

storybook
STEM
THE POLAR EXPRESS



POLAR PASS
The Polar Express

Name: _____

STEM CHALLENGE
Can you build a train bridge that holds the most weight?

What I Know About Bridges:


1 _____

2 _____

POLAR PASS

The Polar Express needs to get to the North Pole!

Can you build a train bridge that will hold the most weight?

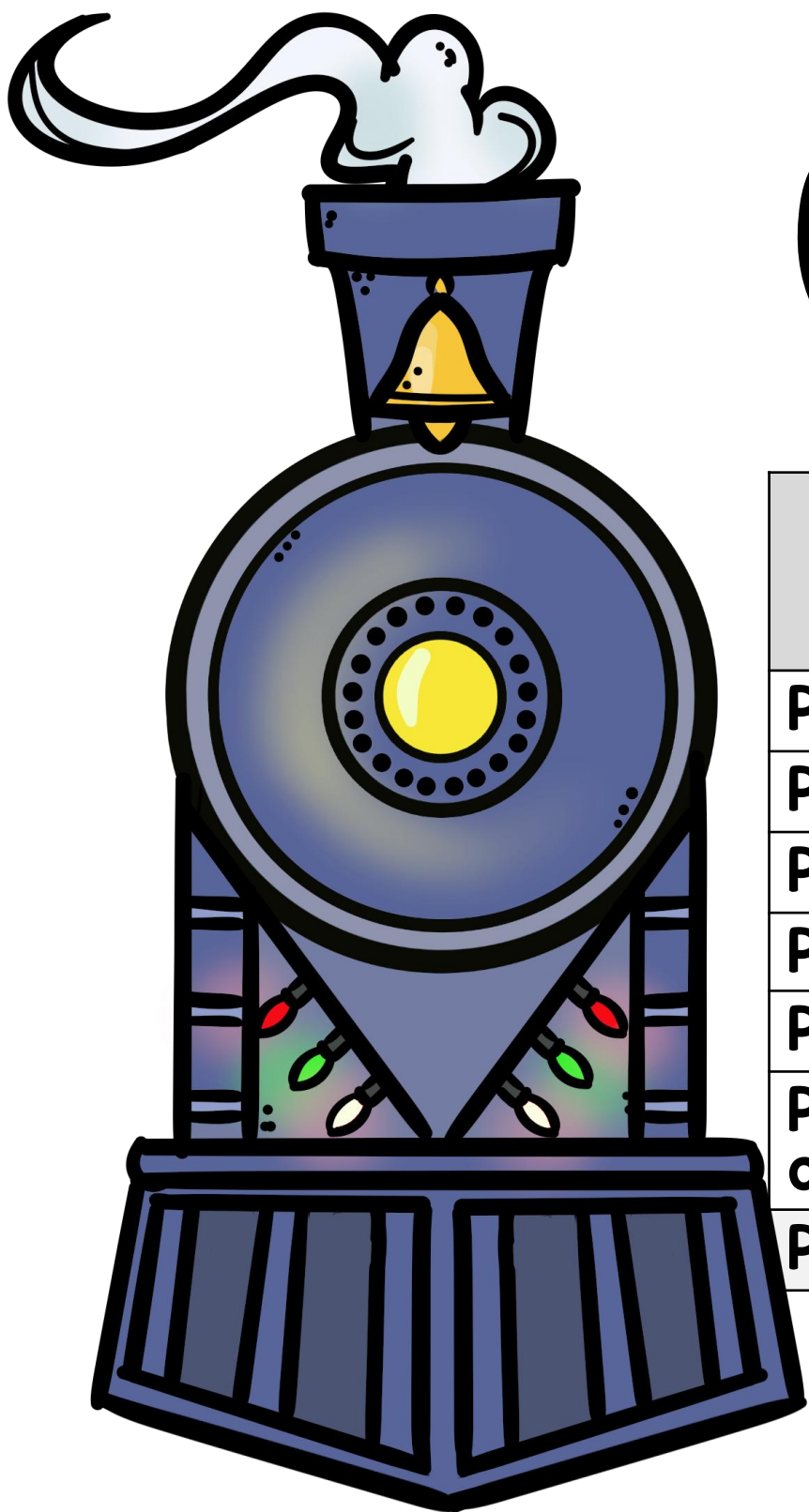


YOU MAY USE:

- linking cubes, base ten blocks, or dominoes
- popsicle sticks
- toy trains or paper trains



CREATED BY BROOKE BROWN AND KATIE KING



CONTENTS

The Polar Express by Chris van Allsburg

Pages 3-5: ELA Lesson Plans

Page 6: Comprehension Bookmark

Pages 7-17: Vivid Verbs activities

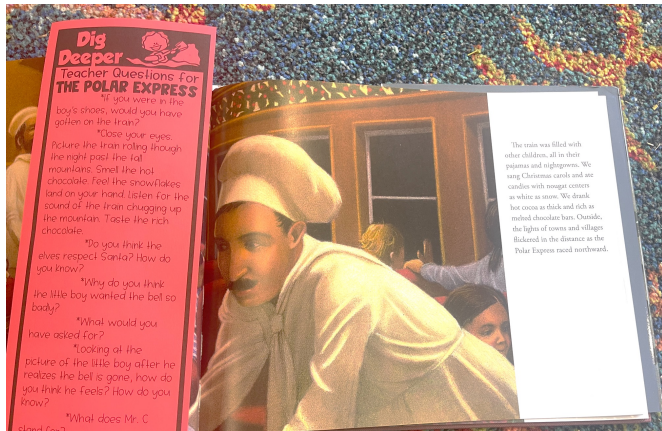
Pages 18-24: Similes anchor chart

Pages 25-33: Vocabulary activities

Page 34: Math Connection - Balanced and Unbalanced Weight

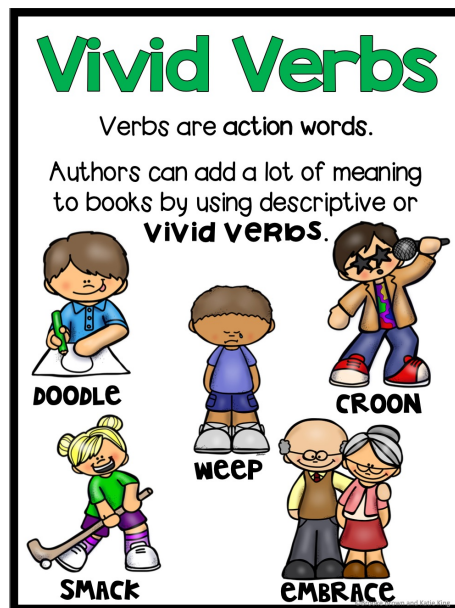
Pages 35-45: STEM Challenge: Polar Pass

THE POLAR EXPRESS



1. Use the comprehension bookmark before, during, and after reading to dig deeper into the text. The bookmark would also be a great question guide to use with a substitute teacher if needed! Laminate a copy on colored paper for multiple year usage!

2. Use the Vivid Verbs poster to discuss how descriptive verbs allow readers to paint a better picture in their head. The authors can pack a lot of meaning into one carefully chosen verb!



Vivid Verbs



move
quietly



rustle

told



insisted

walk



tiptoe

moved




pranced


3. Make a whole class anchor chart where students help decide which verbs are more vivid and help create a better mental image in their head. Verbs can be copied for students too if you would like to make it even more interactive!

THE POLAR EXPRESS

Name: Kelly MENTAL IMAGE
With the Help of Verbs



When the author said the wolves were roaming through the woods it made me picture a mysterious forest that was dangerous. It made the scene more exciting!



4. Students should write about one of the vivid verbs and how it helped them create a picture in their head. I have included a large copy of the teacher sample so it can be displayed and discussed.

5. Look at the poster for Similes. Discuss why an author would use this figurative language tool to better their writing.

SIMILES

as cute as a button



it means little and adorable. The puppy was cute as a button. The child in Mrs Moore's class was as cute as a button while singing Happy Birthday.

as quick as lightning



when something happens so fast that you barely see it. As quick as lightning, the thief jumped out the open window. The raccoon was as quick as lightning as he disappeared into the tree hollow.

as sick as a dog



as sick as a dog means throwing up a lot. Suzie was sick as a dog over the holidays. I was sick as a dog after eating that chicken salad.

like a bull in a china shop



means to be clumsy and wreckless. Jon was like a bull in the china shop at his Grandma's house.

Similes

When an author uses LIKE or AS to make a comparison.

We drank hot cocoa as thick and as rich as melted chocolate bars.



We climbed mountains so high it seemed as if we would scrape the moon.


Faster and faster we ran along, rolling over peaks and through valleys like a car on a roller coaster.



6. Make the whole class anchor chart while looking other examples of similes, what they mean, and examples of how they can be used in conversation and in writing.

THE POLAR EXPRESS


7. Students should look at two additional similes in *The Polar Express* and write about how those similes had an impact on their thinking.

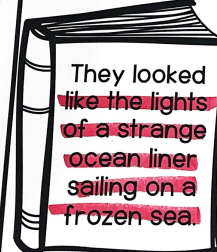
Name: Parker **SIMILES** 

Directions: Highlight the simile. Write about how it helped you understand the text better.

I can picture the exact kind of candy!

This simile makes me continue to think of winter and all things cold!





I think this simile helps me realize how far away the North Pole is! And mysterious!

©Brooke Brown and Katie King



8. Here is an easy but fun craft to review parts of speech and add some winter art to your displays. Students should write about a favorite winter memory. On top of the mug, they should identify a noun, a verb, and an adjective.

Dig Deeper



Teacher Questions for THE POLAR EXPRESS

*If you were in the boy's shoes, would you have gotten on the train?

*Close your eyes.

Picture the train rolling through the night past the tall mountains. Smell the hot chocolate. Feel the snowflakes land on your hand. Listen for the sound of the train chugging up the mountain. Taste the rich chocolate.

*Do you think the elves respect Santa? How do you know?

*Why do you think the little boy wanted the bell so badly?

*What would you have asked for?

*Looking at the picture of the little boy after he realizes the bell is gone, how do you think he feels? How do you know?

*What does Mr. C stand for?

