

STEM Projects - Grades 3-5

Mrs. Smith

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April 13 - May 2, 2020

The projects are purposely similar throughout grades K-5 so families can work together and compare their results. If possible, share a picture of your project with me on Class Dojo and describe how it worked.

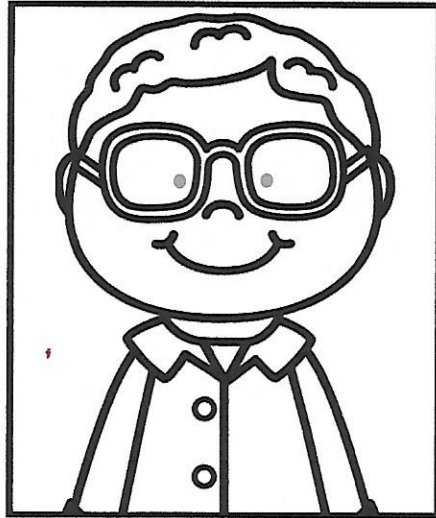
Week 1 - Read the passage about Lonnie Johnson and then answer the questions. Next design your own toy out of materials you have at home. There are suggested materials on the direction sheet, but please use whatever you have available.

Week 2 - April 22 is Earth Day. Read the passage about Earth Day and answer the questions. Then make a Litter Bug or something useful out of recyclable materials you have at home. Have fun and be creative!

Week 3 - Make a bridge that holds pennies using materials you have at home. There are suggested materials on the direction sheet, but please use whatever you have available. Answer the questions that go with it.

Name: _____

All About **Lonnie Johnson**



Lonnie Johnson is an African-American engineer and inventor. He was born in Alabama in 1949. Growing up Johnson always wanted to be an inventor. He wanted to follow in the footsteps of George Washington Carver, the famous African-American agricultural scientist and inventor.

In 1968 Lonnie Johnson entered the Alabama State Science Fair. He was the only African-American student to enter the competition. At the fair, Johnson won first prize for his invention of a compressed-air-powered robot.

Johnson went on to Tuskegee University where received degrees in mechanical and nuclear engineering. He joined the Air Force and later worked for NASA as a systems engineer for the Galileo mission to Jupiter.

During his time at the Air Force, Johnson worked on his own inventions on the side. One of those inventions was an environmentally friendly heat pump that used water instead of Freon. In 1982 he completed the prototype, and when he tested it water blasted out into the tub.

The technology he developed for the heat pump gave him a genius idea for a new kind of toy. The toy was a high pressure water gun which he called the Power Drencher. It was later renamed the Super Soaker. Since the Super Soaker came on the market in 1989, it has ranked among the world's best-selling toys every year.

Lonnie Johnson holds more than 100 patents and pending patents for his inventions. He continues to work on developing new inventions. Although he has invented many things, he is best known for his invention of the Super Soaker.

Name: _____

Directions: Answer the following questions about Lonnie Johnson after reading the article.

Who did Lonnie Johnson want to be like?

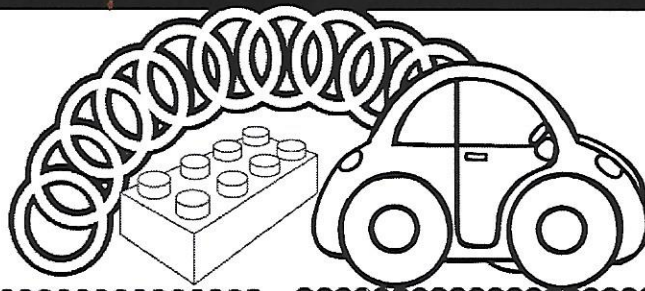
What did he study in school?

Where did Lonnie Johnson work?

