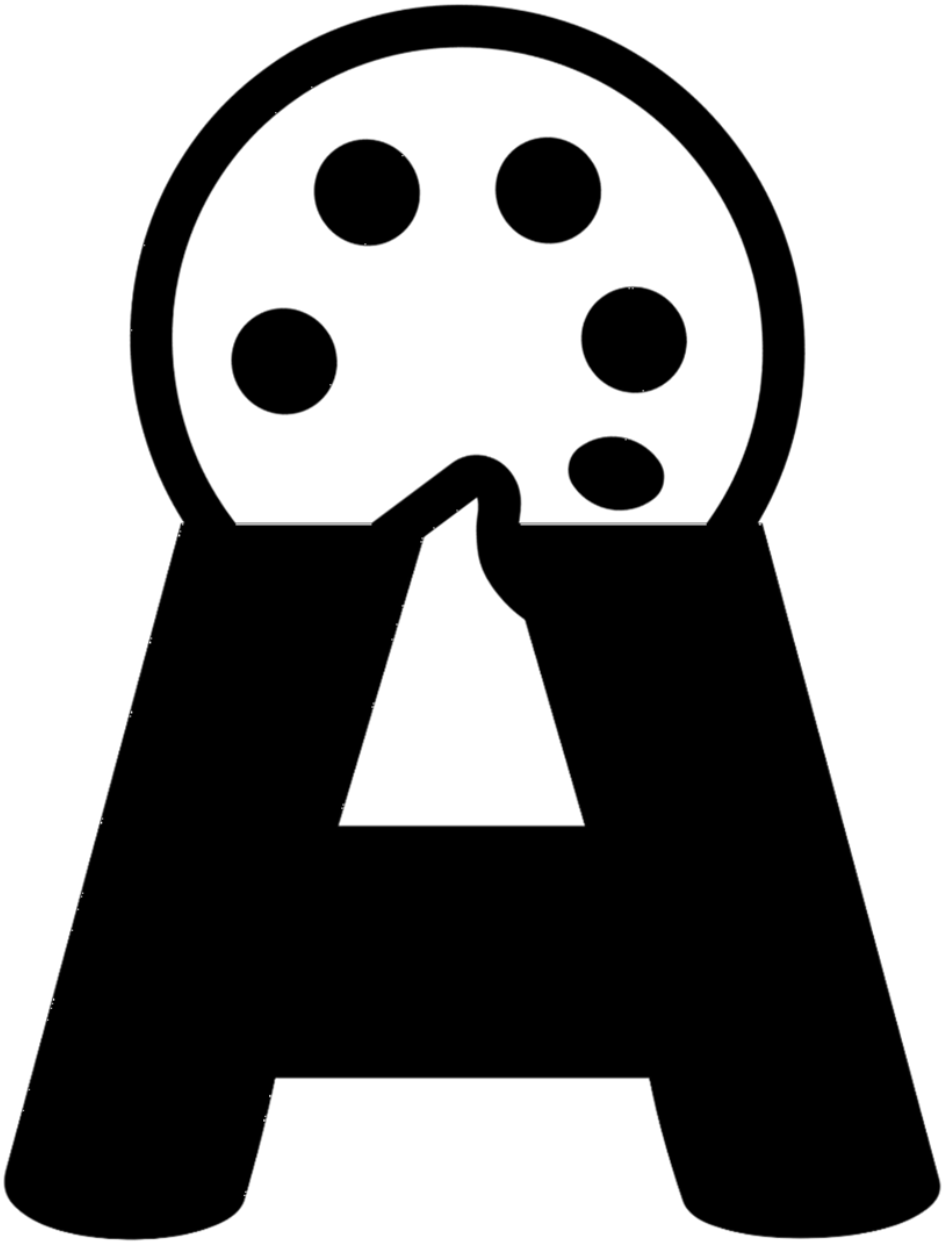

ar+

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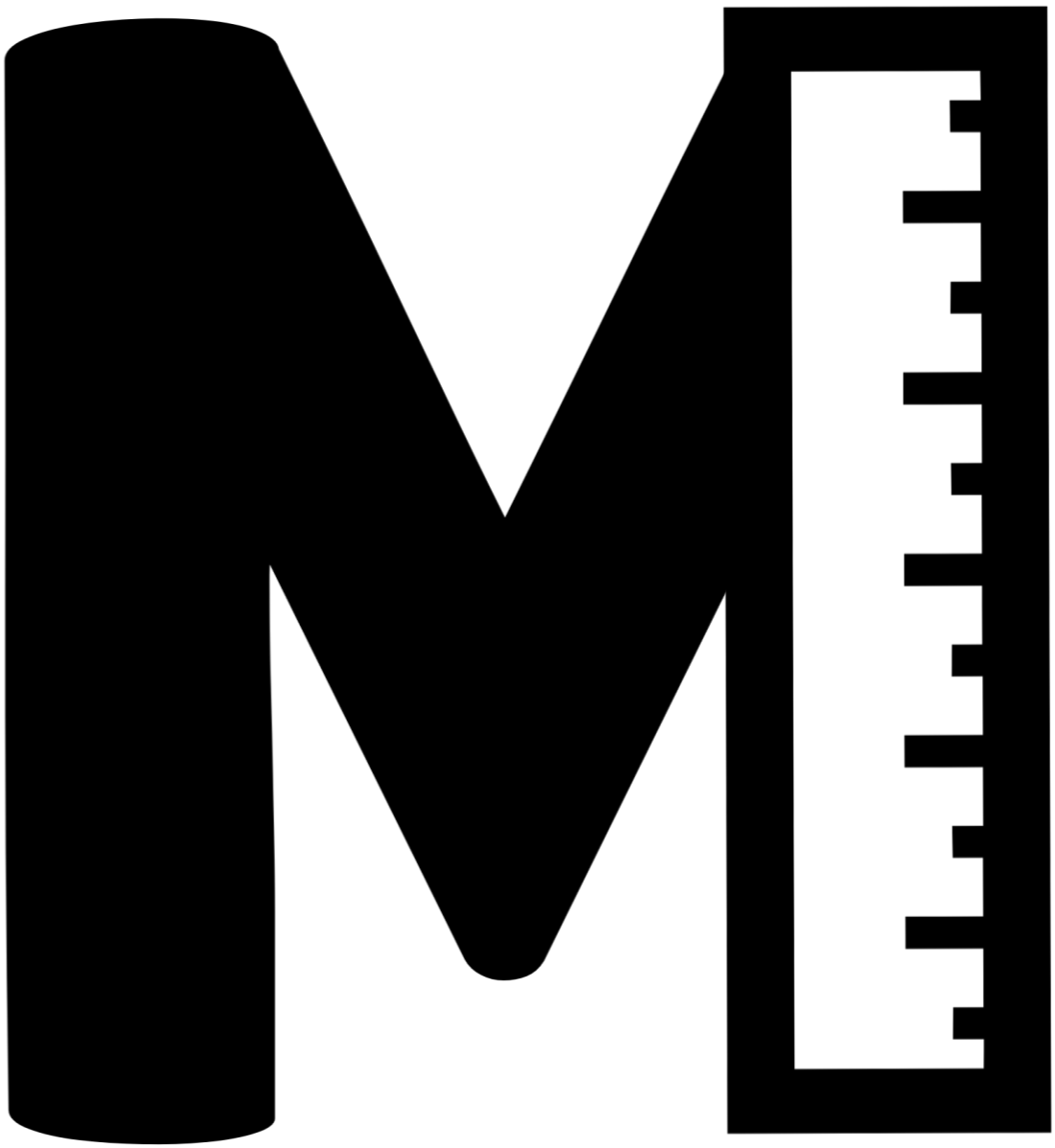

math

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THE ENGINEERING DESIGN PROCESS

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1 ASK

What is the problem or need?

What are the constraints?

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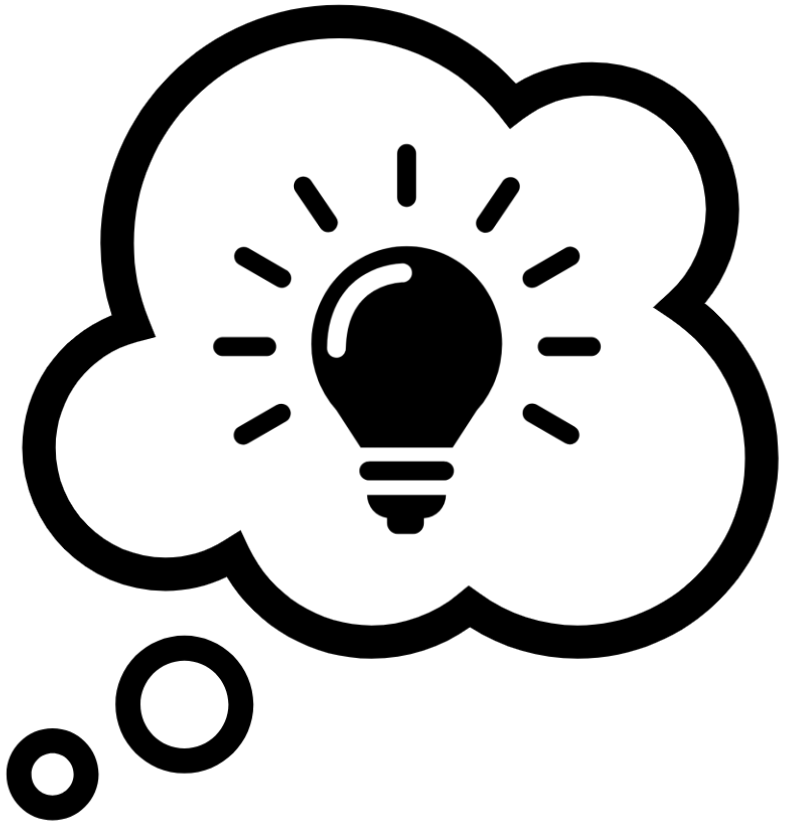
2 IMAGINE



Research and brainstorm possible solutions to the problem.