*Why do his parents believe the bell is broken?

Dig Deeper



Teacher Questions for THE POLAR EXPRESS

*If you were in the boy's shoes, would you have gotten on the train?

*Close your eyes.

Picture the train rolling through the night past the tall mountains. Smell the hot chocolate. Feel the snowflakes land on your hand. Listen for the sound of the train chugging up the mountain. Taste the rich chocolate.

*Do you think the elves respect Santa? How do you know?

*Why do you think the little boy wanted the bell so badly?

*What would you have asked for?

*Looking at the picture of the little boy after he realizes the bell is gone, how do you think he feels? How do you know?

*What does Mr. C stand for?

*Why do his parents believe the bell is broken?

Vivid Verbs

Verbs are action words.

Authors can add a lot of meaning to books by using descriptive or **vivid verbs**.



DOODLE



weep



CROON



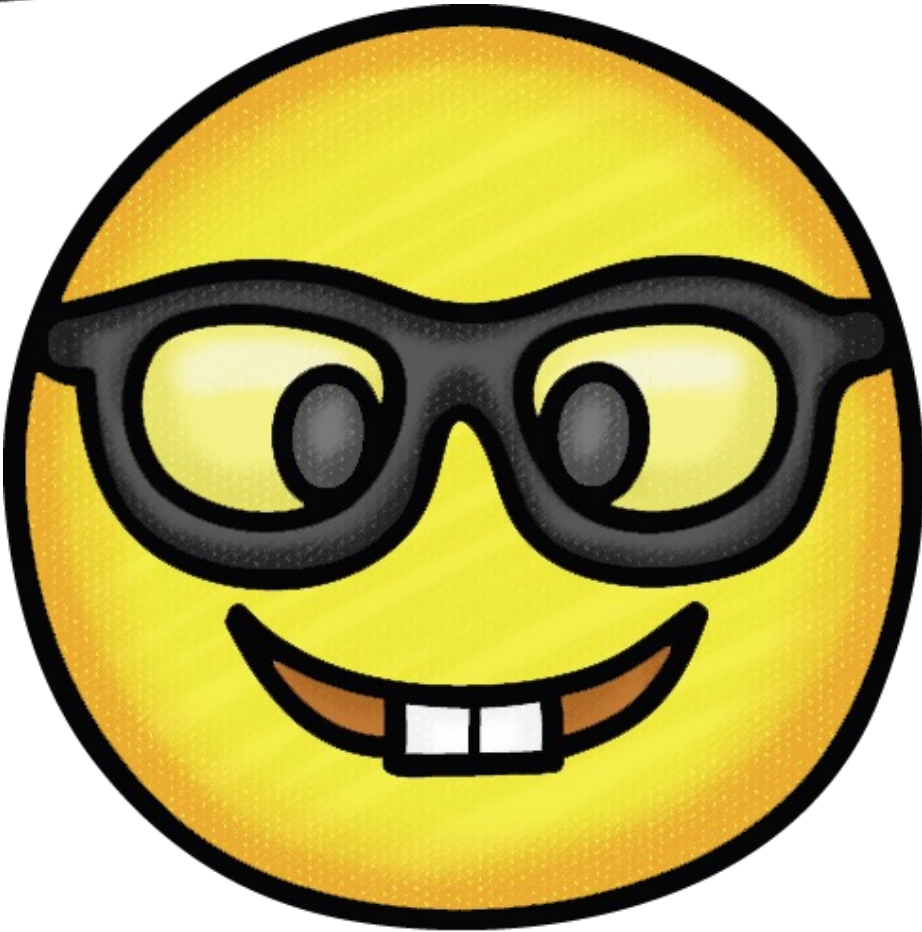
SMACK

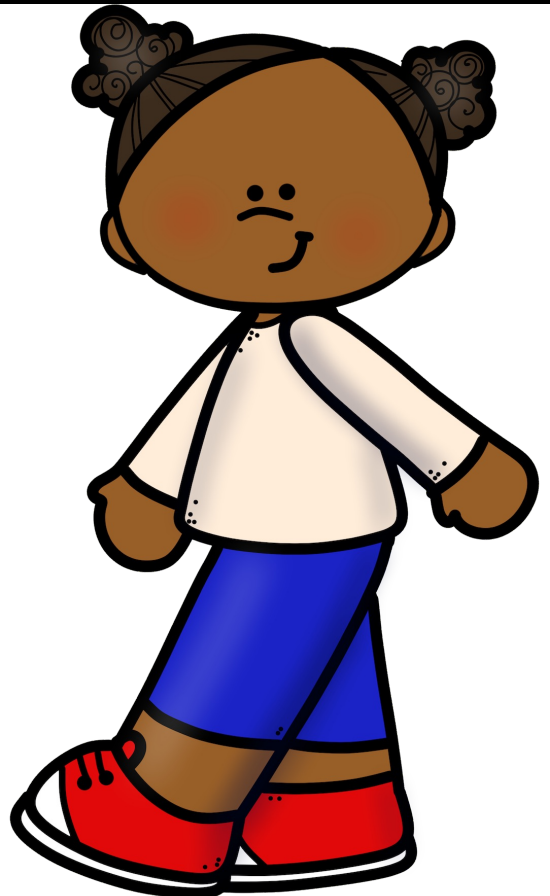
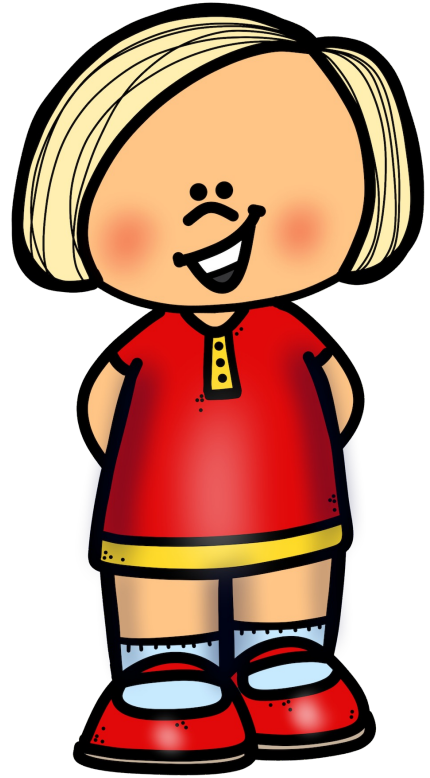
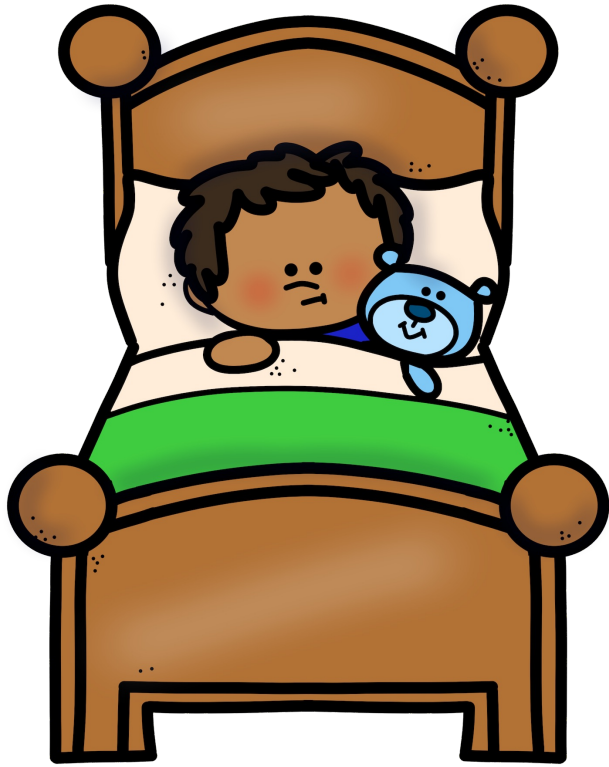