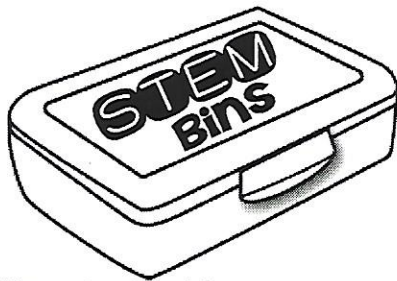
What invention is Johnson best known for?

MAKER STATION

Make a toy.



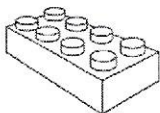
MATERIAL OPTIONS



magnetic blocks



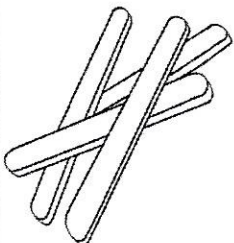
building bricks



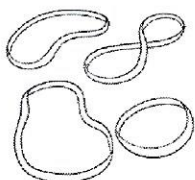
pipe cleaners



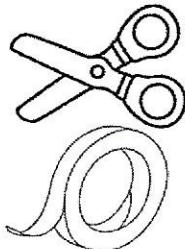
popsicle sticks



rubber bands



scissors and tape



RESOURCES

DIY TOYS



TOP 100 TOYS

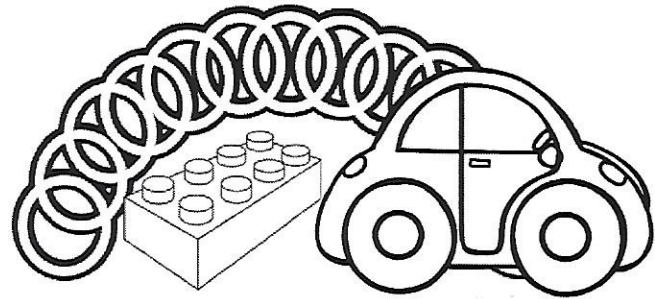
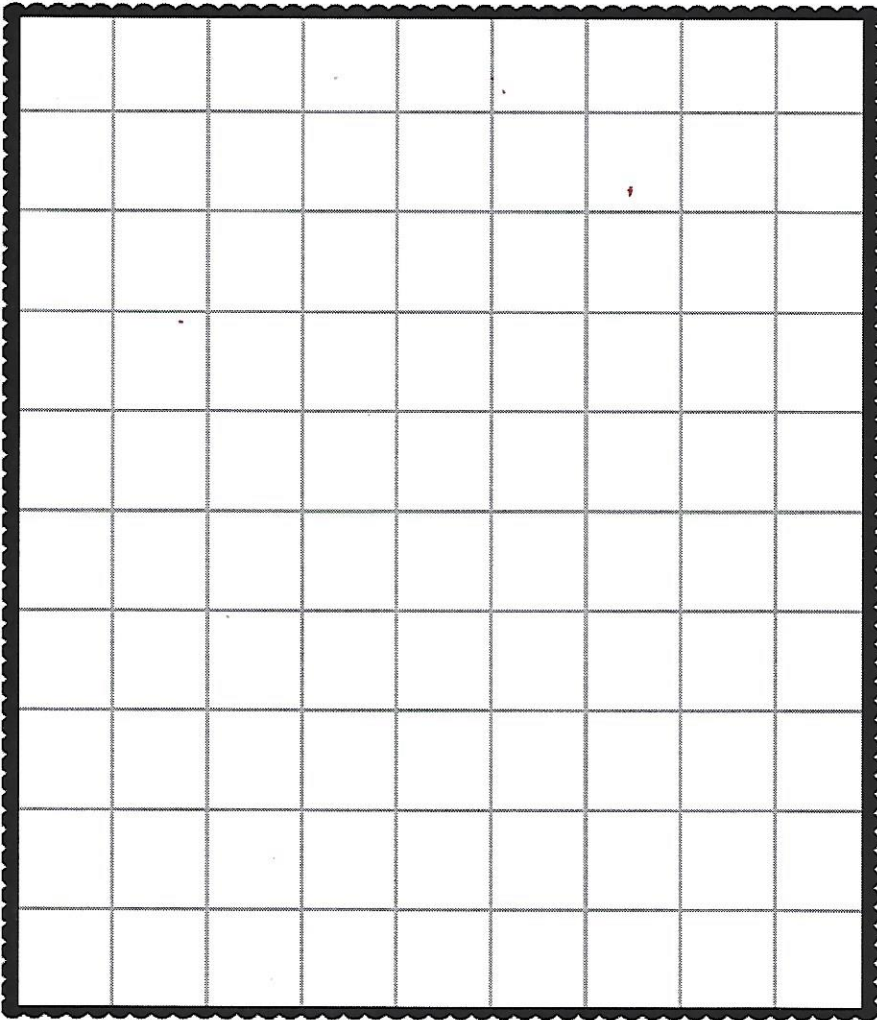


