

CHRISTMAS

SCIENCE & STEM PACK FOR KIDS

Science Experiments

STEM Projects

Building Activities and Much More!



CHRISTMAS SCIENCE & STEM PACK

SANTA'S SLEIGH ENGINEERING SUPPLY LIST

Acrylic paint
Aluminum foil
Baking soda
Baggies
Bamboo sticks
Cardboard
Clothes pins
Coffee filters
Cookies
Cookie cutters
Cookie balls
Cotton balls
Cotton swabs
Craft paper
Craft sticks
Dryer hose
Duct tape
Faux plant
Feathers
Felt
Fish line
Flat mar
Food c
Funnel
Gears
Glitter
Glow
Glue
Golf

Hammer
Hinges
Leaves
LEGO® bricks
Lollipop sticks
Magnets
Rubber Bands
Sand
Scissors
Shovel
Soil
Sponges
Springs

Build the Structure

ICE CHALLENGE

Building the
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GINGERBREAD HOUSE CHALLENGE

SUPPLY IDEAS

Graham Crackers	Shoebbox
Icing	Construction Paper
Milk Carton	Candy Canes
Ruler	Gumdrops
Toothpicks	Other Candies

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CHALLENGE
Using any materials you have available, construct a gingerbread house.

BEST SCIENCE AND ENGINEERING PRACTICES

It is important to note that the scientific method is not a linear set of steps, and you can adapt it to fit your investigation.

1. I can ask questions.
2. I can develop and use models.
3. I can plan and carry out investigations.
4. I can analyze and interpret data.
5. I can use math and computational thinking.
6. I can construct explanations.
7. I can engage in arguments from evidence.
8. I can obtain, evaluate, and communicate information.

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INTRODUCTION:

Welcome to your Christmas Theme STEM Pack filled with great science activities and STEM projects every junior scientist or engineer should try! I hope it sparks creativity and curiosity within your young scientists, inventors, and engineers.

In this pack, find a fun selection of Christmas activities, challenges, and experiments. I have added supplies, setup instructions, and simple science information for each activity. The pack also includes STEM projects and extras to share with your kids. Our packs now include simple writing activities!

Feel free to use this pack with one junior scientist or a whole group of junior scientists. You may copy activities as many times as you like for your class, but please send your friends to grab their pack instead of sharing files.

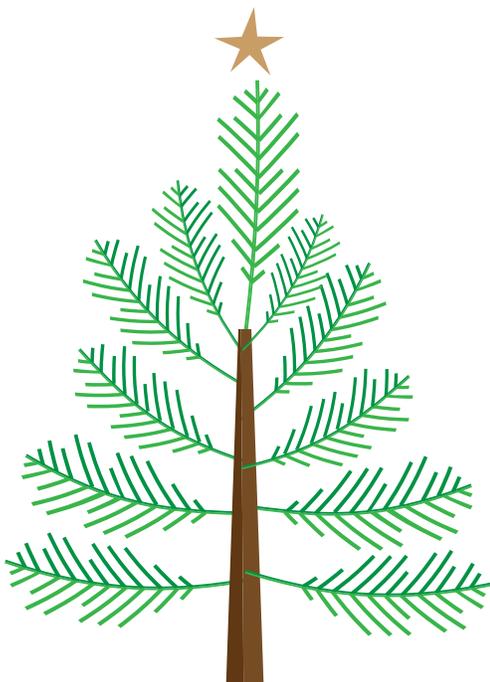
~ Thank you!

CHRISTMAS WRITING ACTIVITY

Our NEW cover page includes the opportunity to draw and write about a favorite Christmas memory or plan a future Christmas event.

What's Included:

- Christmas cover page with the space to draw a holiday memory or plan a holiday event
- Writing prompt for Christmas memory or event



Directions:

On the cover of your Christmas journal, draw your favorite Christmas memory or something you are looking forward to this Christmas. Your drawing can be based on a past or future event. Think about how you felt or will feel during this event or moment! Add as many details as possible.

Write down words that come to mind when you think about a memorable time.

Writing Extension:

MY CHRISTMAS JOURNAL

My Favorite Christmas Memory

LITTLE BINS FOR LITTLE HANDS

Graphics by BookBuddie, DoodleMama and Owl Prints

MY CHRISTMAS JOURNAL



My Favorite Christmas Memory

LITTLE BINS FOR LITTLE  HANDS

Graphics by [Redchocolate Illustrations](#) and [Chili Papers](#)



Directions:

On the cover of your Christmas journal, draw your favorite Christmas memory or something you are looking forward to this Christmas. Your drawing can be based on a past or future event. Think about how you felt or will feel during this event or moment! Add as many details as possible.

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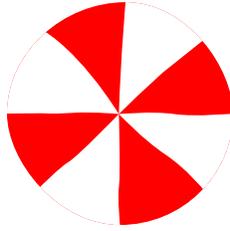
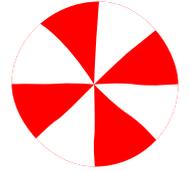
Write about why you chose this particular holiday moment or memory? Are you inside or outside? Are you with family or friends?

CHRISTMAS SCIENCE ACTIVITIES

Explore these fun Christmas theme science activities right through December! Use the enclosed journal pages, and best science practices pack to round out your holiday science this season.

What's Included:

- Candy Cane Oobleck
- Erupting Ornaments
- Santa's Magic Milk
- Color Candy Science
- Fizzing Trees
- Crystal Candy Canes
- Dissolving Candy Canes
- Salt Crystal Gingerbread Men
- Cookie Chemistry



These science activity cards are designed to be printed double sided on 8.5 x 11 paper.

Santa's Magic Milk

YOU WILL NEED:

- Dawn® dish soap
- Whole milk
- Shallow bowl, plastic salad plate or ramekins
- Food coloring
- Cotton swabs
- Christmas cookie cutter (optional)



DIRECTIONS:

1. Fill your shallow bowl or plate with milk.
2. Set your cookie cutter, if using, in the middle of the bowl.
3. Drop a few drops of food coloring into the cookie cutter.
4. Dip the cotton swab into the dish soap. Touch the tip of the swab to the milk inside the cookie cutter and watch what happens.
5. You can also add color droplets to the outside area of the cookie cutter. Repeat the process with the cotton swab and watch what happens.
6. Try not to stir, at least at first, and let the magic happen.
7. Once all the magic has happened, then you can swirl with the cotton swab to make pretty patterns.

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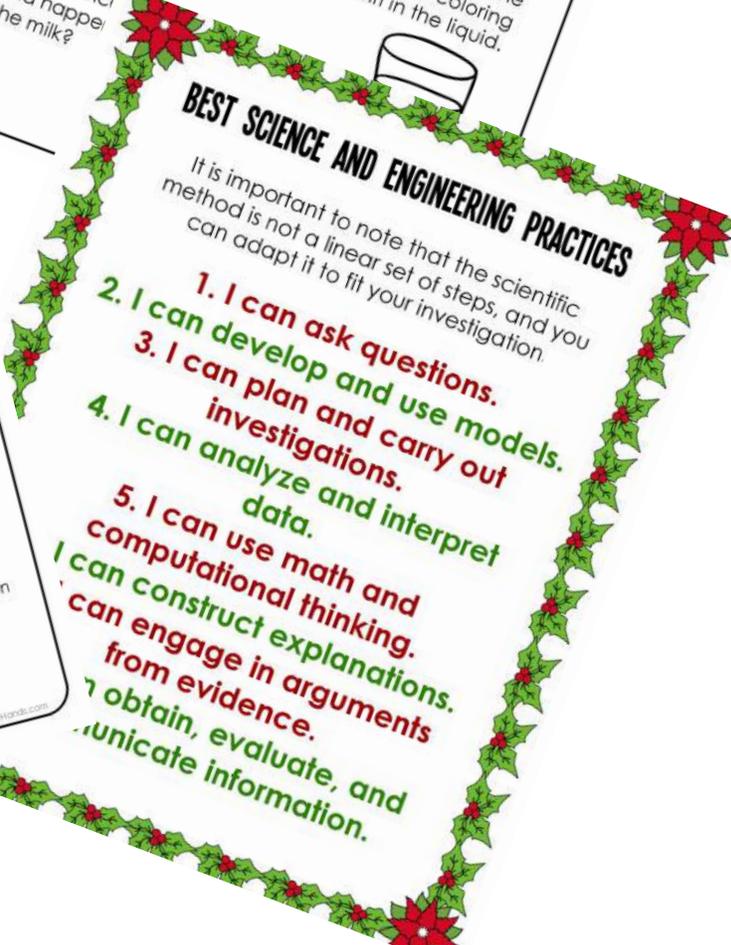
What's Happening?

THE SCIENCE BEHIND THE MAGIC MILK:

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THINK ABOUT IT:

What happens once you add the dish soap to the milk?



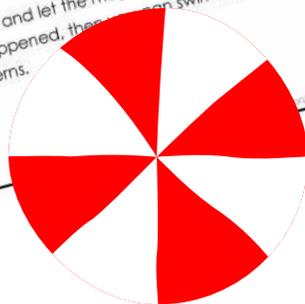
BEST SCIENCE AND ENGINEERING PRACTICES

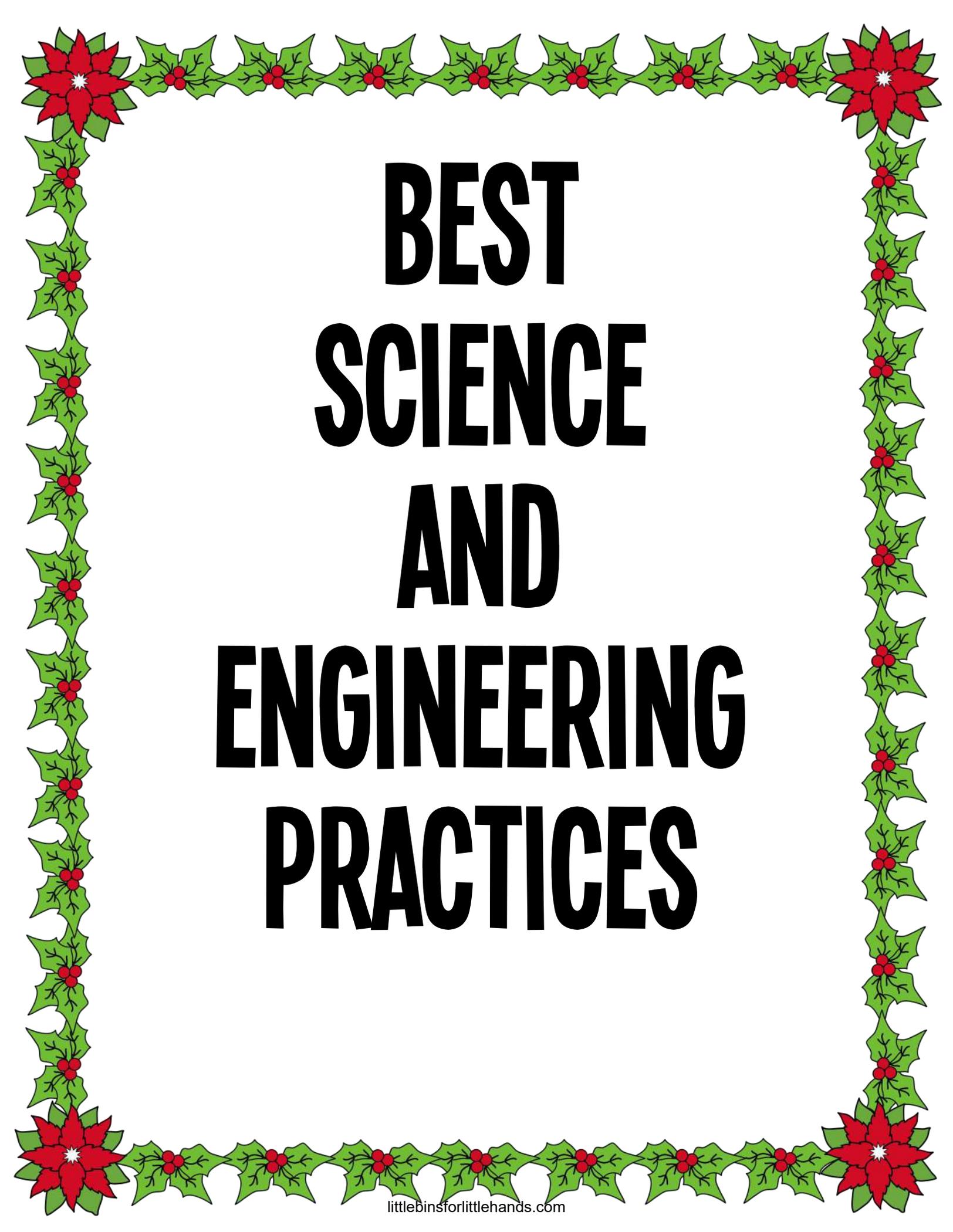
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5. I can use math and computational thinking.

I can construct explanations from evidence.

I can engage in arguments to obtain, evaluate, and communicate information.





**BEST
SCIENCE
AND
ENGINEERING
PRACTICES**

1. I CAN ASK QUESTIONS



2. I CAN DEVELOP AND USE MODELS



3. I CAN PLAN AND CARRY OUT INVESTIGATIONS



4. I CAN ANALYZE AND INTERPRET DATA



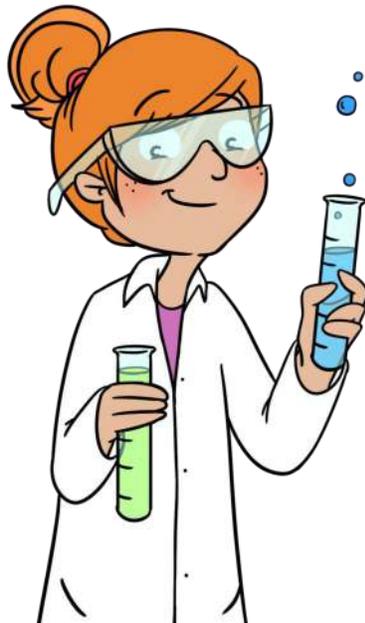
5. I CAN USE MATH AND COMPUTATIONAL THINKING



6. I CAN CONSTRUCT EXPLANATIONS



7. I CAN ENGAGE IN ARGUMENTS FROM EVIDENCE



8. I CAN OBTAIN, EVALUATE, & COMMUNICATE INFORMATION



1. I can **ask questions.**

2. I can **develop and use models.**

3. I can **plan and carry out investigations.**

4. I can **analyze and interpret data.**

5. I can use **math and computational thinking.**

6. I can **construct explanations.**

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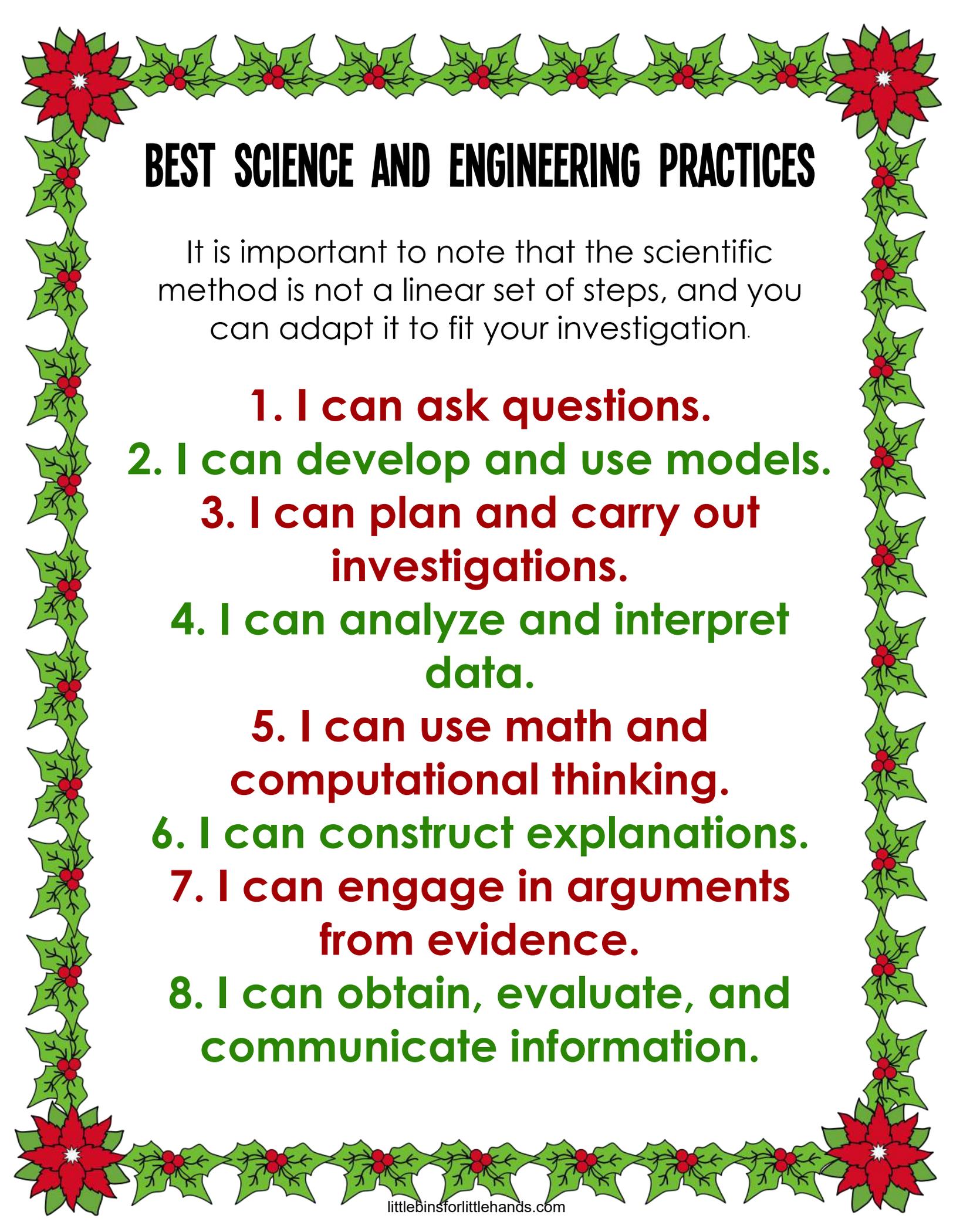
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BEST SCIENCE AND ENGINEERING PRACTICES

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THE SCIENTIFIC METHOD, BEST SCIENCE PRACTICES, AND LEARNING!