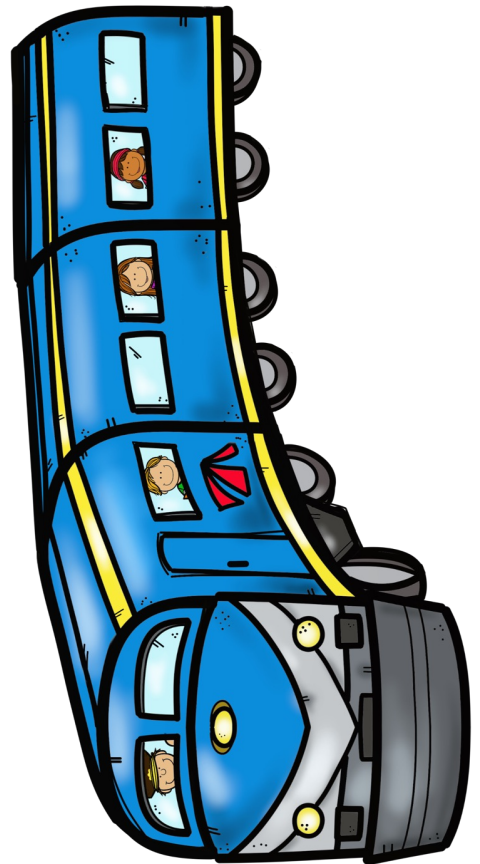
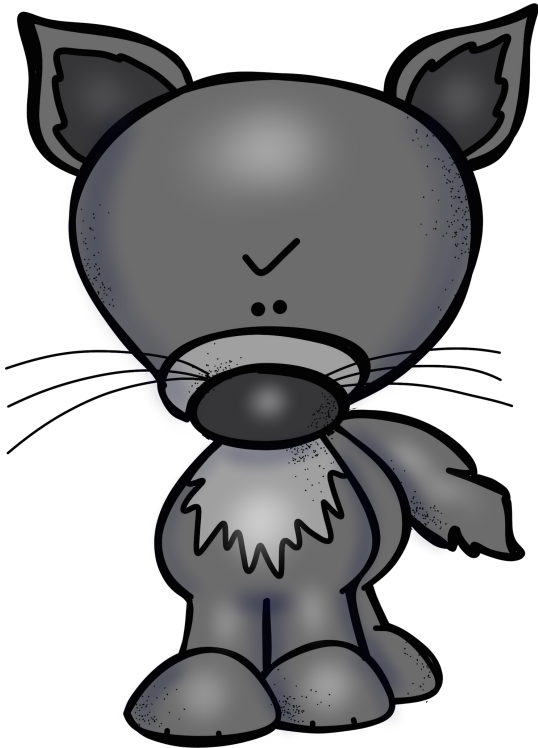
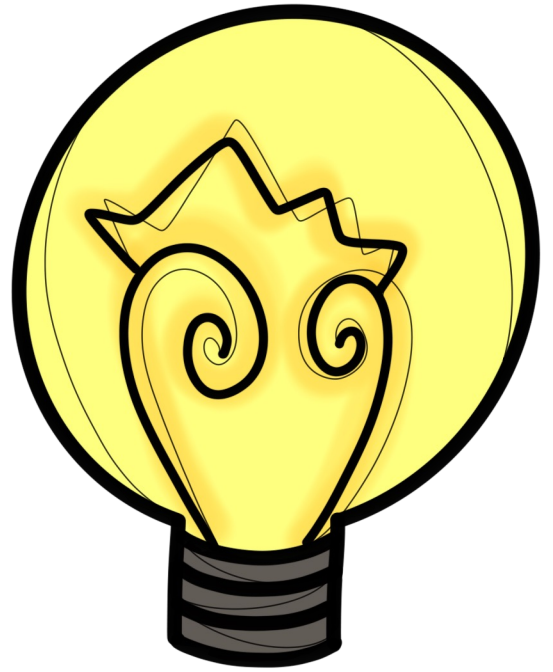
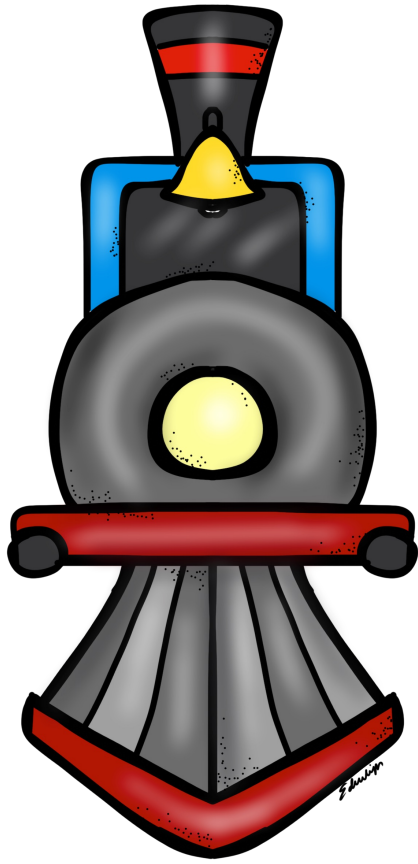
EMBRACE

Vivid

Verbs







insisted

rustle

told

move
quietly

tiptoe

walk

pranced

moved

flickered

scrape

**turn on
and off**

touch

thundered

roamed

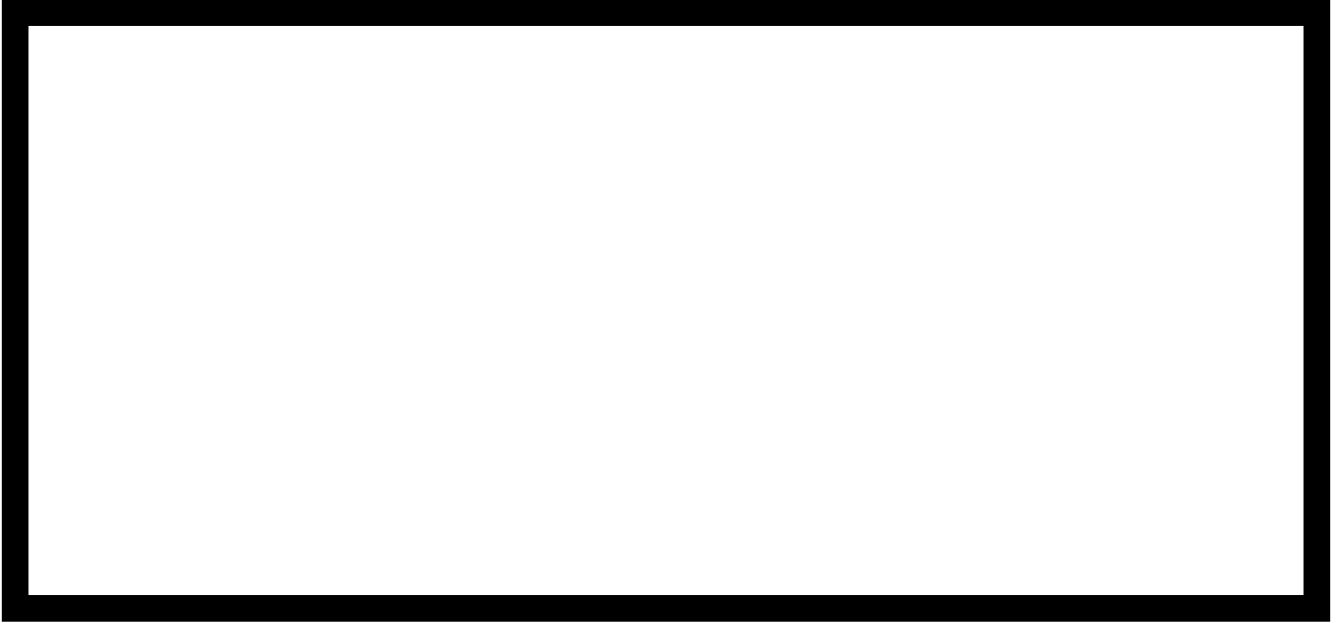
drove

ran

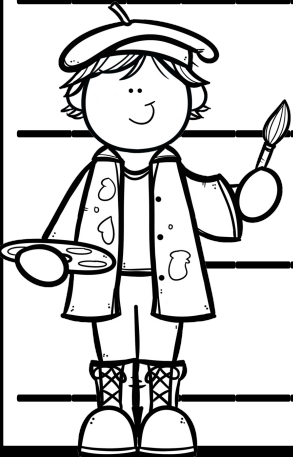
Name: _____

MENTAL IMAGE

With the Help of Verbs

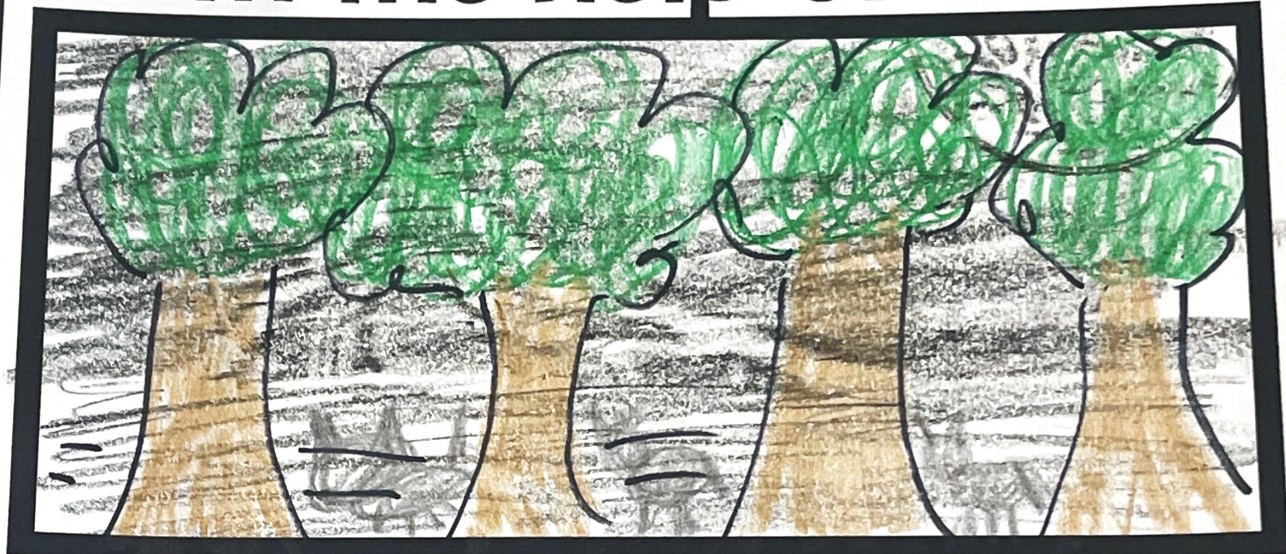


Four sets of horizontal lines for writing, each consisting of a top line, a middle line, and a bottom line.



Name: Kelly MENTAL **IMAGE**

With the Help of Verbs



When the author said
the wolves were roaming
through the woods it made
me picture a mysterious
forest that was
dangerous. It made
the scene more exciting!



Similes

When an author uses LIKE or AS to make a comparison.

We drank hot cocoa as thick and as rich as melted chocolate bars.



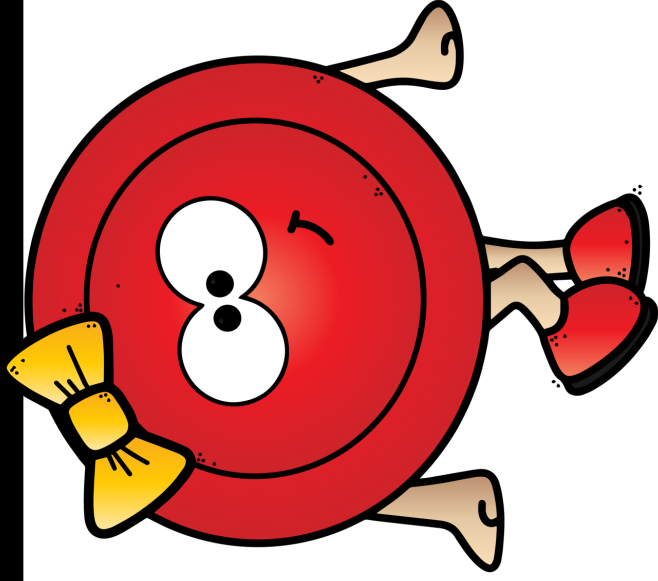
We climbed mountains so high it seemed as if we would scrape the moon.