TOY

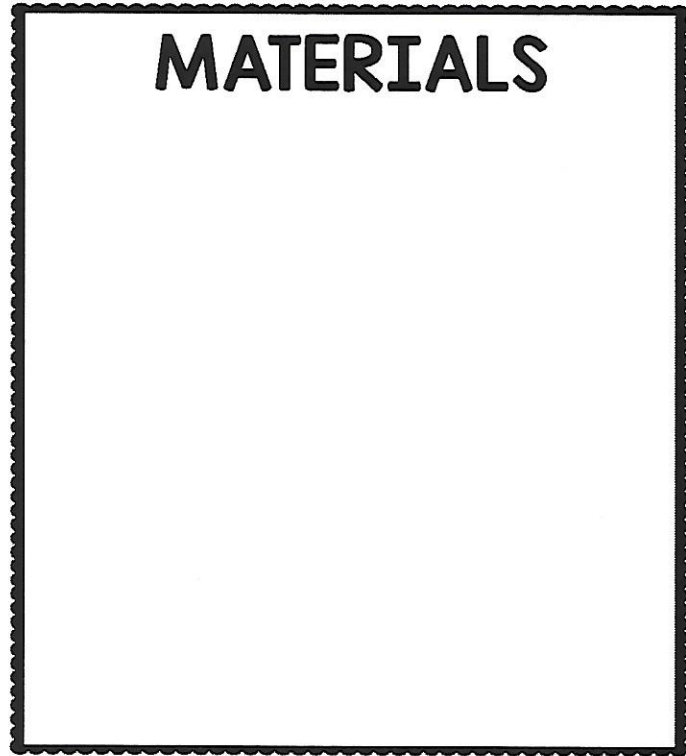
Maker Station Creation

Name: _____

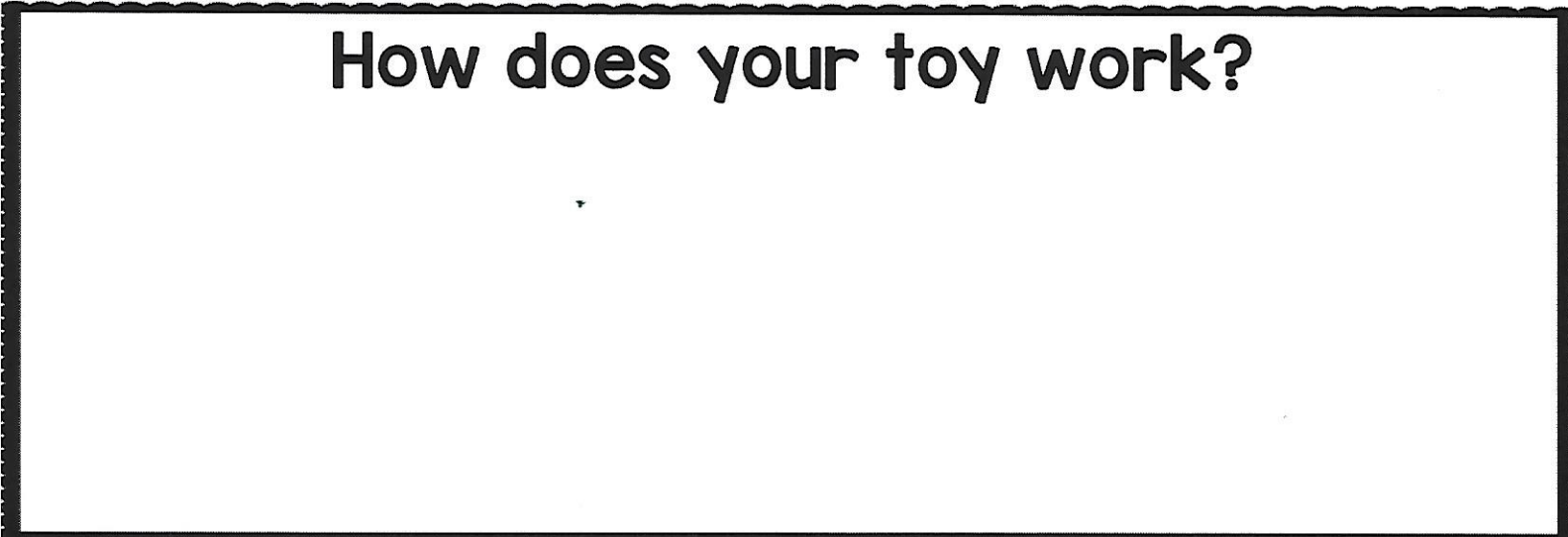
Blueprint



MATERIALS



How does your toy work?





R-E-C-Y-C-L-E

“One man’s trash is another man’s treasure!” Have you ever heard this saying? People can make treasure out of trash. How? They reduce, reuse, and recycle it. These are called the three “R’s.” The three “R’s” help decrease how much is thrown away. This saves natural resources. **Reducing** means to use less. We can use reusable bags at the grocery store. Then, we won’t need to use plastic or paper bags. This helps to use less. Companies can use less, too. They can make bottles that use less plastic. They can also send emails instead of using paper mail. This saves paper. **Reusing** means finding new ways to use old things. This is better than throwing things out. People can reuse all kinds of things. Even old pasta or soup jars. Other foods can be kept in the empty jars. People can also reuse old furniture. Then, they won’t have to buy new furniture.

Reducing and reusing protects the environment. You can try these two “R’s” in your home. The third “R”, recycling, is different. You can start recycling at home or at school. But, you can’t finish the job there. Recycling is finished at a recycling center. **Recycling** means to turn trash into new material.