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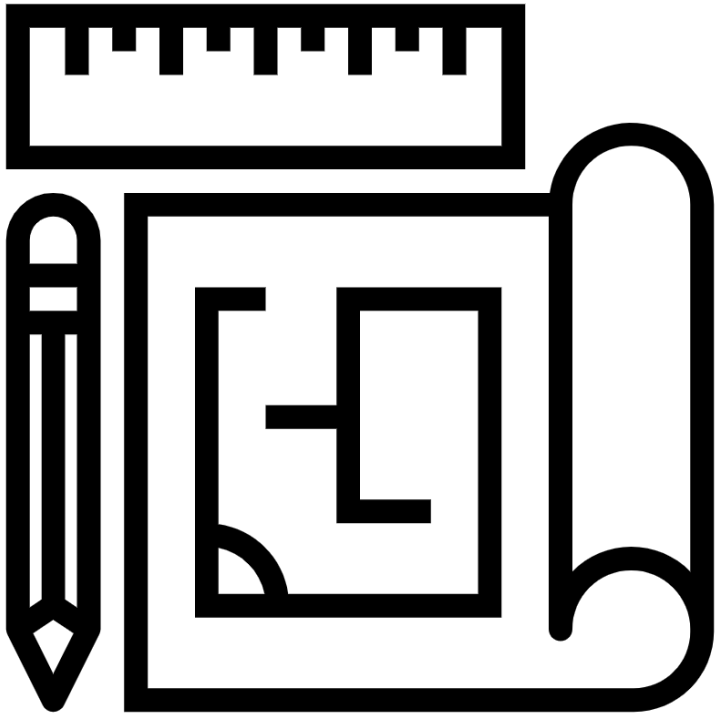
3 PLAN



Draw and label a blueprint of your design.

Gather your materials.

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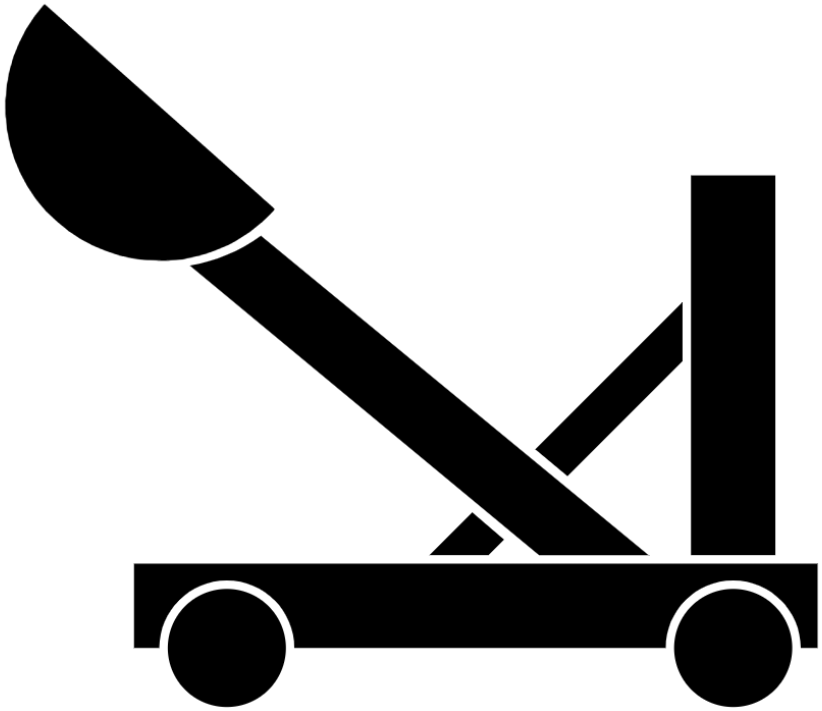
4 CREATE



Create a prototype or model of your design.

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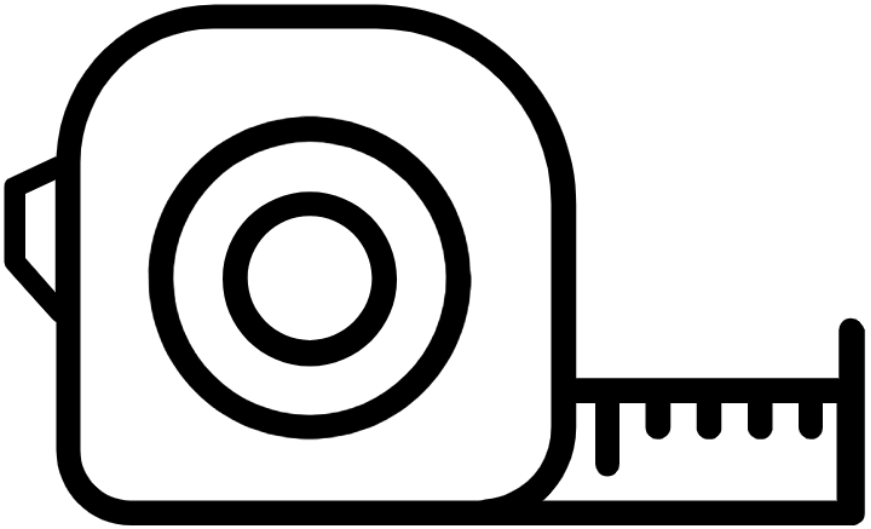
5 TEST



Test your prototype and measure the results.

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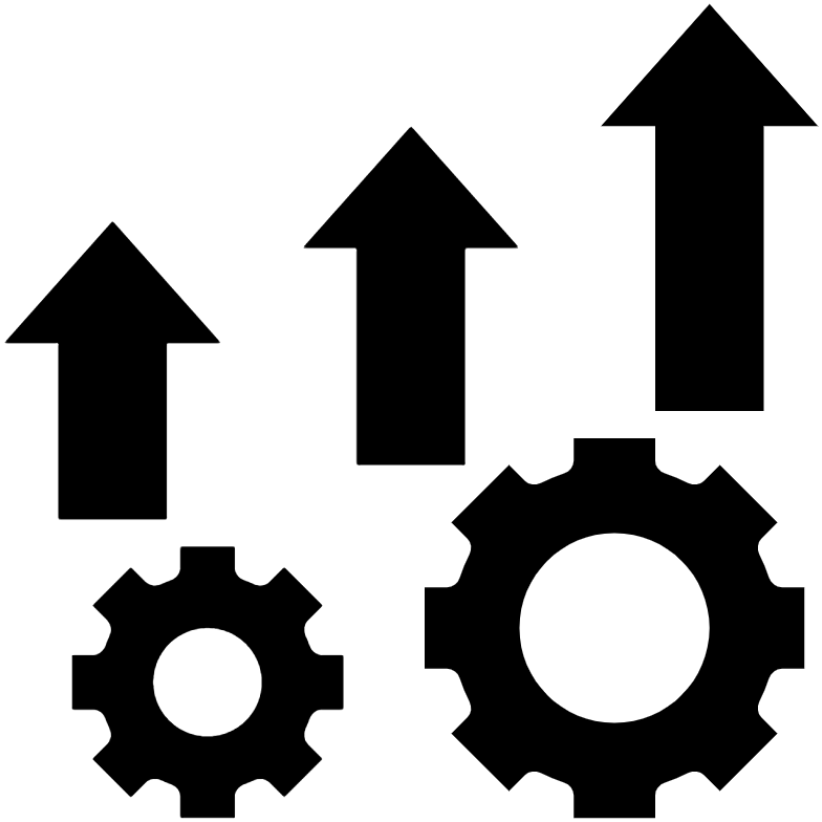
6 IMPROVE



Redesign your prototype to make it work better.

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7 REFLECT

Share your creation with others and discuss your results.

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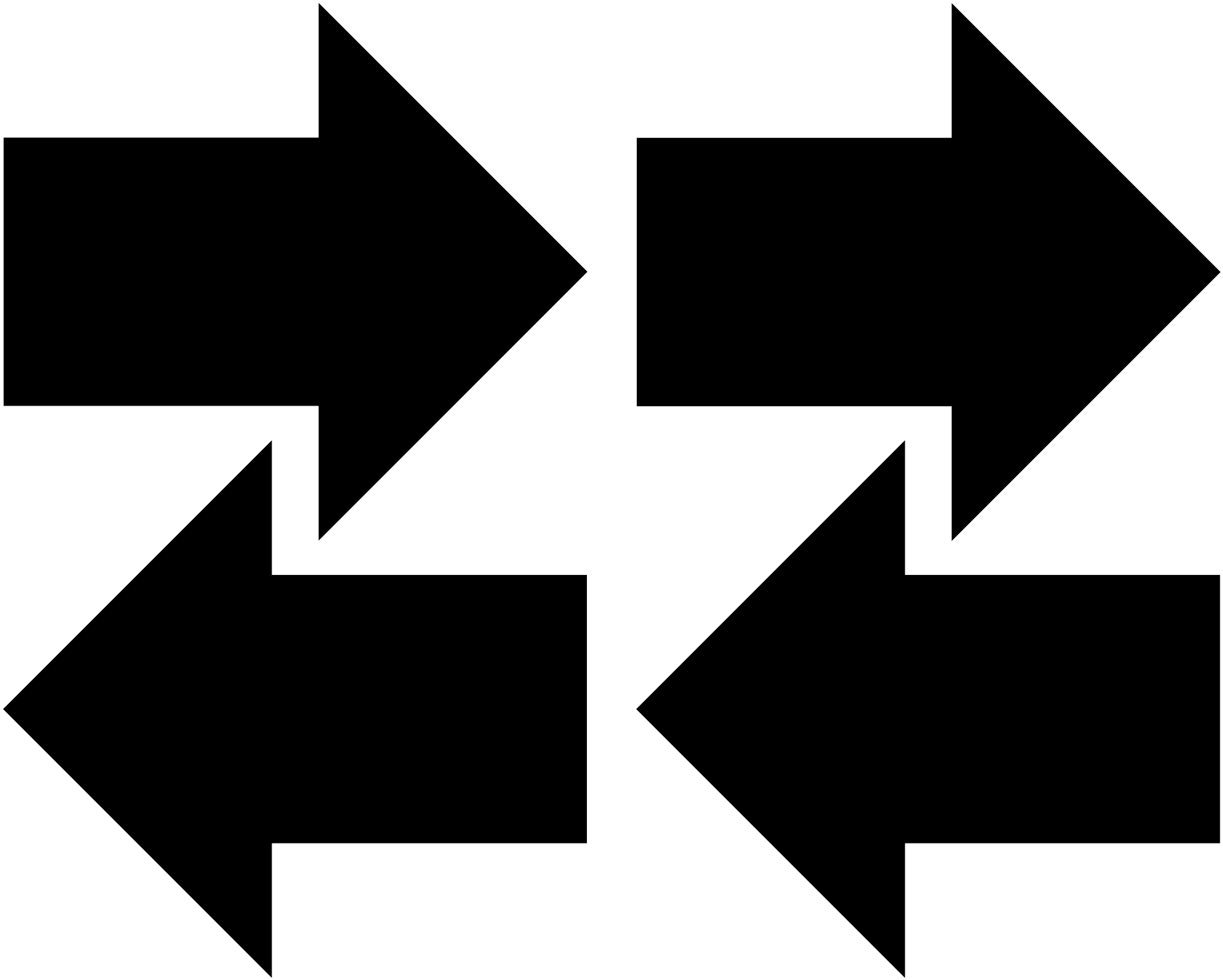