Faster and faster we ran along, rolling over peaks and through valleys like a car on a roller coaster.



SIMILESS

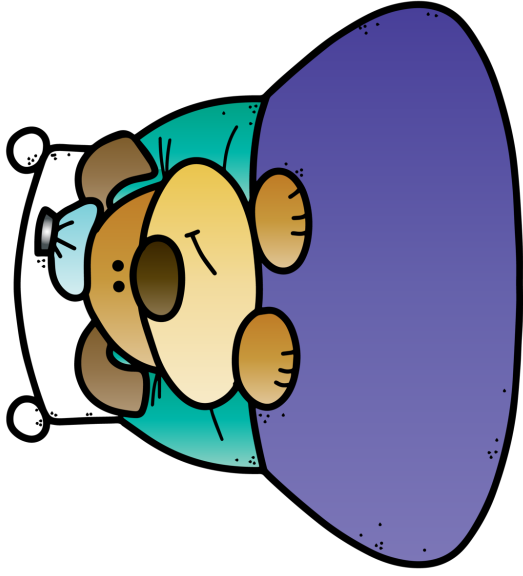
as cute as
a button



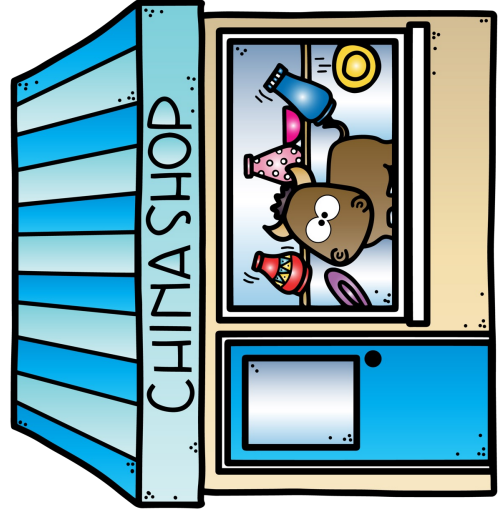
as quick as
lightning



as sick as
a dog



like a bull
in a china
shop

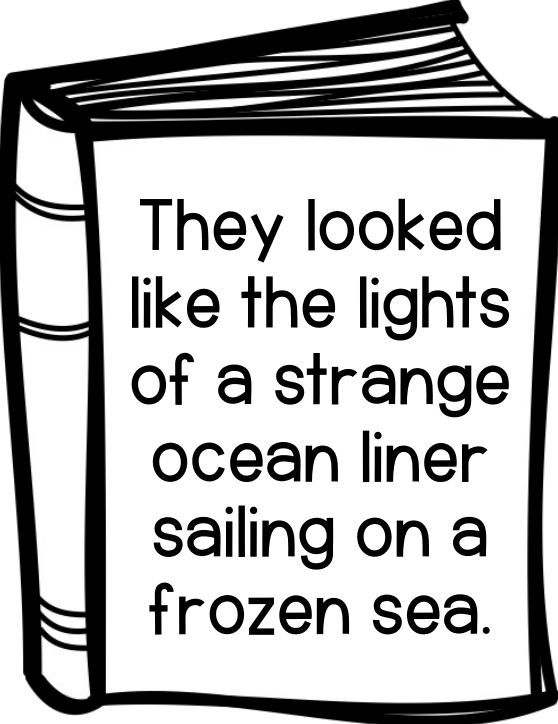


Name: _____

SIMILES



Directions: Highlight the simile. Write about how it helped you understand the text better.



They looked like the lights of a strange ocean liner sailing on a frozen sea.

NOUN

VERB

ADJECTIVE

NOUN

VERB

ADJECTIVE

NOUN

VERB

ADJECTIVE

NOUN

VERB

ADJECTIVE



Vocabulary CHATS

We are providing several whole group vocabulary activities and one individual activity. Pick and choose which works best for your students!



1. Print the Vocabulary Picture Cards in color. Use the color version for display in the classroom. The pages with four identical cards should be used for response cards. Give each child one of all four cards. Give examples or definitions. Students should raise the card that matches. Teachers should scan the room to check for understanding.

Vocabulary

ACT IT OUT



Use the vocabulary cards from Vocabulary chats. Put the cards in a bag. Call two students up to the front of the room and ask them to act out the words. Classmates should raise their hand to guess what word is being acted out.