Do you recycle cereal boxes at home? Guess where those boxes go next? Let’s take a journey to find out! First, they are taken to recycling spaces. Next, they are put on a moving platform. Recycling spaces sort the items. There are different ways to do this. Some use machines. Some use people. And, some use both. Let’s visit a space that uses both. People and machines both sort items. Workers begin to sort the items by hand. Trash and some cardboard are pulled out. Cardboard goes into its own pile. Trash is taken to a landfill. Then, a machine takes over. Strong fans blow on the items. Lighter paper, metal, and plastic blow away. The glass items are heavy, so they are not blown away by the fans. They are moved to another pile. The paper, metal, and plastic travel up the platform. Paper items move into their own pile. Powerful magnets grab the metal items. Then, the factory workers step back in. Workers sort the leftover plastic items by hand. Finally, strong machines smash the different piles. The piles become small cubes called bales. The bales are sold to companies that make recycled goods. For example, Papa John’s Pizza might buy bales. They might use them to make pizza boxes.

Did that sound like an easy process? It is not so simple! Most recycling spaces are limited. They can only recycle certain items. Bales must be made from similar items. It’s not good if the wrong kinds of plastic mix together! What if you recycle the wrong materials together? It could ruin the whole bale of goods. Think about it this way. What if you threw pizza toppings into a cake mix? Pizza and cake are tasty on their own, but they shouldn’t be mixed together!