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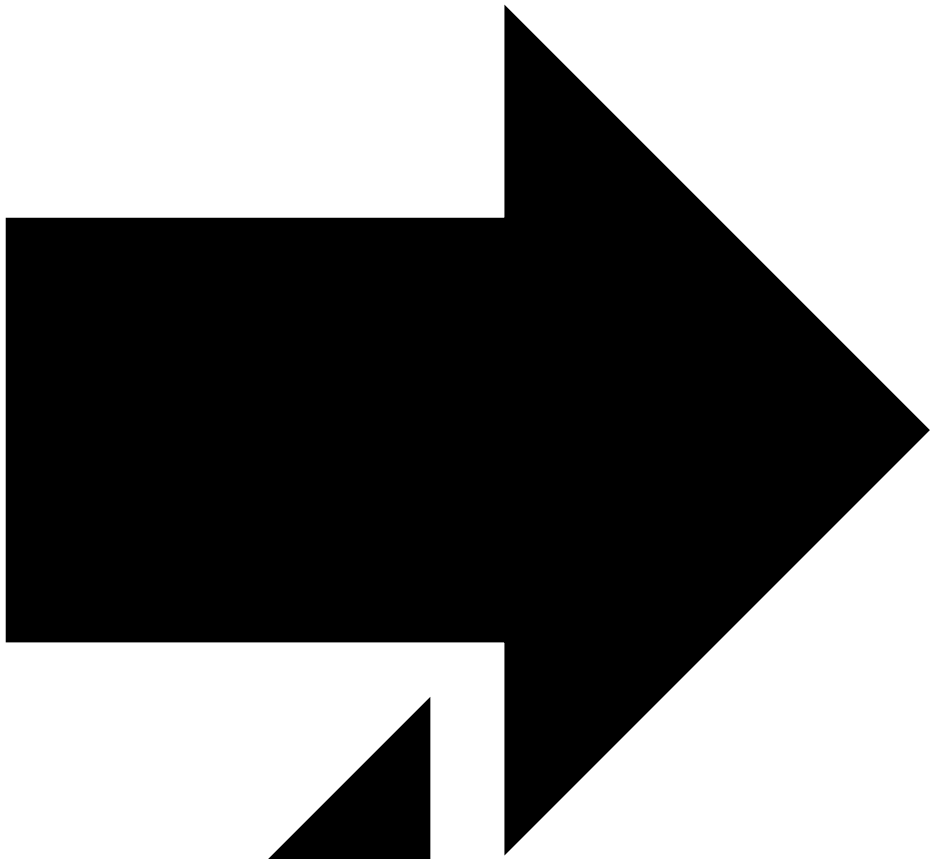

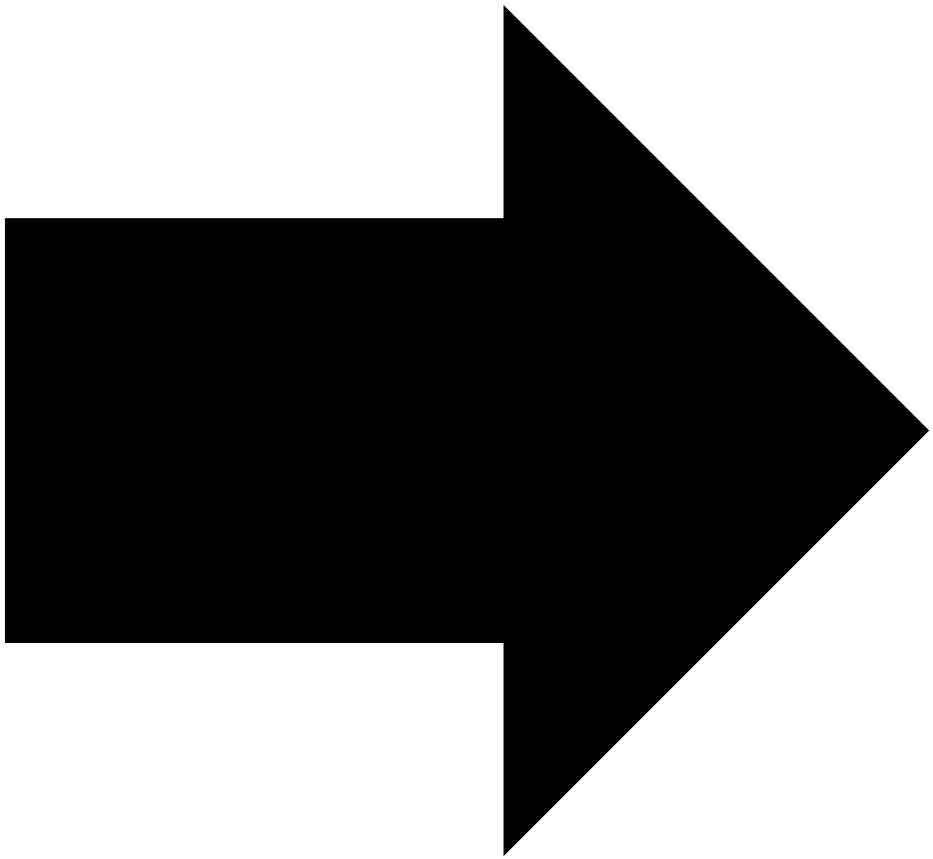

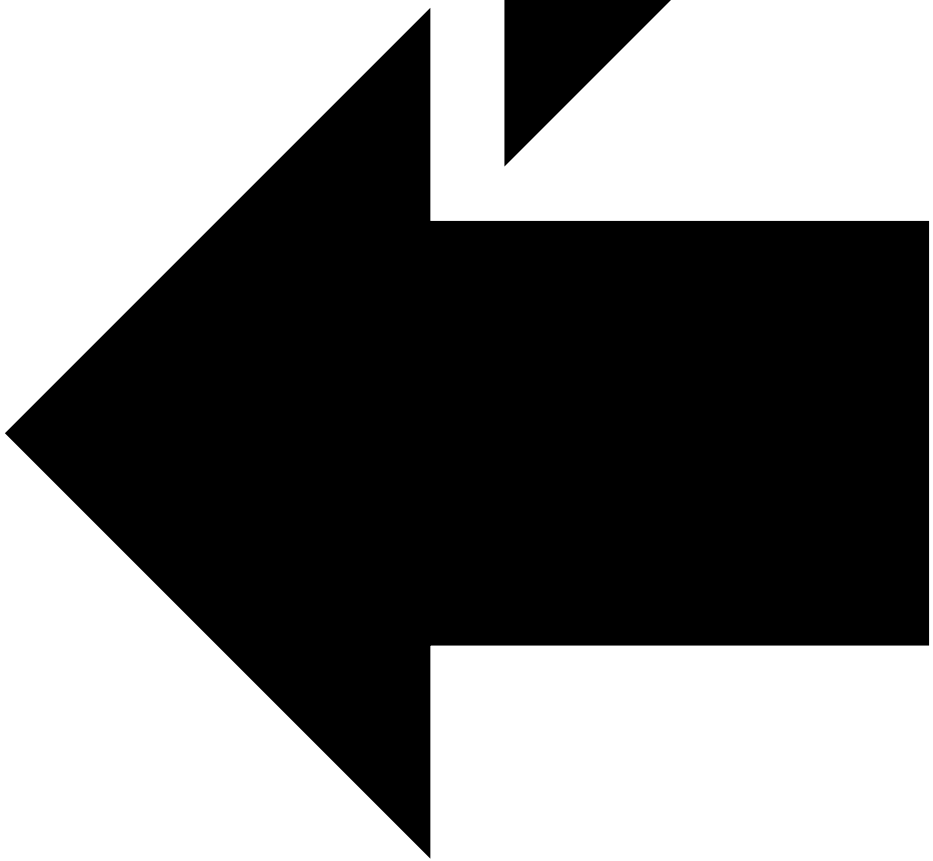

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THE ENGINEERING DESIGN PROCESS

ASK

IMAGINE

PLAN

CREATE

TEST

IMPROVE

REFLECT

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MAKER ACTIVITIES

The following Maker Activities are ideal for Back to School, but can be incorporated any time of year. They are designed to encourage students to think like inventors, promoting collaboration and creative, "outside the box" thinking.
Each mini-lesson pairs an engaging read aloud with a low prep Maker Activity, either for students to complete independently or with a small group.