barren



empty or
deserted

approval



showing you
agree

lurch



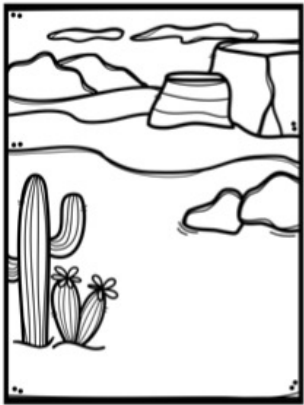
a sudden jerk

peaks



The pointed
top of a
mountain

barren



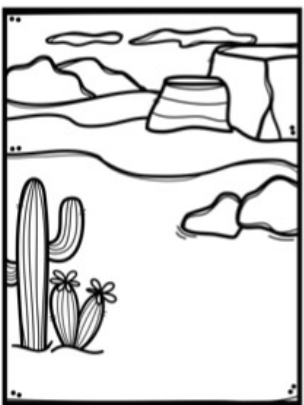
empty or
deserted

barren



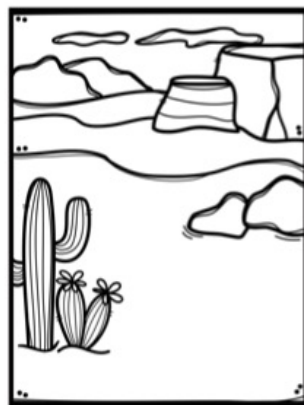
empty or
deserted

barren



empty or
deserted

barren



empty or
deserted

approval



showing you
agree

approval



showing you
agree

approval



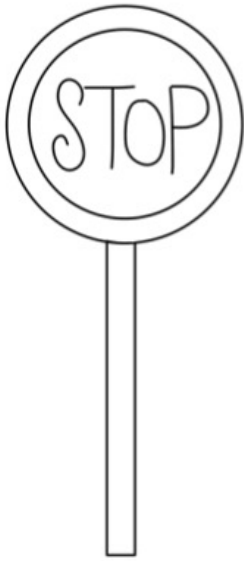
showing you
agree

approval



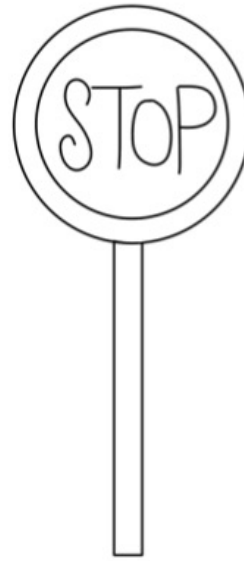
showing you
agree

lurch



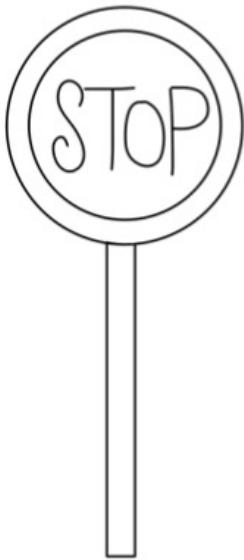
a sudden jerk

lurch



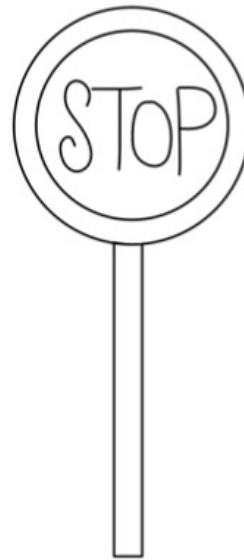
a sudden jerk

lurch



a sudden jerk

lurch



a sudden jerk

peaks



The pointed
top of a
mountain

peaks



The pointed
top of a
mountain

peaks



The pointed
top of a
mountain

peaks

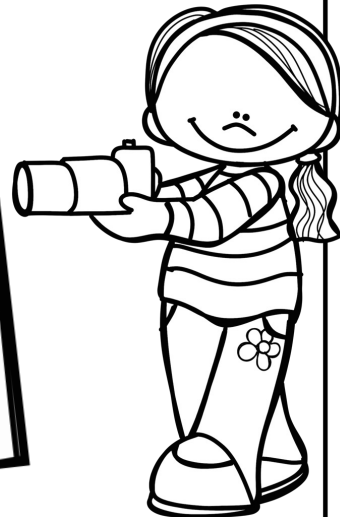
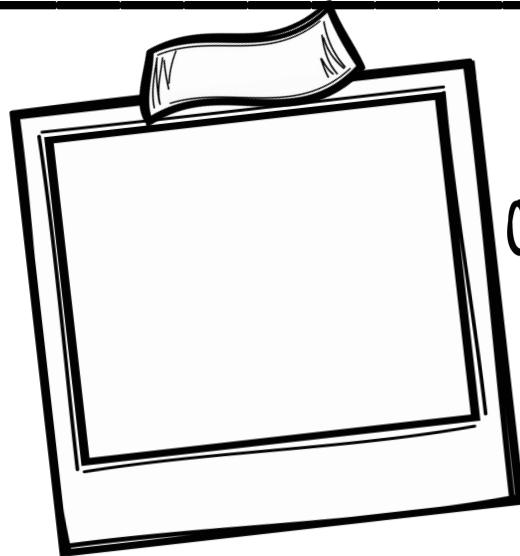
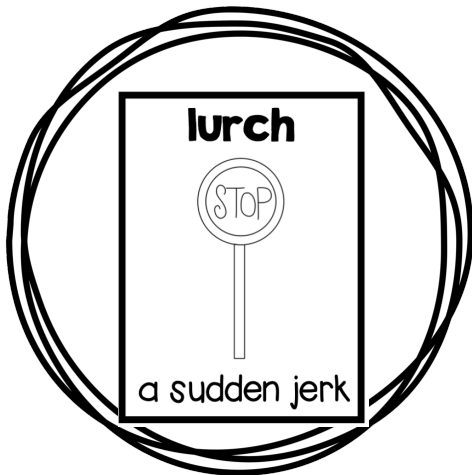
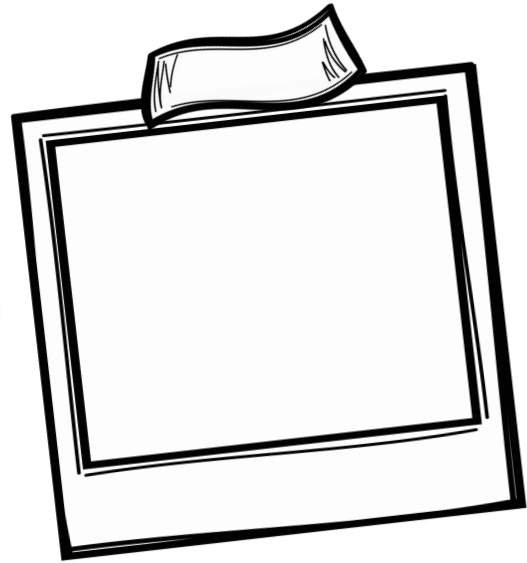
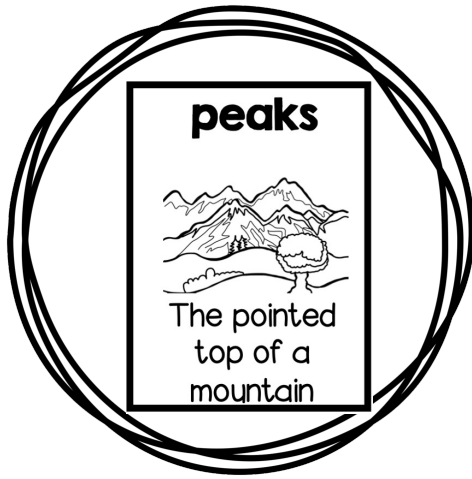
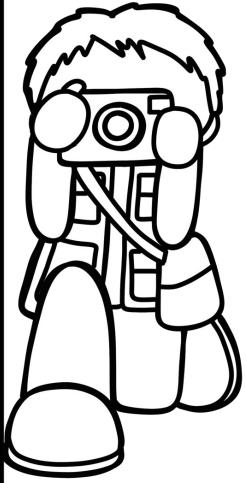


The pointed
top of a
mountain

Name: _____

CLICK!

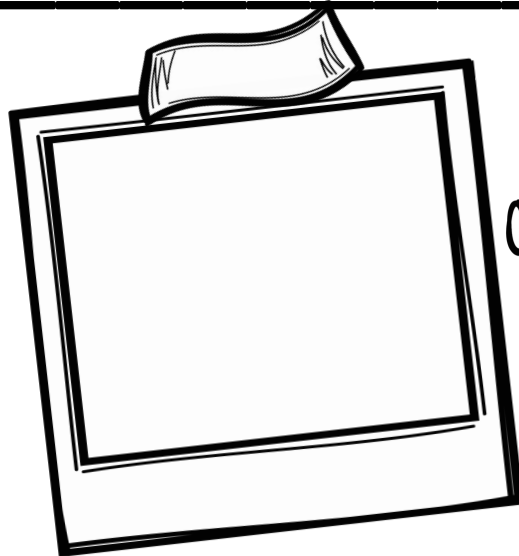
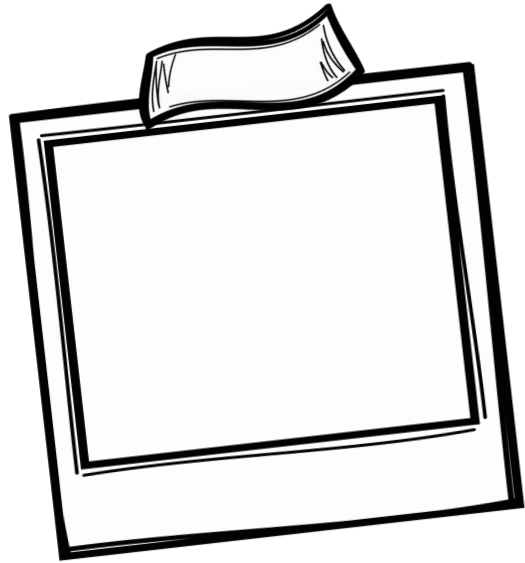
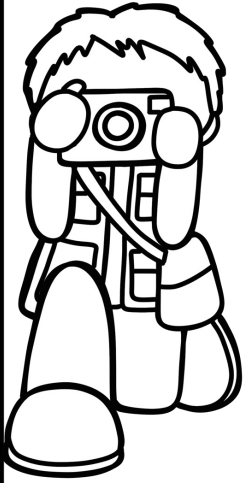
Directions: Draw and write about each word.



Name: _____

CLICK!

Directions: Draw and write about each word.

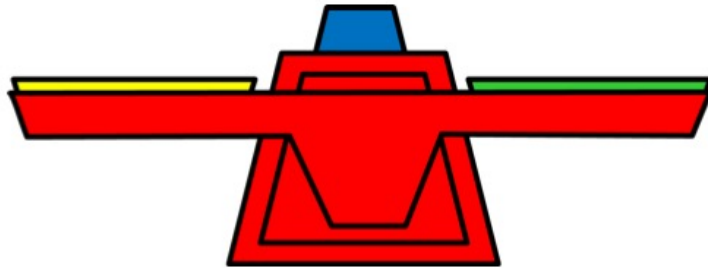


MATH CONNECTION



Balanced Weight:

When weight is evenly distributed, things are even or steady.



Unbalanced Weight:

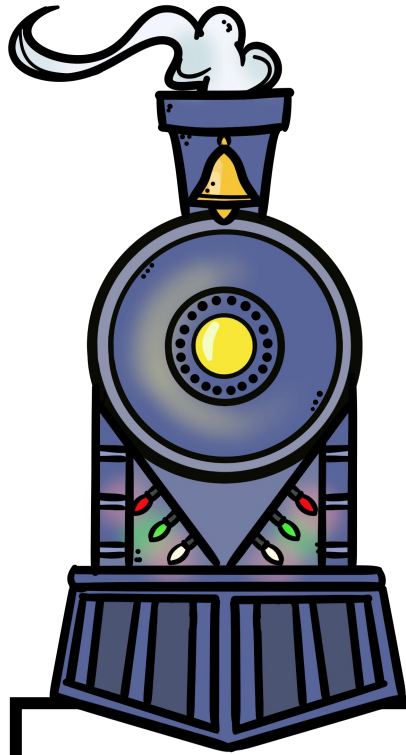
When weight is NOT evenly distributed, things are uneven or unbalanced.



You can see this on the playground with a seesaw! How will this information help you in your STEM challenge?



STEM CHALLENGE: POLAR PASS



NGSS Standard Alignment: 2-PS1-2. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. 2-PS1-3. Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. K-2-ETS1-1: Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool, K-2-ETS1-2: Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. CCSS.MATH.CONTENT: Represent and interpret data. CCSS.MATH.CONTENT.3: Solve problems involving measurement and estimation.

Challenge Description: Using a choice of construction materials, students will build a train bridge that will hold the most weight, similar to the one shown in The Polar Express. Students may use linking cubes, base ten blocks, dominoes, and popsicle sticks to build their bridge and then use toy trains or paper trains to test the weight, stability, and balance of their bridge design. They will measure the weight by counting the number of items that the bridge will hold without collapsing and recording it in the provided chart.