What is science, and why should we learn it?

The word "science" comes from the Latin word that means "knowledge". So science is all about gaining knowledge about the world around us. We know kids love to ask questions about what they see!

The word "method" comes from the Greek word that means "road". A method is all about the route you take to get someplace, but is it a road map?

If you put the two words together, science and method, you get a new term called "scientific method". This term is used to talk about a series of steps to use as a way to figure things out or to gain knowledge.

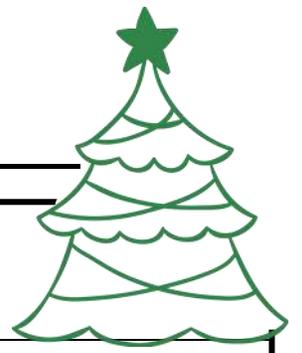
The scientific method is a useful tool for introducing kids to a logical way to solve scientific problems. The steps are helpful for guiding the process, but "guide" is the key here. It's important to understand that the scientific method is not a linear set of steps and can be adapted to suit the needs of a variety of investigations.

There are many ways scientists look to gain knowledge. It is important to allow kids to use the practices with what they are learning. This process will encourage the use of higher-order thinking skills for creating, evaluating, and analyzing. As kids develop the practices of questioning, gathering data, analyzing, and communication, they can apply these critical thinking skills to any situation. Now that's a winner!

* Note: You might be familiar with the more traditional version which includes some similar practices but in a linear format. These steps include asking questions, developing a hypothesis, conducting research, doing experiments and tests, analyzing data, and drawing conclusions.

However, the following eight science practices are less structured and allow for a more free-flowing approach to problem-solving and finding answers to questions.

MY EXPERIMENT:



Materials I Used:

What I think will happen:

MY EXPERIMENT:



What I did:

What I saw:

MY EXPERIMENT:

Draw it:

MY EXPERIMENT:

What happened:

Fizzy Ornaments

YOU WILL NEED:

- Plastic ornaments with removable tops
- Baking soda
- Vinegar
- Food coloring {optional}
- Glitter and sequins
{optional but always better with glitter!}
- Container with compartments
{a 5 compartment party tray or egg carton}
- Turkey baster or eyedropper
- A plastic tray or aluminum pan to catch fizz
- Funnel for filling ornaments
{optional but helpful}
- Plastic drop cloth or newspaper is handy for mess control



DIRECTIONS:

1. Begin by adding 2 tablespoons of baking soda in each compartment and dust with glitter.
2. Place plastic ornaments into an open space in the compartments. Use funnel to fill each ornament with 2 tablespoons of baking soda and sprinkle in more glitter and some sequins.
3. Mix up a container of vinegar and food coloring. You'll want to mix 4 to 6 cups of vinegar mixture. You can also divide and mix in multiple colors.
4. Place newspaper or plastic drop cloths on your work surface and set tray on top. Then place your container with ornaments on top of that.
5. Use your turkey baster or eyedropper to transfer the colored vinegar to each ornament, dropping the liquid into the ornament onto the baking soda.

What's Happening?

THE SCIENCE OF THE FIZZY ORNAMENTS:

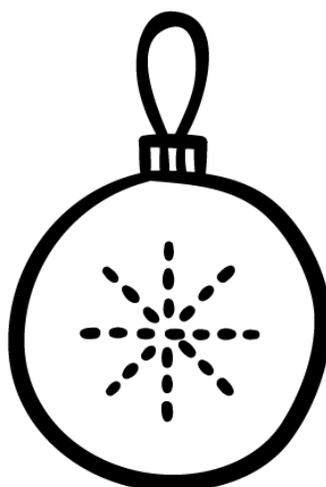
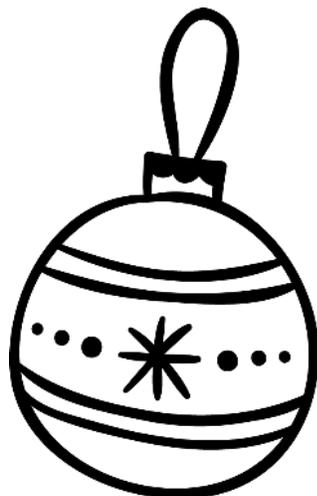
This fizzy Christmas activity is all about a chemical reaction. The scientific name of baking soda is sodium bicarbonate and it is a base. The vinegar is an acid.

When you combine the two, a chemical reaction occurs. The reaction produces a new product, a gas called carbon dioxide. This is a chemical reaction that you can see, hear, feel, and smell. The fizzing action is the reactionary change that produces carbon dioxide. It occurs until either the baking soda, or vinegar, or both are used up.

THINK ABOUT IT:

Why do you think the fizzing reaction shoots out the top of the ornament? What might happen if you place the cap back on the top?

{Note: it's a good idea to wear your goggles if you try with the cap on.}



Santa's Magic Milk

YOU WILL NEED:

- Dawn® dish soap
- Whole milk
- Shallow bowl, plastic salad plate or ramekins
- Food coloring
- Cotton swabs
- Christmas cookie cutter (optional)



DIRECTIONS:

1. Fill your shallow bowl or plate with milk.
2. Set your cookie cutter, if using, in the middle of the bowl.
3. Drop a few drops of food coloring into the cookie cutter.
4. Dip the cotton swab into the dish soap. Touch the tip of the swab to the milk inside the cookie cutter and watch what happens.
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What's Happening?

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Milk is made up of minerals, proteins, and fats. The chemistry of the dish soap and the fat of the milk is what makes the magic happen. When the dish soap is added to the milk, those soap molecules move around and attach to the fat molecules in the milk.

While some of the dish soap's properties dissolve in the water, the other properties search out and bind to the fat of the milk.

This "searching" is a whole bunch of molecules racing around to get those fat globs. You can see it with the color movement.

Because you are using food coloring, you are able to see this reaction occur. The food coloring has no fat so as the soap molecules move around the bowl the food coloring gets bumped around making the colors swirl in the liquid.

THINK ABOUT IT:

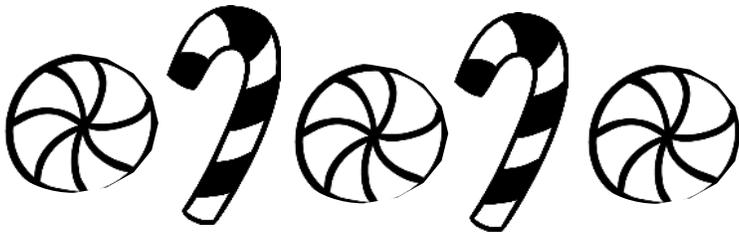
What happens once the movement stops?
What would happen if you add a bit more soap to the milk?



Dissolving Candy Canes

YOU WILL NEED:

- Small candy canes
- Small peppermints
- Water
- Cups
- Sharpie® marker
- Stopwatch/timer and/or kitchen scale



DIRECTIONS:

This is a great experiment for comparing two like items in the process of dissolving.

1. Start by boiling about 2 cups of water.
 2. While the water is coming to a boil, weigh each of your candy canes and each of your peppermints. Document their weights.
 3. You will need 6 cups. Label each of the cups as follows.
two cups - boiling water
two cups - room temperature
two cups - cold water
 4. Next fill each cup with the same amount of water. Add boiling water to the cups labeled as boiling, room temperature water to the cups labeled room temp., and the cold water to the final two cups.
 5. Now add candy canes to one set of cups and small peppermints to the other set of cups.
 6. Time the dissolving of each item. Document your results.
- Note: Adult supervision is required when using boiling water.

What's Happening?

THE SCIENCE BEHIND DISSOLVING:

In chemistry, to dissolve is to cause a solute to pass into a solution. Usually, we see this happening when a solid is changed from a solid-state to the liquid state.

For example: When sugar is stirred into a hot liquid it dissolves.

Another word for dissolving is dissolution. This dissolution is caused by adding a solvent to the solution. Dissolving occurs when larger molecules are broken into smaller molecules.

In our experiment, the solvent is the water and the solute is the candy. The water acts upon the crystal molecules in the candy to break them apart.

THINK ABOUT IT:

Which type of candy melted the fastest? Why?

Which type of solvent (water) caused the fastest dissolution?

Experiment with a variety of liquids to see how your results might be affected.

Suggested alternatives:

cooking oil, vinegar, rubbing alcohol, milk



Crystal Candy Canes

YOU WILL NEED:

- Borax
- Water
- 3 pint sized mason jars {a wide mouth is best}
- Pan, spoon, measuring cup and tablespoon
- Pipe cleaners {Red, Green, White}
- Craft stick
- Ribbon
- Magnifying glass



DIRECTIONS:

1. Cut your pipe cleaners in half. Twist together various color combinations to form your candy canes.
2. Tie a loop of ribbon to hang your candy cane from. Then hook the cane through the ribbon. Slide the craft stick through the other end of the looped ribbon.
3. Hang the cane into the borax mixture letting the craft stick rest across the top of the jar suspending the cane in the liquid. You don't want the cane to touch the sides or bottom of the jar.
4. Boil enough water to end up with 6 cups of boiling water. Add in 1 cup + 2 tablespoons of borax. Stir to mix so the borax is dissolved. Pour into 3 mason jars.
5. Within a few hours, you should begin to see crystals forming. Within 18-24 hours your crystal candy canes will be covered in crystals.
6. Remove from liquid and place on paper towels to dry a bit.
7. Use a magnifying glass to observe the crystal formations.
8. These are quite sturdy crystal canes, you can hang them on your Christmas tree.

Note: Adult supervision is required when using boiling water.

What's Happening?

THE SCIENCE BEHIND CRYSTALS:

Borax is a natural chemical compound, sodium tetraborate. The mixture of borax and water mixture is called a saturated solution.

While the liquid is hot the borax is suspended throughout the solution. More borax can be dissolved in hot liquid than in cold liquid. This is because in hot liquid the space between molecules is larger, which means there is more room between molecules for the borax particles to dissolve.

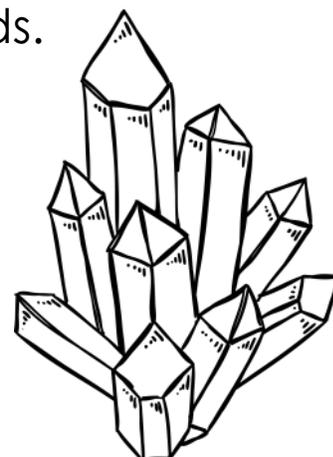
As the solution cools, the particles settle out of the saturated mixture. The settling particles form crystals and adhere to the pipe cleaner. These crystals can be seen, felt, and touched.

THINK ABOUT IT:

What would happen if you used cold water for your mixture? What about warm water? Could you add food coloring to the water? If so, would that change the color of the crystals?

Experiment making crystals with other compounds.

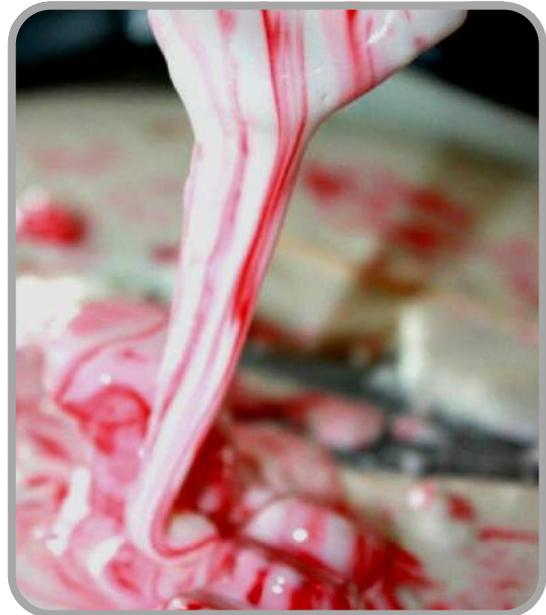
Suggested compounds:
salt, sugar, Epsom salt, alum



Peppermint Oobleck

YOU WILL NEED:

- Cornstarch
- Water
- Peppermints
- Tweezers, spoon
- Cookie sheet



DIRECTIONS:

1. Mix together about 1 cup of cornstarch to 1/2 cup of water. You can add a bit more of water or cornstarch as needed to get a good mixture. But, generally a 2:1 ratio works well.
2. Pour your oobleck mixture onto the cookie sheet, or you can use your spoon to spoon it on a little at a time.
3. Add in your peppermints.
4. Use your fingers, the tweezers, or the spoon and play with the oobleck. Is it a solid? Is it a liquid? What's happening to the peppermints?

What's Happening?

THE SCIENCE BEHIND THE OOBLECK:

You can grab a handful of it, but then it seems to melt like a liquid through your fingers. Is it a solid or a liquid? The answer is both, and it's neither!

This is called a non-Newtonian liquid, a substance that acts like both a liquid and a solid.

Oobleck is made with a combination of cornstarch and water. Generally, the oobleck recipe is a ratio of 2:1, so two cups of cornstarch and one cup of water gives you good oobleck consistency. There are more cornstarch particles than water molecules in the mixture. It can act like a solid when force is applied. But, it can act as a liquid when no force is present.

THINK ABOUT IT:

What would happen if you used warm water for your mixture? What about hot water?

Can you think of other mixtures that are non-Newtonian liquids? Try listing a few.



Fizzing Trees

YOU WILL NEED:

- Paper plates and tape to make into a cone shape, or paper cone cups
- Baking soda
- Water
- Sequins and glitter
- Food coloring
- Vinegar
- Bowl, spoon, tray to put in the freezer
- Squirt bottle, eyedropper, or baster



DIRECTIONS:

1. Slowly add water and green food coloring to a good amount of baking soda just until you get a crumbly but pack-able dough. It shouldn't be runny or soupy.
2. Add sequins and glitter.
3. Make a cone shape with a paper plate. Cut the plate in half and then wrap it around itself and fastened with tape.
4. Pack the baking colored baking soda mixture carefully into the cone shape making sure it is packed tightly to the tip.
5. Place in the freezer for several hours or overnight.
6. Peel off the paper and place trees in a container. I added a light snowfall of baking soda to the bottom for more fizzing action.
7. Use a squirt bottle filled with green vinegar. Begin squirting the trees with the vinegar mixture. Watch your trees begin to fizz.

What's Happening?

THE SCIENCE BEHIND THE FIZZING TREES:

What's happening to the trees?

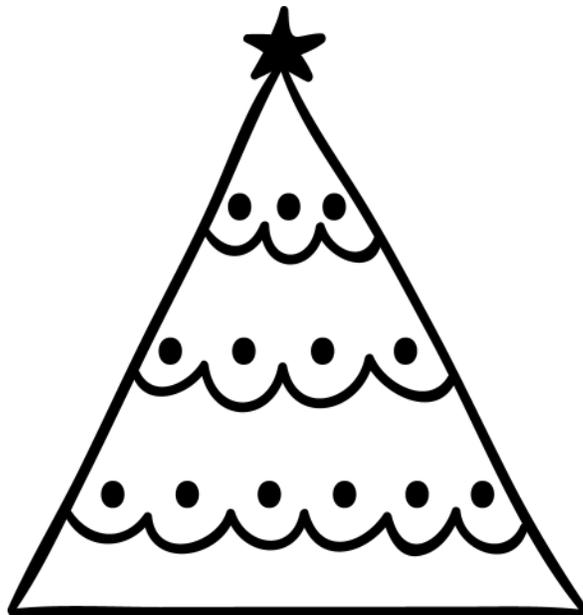
These fizzy trees are the result of a chemical reaction. The acid in the vinegar is reacting with the baking soda, or sodium bicarbonate which is the scientific name for baking soda.

When you squirt the trees with the vinegar the reaction produces a gas called carbon dioxide. The fizzing action is the change that is occurring while the carbon dioxide is being produced. As the gas is formed the carbon dioxide disperses into the air. The fizzing continues until either the baking soda, or vinegar, or both are used up.

What happens if you add more vinegar? What happens if you sprinkle more baking soda on top?

THINK ABOUT IT:

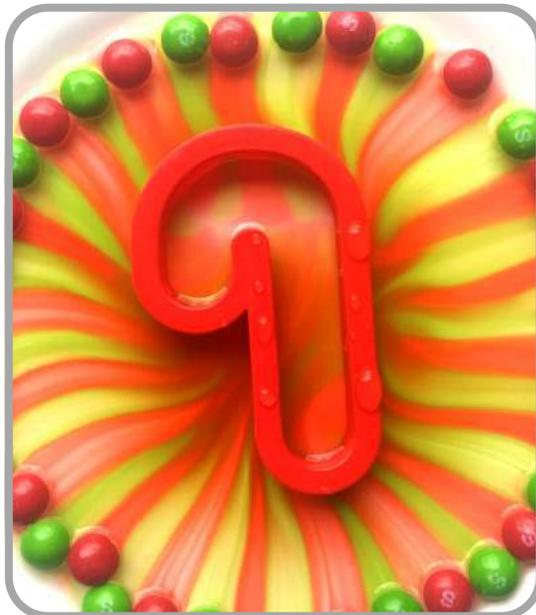
What other household acidic liquids could you use to get a similar reaction?



Christmas Candy

YOU WILL NEED:

- Red and green Skittles® candy
- Water
- White plates
- Christmas cookie cutters



DIRECTIONS:

1. Set out a bowl of red and green Skittles® or you can let the kids sort them out themselves (save the rest of the colors for another time!)
2. Arrange the red and green Skittles® in a pattern around the plate alternating colors. Or, in any number combination you like, singles, doubles, triples, etc..., forming your preferred pattern.
3. Set a Christmas shaped cookie cutter to the center of the plate just to add a little more of the theme and some additional color.
4. Carefully pour water into the center of cookie cutter until it just covers the candy.
5. Be careful not to shake or move the plate once you add the water or it will mess up the effect.
6. Watch as the colors stretch and bleed out away from the Skittles, coloring the water.
7. Time how quickly the colors dissolve.

What's Happening?