READ ALOUD	MAKER ACTIVITY
Be a Maker by Katey Howes	Lightbulb Moment
Duck! Rabbit! By Amy Krouse Rosenthal and Tom Lichtenheld	Think Like an Engineer
Collaboration Station by Shannon Olsen	Maker Mindset
What Do You Do With an Idea? by Kobi Yamada	Genius Gizmo
Dreaming Up By Christy Hale	Creation Stations
Trying by Kobi Yamada	Mini Museum
Too Tall Houses By Gianna Marino	Team Towers
Very Good Hats By Emma Straub	Helpful Headwear

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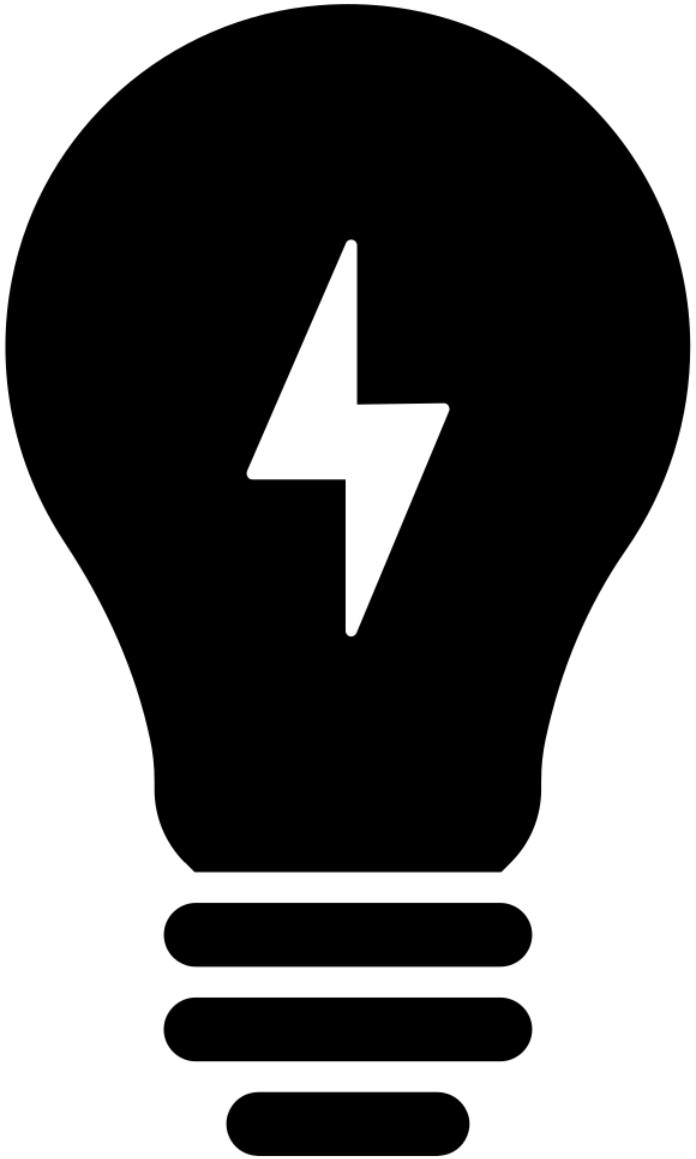
LIGHTBULB MOMENT



Create a 3D paper lightbulb to help you set goals for the year.

YOU WILL NEED:

- lightbulb template
- paper strip
- crayons or markers
- glue stick

Be a Maker
by Katey Howes

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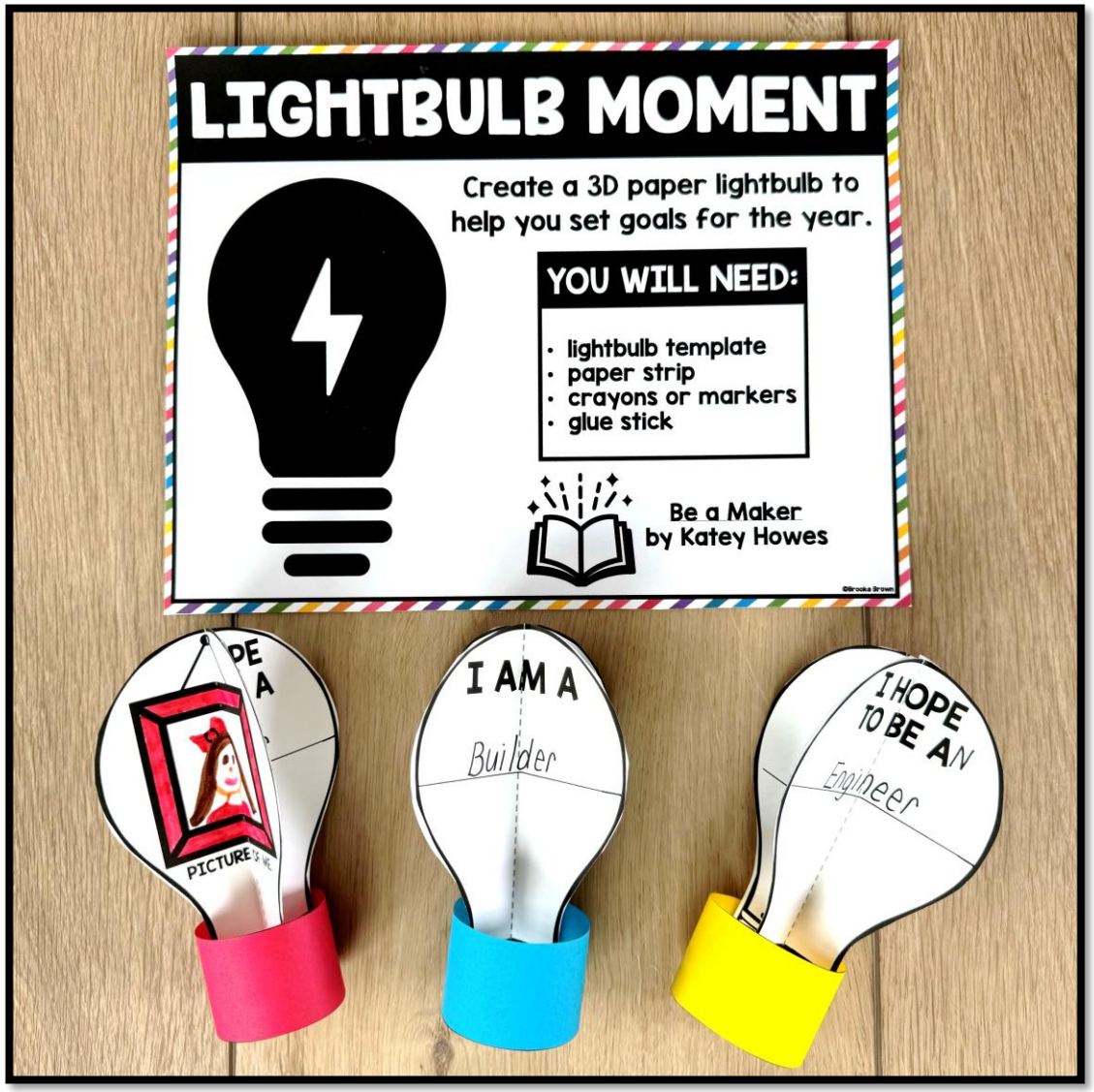
LIGHTBULB MOMENT

EXAMPLES



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WHO DO YOU HOPE TO BE THIS YEAR?

Think about who you ARE and who you hope to BE this year.
Write your answers on your lightbulbs.

- engineer
- builder
- technician
- mathematician
- writer
- reader
- programmer
- artist
- leader
- friend
- maker
- helper
- scientist
- inventor

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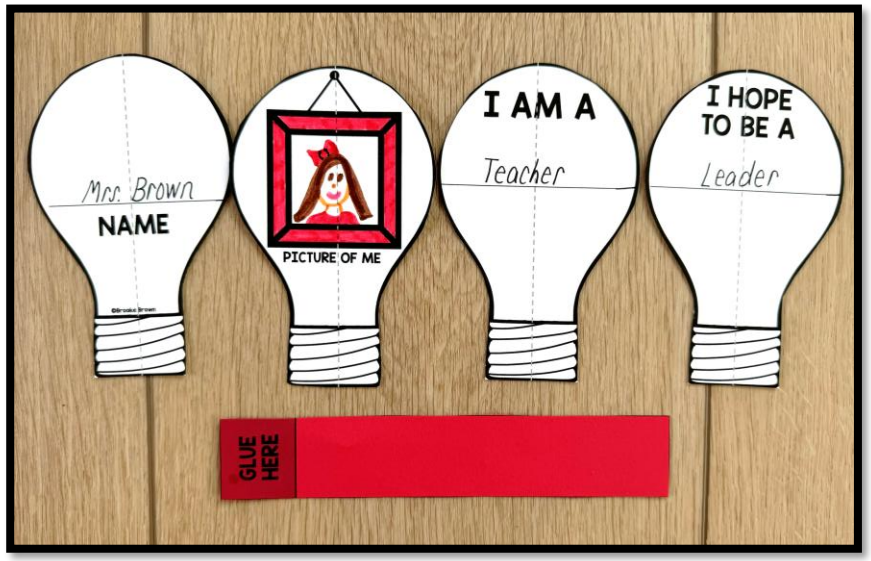
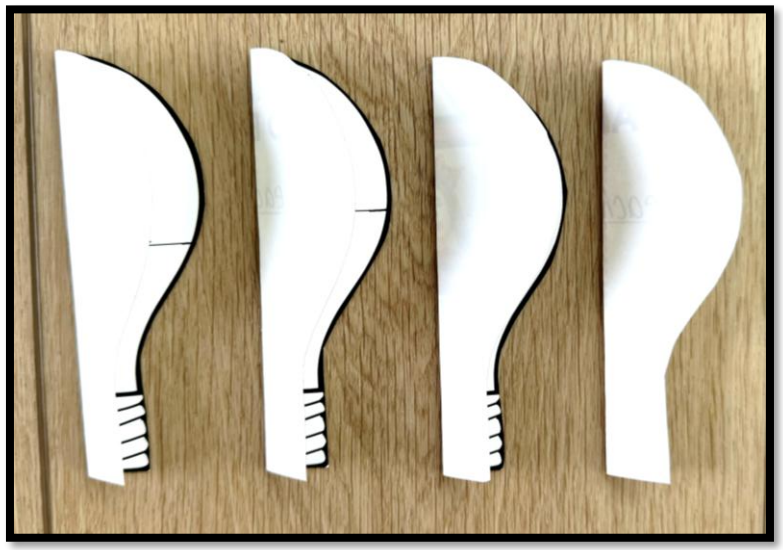
LIGHTBULB MOMENT

How to Make a 3D Lightbulb:



Cut out all 4 lightbulbs.



Fold lightbulbs in half on the dashed lines.

Glue halves back to back.

Glue paper strip together and place lightbulb inside.