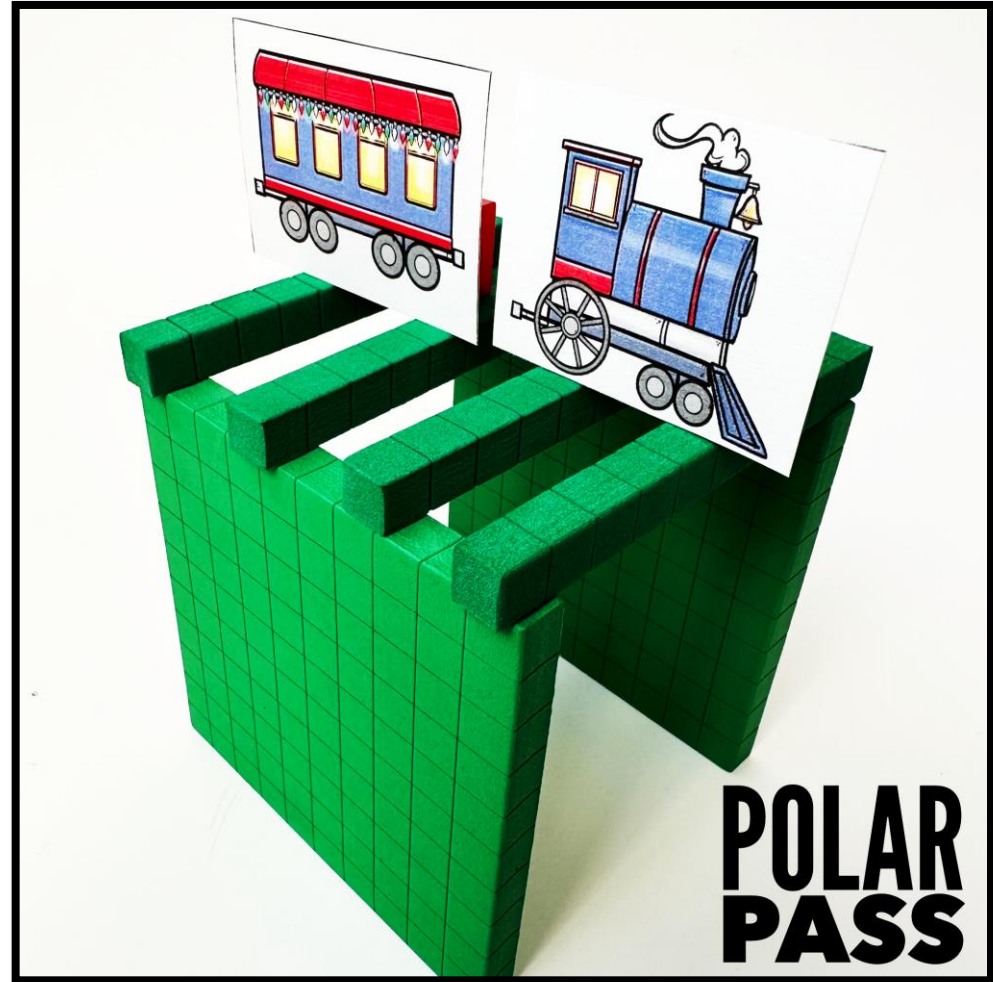
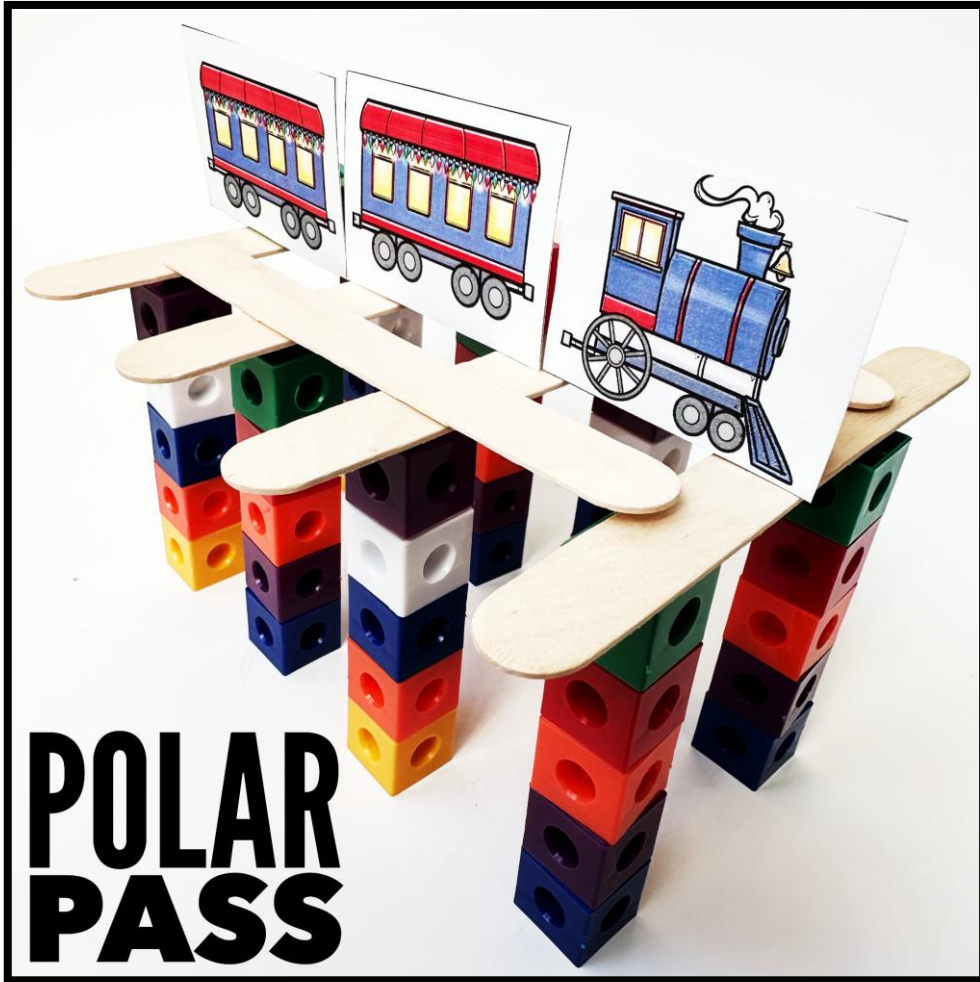
Suggested Materials: popsicle sticks, small toy trains OR paper trains taped to linking cubes
Choices for bridge materials: base ten blocks, dominoes, or linking cubes

LESSON PLAN

1. Prime students' background knowledge about bridges by projecting the "Real World Examples" of bridges from the teacher chart. Also, refer back to the train bridge design shown in The Polar Express. Discuss the similarities and differences between bridge designs, as well as the important parts of a bridge.
2. Allow students to share what they already know about bridge designs and why bridges are important. Record their ideas on the provided teacher chart and have them add ideas to their individual booklets. Explain the two common terms used for the parts of a bridge: **piers (vertical supports)**, and **deck (main horizontal surface)**.
3. Introduce permitted materials and share the challenge. Allow students to share ideas for how the materials work and might fit together in different ways to make a bridge that is balanced, sturdy, and holds the most weight.
4. Allow students at least 45 minutes with partners or small groups to create and test a variety of bridge designs, as well as record in their STEM booklets.
5. Hold a whole class closing discussion and reflection, allowing students to share what they created and what they learned about bridges and weight. Record their ideas on the provided teacher chart and have them finish their individual booklets.

POLAR PASS

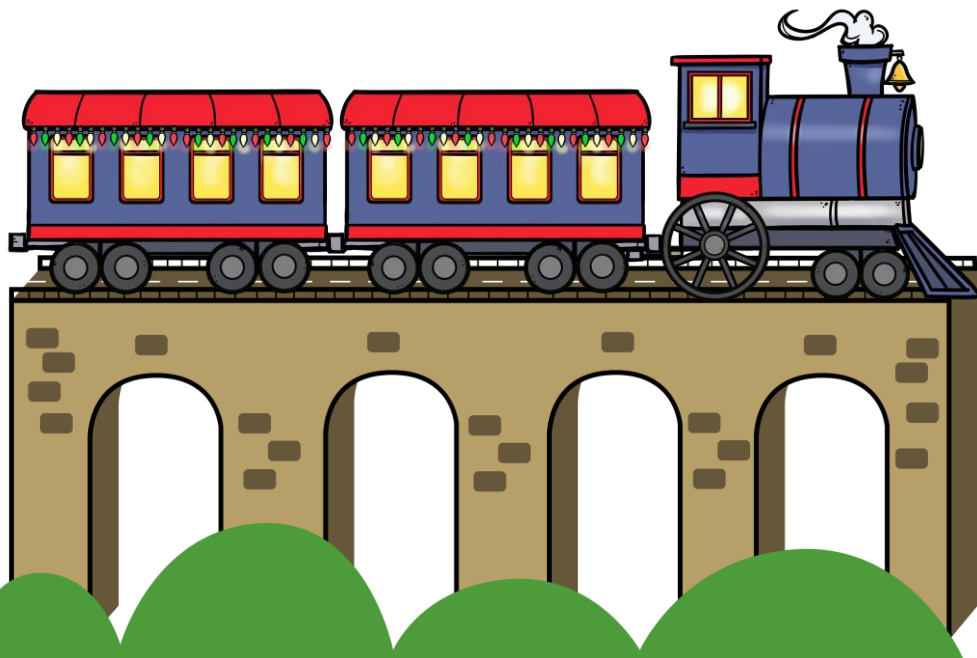
Possible Products



POLAR PASS

The Polar Express needs to get to
the North Pole!

Can you build a train bridge that will hold
the most weight?