THE SCIENCE BEHIND THE CHRISTMAS CANDY ACTIVITY:

Skittles Science demonstrates a process called stratification. The simple definition is that stratification is the arrangement of something into groups. Specifically, this is water stratification, and water has different masses with different properties that create the barriers you see within the different colors of candies.

The coating of the candy is made up of mostly sugar and food coloring. The water dissolves the sugar and the coloring diffuses into the water. Each color creates a water solution with slightly different properties.

Note: over time the colors will eventually mix.

THINK ABOUT IT:

What if you used other liquids? Do you think warm water would work better or worse?

Alternate experiment:

Try using clear soda instead of water.



Salt Crystal Gingerbread Men

YOU WILL NEED:

- Table salt
- Very hot water
- Bowl/spoon
- Gingerbread cookie cutter
- Construction paper cut-outs
- Plate/pan



DIRECTIONS:

1. Start by dissolving 3 T. of salt in 1 cup of hot water.
2. Cut your shapes out of construction paper. Brown paper is perfect for gingerbread men. Use a gingerbread cookie cutter to trace your shape. Cut out several.
3. Next, lay your cutout on the plate and pour the salt solution over the gingerbread men.
4. Place the plate in a place that gets a good amount of sunlight and won't be disturbed.
5. Now you have to wait.
6. Check on the progress occasionally to see if you notice any changes.
7. When the water is completely evaporated you'll see crystals formed on your gingerbread men.
8. Use a magnifying glass to look closely at the crystals and document their shapes.

What's Happening?

THE SCIENCE BEHIND THE CRYSTAL GINGERBREAD MEN:

The chemical name for table salt is sodium chloride. When mixed with water you form a solution. The more salt you have the more saturated the solution becomes. Eventually, if you added enough salt to the water it would stop dissolving.

When you place your gingerbread men in the sunlight the water molecules heat up and convert to a gas state. This process is called evaporation. As the gases rise the salt is left behind, this process of removing salt from water is called desalination.

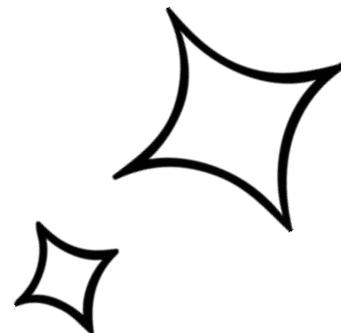
Look closely at your crystals, what shape are they? This is because sodium and chlorine are reactive atoms. When combined the sodium atom gives up an electron, and the chlorine atom catches it. The ions formed within the sodium chloride are so tightly packed that the crystals look like a cube.

THINK ABOUT IT:

What happens when there is so much salt in water that the solution is more salt than water?

Will a solid float or sink in a salt water solution?

Test your theory: set an egg or toy on top of the solution, does it float or sink?



Cookie Experiment

YOU WILL NEED:

- Baking powder
- Water
- Cinnamon
- Eyedropper
- Cookie cutters
- Tray or plates



DIRECTIONS:

1. Set your cookie cutters on a tray or plate to catch the mess.
2. Add baking powder to the inside of the cutters spreading out in an even layer.
3. Sprinkle the top with powdered cinnamon for a delightful aroma during the experiment.
4. Set a small container of water and an eyedropper on the tray.
5. Use the eyedropper to drop water into the cookie cutters.
6. What happens? Document your results.



What's Happening?

THE SCIENCE BEHIND THE COOKIE EXPERIMENT:

You've learned already that when an acid and a base combine a chemical reaction occurs. You've seen this result when combining baking soda and vinegar.

Baking powder is a mixture that has both an acid and a base already combined. All it needs is to be moistened by whatever liquid is being added to the mix. When you add the water to the baking powder it mixes with the acid, and the acid reacts with the base, sodium bicarbonate contained within the baking powder.

The reaction is forming carbon dioxide gas. This reaction is very important in the baking process because it is what causes cookies to rise, and puff up while baking.

THINK ABOUT IT:

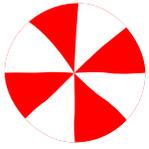
What happens when you use milk instead of water in a cookie dough that has baking powder in it?
Will the cookies rise?

Test your theory: bake a batch of your favorite Christmas cookies. If the recipe calls for water, replace it with milk to see what happens.



CHRISTMAS QUICK STEM CHALLENGES

Add these 25 Christmas STEM challenge cards to a simple engineering kit filled with easy to find supplies. Encourage the kids to get creative! Fun individual or group activity that's perfect for maker spaces or tinker tables. Countdown to Christmas with them!



What's Included:

Handy Supply List

Christmas Theme STEM Cards

Christmas
SENSORY COUNTDOWN CHALLENGE CARDS

Mark off each day as you complete the STEM challenges.

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15

SANTA'S SLEIGH ENGINEERING SUPPLY LIST

Acrylic paint	Hammer	Rubber Bands
Aluminum foil	Hinges	Sand
Baking soda	Leaves	Scissors
Baggies	LEGO® bricks	Screwdriver
Bamboo sticks	Lollipop sticks	Skewers
Cardboard	Magnets	Soil
Clothes pins	Marbles	Sponges
Coffee filters	Nails	Springs
Cookies	Needle and thread	Stapler
Cookie cutters	Newspaper	Sticks
Cotton balls	Nuts & bolts	Straws
Cotton swabs	Paint	String
Craft paper	Paper cups	Styrofoam balls
Craft sticks	Paper clips	Tape
Dryer hose	Paper plates	Tape measure
Duct tape	Peeps	Tea lights
Faux plants	Pencil	Tin can
Feathers	Pipe cleaners	Toilet paper rolls
Felt	Plastic bowls	Toothpicks
Fish line	Plastic spoons	Twine
Flat marbles	Plastic wrap	Twist ties
Food coloring	Pom-poms	Washers
Funnel	Raffia	Wash® tape
Gears	Ribbon	Water
Glitter glue		Wire
Glow stars		Wooden planks
Glue		Yarn
Golf tees		Zip ties

LITTLE BINS @ LITTLE HANDS

BUILD A PULLEY FOR SANTA
 Help Santa move that big bag of presents easily.

SANTA'S LETTER AIRPLANE
 Write a letter to Santa and turn it into an airplane. How far will it go?

MAKE A PAPER CHAIN
 A classic project, but this one should be the length of your room.

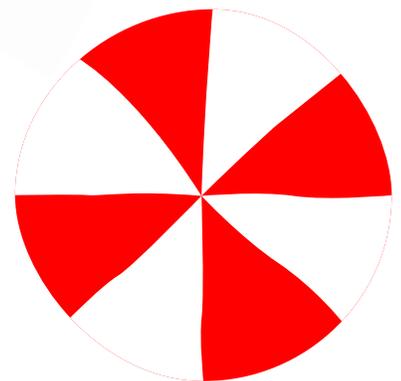
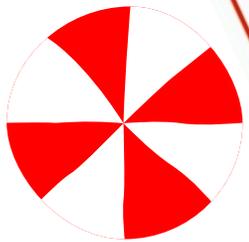
A MAP FOR SANTA
 Remind Santa which house is yours! Draw a map of your street.

HOW LONG IS SANTA'S SLEIGH
 Look up the information and use a tape measure to check out the size.

COOKIE TASTE TESTING: 5 SENSES
 What cookies will Santa like best? Use the 5 senses to find out.

FLOOR PLAN FOR WORKSHOP

DESIGN A NEW TOY MAKING MACHINE
 How can Santa make more toys faster?



Christmas



SENSORY COUNTDOWN CHALLENGE CARDS

Mark off each day as you complete the STEM challenges.

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25 

Christmas STEM Activity Supply List

Acrylic paint
Aluminum foil
Baking soda
Baggies
Bamboo sticks
Cardboard
Clothes pins
Coffee filters
Cookies
Cookie cutters
Cotton balls
Cotton swabs
Craft paper
Craft sticks
Diapers
Dryer hose
Duct tape
Faux plants
Feathers
Felt
Fish line
Flat marbles
Food coloring
Funnel
Gears
Glitter glue
Glow stars
Glue



Golf tees
Gumdrops
Hammer
Hinges
Jingle bells
Leaves
LEGO® bricks
Lollipop sticks
Magnets
Marbles
Nails
Needle and thread
Newspaper
Nuts & bolts
Paint
Paper
Paper cups
Paper clips
Paper plates
Peeps
Pencil
Pipe cleaners
Plastic bowls
Plastic spoons
Plastic wrap
Pom-poms
Raffia
Ribbon



Rubber Bands
Sand
Scissors
Screwdriver
Skewers
Soil
Sponges
Springs
Stapler
Sticks
Straws
String
Styrofoam balls
Tape
Tape measure
Tea lights
Tin can
Toilet paper rolls
Toothpicks
Twine
Twist ties
Washers
Washi Tape
Water
Wire
Wooden planks
Yarn
Zip ties



BUILD A CHIMNEY FOR SANTA

Use items from the supply list to make the chimney for Santa.



DESIGN & BUILD

A CHRISTMAS TREE

Use items from the supply list to make a new tree for Santa.



CANDY ENGINEERING

What can you build for Santa using gumdrops and toothpicks?



DISSOLVING CANDY CANES

What is the fastest way to dissolve a candy cane? Record your results.



PARACHUTE FOR SANTA

Just in case Santa falls, make him a parachute.



SILENCE A JINGLE BELL

Bells are noisy, can you make a quiet jingle bell?



BUILD A PLASTIC CUP TREE

Can you build a Christmas tree with 100 cups?



CREATE A JINGLE BELL MAZE

Use a cardboard box top and create a maze for a jingle bell.



BUILD A PULLEY FOR SANTA

Help Santa move that big bag of presents easily.



SANTA'S LETTER AIRPLANE

Write a letter to Santa and turn it into an airplane. How far will it go?



MAKE A PAPER CHAIN

A classic project, but this one should be the length of your room.

A MAP FOR SANTA

Remind Santa which house is yours! Draw a map of your street.



HOW LONG IS SANTA'S SLEIGH

Look up the information and use a tape measure to check out the size.



COOKIE TASTE TESTING:

5 SENSES

What cookies will Santa like best? Use the 5 senses to find out.



DRAW A FLOOR PLAN FOR SANTA'S WORKSHOP

Design Santa a new workshop.



DESIGN A NEW TOY MAKING MACHINE

How can Santa make more toys faster?



HOT CHOCOLATE TESTING

Which makes a better hot chocolate, milk or water?

Which melts the marshmallows faster?



MAKE FAKE SNOW

Have you ever turned a diaper into fake snow or used a fake snow kit?



ADDING CHRISTMAS

Find 25 Christmas objects.
How many combinations of the objects equal 25?
Write them all down.



GRINCH HEARTS

Make the Grinch a new heart in three different sizes!
Read the book too!



DESIGN & BUILD A CHRISTMAS ORNAMENT

Use nuts, bolts, washers and pipe cleaners to create an ornament.



CHRISTMAS CARD BUILDING CHALLENGE

Use Christmas cards to build a structure.



RACING SANTA'S SLEIGH

Build vehicles for Santa and race them.



Hint, add a balloon.

TRACK SANTA CHRISTMAS EVE



Look up the official NORAD Santa tracker.
Follow Santa on the map.



CHRISTMAS DAY FINAL STEM CHALLENGE

After you have unwrapped the presents, lay out the pieces of wrapping paper and see how much of the floor you can cover.

Measure the area.



1. Print and cut out the Christmas STEM challenge cards. Use the blank ones if you want to create your own STEM challenges.
2. Find a fun way to display the cards like a small artificial tree or put each challenge in an envelope in a basket.
3. Start gathering some of the simple supplies this month before the countdown starts.
4. Fill up a bin with items from the supply list.
5. Have paper, colored pens, scissors and glue available.
6. Don't stress if you can't do them all. Have fun and try some as a family. Help out as needed. Some challenges may require more help than others.

CHRISTMAS ENGINEERING PACK

Try these Christmas themed, problem-based challenges, and get the kids thinking about the engineering design process.

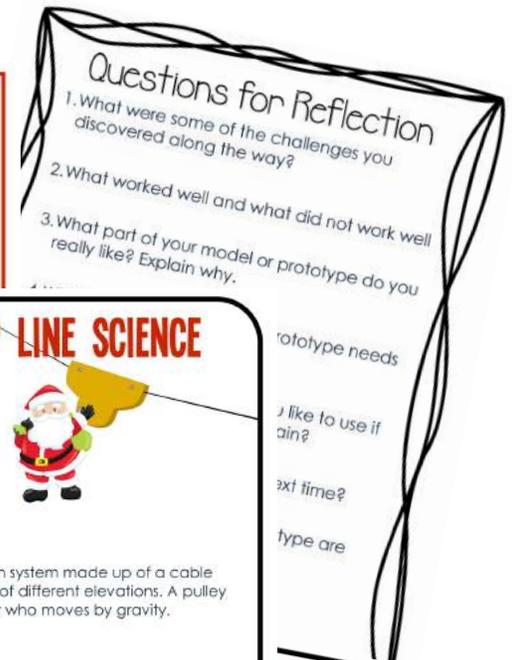
What's Included:

- Christmas STEM Challenges
- STEM Journal Pages
- Engineering Design Process



SANTA'S SLEIGH ENGINEERING SUPPLY LIST

Acrylic paint	Hammer	Rubber Bands
Aluminum foil	Hinges	Sand
Baking soda	Leaves	Scissors
Baggies	LEGO® bricks	Screwdriver
Bamboo sticks	Lollipop sticks	Skewers
Cardboard	Magnets	Soil
Clothes pins	Marbles	Sponges
Coffee filters	Nails	Springs



SANTA'S NEW SLEIGH

Oh no! Santa's sleigh is broken and won't be able to deliver presents on Christmas Eve. You need to draw a quick sketch for a new sleigh and build a model or prototype out of materials you have on hand.

What does your sleigh have that is different or the same as the real-world models?

Possible Supplies: Wood planks, hammer, nails, screws, screwdriver, saw, stapler, paint, brushes, foil, Washi tape, craft sticks, toothpicks, skewers, duct tape

My ideas:

SANTA'S ZIP-LINE SCIENCE



What is a zip line?

A zip line is a transportation system made up of a cable stretched between points of different elevations. A pulley and harness attach a rider who moves by gravity.

Zip Line Vocabulary

Friction: The force two touching objects exert on each other when they slide against each other.

Friction is a force that acts between two surfaces in contact. It opposes the direction of motion or attempted motion of an object.

Friction acts in the opposite direction to the motion of an object down toward the ground.

SANTA'S PARACHUTE SCIENCE

What is a Parachute?

A parachute is shaped like an umbrella, made of sailcloth fabric and cords, and allows a person or object to fall safely to the ground.

Handy Words to Know:

Air Resistance: a force that opposes the motion of objects moving in the air

Gravity: a force that pulls an object down toward the earth

Descent: an action of moving down



PICTURE

It has to be a picture in your notebook.



Engineering!



Improve
What works? What doesn't? What could be better? Test it out!



Create
Follow your plan and create something new!

Plan
Draw a diagram, make a list of materials.

LITTLE BINS @ LITTLE BINS

TALLEST TREE STRUCTURE VOCABULARY



Handy Words to Know:

Structure: Something built or constructed.

Architect: Someone who designs the plans to build something.

Contractor: Someone who is hired to build things.



TALLEST TREE STRUCTURE

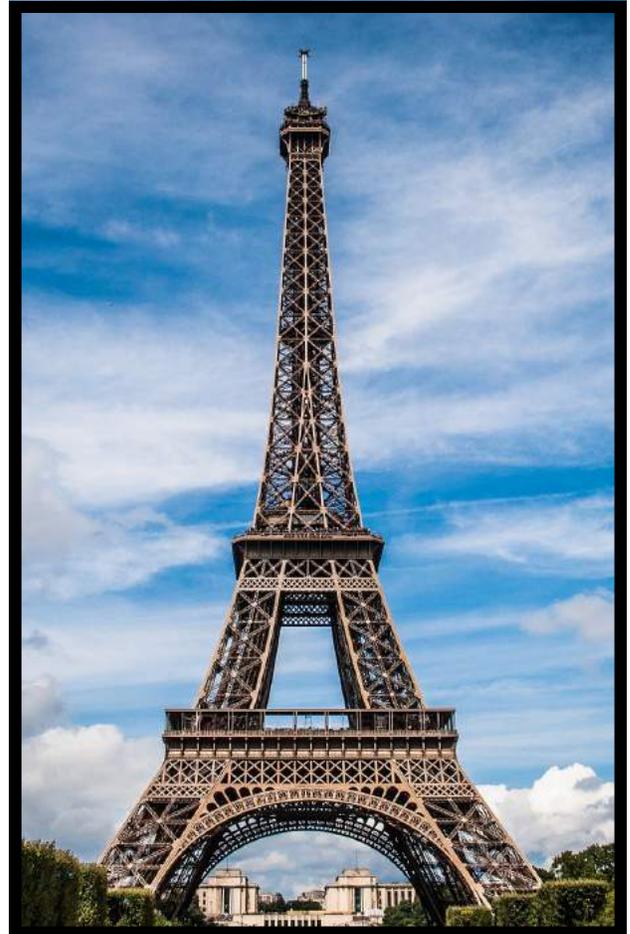
Santa's Village needs a new Christmas tree, but it has to be the tallest one ever! Build the tallest tree structure in 15 minutes out of only paper or plastic cups and add a star to the very top. Think about some of the tallest structures you have seen!

Possible Supplies:

Paper or plastic cups, star cut-out



My ideas:



Cut out the star to use at the top of your tallest tree tower.



Engineering Design Process



Engineering Design Process



ASK

What is the problem?

What do I need to know?

How can I solve the problem?



Imagine

What information will I need?

What are some solutions?

How can I solve the problem?



Plan

What things do I need to use?

Draw a diagram and make a list of needed materials.



Create

Follow your plan and create something.

Test it out!



Improve

What changes can

I make to get better results?