R-E-C-Y-C-L-E

Some items cannot be recycled at your local space. Plastic bags are an example. They can't be taken to most recycling spaces. Pizza boxes and some paper are not always recyclable. These items could ruin bales. Some items must go to a recycling space for those types of bales. Call your local recycling center. Or, check its website. They will tell you which types of items you can send. Some recycling bins are labeled. This shows people what items can be recycled.

Does recycling seem like a lot of work? Is it worth the extra effort? The answer is yes! Recycling helps the environment. Recycling has created lots of jobs. Many businesses have been started to help the process. Recycling companies make a lot of money. These businesses have helped boost the economy. Recycling also reduces the amount of waste that is sent to landfills. **Landfills** are places where trash is dumped and then covered up by soil. The trash in landfills stays put for a long time. Someday, we will run out of space for landfills. This is why recycling is important! Instead of sending your waste to a landfill, recycle it. Recycling also helps protect our world for the future. It saves natural resources. It cuts back on pollution. Recycling helps people and the environment!

FAST FACT: Some sorting machines sort over 300 tons of waste in one day!

FAST FACT: Over 60% of the things that are thrown away could be recycled.



TEXT-BASED EVIDENCE QUESTIONS

R-E-C-Y-C-L-E

Directions: Answer these questions after you read the passage. Remember to begin your answer by restating part of the question, use direct evidence from the text, and explain your thinking.

KEY IDEAS & DETAILS

1. According to the first paragraph of the text, what are the three "R's?" **RI.1**

2. Describe how people can reduce or reuse waste at home. **RI.3**

3. Describe how companies can reduce or reuse waste. **RI.3**

4. Explain why only certain items can be recycled. **RI.3**

5. Summarize the recycling process that takes place at many recycling facilities. **RI.2**

TEXT-BASED EVIDENCE QUESTIONS

R-E-C-Y-C-L-E

Directions: Answer these questions after you read the passage. Remember to begin your answer by restating part of the question, use direct evidence from the text, and explain your thinking.

CRAFT & STRUCTURE

6. What is a "landfill?" **RI.4**

7. How is the passage organized? (Chronological, cause/effect, comparison/contrast, description, problem/solution). Use evidence from the text to explain your answer. **RI.5**

INTEGRATION OF KNOWLEDGE & IDEAS

8. What is the author's message about the importance of recycling? Use evidence from the text to support your reasoning. **RI.8**

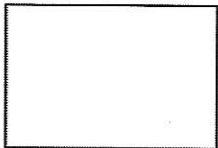
MAKER STATION

Make something
useful
out of trash.