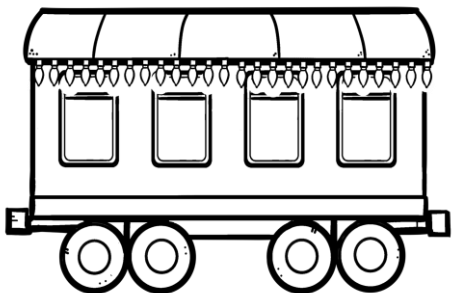
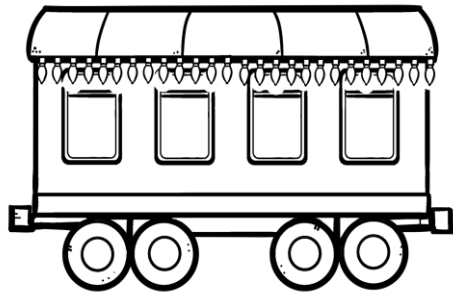
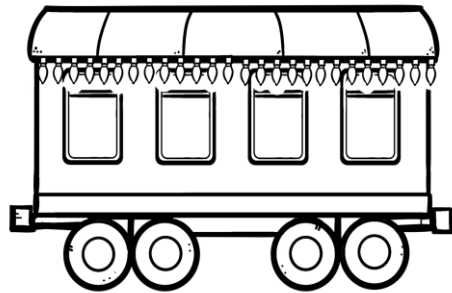
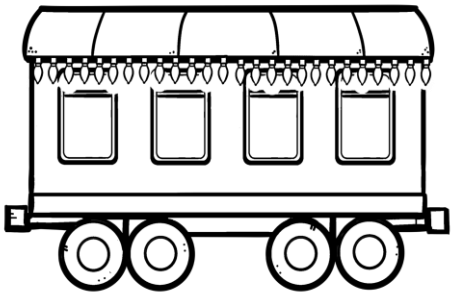
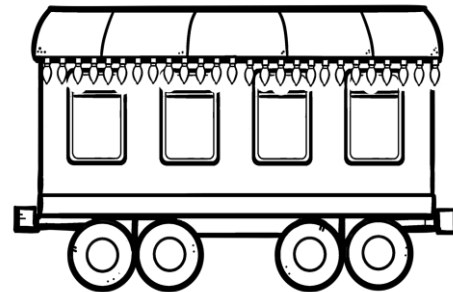
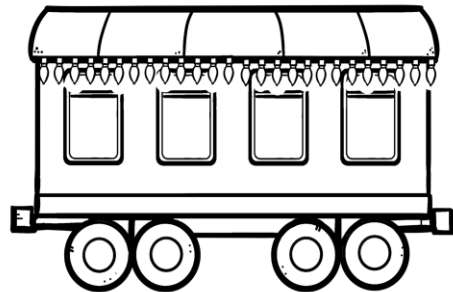
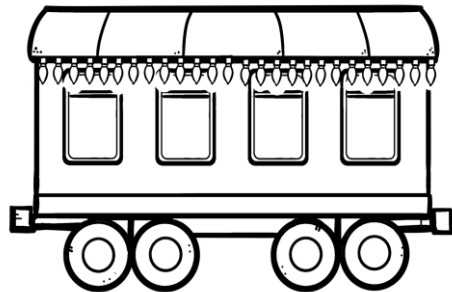
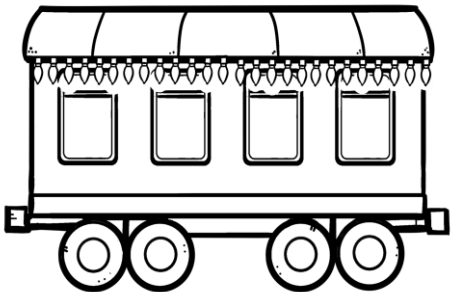
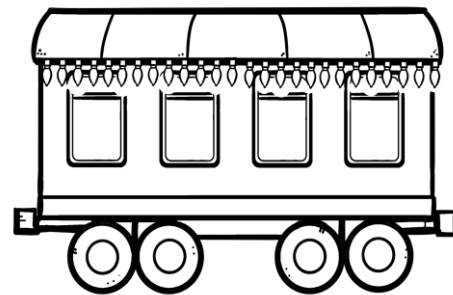
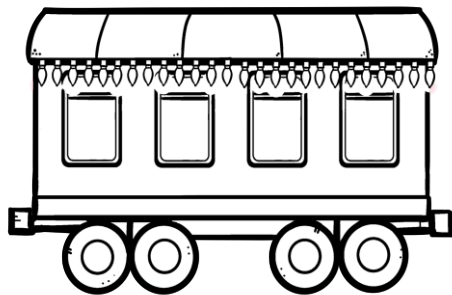
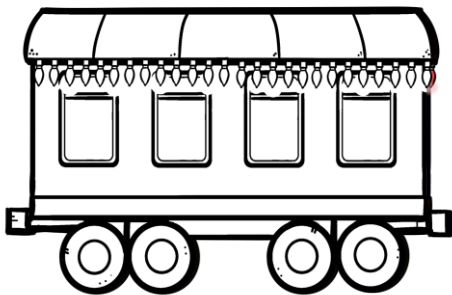
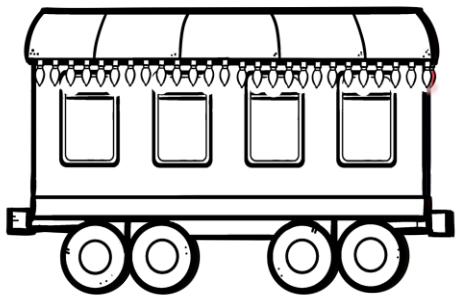
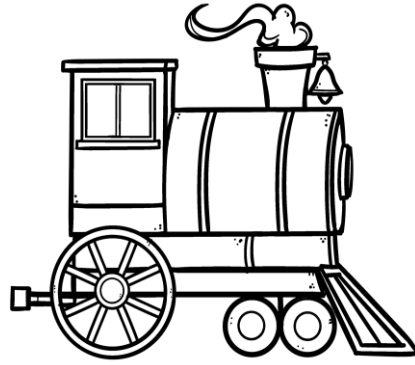
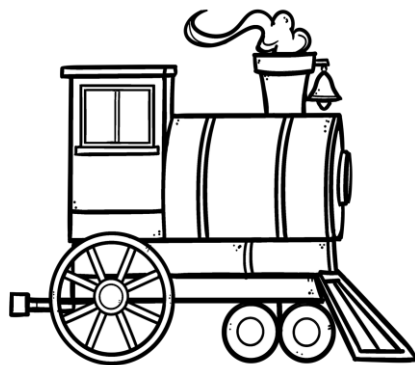
YOU MAY USE:

- linking cubes, base ten blocks, or dominoes
- popsicle sticks
- toy trains or paper trains

Tape these paper trains to the front of linking cubes.



Tape these paper trains to the front of linking cubes.

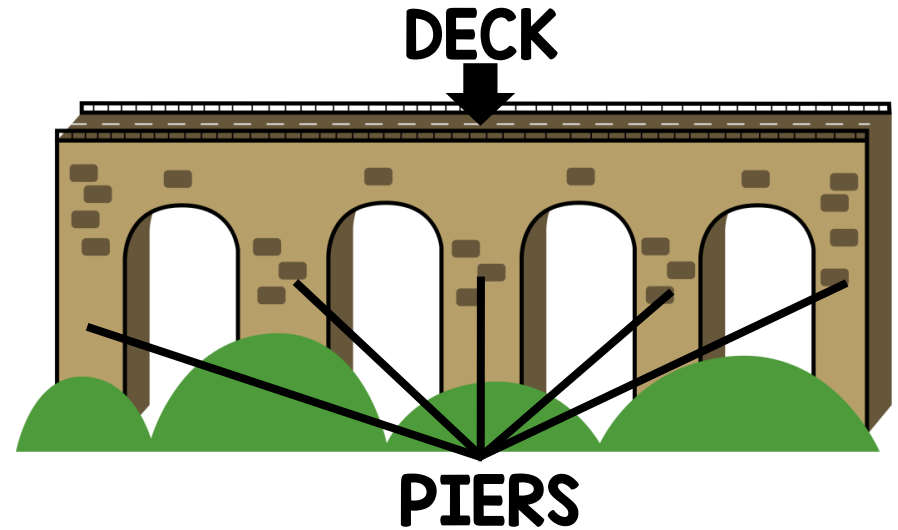


POLAR PASS

Real World Examples

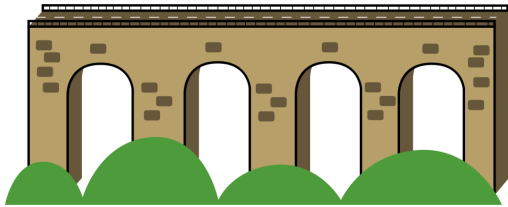


Parts of a Bridge

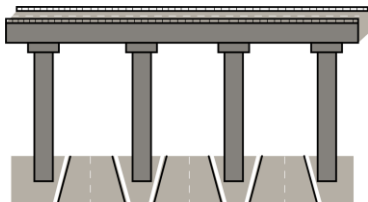


Types of Bridges

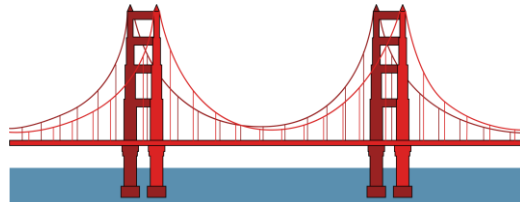
ARCH



BEAM



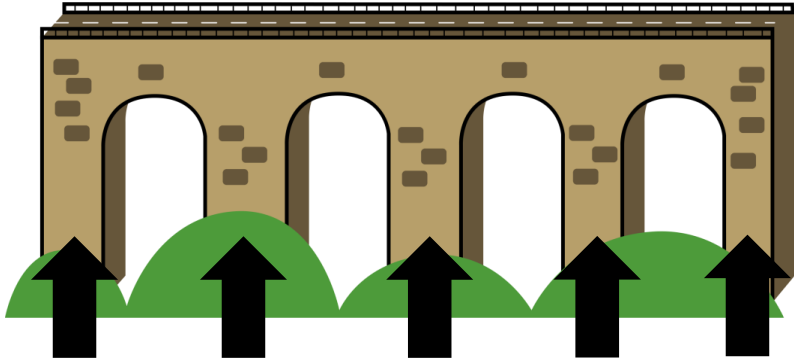
SUSPENSION



Why do you think bridges are important?

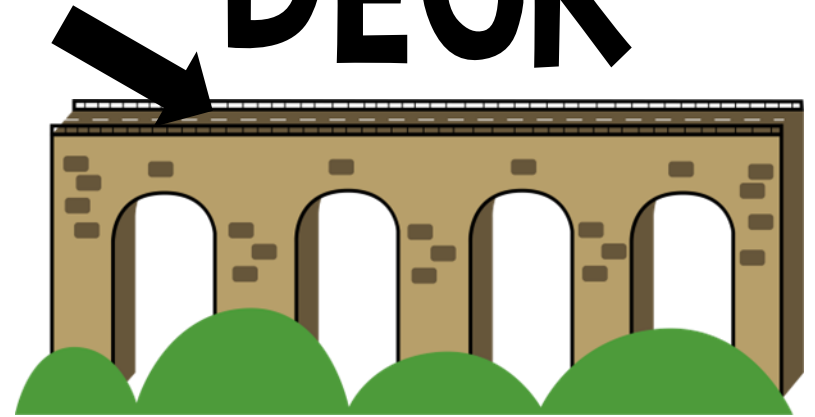
POLAR PASS

PIER



a vertical support on a bridge

DECK



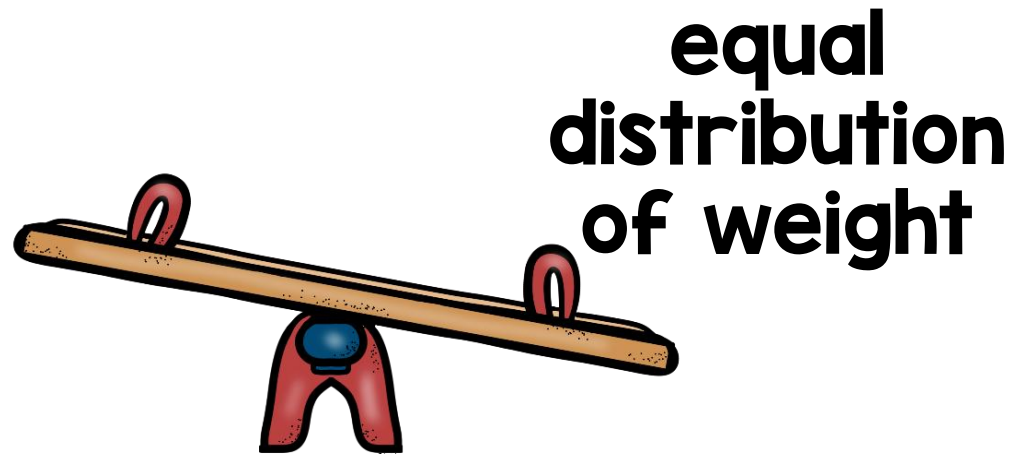
the main horizontal surface of a bridge

WEIGHT



how heavy an object is

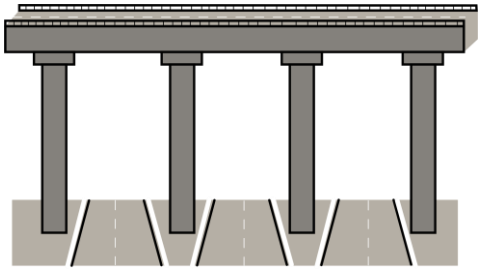
BALANCE



equal distribution of weight

LET'S EXPLORE BRIDGES AND TRAINS!