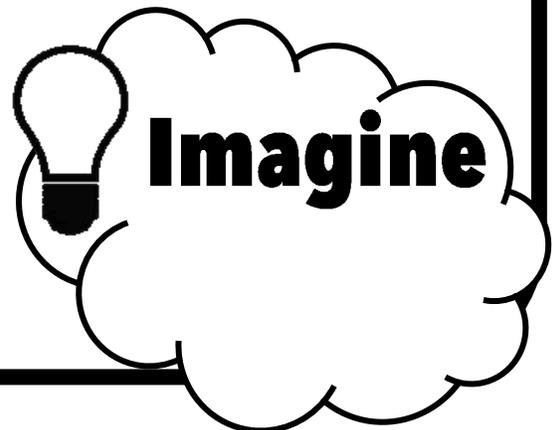
My STEM Challenge:



ASK

What's the problem?

BRAINSTORM AND RECORD possible solutions, as many as you can.



Imagine

My STEM Challenge:



Plan

Draw a diagram and make a list of needed materials.

My STEM Challenge:



Create

Look at the materials provided for use in creating your models.

My STEM Challenge:



Improve

Create a new drawing incorporating your ideas as well as the feedback you received on your prototype. Create an improved version of your original model.

Questions for Reflection

1. What were some of the challenges you discovered along the way?
2. What worked well and what did not work well?
3. What part of your model or prototype do you really like? Explain why.
4. What part of your model or prototype needs improvement? Explain why.
5. What other materials would you like to use if you could do this challenge again?
6. What would you do differently next time?
7. What parts of your model or prototype are similar to the real world version?
8. What does your sleigh have that is different or the same as the real-world models?

SANTA'S PARACHUTE

When Santa can't land his sleigh on the roof or use his speedy zip line, he needs to take out his trusty parachute to make sure he gets down the chimney safely. Can you design and build a prototype of a parachute for Santa? Make sure to test it out!



Possible Supplies:

tape, fish line, plastic bags, coffee filters, straws, string, and paperclips

My ideas:

SANTA'S PARACHUTE SCIENCE

What is a Parachute?

A parachute is shaped like an umbrella, made of sailcloth fabric and cords, and allows a person or object to fall safely to the ground.



Handy Words to Know:

Air Resistance: a force that opposes the motion of objects moving in the air

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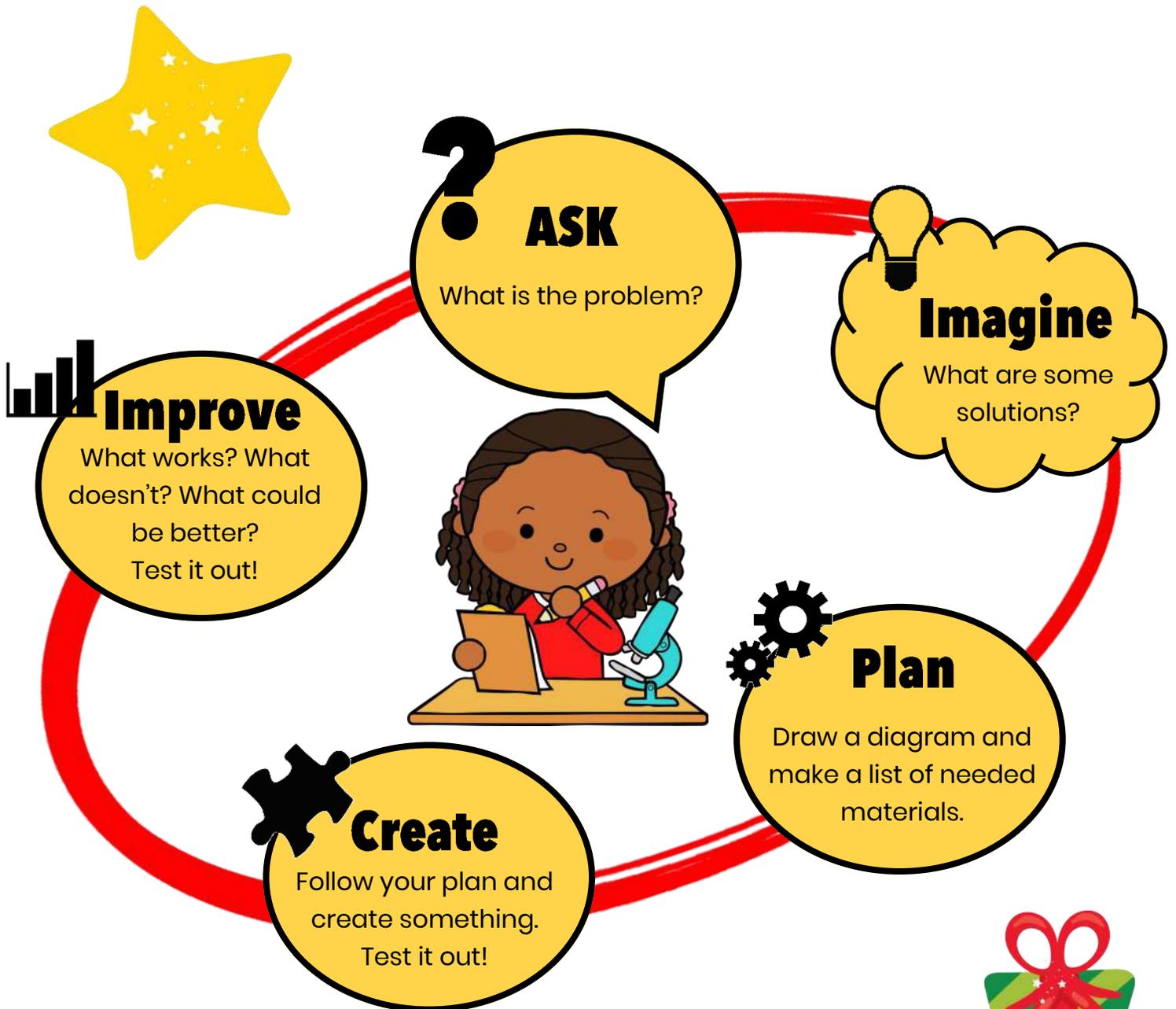
Descent: an action of moving down

SANTA'S SLEIGH ENGINEERING SUPPLY LIST

Acrylic paint	Hammer	Screwdriver
Aluminum foil	Hinges	Skewers
Baking soda	Leaves	Soil
Baggies	LEGO® bricks	Sponges
Bamboo sticks	Lollipop sticks	Springs
Cardboard	Magnets	Stapler
Clothes pins	Marbles	Sticks
Coffee filters	Nails	Straws
Cookies	Needle and thread	String
Cookie cutters	Newspaper	Styrofoam balls
Cotton balls	Nuts & bolts	Tape
Cotton swabs	Paint	Tape measure
Craft paper	Paper	Tea lights
Craft sticks	Paper cups	Tin can
Dryer hose	Paper clips	Toilet paper rolls
Duct tape	Paper plates	Toothpicks
Faux plants	Peeps	Twine
Feathers	Pencil	Twist ties
Felt	Pipe cleaners	Washers
Fish line	Plastic bowls	Washi® tape
Flat marbles	Plastic spoons	Water
Food coloring	Plastic wrap	Wire
Funnel	Pom-poms	Wooden planks
Gears	Raffia	Yarn
Glitter glue	Ribbon	Zip ties
Glow stars	Rubber Bands	
Glue	Sand	
Golf tees	Scissors	



Engineering Design Process



Engineering Design Process



ASK

What is the problem?
What do I need to know?
How can I solve the problem?



Imagine

What information will I need?
What are some solutions?
How can I solve the problem?



Plan

What things do I need to use?
Draw a diagram and make a list of needed materials.



Create

Follow your plan and create something.
Test it out!



Improve

What changes can I make to get better results?



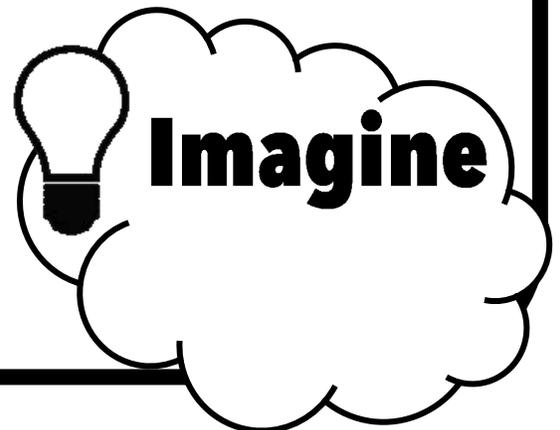
My STEM Challenge:



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What's the problem?

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SANTA'S NEW SLEIGH

Oh no! Santa's sleigh is broken and won't be able to deliver presents on Christmas Eve. You need to draw a quick sketch for a new sleigh and build a model or prototype out of materials you have on hand.

What does your sleigh have that is different or the same as the real-world models?

Possible Supplies:

Wood planks, hammer, nails, screws screwdriver, saw, stapler, paint, brushes, foil, Washi tape, craft sticks, toothpicks, skewers, duct tape

My ideas:



SANTA'S SLEIGH ENGINEERING SUPPLY LIST

Acrylic paint	Hammer	Rubber Bands
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Cotton balls	Nuts & bolts	Straws
Cotton swabs	Paint	String
Craft paper	Paper	Styrofoam balls
Craft sticks	Paper cups	Tape
Dryer hose	Paper clips	Tape measure
Duct tape	Paper plates	Tea lights
Faux plants	Peeps	Tin can
Feathers	Pencil	Toilet paper rolls
Felt	Pipe cleaners	Toothpicks
Fish line	Plastic bowls	Twine
Flat marbles	Plastic spoons	Twist ties
Food coloring	Plastic wrap	Washers
Funnel	Pom-poms	Washi® tape
Gears	Raffia	Water
Glitter glue	Ribbon	Wire
Glow stars		Wooden planks
Glue		Yarn
Golf tees		Zip ties



Engineering Design Process



Engineering Design Process



ASK

What is the problem?

What do I need to know?

How can I solve the problem?



Imagine

What information will I need?

What are some solutions?

How can I solve the problem?



Plan

What things do I need to use?

Draw a diagram and make a list of needed materials.



Create

Follow your plan and create something.

Test it out!



Improve

What changes can

I make to get better results?



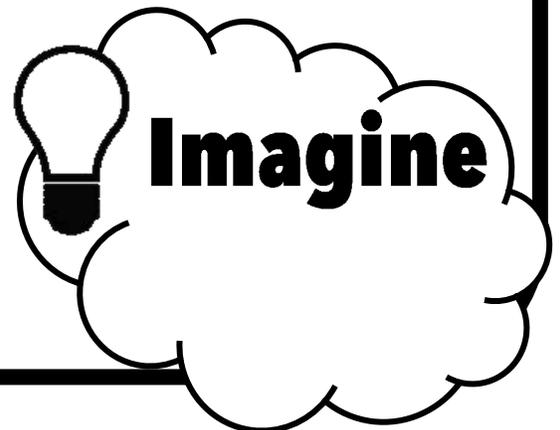
My STEM Challenge:



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What's the problem?

BRAINSTORM AND RECORD possible solutions, as many as you can.



Imagine

My STEM Challenge:



Plan

Draw a diagram and make a list of needed materials.

My STEM Challenge:



Create

Look at the materials provided for use in creating your models.

My STEM Challenge:



Improve

Create a new drawing incorporating your ideas as well as the feedback you received on your prototype. Create an improved version of your original model.

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6. What would you do differently next time?
7. What parts of your model or prototype are similar to the real world version?
8. What does your sleigh have that is different or the same as the real-world models?



SANTA'S ZIP LINE

Occasionally Santa's sleigh can't get close enough to the chimney, so Santa needs an easy way to get from his sleigh to the chimney quickly.

Can you design a zip line for Santa?

Possible Supplies:

zip ties, yarn, fish line, duct tape, rubber bands, fabric, string, balloons, twist ties, golf tees, straws, stapler, craft paper, toilet paper rolls

My ideas:

SANTA'S ZIP LINE SCIENCE



What is a zip line?

A zip line is a transportation system made up of a cable stretched between points of different elevations. A pulley and harness attach a rider who moves by gravity.

Zip Line Vocabulary

Friction: The force two touching objects exert on each other that resists motion between them. Objects sliding past each other create friction.

Mass: the amount of matter in an object.

Gravity: a force that pulls an object down toward the earth.

Cut out any of the Santa photos below to use in your experiments.





SANTA'S ZIP LINE ENGINEERING SUPPLY LIST

Acrylic paint
Aluminum foil
Baking soda
Baggies
Bamboo sticks
Cardboard
Clothes pins
Coffee filters
Cookies
Cookie cutters
Cotton balls
Cotton swabs
Craft paper
Craft sticks
Dryer hose
Duct tape
Faux plants
Feathers
Felt
Fish line
Flat marbles
Food coloring
Funnel
Gears
Glitter glue
Glow stars
Glue
Golf tees

Hammer
Hinges
Leaves
LEGO® bricks
Lollipop sticks
Magnets
Marbles
Nails
Needle and thread
Newspaper
Nuts & bolts
Paint
Paper
Paper cups
Paper clips
Paper plates
Peeps
Pencil
Pipe cleaners
Plastic bowls
Plastic spoons
Plastic wrap
Pom-poms
Raffia
Ribbon
Rubber Bands
Sand
Scissors



Screwdriver
Skewers
Soil
Sponges
Springs
Stapler
Sticks
Straws
String
Styrofoam balls
Tape
Tape measure
Tea lights
Tin can
Toilet paper rolls
Toothpicks
Twine
Twist ties
Washers
Washi® Tape
Water
Wire
Wooden planks
Yarn
Zip ties



Engineering Design Process



Engineering Design Process



ASK

What is the problem?

What do I need to know?

How can I solve the problem?



Imagine

What information will I need?

What are some solutions?

How can I solve the problem?



Plan

What things do I need to use?

Draw a diagram and make a list of needed materials.



Create

Follow your plan and create something.

Test it out!



Improve

What changes can

I make to get better results?



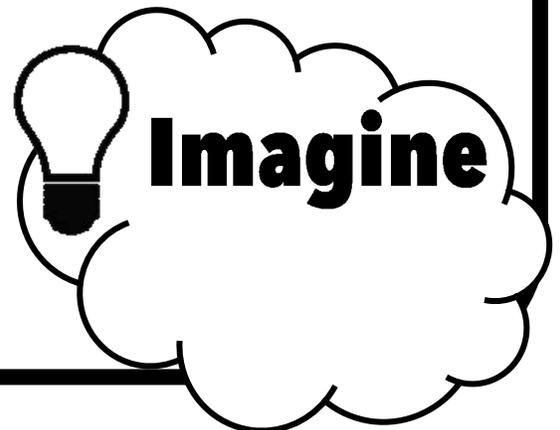
My STEM Challenge:



ASK

What's the problem?

BRAINSTORM AND RECORD possible solutions, as many as you can.



Imagine

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Plan

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My STEM Challenge:



Create

Look at the materials provided for use in creating your models.

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8. What does your zip line have that is different or the same as the real-world models?

CHRISTMAS SCREEN FREE CODING

Screen-free coding is a fun and easy way to introduce computer coding concepts to young kids! Explore the binary alphabet and create an ornament with pipe cleaners and beads, discover how an algorithm works, and draw a tree based on an algorithm.

[Click here to read about our ornaments!](#)

ALPHABET IN BINARY CODE

A	01000001	J	01001010	S	01010011
B	01000010	K	01001011	T	01010100
C	01000011	L	01001100	U	01010101
D	01000100	M	01001101	V	01010110
E	01000101	N	01001110	W	01010111
F	01000110	O	01001111	X	01011000
G	01000111	P	01010000	Y	01011001
H	01001000	Q	01010001	Z	01011010
I	01001001	R	01010010		

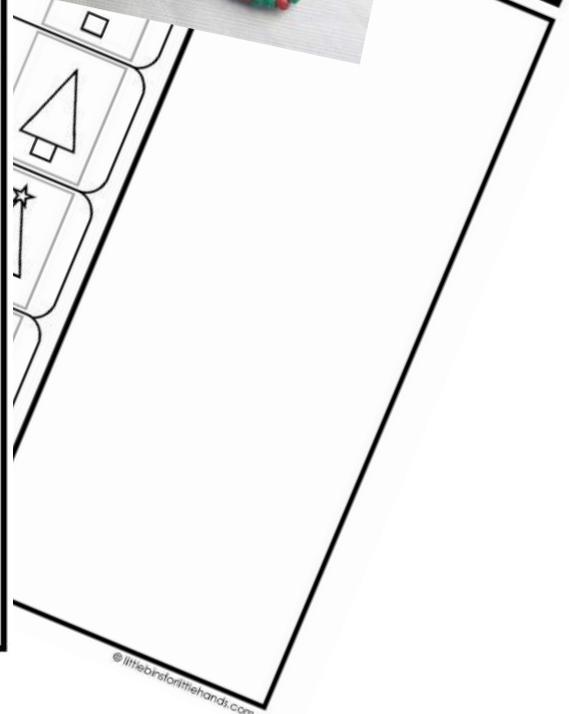
WRITE YOUR NAME IN CODE



CHRISTMAS CODING ORNAMENTS



AN ALGORITHM



PRINTABLE

CHRISTMAS ALGORITHM CODING GAME

FOR KIDS

3 LEVELS OF DIFFICULTY

LITTLE BINS
BY LITTLE HANDS



PRINTABLE

CHRISTMAS ALGORITHM CODING GAME



FOR KIDS
3 LEVELS OF DIFFICULTY





Screen-free coding with a Christmas theme!

Learn about algorithms as you play games.



SET UP & PLAY

Print out one of the sets of grids to set up your board. Choose a blank grid with either one of the elves. Cut out the corresponding Christmas goodies, Christmas decorations, and arrows for your pieces.

Place the goodies and decorations on the board in some of the blank spaces (not every space). You can play where the decorations are obstacles to move around and/or the goodies need to be collected.



Your arrows are your direction cards and how you write the code to solve the puzzle (around the decorations or collect the goodies). Included are left, right, and straight arrow pieces. You can use and re-use the grids over and over again and even laminate the sheets.

Use a small figure as an object to move through the board to get to the elves or vice versa.

Use the directional cards to create an algorithm to reach the desired object. You can change the obstacle cards to create a new board each time. Use either the decorations or goodies, or both, on the same board! Start simple using just a few and work your way up!

Easier version: Place one directional card out at a time as you move the object one square at a time with or without obstacles to go around.