©Brooke Brown

_____

NAME

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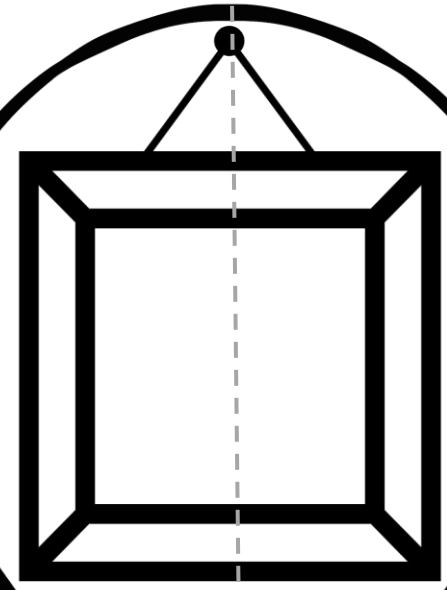


PICTURE OF ME

I AM A

_____

I HOPE
TO BE A

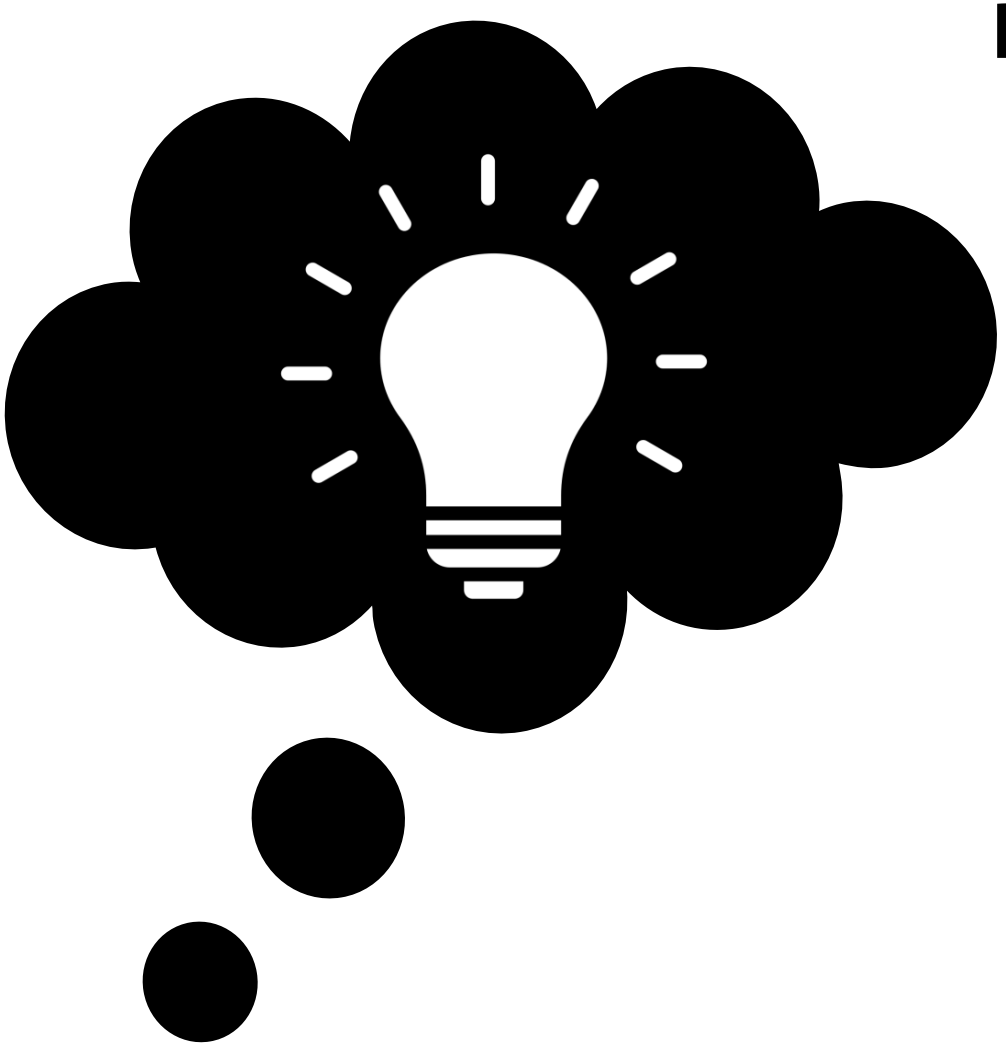
_____

Each student needs one strip of paper to make the base of the lightbulb.
They will wrap the paper around to make a loop and glue together.
The 3D lightbulb will go inside the base.

©Brooke Brown

GLUE HERE	GLUE HERE	GLUE HERE	GLUE HERE	GLUE HERE	GLUE HERE	GLUE HERE	GLUE HERE

THINK LIKE AN ENGINEER



Play a game with your group! Pass each tool around and take turns sharing NEW uses for each tool.

YOU WILL NEED:

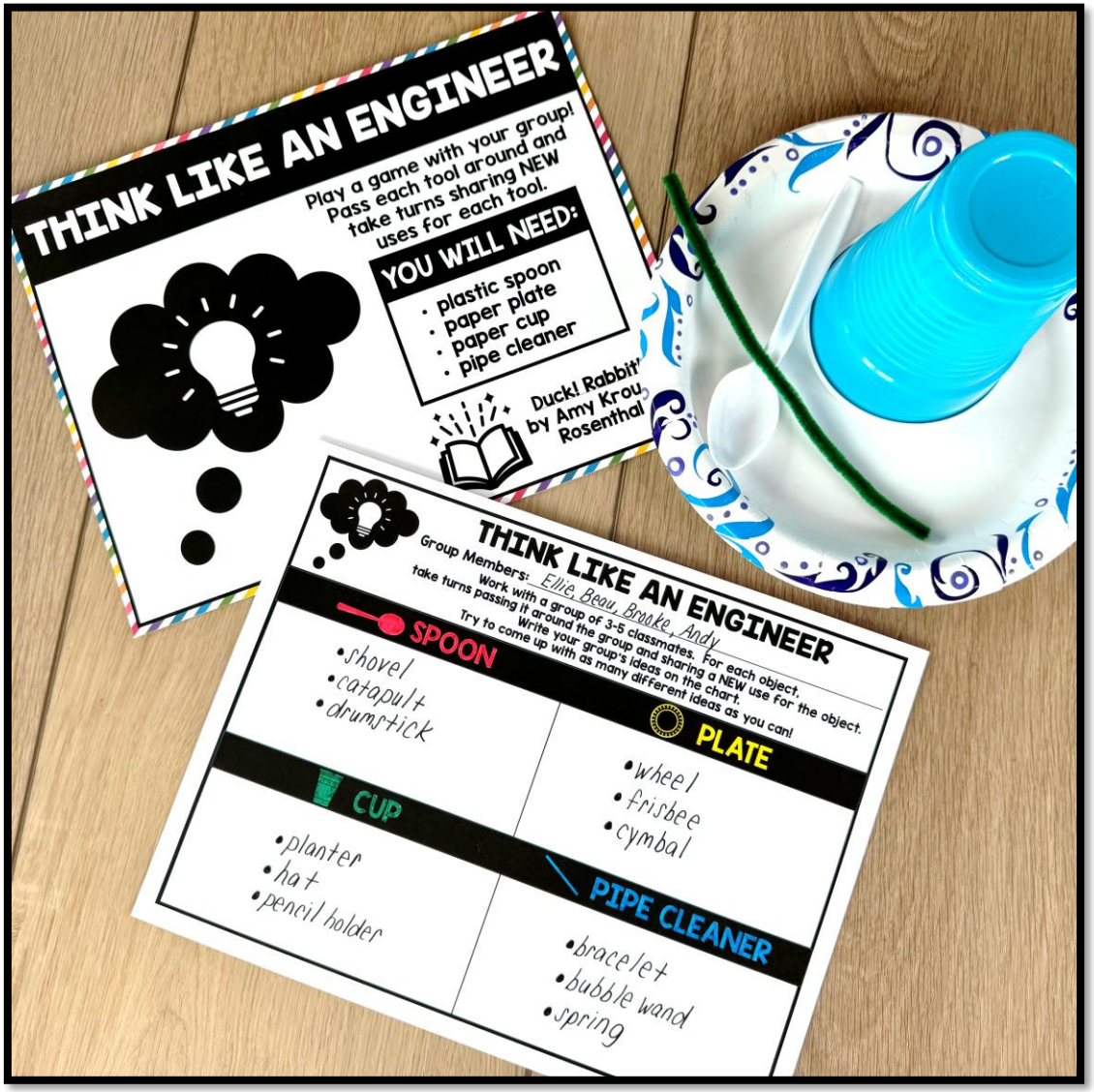
- plastic spoon
- paper plate
- paper cup
- pipe cleaner

Duck! Rabbit!
by Amy Krouse Rosenthal

©Brooke Brown

THINK LIKE AN ENGINEER

EXAMPLE



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THINK LIKE AN ENGINEER

Group Members:_____

Work with a group of 3-5 classmates. For each object,
take turns passing it around the group and sharing a NEW use for the object.
Write your group's ideas on the chart.
Try to come up with as many different ideas as you can!