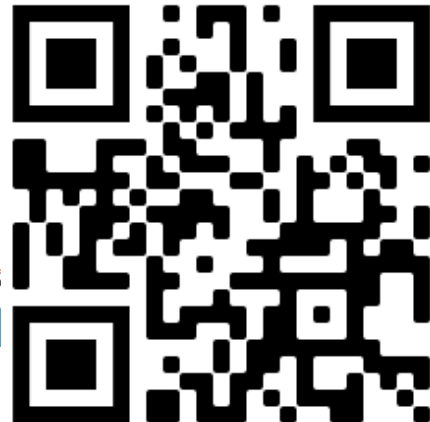
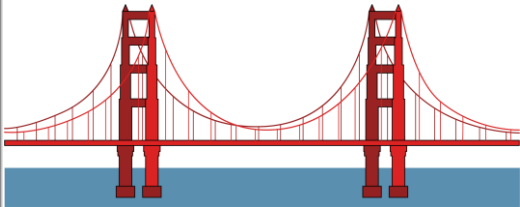
ALL ABOUT BRIDGES



STRONG BRIDGES



FAMOUS BRIDGES



TRAINS



WEIGHT TESTS

Test	Number of Trains Held
1	
2	
3	

One thing that was EASY:

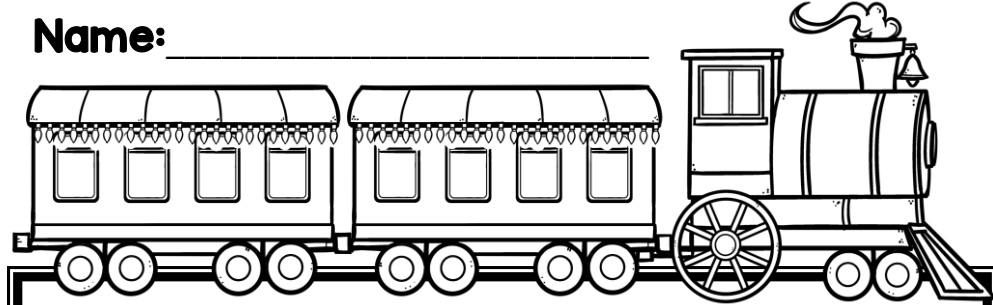
One thing that was HARD:

One new thing I LEARNED:

POLAR PASS

The Polar Express

Name: _____



STEM CHALLENGE

Can you build a train bridge that holds the most weight?

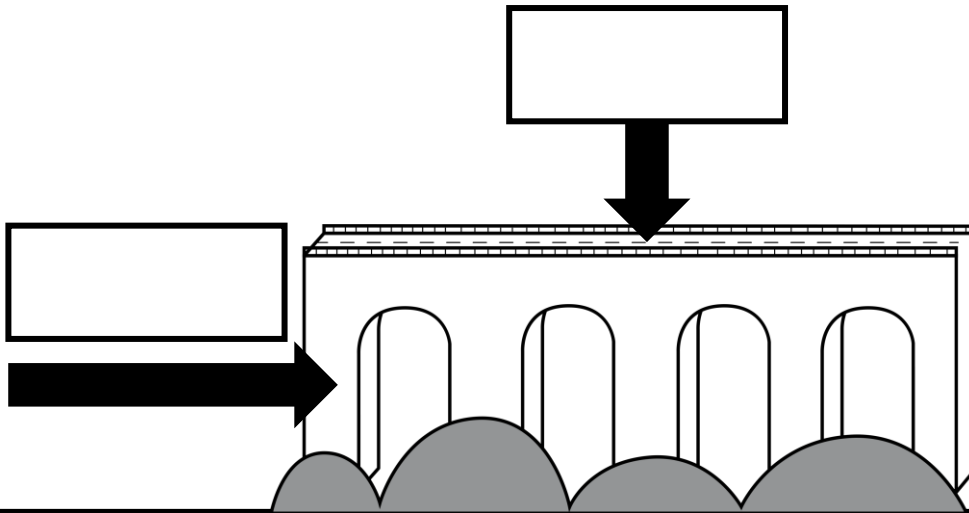
What I Know About Bridges:

1 _____

2 _____

PARTS OF A BRIDGE

Label the DECK and the PIERS.

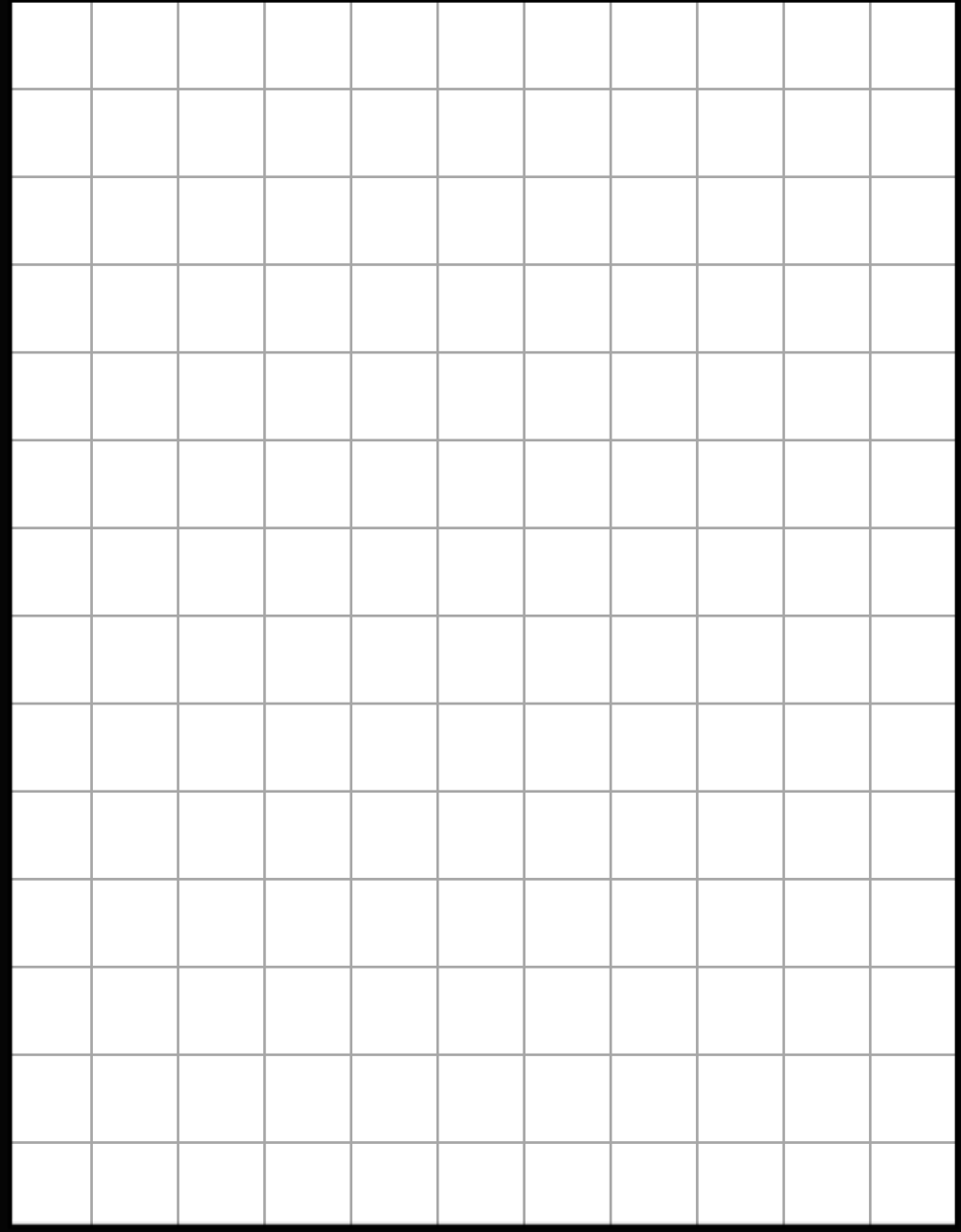


MATERIALS

Draw or write the materials you will use to build your bridge.

MY TRAIN BRIDGE

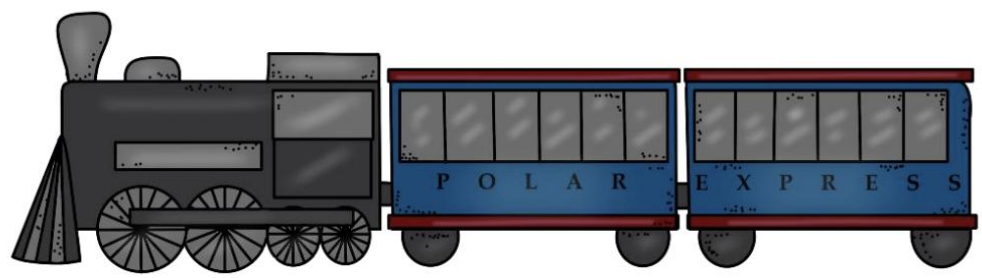
Draw a picture of your train bridge.
Label the DECK and the PIERS.



The Polar Express Maker Task Cards

Use the following task cards in a Makerspace or with STEM Bins for students to make more creations.

Make a train.



Make a bell that makes noise.



Design a new pair of holiday pajamas.



Write a recipe for a new type of hot cocoa.



Credits

**Thank you for your
purchase!**

Created by
Brooke Brown & Katie King