Harder version: Think out the sequence of actions ahead of time and place out a string of directional cards to show your program. Run your program (move your piece) according to your directions. Check your results. Did you make it? Do you need to fix a card?

QUICK STEM

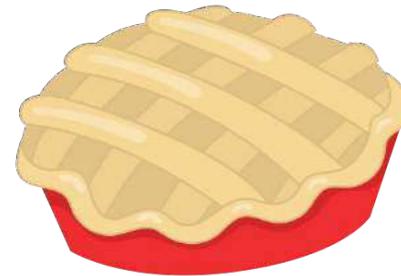
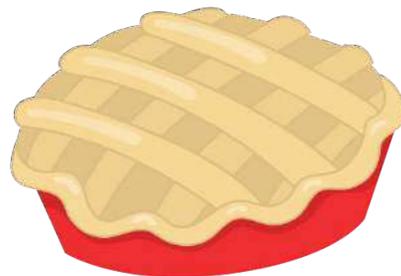
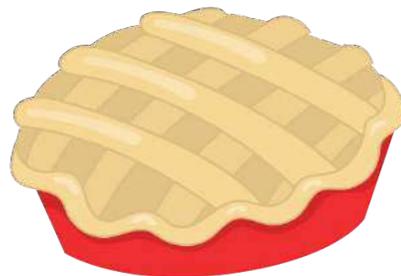
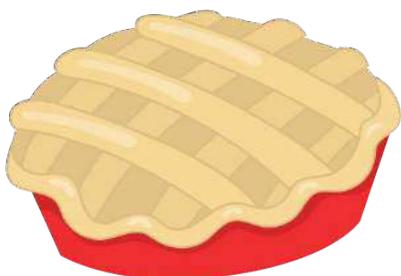
Coding is its own language. For programmers, it's like learning a new language when they write code for a new program. An algorithm is a series of actions that are strung together to solve a problem or tell something what it should do. Our printable algorithm coding game is perfect for learning how these actions string together to create a program through hands-on play!

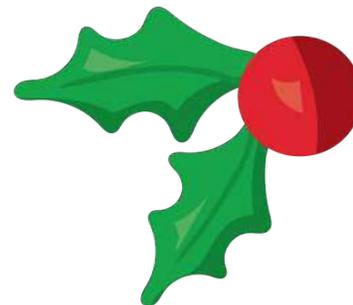
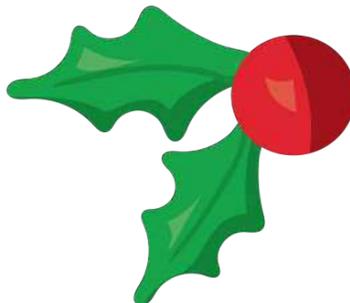
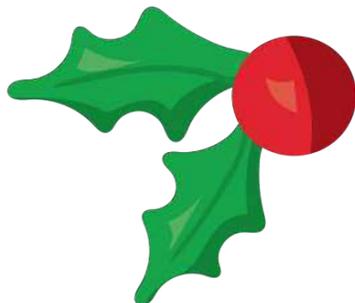
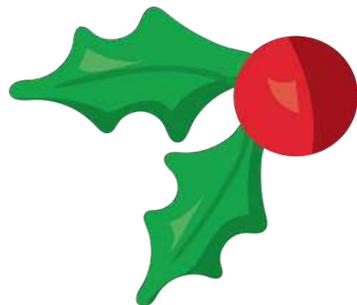
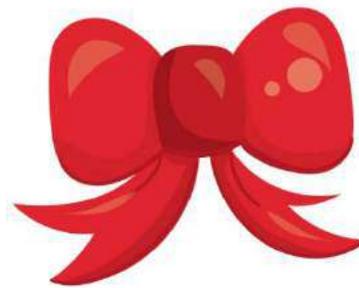
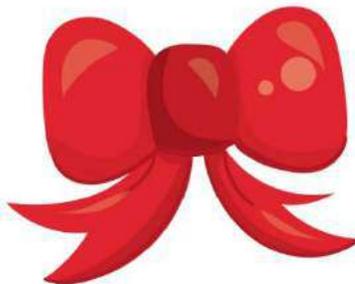
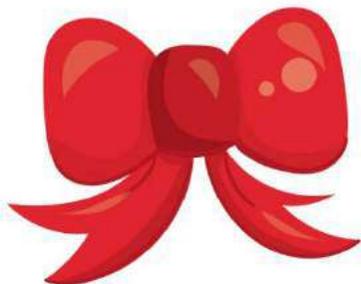
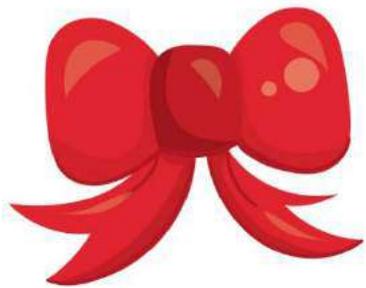