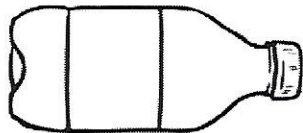


MATERIAL OPTIONS

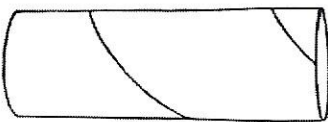
paper



plastic bottles



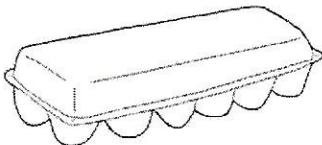
paper rolls



bottle caps



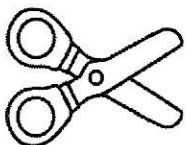
egg cartons



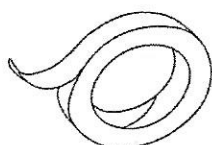
markers



scissors



tape



RESOURCES

PAPER ROLL CREATIONS



PLASTIC BOTTLE CREATIONS

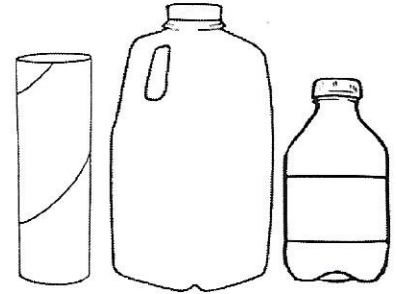
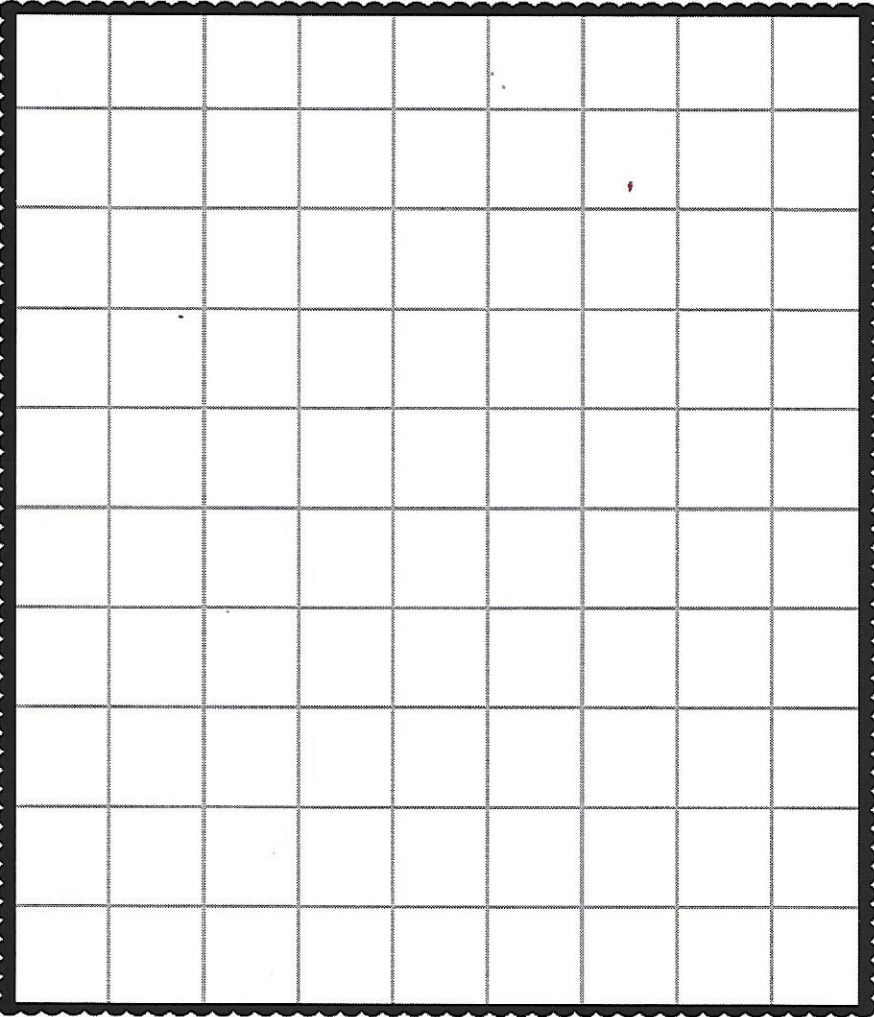


TRASH TO TREASURE

Maker Station Creation

Name: _____

Blueprint



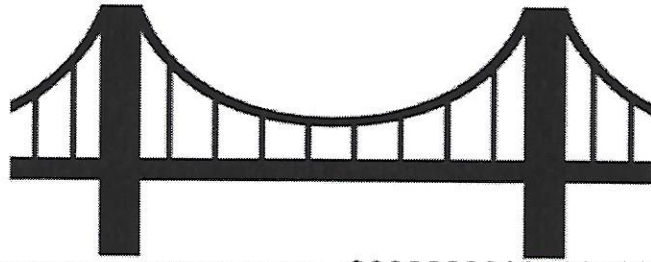
What I Made:

MATERIALS

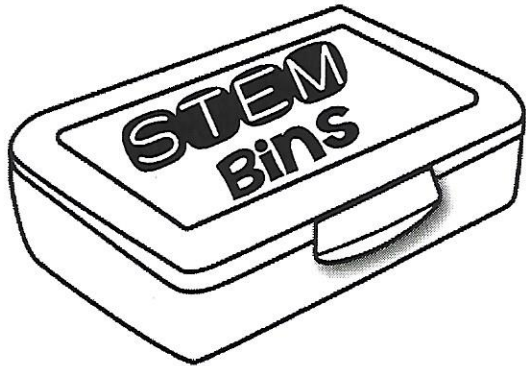
HOW IT IS USEFUL

MAKER STATION

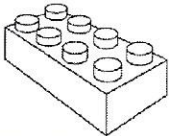
Make a bridge
that holds
pennies.



MATERIAL OPTIONS



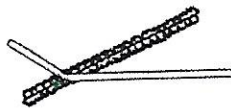
building
bricks



wooden
planks



straws and
pipe cleaners

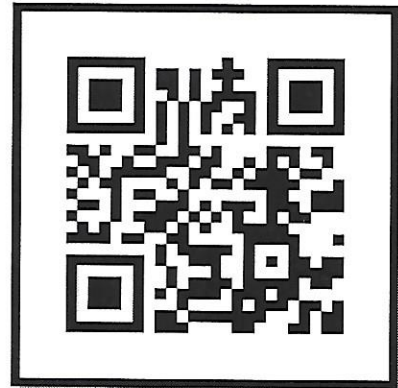


pennies



RESOURCES

STRONG BRIDGES



TYPES OF BRIDGES

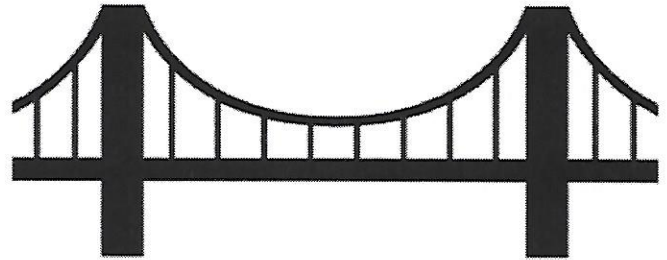
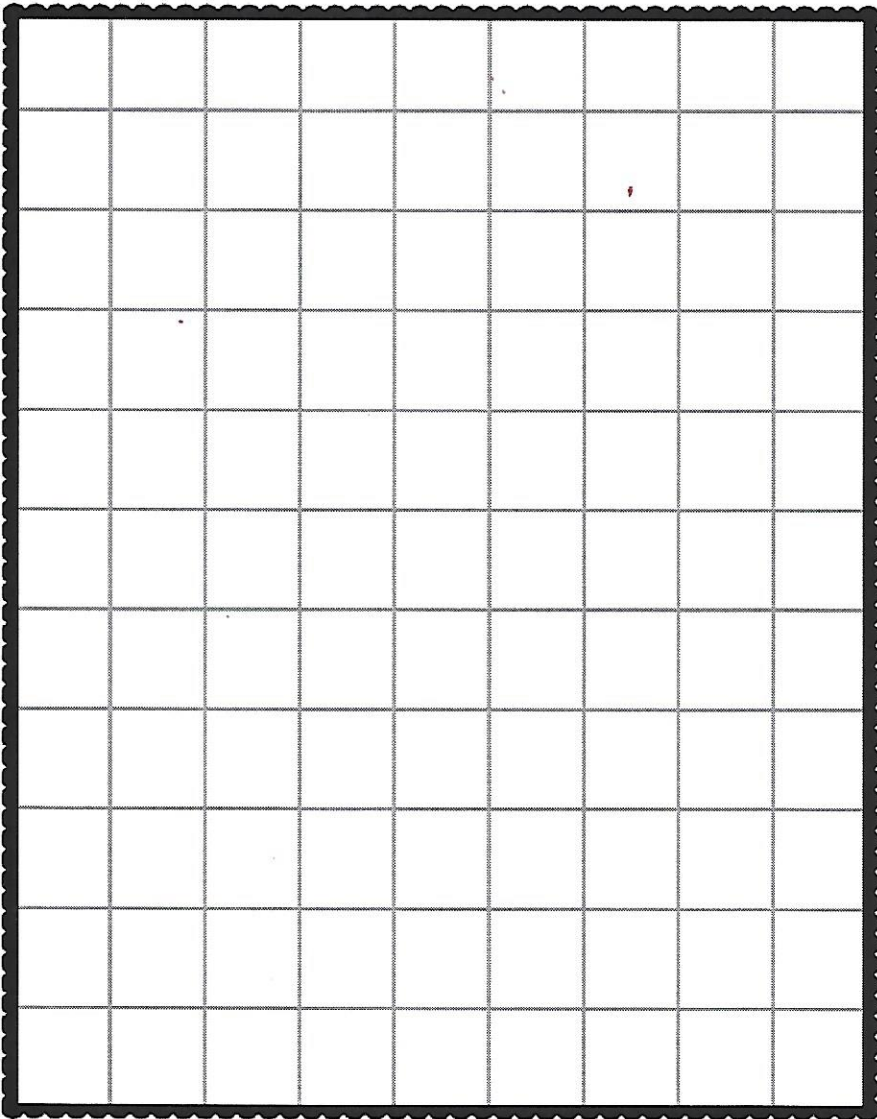