SPOON

PLATE

CUP

PIPE CLEANER

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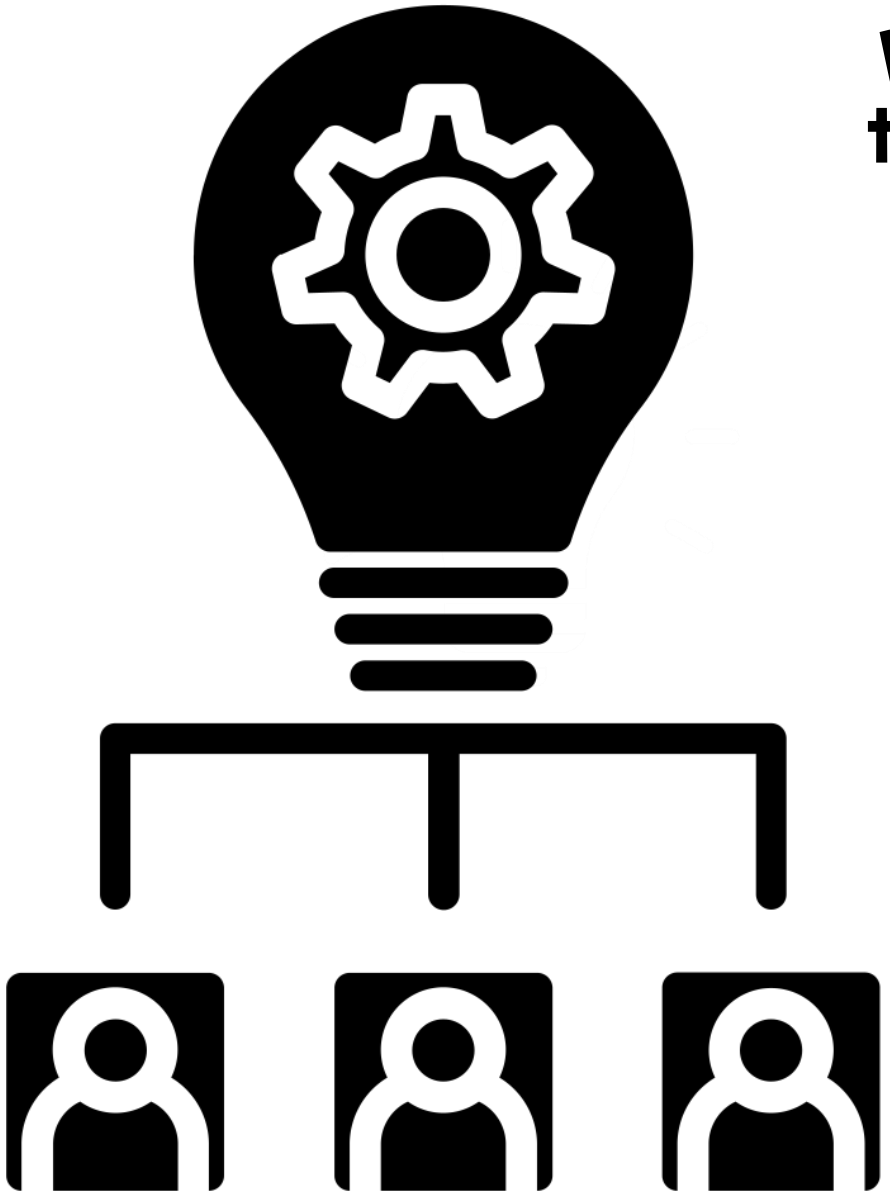
MAKER MINDSET



Work with your group and use the materials in your baggie to create a useful tool or toy.

YOU WILL NEED:

Large baggie with 10-15 craft supplies such as:

- paper
- tape
- scissors
- cups
- paper plates
- popsicle sticks
- rubber bands
- pipe cleaners
- straws
- paper rolls

Collaboration Station
by Shannon Olsen

©Brooke Brown

MAKER MINDSET

EXAMPLES

X-RAY BINOCULARS

CANDY CATAPULT

HAMSTER HOUSE

©Brooke Brown

MAKER MINDSET

Group Members:_____

Work with a group of 3-5 classmates.
Use the materials in your baggie to create a useful tool or toy.

OUR BLUEPRINT

OUR IDEAS

What did your group create?

_____

How is your creation useful?

_____

_____

_____

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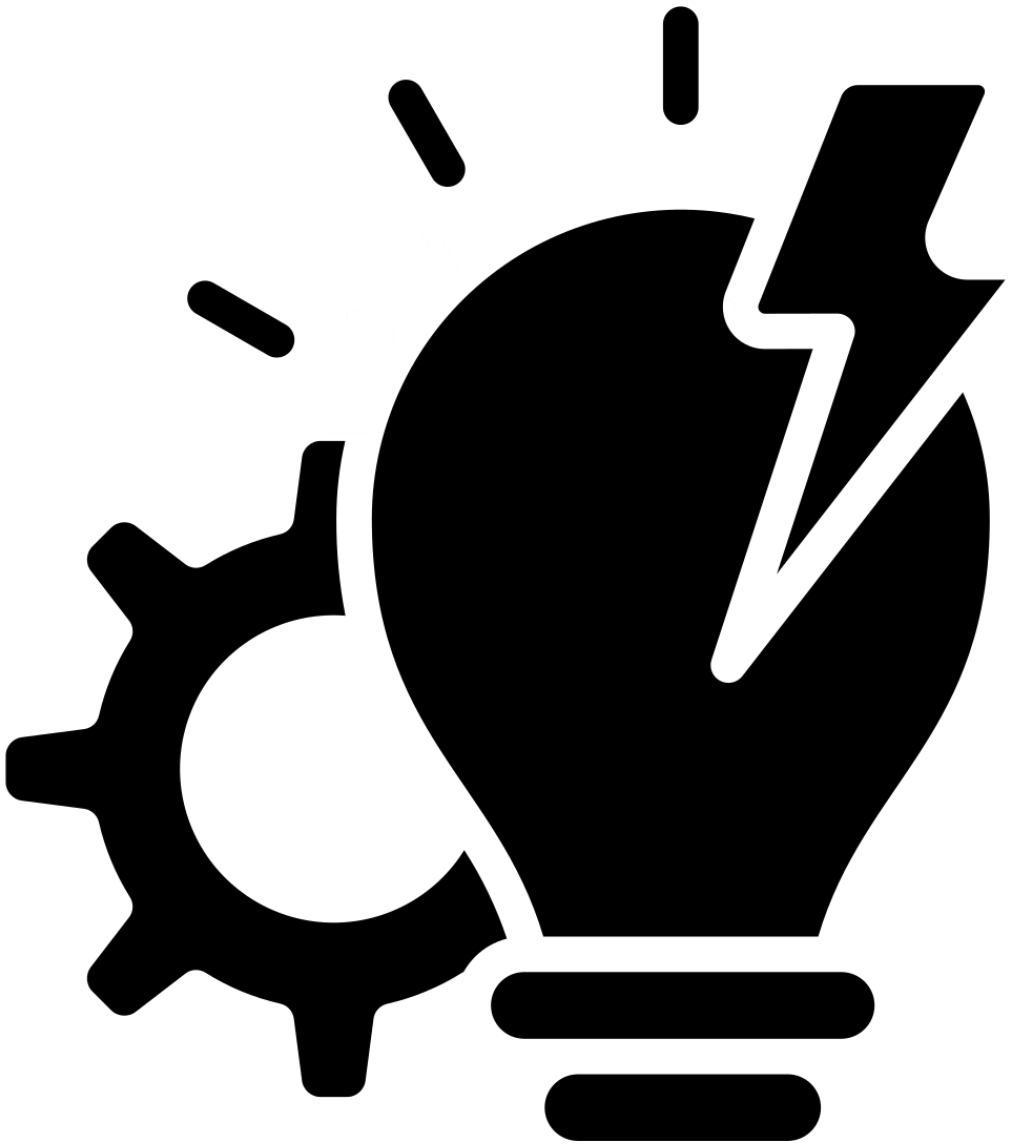
GENIUS GIZMO



Work with a partner.
Use the "Makers' Junk" to design an invention that solves a problem.

YOU WILL NEED:

- paper "Makers' Junk"
- planning template
- blueprint template
- advertisement template
- scissors & glue sticks
- crayons or markers

What Do You Do With an Idea?
by Kobi Yamada

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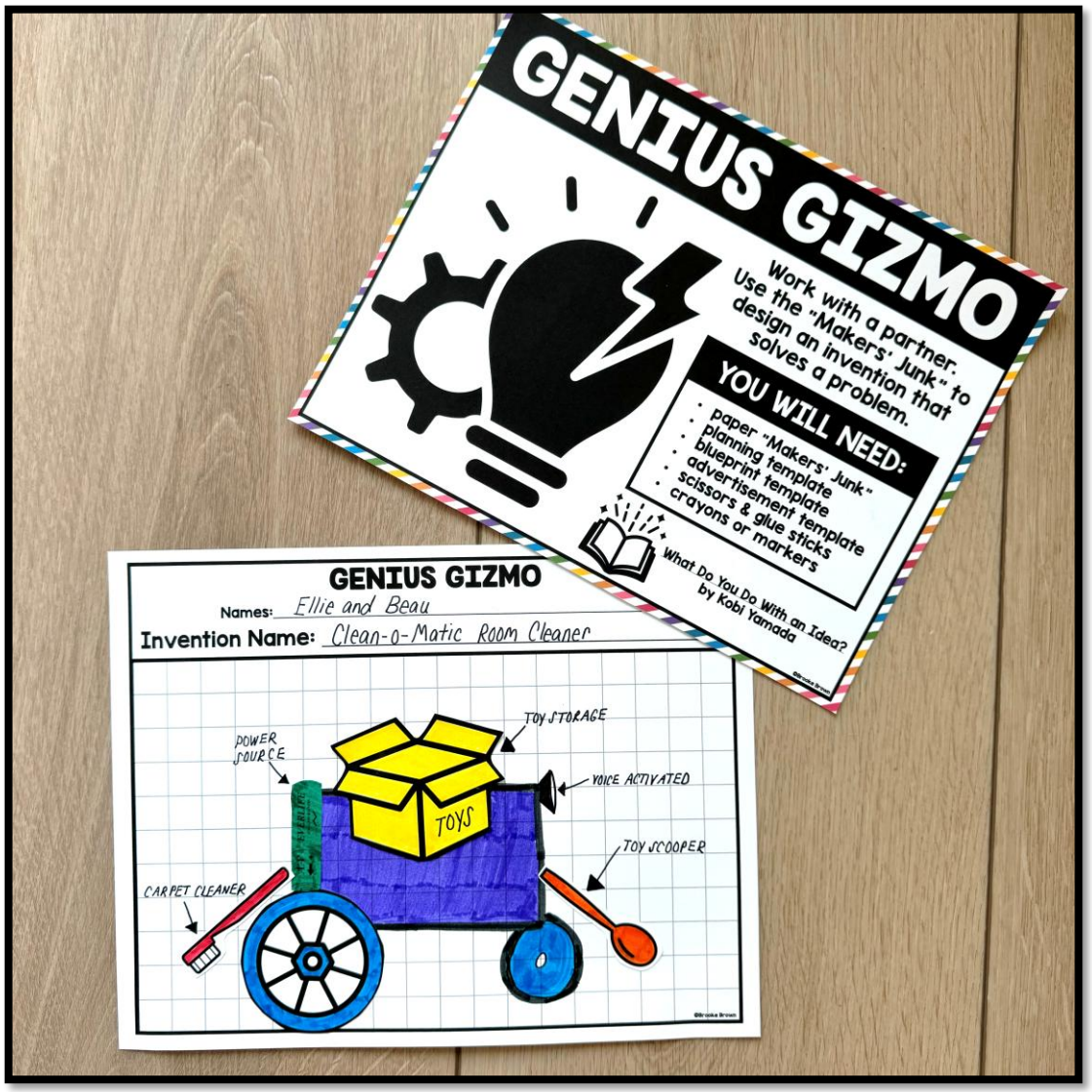
GENIUS GIZMO