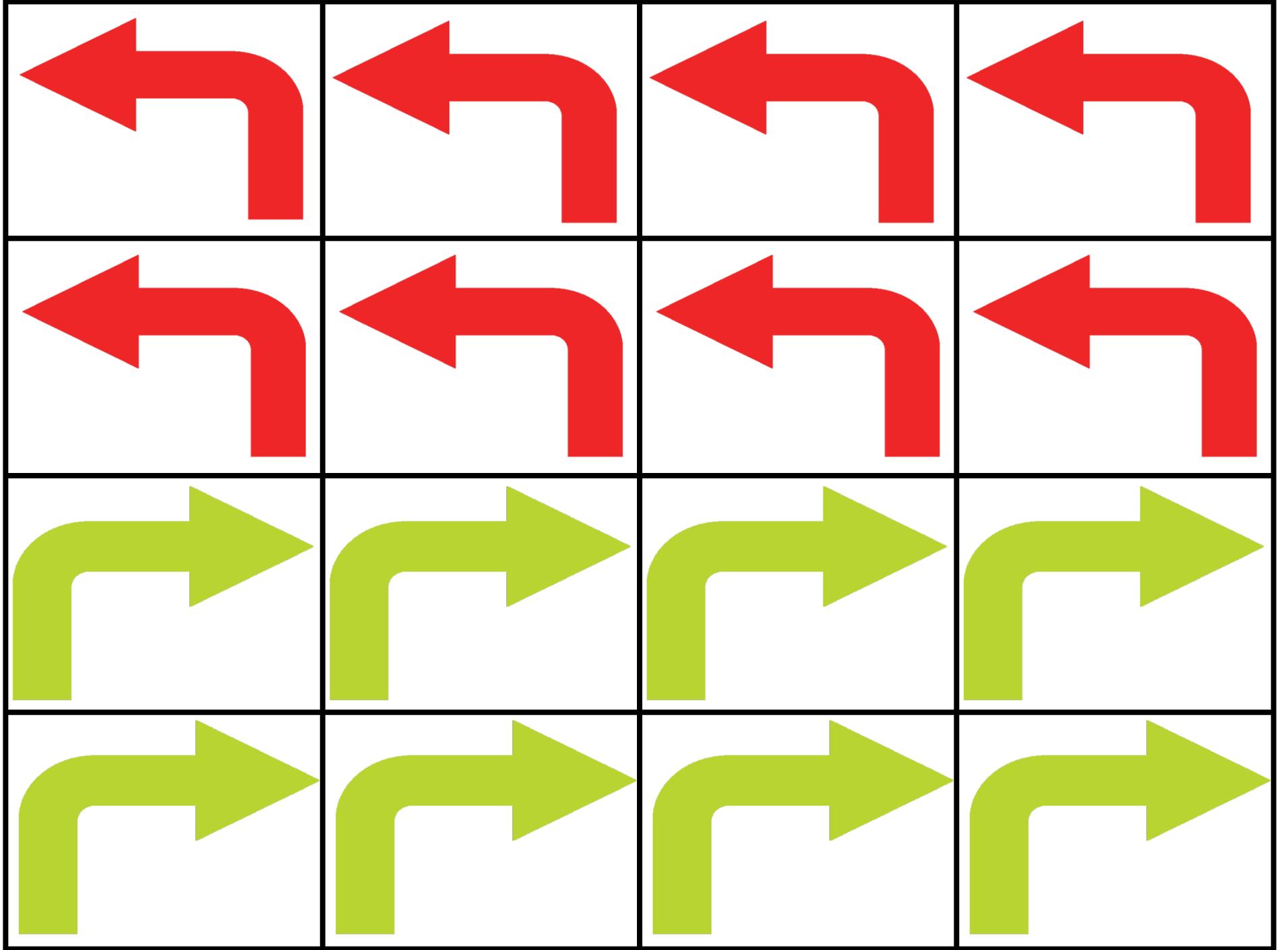
			

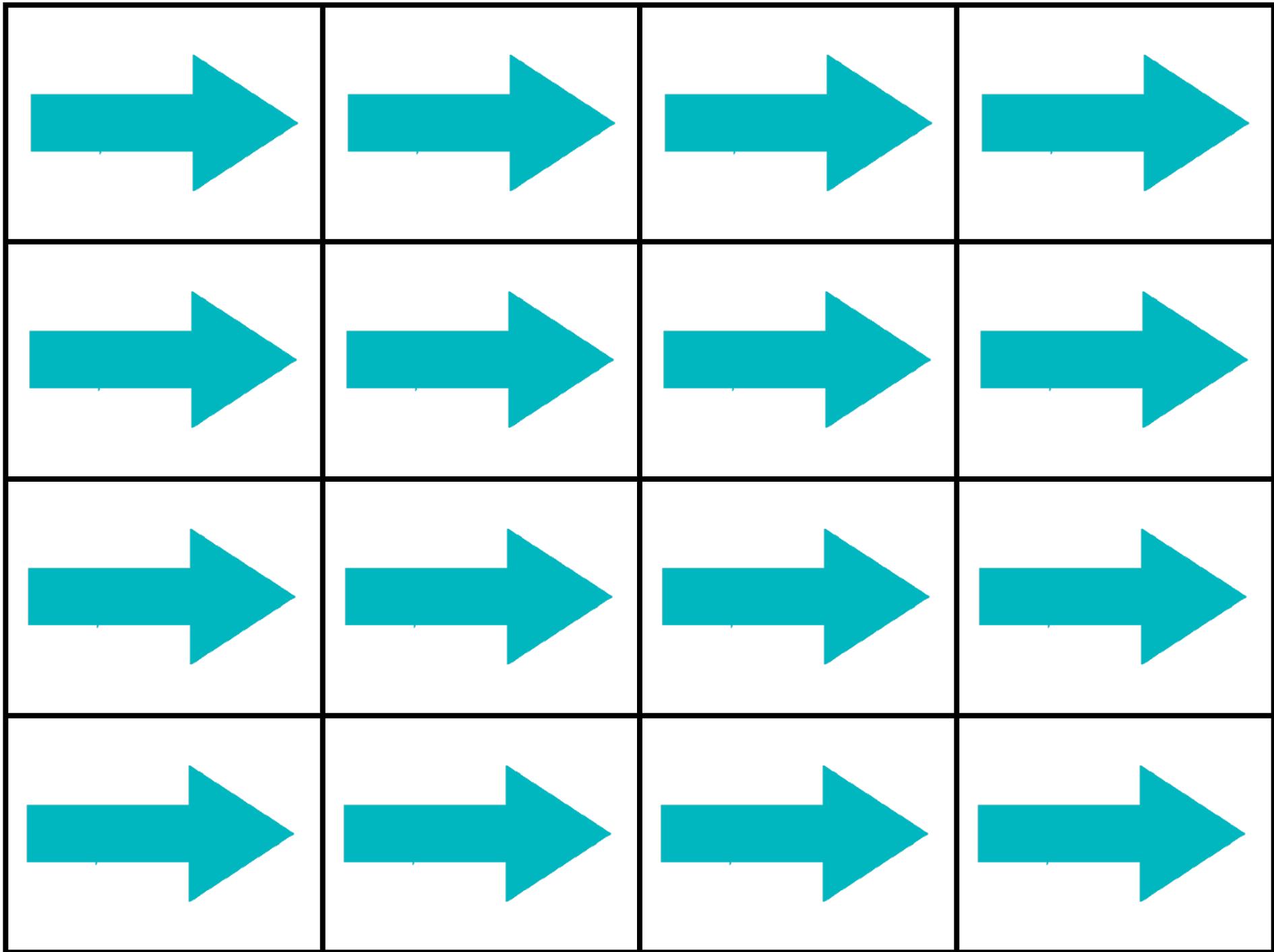




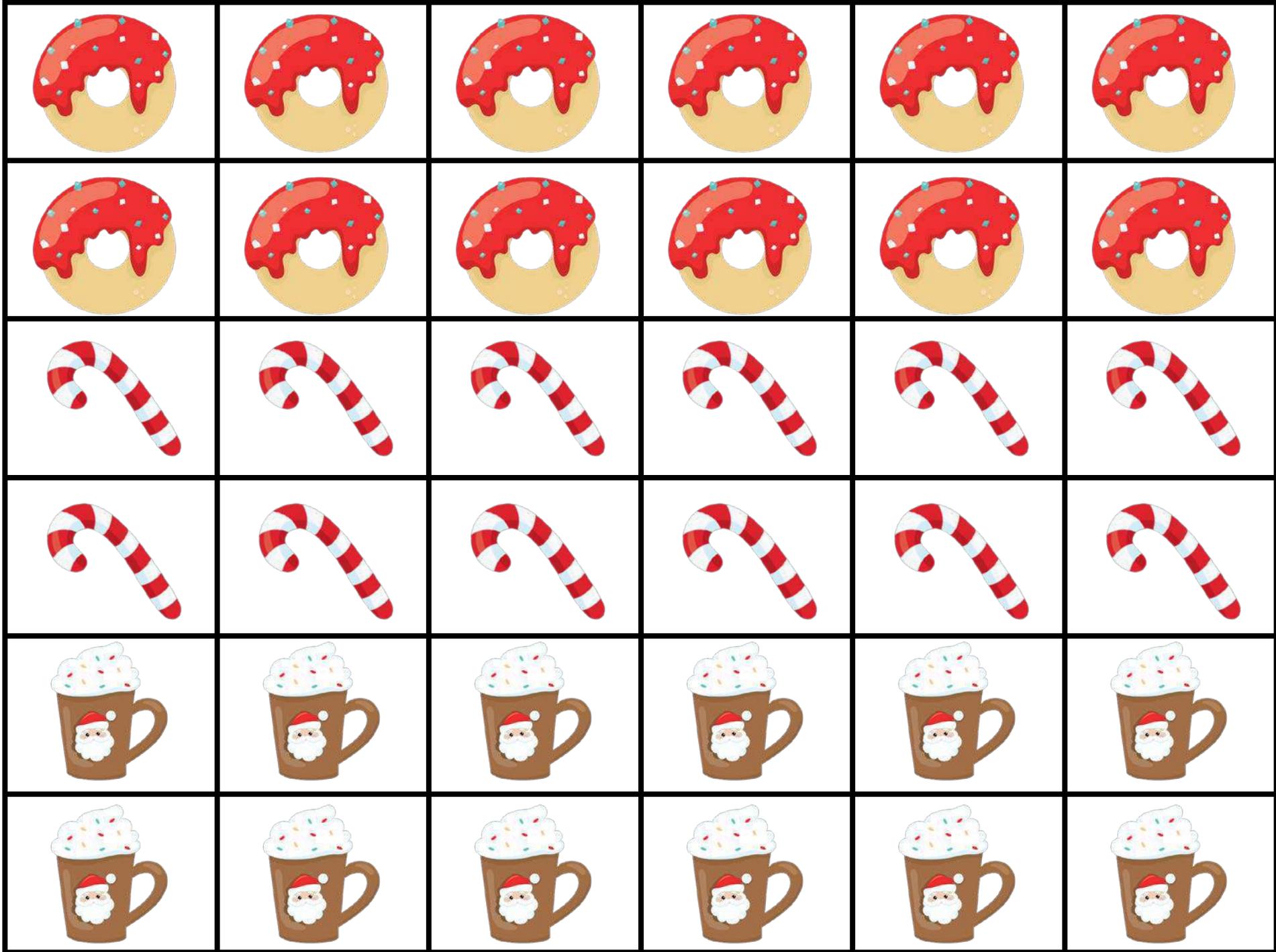


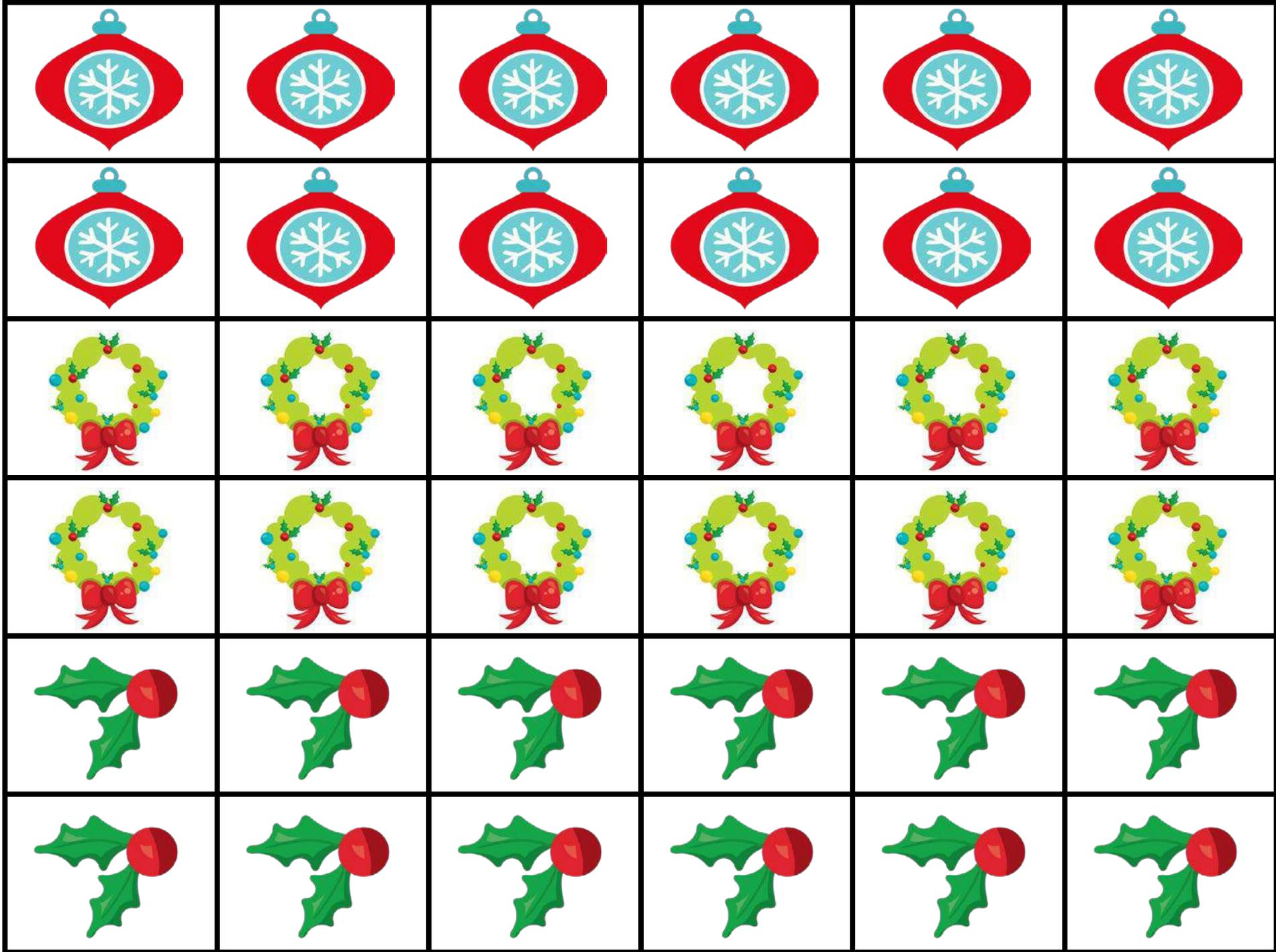


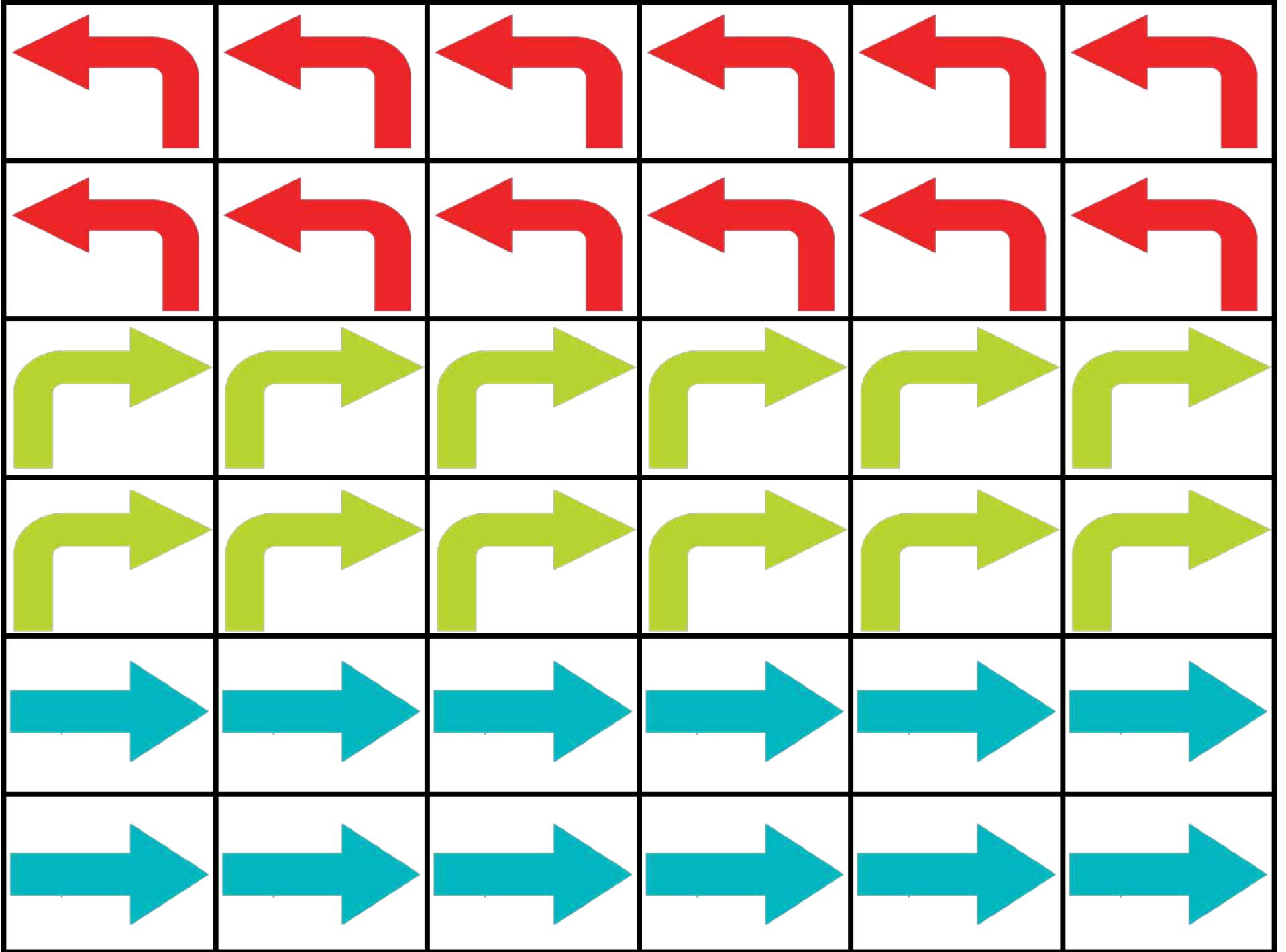


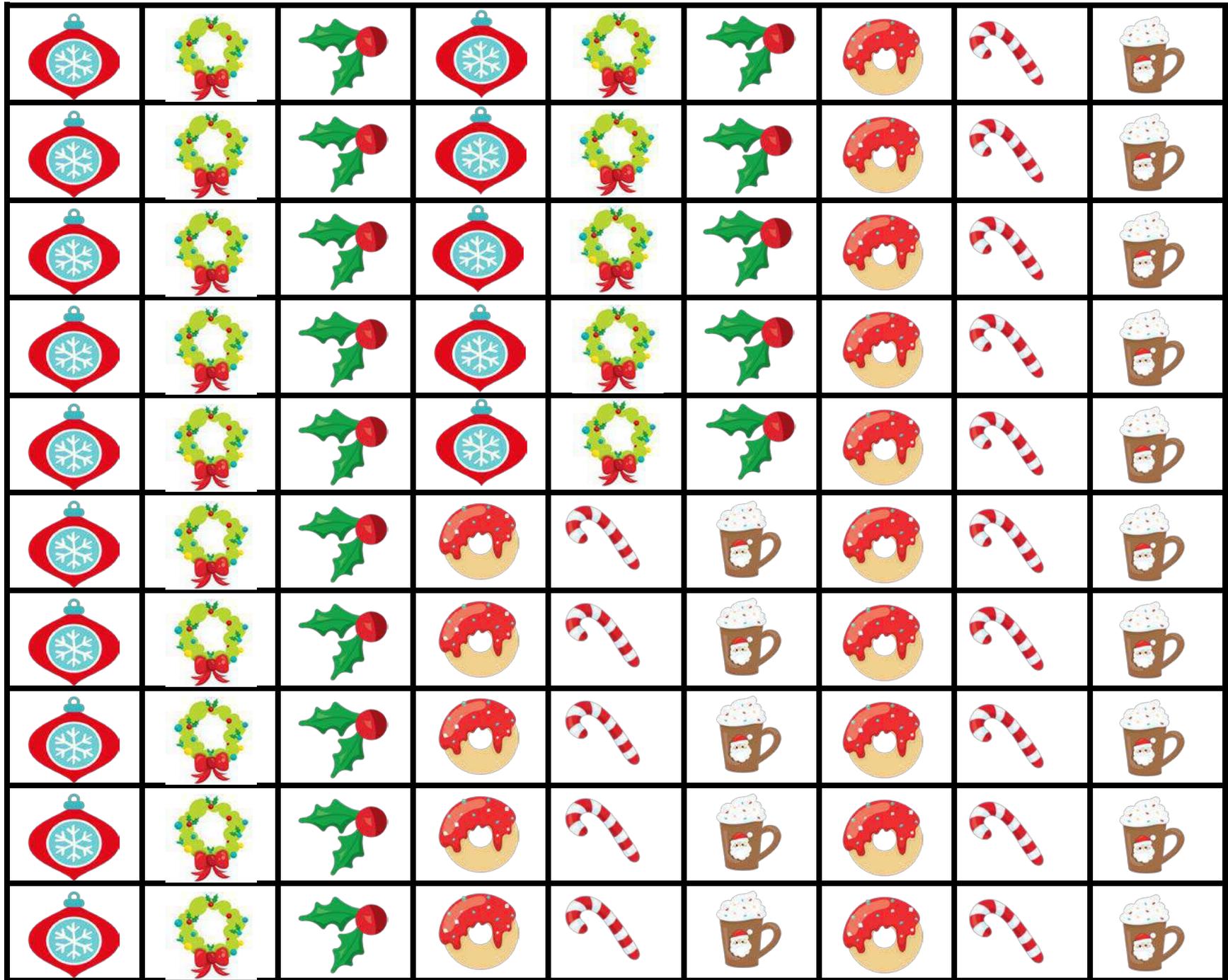
					

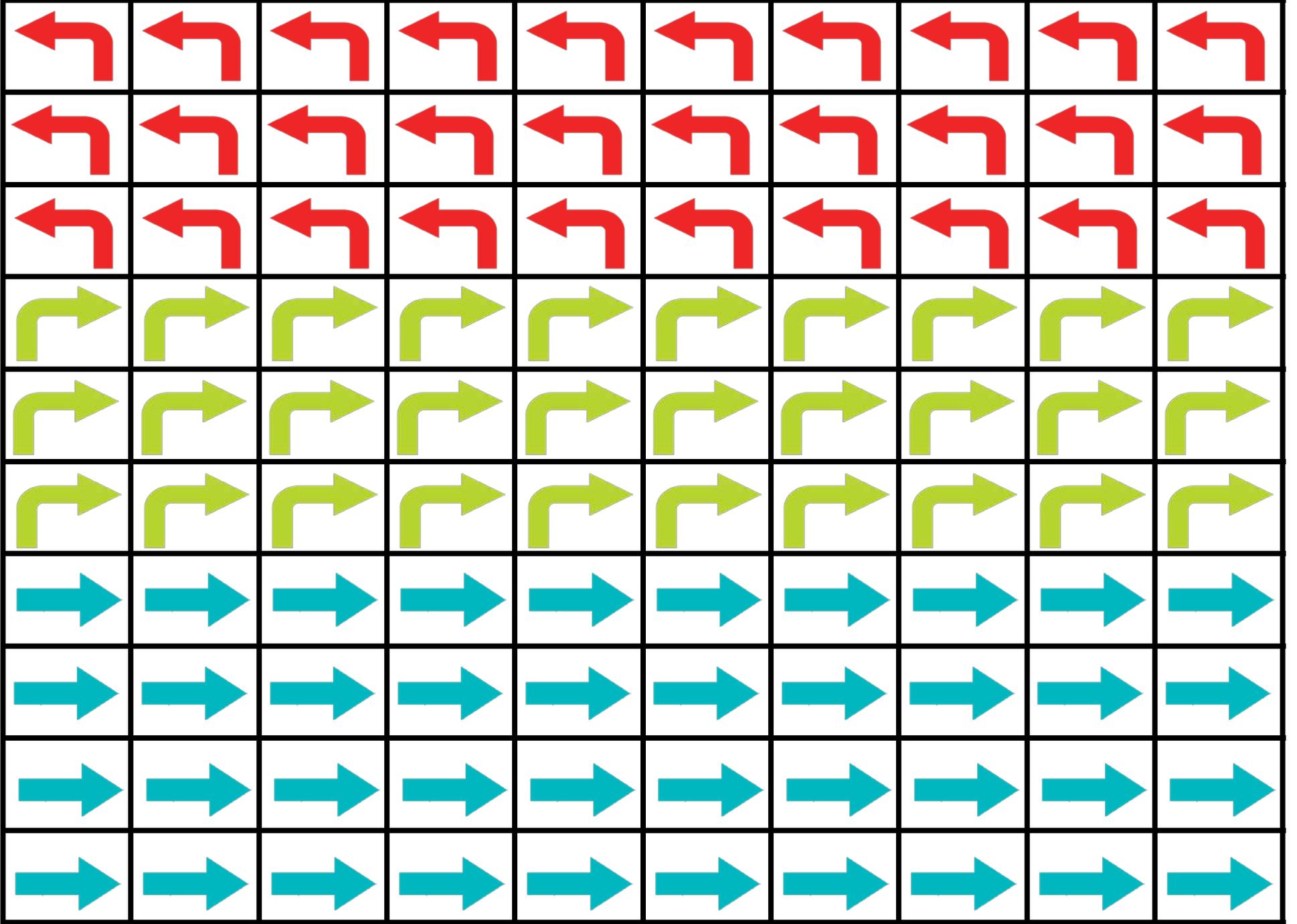
					











BINARY CODE

Coding ornaments are the perfect craft activity for the kid who doesn't care too much for crafts! Enjoy screen-free coding and ornament making as you explore the binary code.

SUPPLIES

- 3 Colors of Beads
- Pipe Cleaners
- Printable Binary Code Sheet

Choose one color bead for the number 1 and another color bead for the number 0. Choose a third color bead to use as a spacer between letters.

Bend your pipe cleaner into any ornament shape.

Choose a word or your name to be represented with the binary code. Use the printable sheet to write down the code.

If your word is too long for one pipe cleaner, simply attach another! Use ribbon or another type of fastener to hang the ornament on your Christmas tree, in your window, or turn into a keychain!

The computer doesn't read the letter A like we read the letter A. It reads it in a series of 1's and 0's. Each letter has its own code of 1's and 0's. This code is called the ASCII Binary Alphabet.

The binary number system is a base-2 number system. This means it only has two numbers: 0 and 1. The number system that we normally use is the decimal number system. It has 10 numbers: 0-9.

Computers work best with an "on" and "off" system and that is just what the binary code is all about. 1 is "on" and 0 is "off".

ALPHABET IN BINARY CODE

A	01000001	J	01001010	S	01010011
B	01000010	K	01001011	T	01010100
C	01000011	L	01001100	U	01010101
D	01000100	M	01001101	V	01010110
E	01000101	N	01001110	W	01010111
F	01000110	O	01001111	X	01011000
G	01000111	P	01010000	Y	01011001
H	01001000	Q	01010001	Z	01011010
I	01001001	R	01010010		

WRITE YOUR NAME IN CODE

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

WRITE CHRISTMAS
IN BINARY CODE

WRITE TREE
IN BINARY CODE

WRITE ORNAMENT
IN BINARY CODE

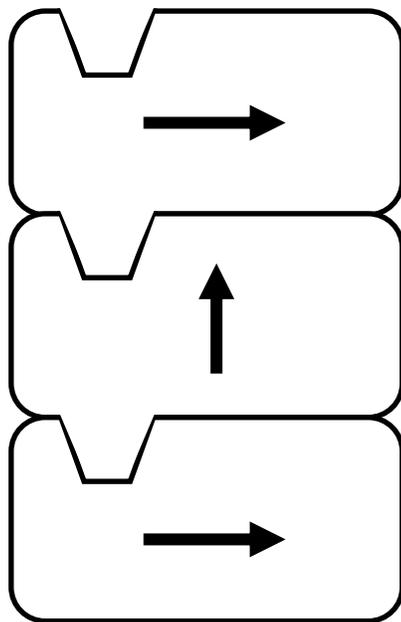
WRITE STAR
IN BINARY CODE

DRAW A HOLIDAY TREE BASED ON AN ALGORITHM

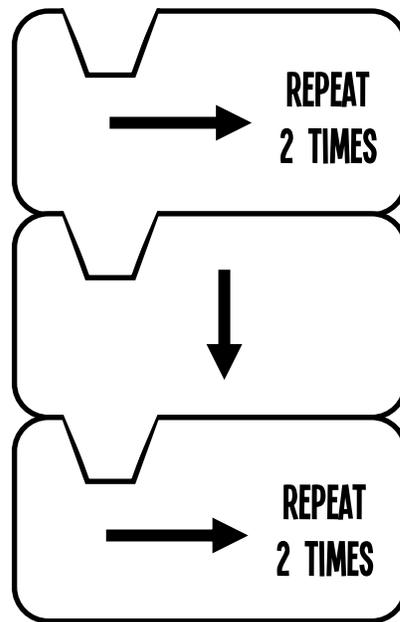
Years ago when people learned to code. They needed to learn a computer language like Cobol, Basic or C++. The language features a combination of words, letters, numbers and symbols.

A few years ago Neil Fraser invented a coding language called Blockly Blocks which features visual block programming. A series of command or function blocks are linked together vertically to create an algorithm or series of steps

Examples:



This means after you click on run, you need the object you are programming to go right, then forward, and finally, right again.



This means after you click on run, you need the object you are programming to go right twice, then backwards, and finally, right again twice.

Coding sites for children like Tynker and Code.org feature Blockly Blocks in their coding activities. Before you have them put Blockly blocks together online, you can have them follow an algorithm offline. One way they can work with a Blockly block algorithm is to follow the steps you need to draw an object like a tree. The algorithm or series of steps needed to draw and color a tree can be found on the Drawing a Tree Based on an Algorithm worksheet.

What will they do? Your children will draw what is mentioned or pictured in each of the blocks from the top block to the bottom block. When they have completed each step displayed in the block, they will have drawn a tree.