BRIDGE

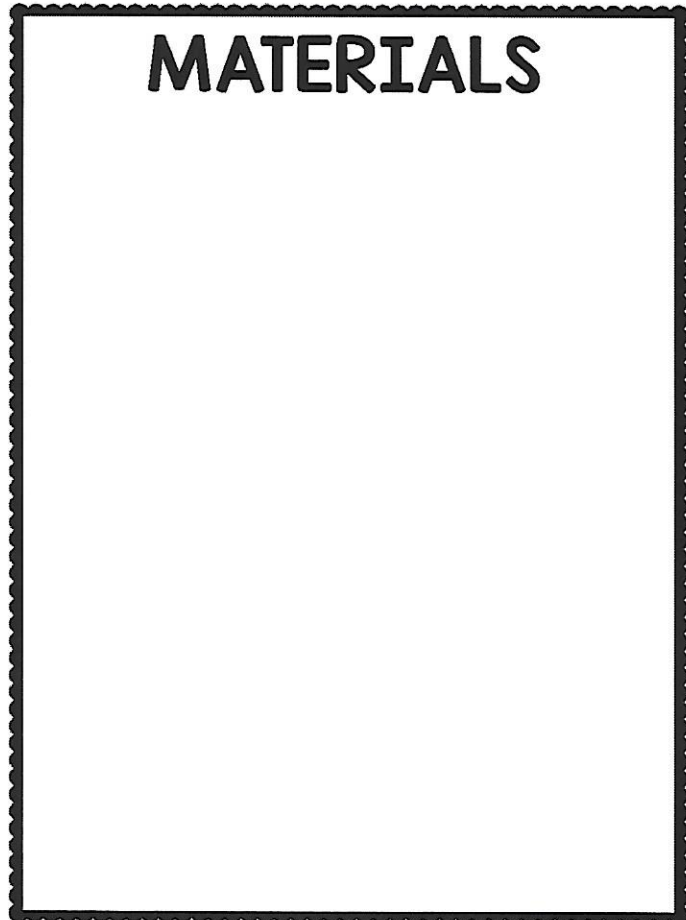
Maker Station Creation

Name: _____

Blueprint



MATERIALS



How many pennies does your bridge hold?

_____ pennies



What else can your bridge hold?

Make a Bridge Questions

1. What makes a bridge strong?
2. What materials did you use to make your bridge strong?
3. Did your ideas work the first time? What did you do next?
4. What did you learn during this challenge?