EXAMPLE



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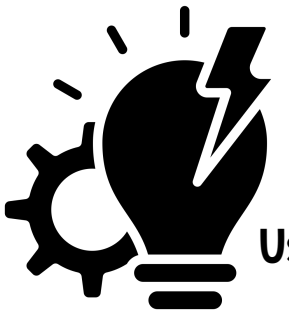
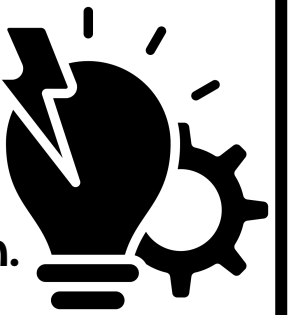


GENIUS GIZMO



Names:_____

Work with a partner.
Use the "Makers' Junk" to design an invention that solves a problem.
Brainstorm your ideas below.

INVENTION	WHAT IT DOES

©Brooke Brown

MAKERS' JUNK

Cut out the "junk" pieces below that you'd like to use for your invention! Make sure to draw and add your own parts too..

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GENIUS GIZMO

Names:_____

Invention Name: _____

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OUR ADVERTISEMENT

Names:_____

Create a poster or ad that will encourage people to buy your invention. Make sure to include a picture, name of the invention, reasons why someone should buy it, and how much it costs.

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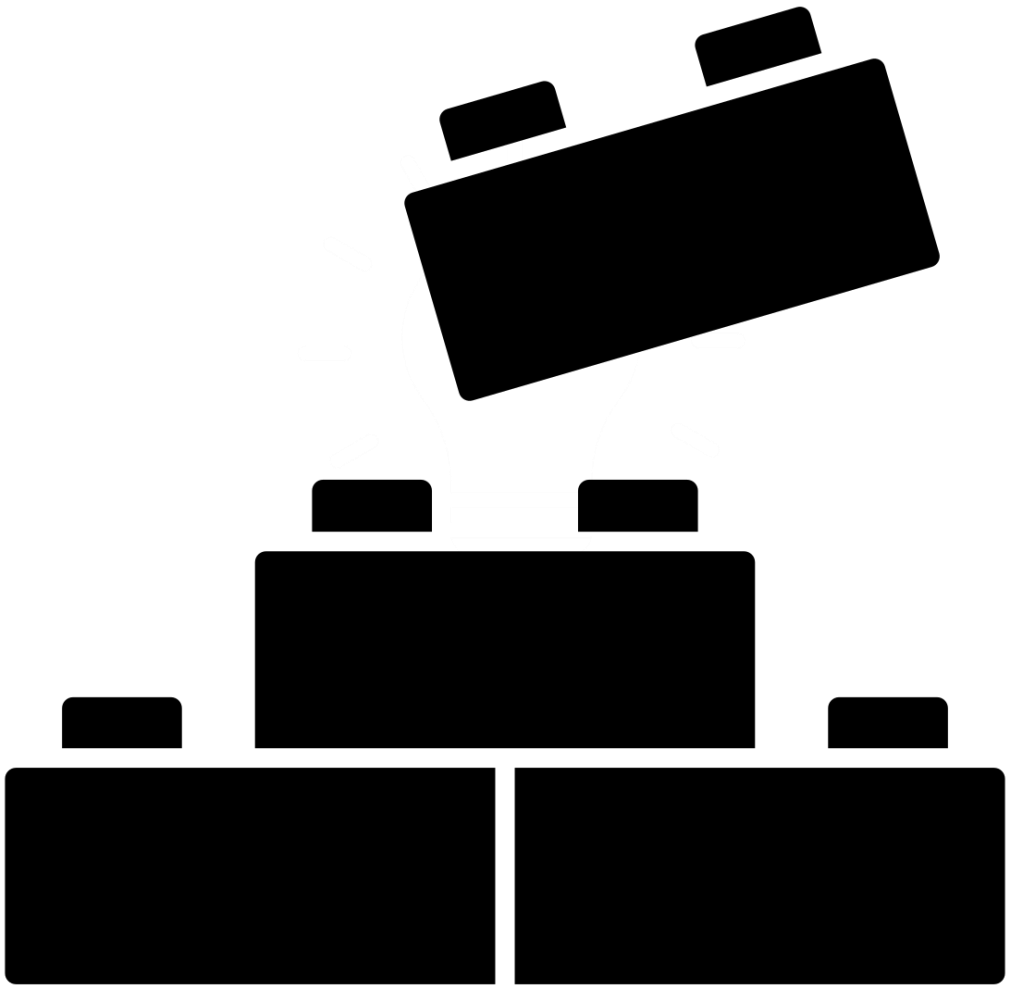
CREATION STATIONS



Explore, build, and play with STEM Bins! What can you create?

YOU WILL NEED:

Variety of STEM Bins such as:

- pattern blocks
- building bricks
- base ten blocks
- dominoes
- linking cubes
- mini cups

Dreaming Up
by Kristi Hale

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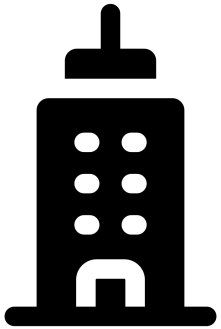
WHAT CAN YOU BUILD?

HOUSE

BRIDGE

CAR

TUNNEL



TOWER

CASTLE

BOAT

MAZE

RAMP

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CREATION STATIONS

Set up a variety of STEM Bins Stations for students to rotate through in groups of 3-5. Allow 15-20 minutes of free building per station.

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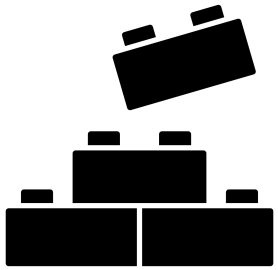
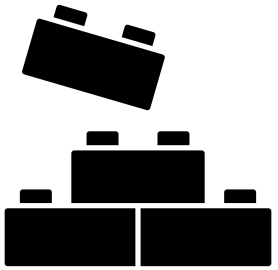


CREATION STATIONS



Name:_____

Draw pictures of your creations.

This is a _____.

I built with_____.

This is a _____.

I built with_____.

This is a _____.

I built with_____.

This is a _____.

I built with_____.

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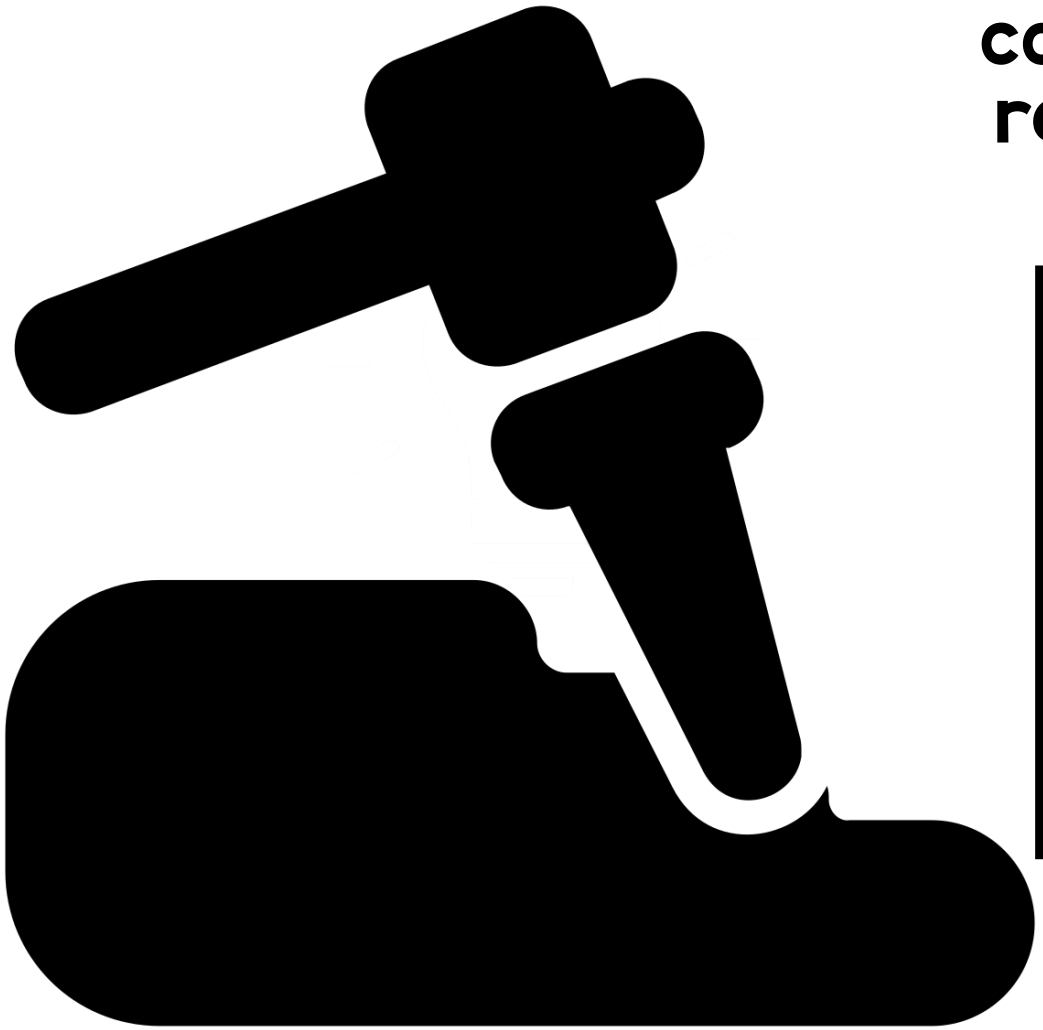
MINI MUSEUM



Use playdough to create a collection of sculptures that represent things about you and things that you like.