DRAW A HOLIDAY TREE BASED ON AN ALGORITHM

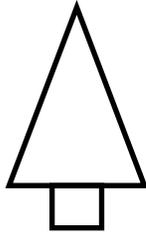
WHEN RUN



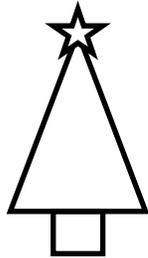
DRAW A STUMP



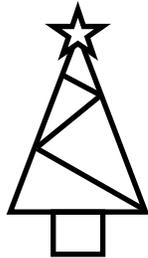
DRAW A TREE



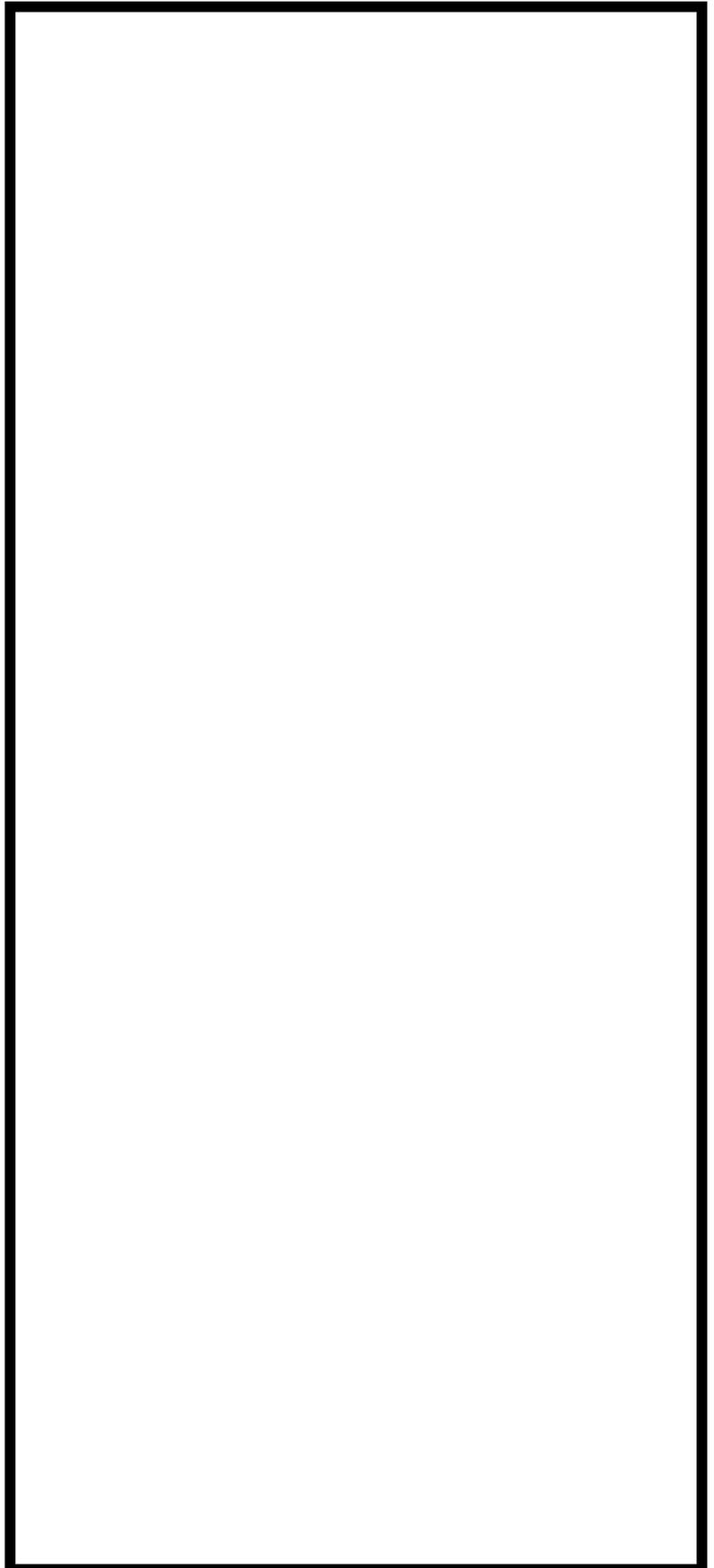
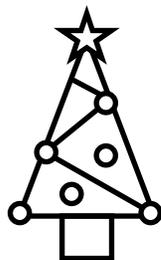
DRAW A STAR



DRAW LIGHTS



DRAW AN ORNAMENT
REPEAT 6 TIMES



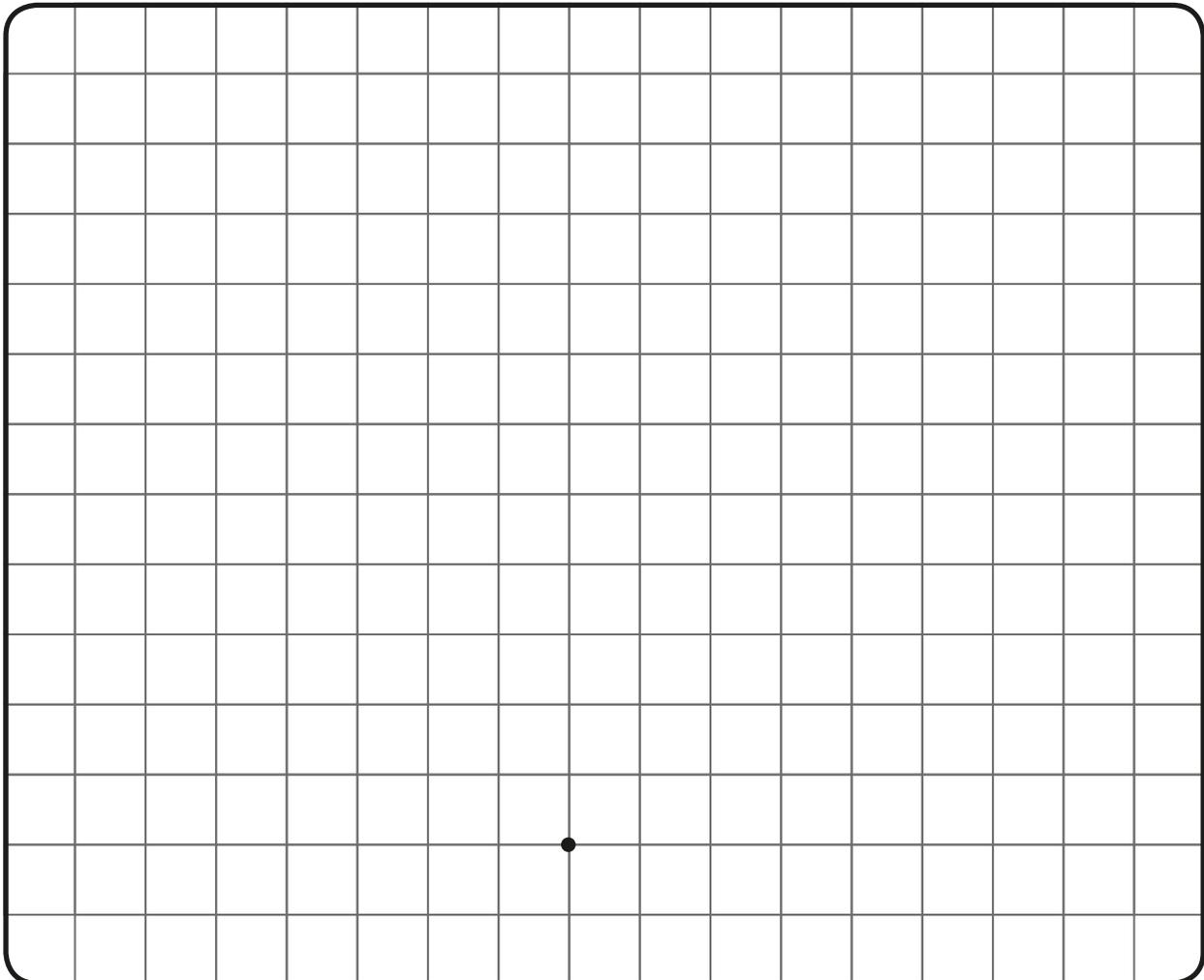
SECRET CODING PICTURE

CHARMISTS REET

The above name is an anagram clue: _____

FOLLOW THE DIRECTIONS TO REVEAL THE HIDDEN IMAGE

Start at the dot: 1↓ 1→ 1↑ 4→ 1↑ 1← 1↑ 1← 1↑ 1→ 1↑ 1← 1↑ 1← 1↑
1→ 1↑ 1← 1↑ 1← 1↑ 1→ 1↑ 1← 1↑ 1← 1↓ 1← 1↓ 1→ 1↓ 1← 1↓ 1← 1↓
1→ 1↓ 1← 1↓ 1← 1↓ 1→ 1↓ 1← 1↓ 1← 1↓ 5→ 1↑ 3← 1↑ 2→ 1↑ 3→
1↑ 2← 1↑ 1← 1↑ 1← 1↑ 2→ 1↑ 1←



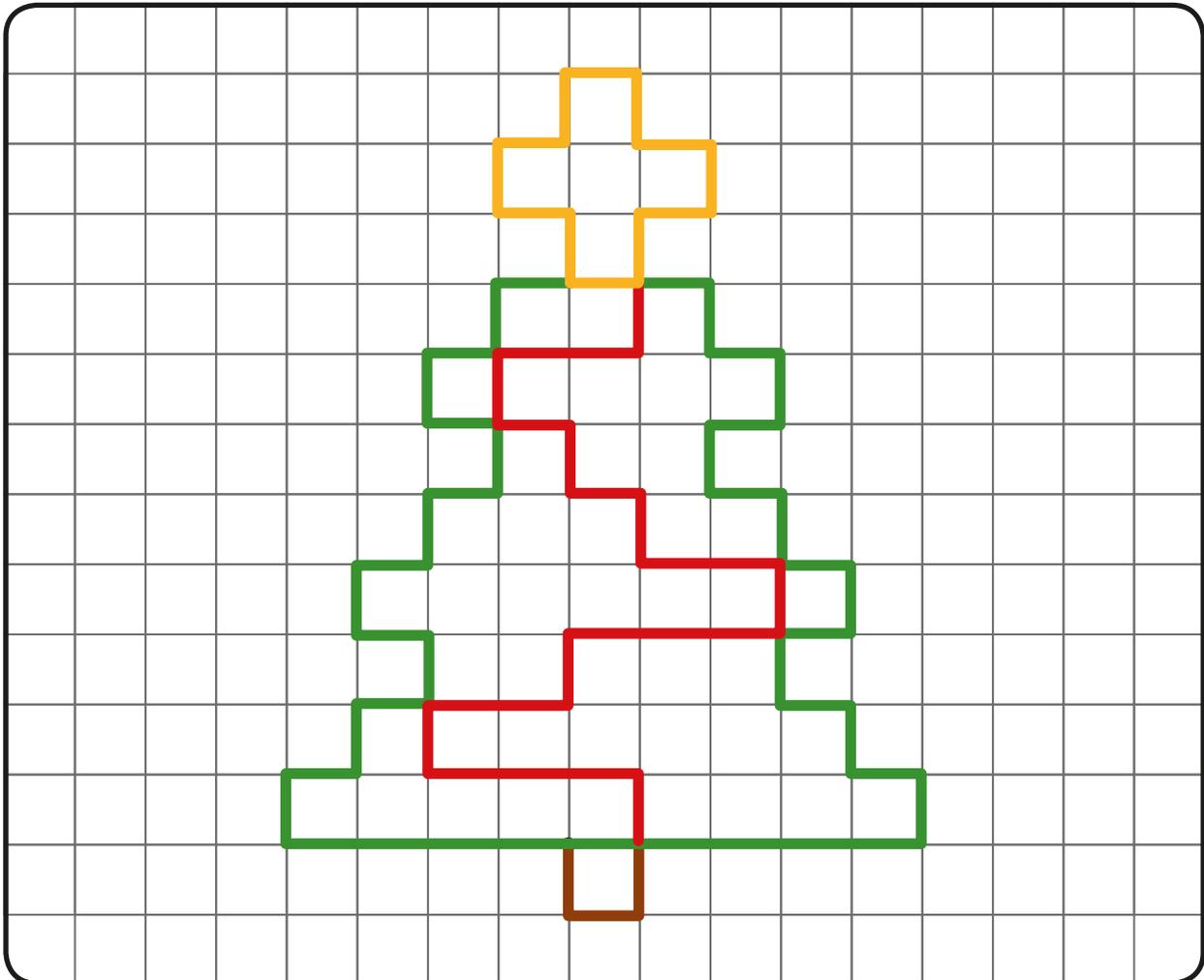
SECRET CODING PICTURE

CHARMISTS REET

The above name is an anagram clue: Christmas tree

FOLLOW THE DIRECTIONS TO REVEAL THE HIDDEN IMAGE

Start at the dot: 1↓ 1→ 1↑ 4→ 1↑ 1← 1↑ 1← 1↑ 1→ 1↑ 1← 1↑ 1← 1↑
 1→ 1↑ 1← 1↑ 1← 1↑ 1→ 1↑ 1← 1↑ 1← 1↓ 1← 1↓ 1→ 1↓ 1← 1↓ 1← 1↓
 1→ 1↓ 1← 1↓ 1← 1↓ 1→ 1↓ 1← 1↓ 1← 1↓ 5→ 1↑ 3← 1↑ 2→ 1↑ 3→
 1↑ 2← 1↑ 1← 1↑ 1← 1↑ 2→ 1↑ 1←



SANTA'S FIVE SENSES LAB

Explore the holidays with the five senses, including sight, sound, touch, taste, and smell. Use simple supplies to set up a Santa Science Lab!

[Click here to see our Santa Science Lab!](#)

SANTA SCIENCE: COOKIE LAB 1

Continue your lab work by setting up three! Put one kind of each cookie in the cups. Let it sit for one minute. Repeat your observations and note.

USING MY SENSES TO OBSERVE
Record your sensory observations for:

Sight _____
Sound _____
Smell _____
Touch _____
Taste _____

MY FAVORITE COOKIES
Dry _____
Soaked _____

COOKIE LAB SUPPLIES

- Milk
- Three Shallow Cups
- Three Different Kinds of Cookies

Cookie #1: _____
Cookie #2: _____
Cookie #3: _____

USING MY SENSES TO OBSERVE
Record your sensory observations for Cookie #1 on the chart below.

Sight _____
Sound _____
Smell _____
Touch _____
Taste _____

BELL LAB

Shaking What do you hear when you shake your observations?

LIKE IN A . . .

CANDY CANE LAB

SUPPLIES
Candy Cane
Cocoa Powder
Shallow Pan

OBSERVE
Place one (or more) candy canes over the fire to watch what happens.

LIKE IN A . . .

Record one cup with cocoa and allow it to sit for one minute. Record your observations in the chart below. How does it taste like?

© Little Bins for Little Hands



SANTA SCIENCE: COOKIE LAB 1



COOKIE LAB SUPPLIES

- Milk
- Three Shallow Cups
- Three Different Kinds of Cookies:

Cookie #1: _____

Cookie #2: _____

Cookie #3: _____



USING MY SENSES TO OBSERVE

Record your sensory observations for Cookie #1 on the chart below.

Sight _____

Sound _____

Smell _____

Touch _____

Taste _____

SANTA SCIENCE: COOKIE LAB 2



USING MY SENSES TO OBSERVE



Record your sensory observations for Cookie #2 on the chart below.

Sight

Sound

Smell

Touch

Taste



Record your sensory observations for Cookie #3 on the chart below.

Sight

Sound

Smell

Touch

Taste

SANTA SCIENCE: COOKIE LAB 3



Continue your lab work by setting up three cups. Put some milk in each cup. Put one kind of each cookie in the cups. Let the cookies soak for one minute. Repeat your observations and make comparisons.

USING MY SENSES TO OBSERVE

Record your sensory observations for the cookies that have soaked in milk.

Sight

Sound

Smell

Touch

Taste

MY FAVORITE COOKIES

Dry

Soaked



SANTA SCIENCE: HOT COCOA LAB



COCOA LAB SUPPLIES

- Milk
- Water
- Hot Cocoa Mix
- Cups
- Spoons
- Marshmallows

USING MY SENSES TO OBSERVE

Procedure: Make hot cocoa. Make one cup with hot water and one cup with hot milk. Make sure an adult handles the hot liquid. Stir the cocoa and allow it to cool. Observe your cocoa. Jot down your observations on the chart.

What does it look like?

What does it taste like?

Cocoa Made with Water

Cocoa Made with Milk

MY FAVORITE COCOA _____

SANTA SCIENCE: CANDY CANE LAB

CANDY CANE LAB SUPPLIES



- Shallow Plate or Pan
- Candy Canes
- Water



USING MY SENSES TO OBSERVE

Procedure: Fill a shallow plate with some water. Place one (or more) candy canes on the plate. Observe the candy canes over time to watch what happens. Log your observations below.

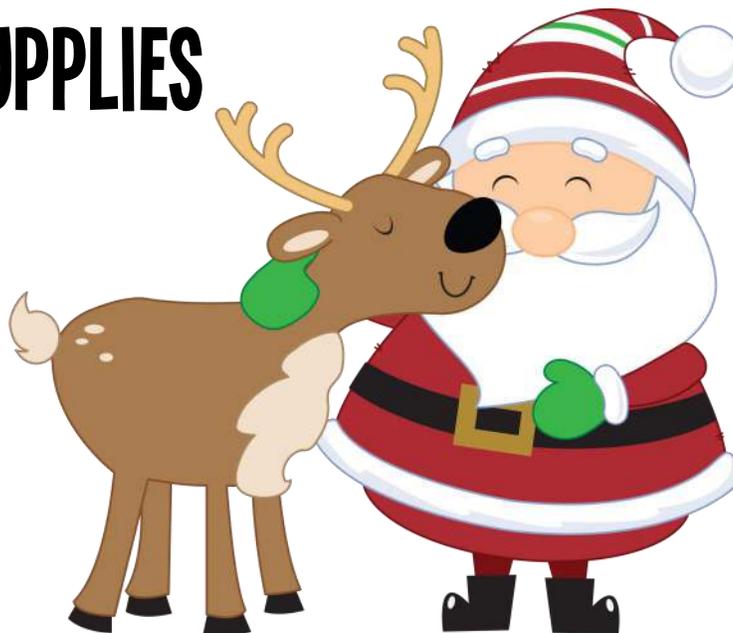
TIME  **MY OBSERVATIONS**

SANTA SCIENCE: JINGLE BELL LAB



JINGLE BELL LAB SUPPLIES

- Glass Jar
- Cardboard Container
- Tin Can
- Plastic Bottle
- Jingle Bells



USING MY SENSES TO OBSERVE

Procedure: Put some bells in each container and get shaking! What do jingle bells sound like in different types of containers? Log your observations.