YOU WILL NEED:

- 2 cans of playdough per student
- sculpting tools such as popsicle sticks and toothpicks

Trying
by Kobi Yamada

©Brooke Brown

MINI MUSEUM

EXAMPLES

©Brooke Brown

SCULPTING IDEAS

- Favorite animal
- Favorite food
- Favorite sport or game
- Favorite school subject
- Favorite number
- Family members

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MINI MUSEUM

Name:_____

Draw pictures of your sculptures.

I made a _____

because _____

_____.

I made a _____

because _____

_____.

I made a _____

because _____

_____.

I made a _____

because _____

_____.

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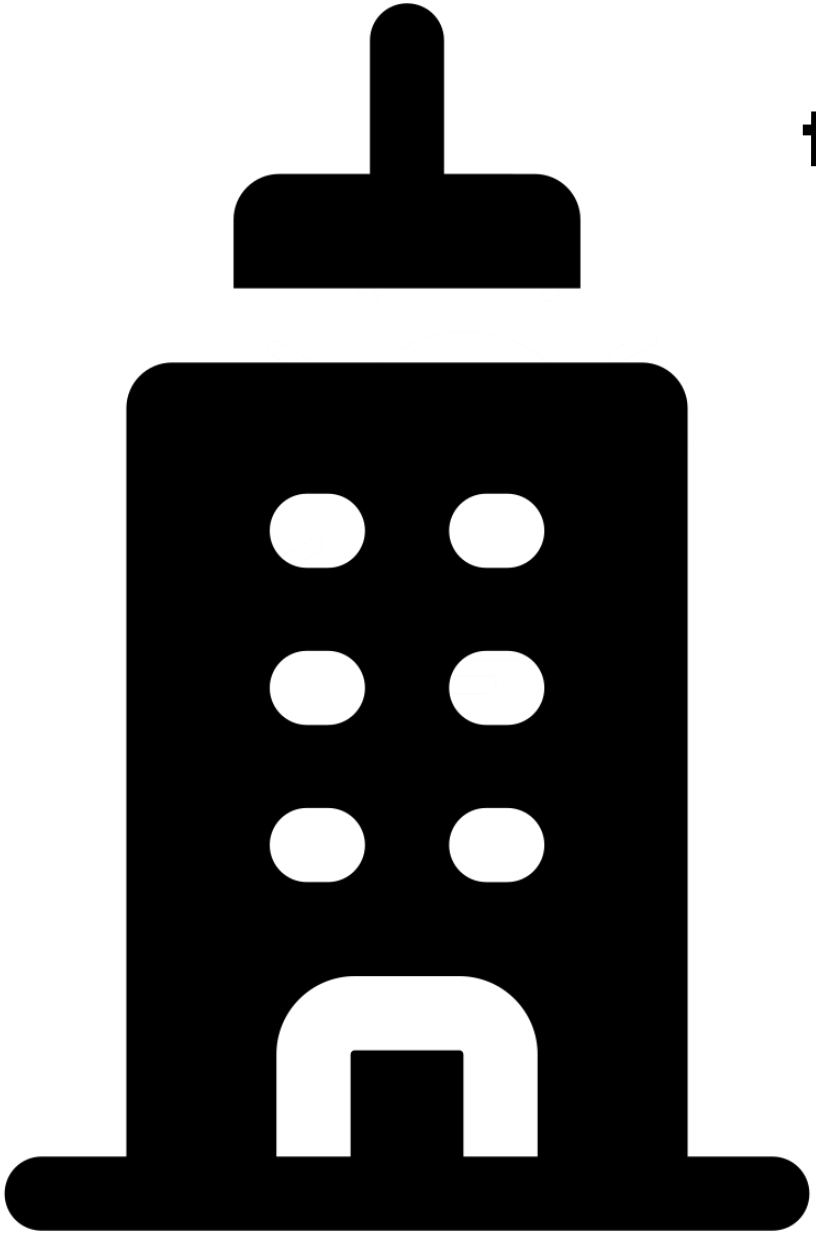
TEAM TOWER



Work with your group to build the tallest tower possible using index cards and tape.

You will have ____ minutes to complete this challenge.

YOU WILL NEED:

- 40 index cards per group
- tape or address labels
- ruler

Too Tall Houses
by Gianna Marino

©Brooke Brown

TEAM TOWER

EXAMPLES

©Brooke Brown

TEAM TOWER

Group Members: _____

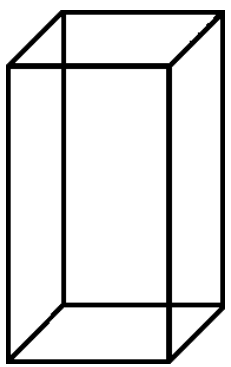
Work with a group of 3-5 classmates.
Use index cards and tape to build the tallest possible tower.

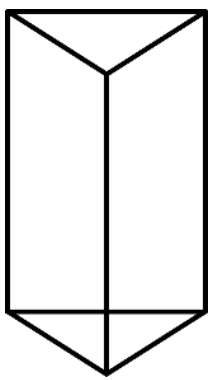
OUR BLUEPRINT

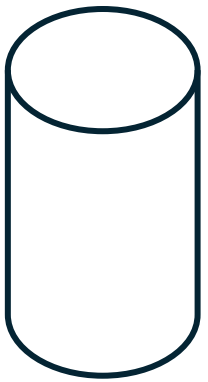
How tall was your final tower?

What building strategy worked best?

Color the 3D solids you used in your tower.







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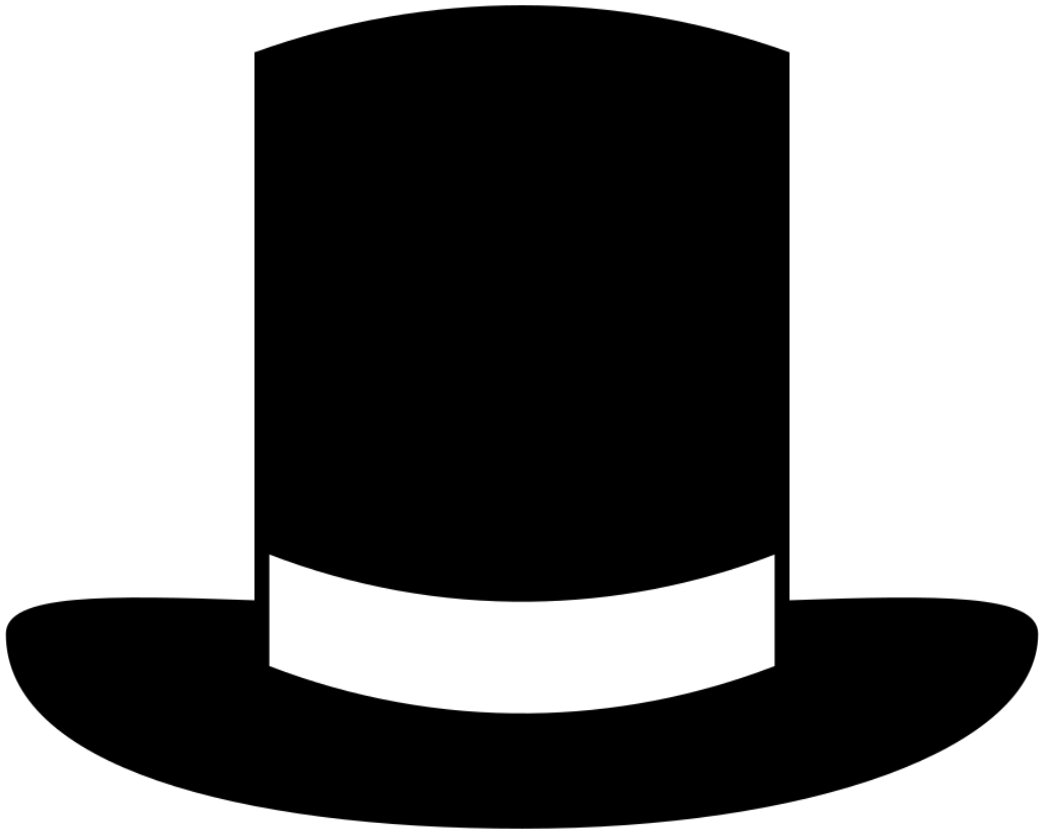
HELPFUL HEADWEAR



Use paper and tape to create a useful hat.

YOU WILL NEED:

- construction paper
- tape & scissors

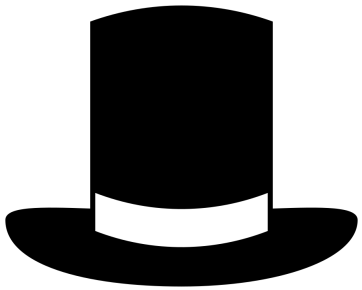
Very Good Hats
by Emma Straub

©Brooke Brown

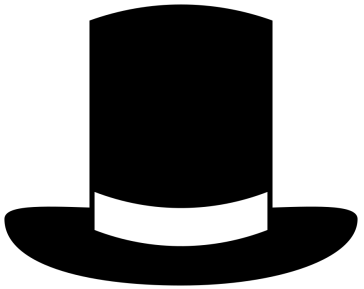
HELPFUL HEADWEAR

EXAMPLES

©Brooke Brown



HELPFUL HEADWEAR



Name:_____

Use construction paper and tape to make a useful hat.

BLUEPRINT

HAT IDEAS

What kind of hat did you make?

How is your hat helpful?

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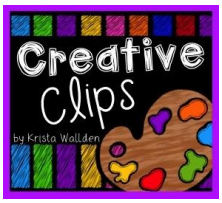
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