WHAT JINGLE BELLS SOUND LIKE IN A . . .

Glass Jar	
Tin Can	
Cardboard Container	
Plastic Bottle	

SANTA SCIENCE: FAKE SNOW LAB

SNOW LAB SUPPLIES

- Fake Snow
- Water
- Measuring Cups

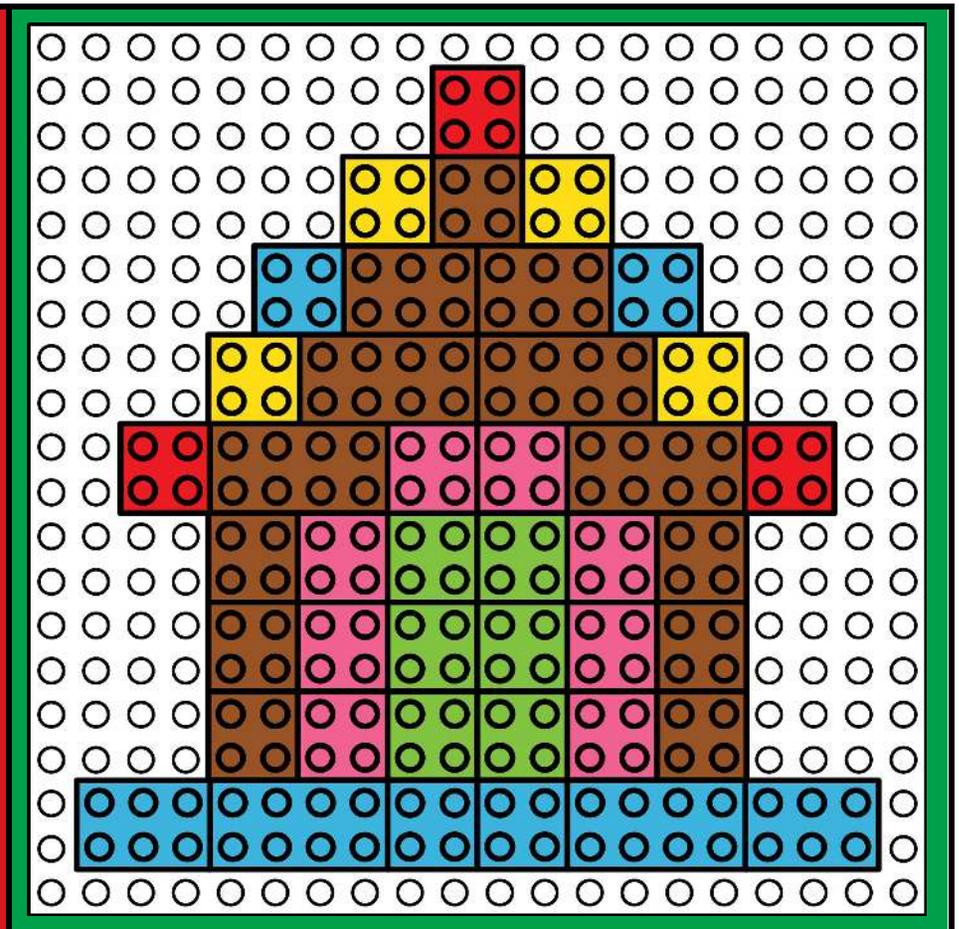
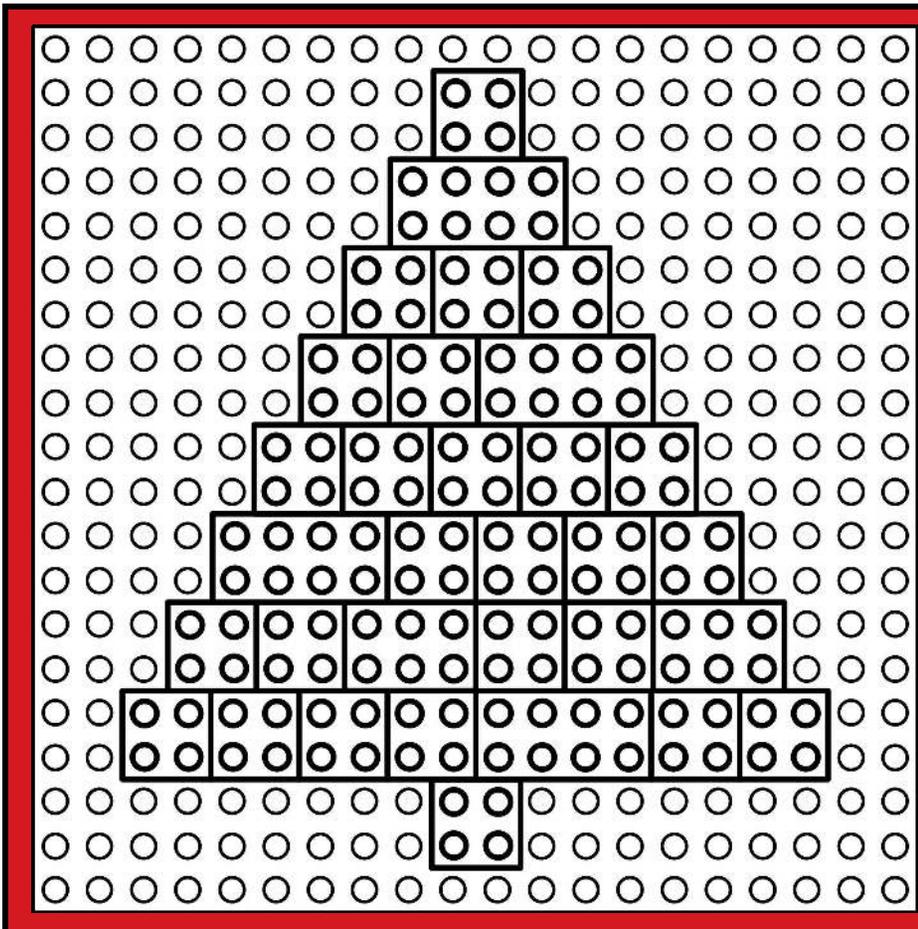


USING MY SENSES TO OBSERVE

Procedure: Using the measuring cups, choose how much water to add to the powdery snow. Log it on the chart. Log your observations, too.

WATER ADDED

SNOW OBSERVATIONS



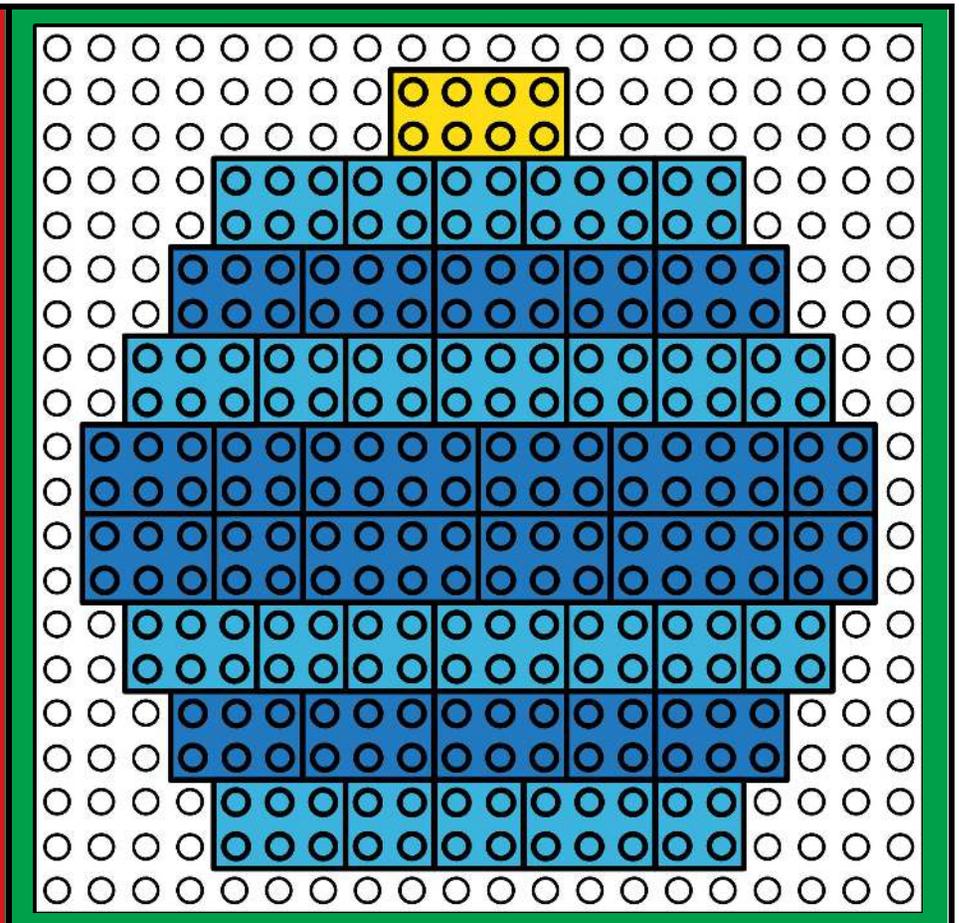
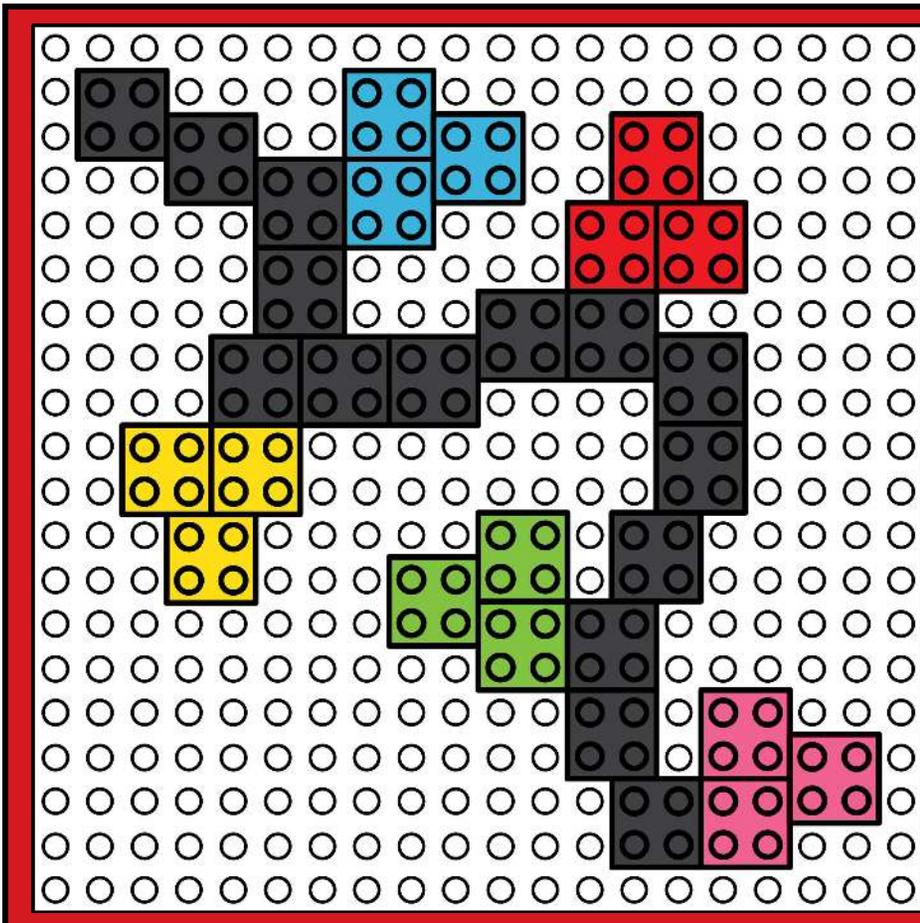
HOLIDAY TREE CHALLENGE

ESTIMATION CHALLENGE

Your challenge is to imagine and build a holiday tree. Don't forget the ornaments!

1. Estimate 2. Build 3. Count
 How many bricks do you think you will use?

 How many bricks did you use? _____



TWO-STORY CHALLENGE



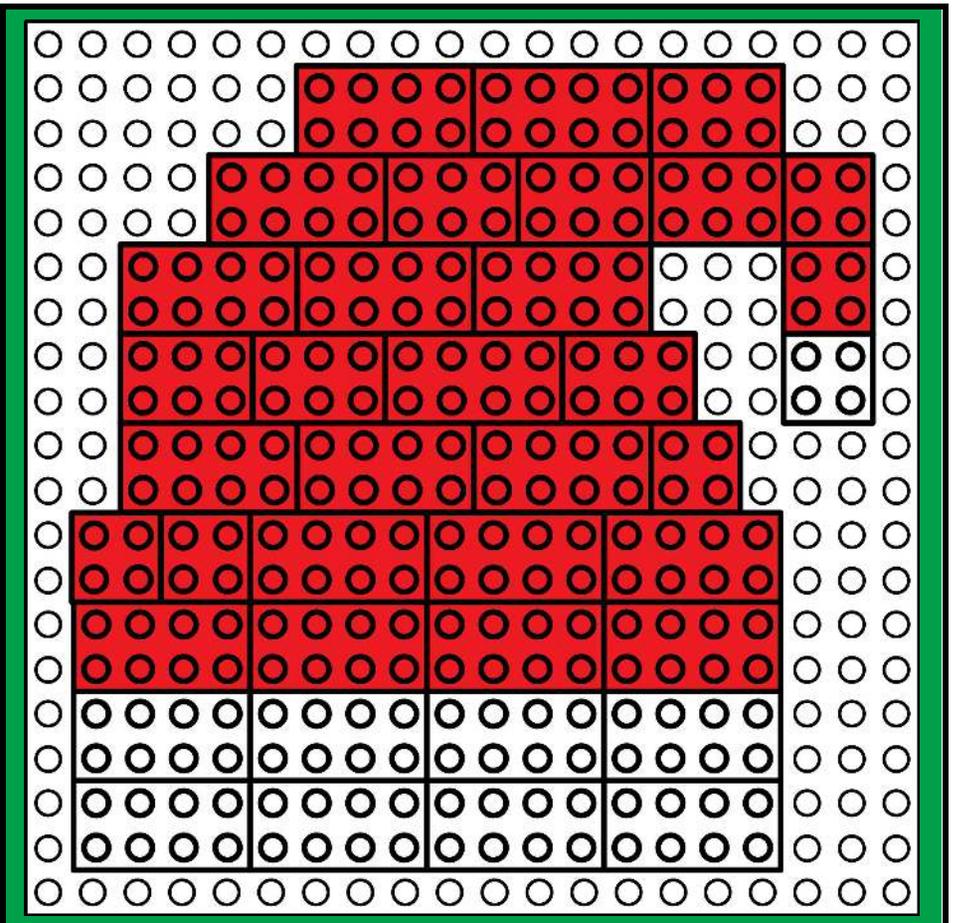
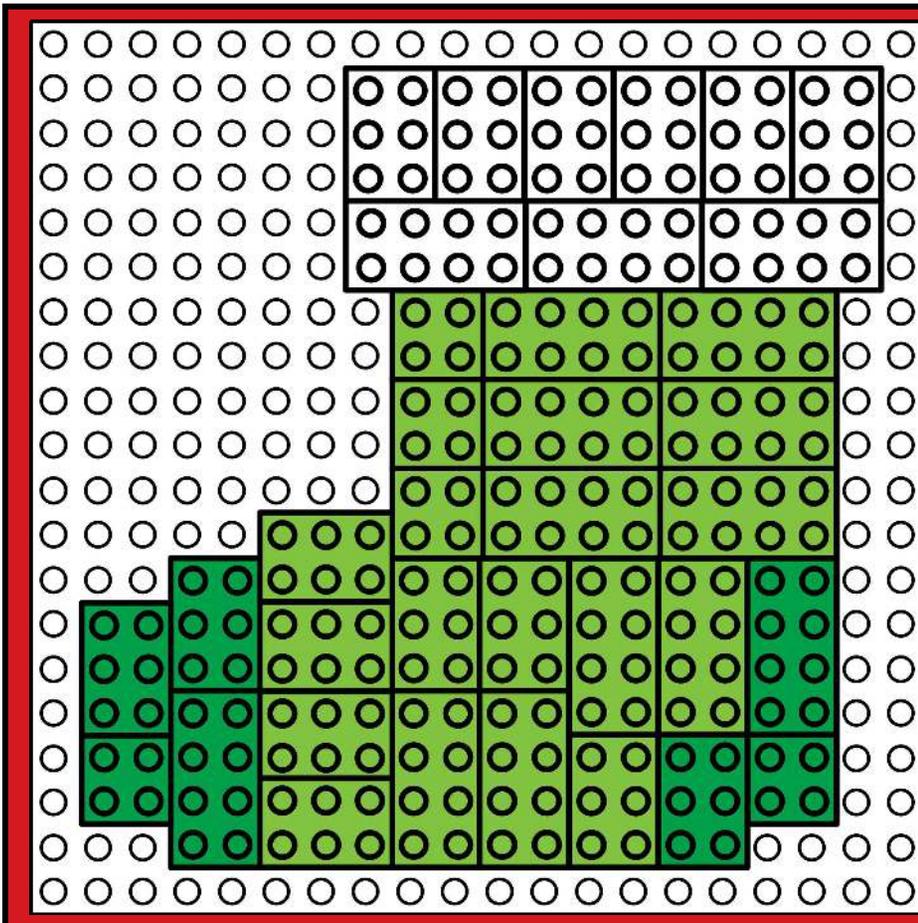
Build it twice as tall!

Make sure the entire strand of lights has two layers of bricks.

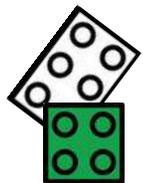


TIMER CHALLENGE

Build the ornament in **four** minutes or less. On your mark, get set, go!

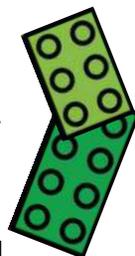


OPPOSITE HAND CHALLENGE UPSIDE DOWN CHALLENGE



Are you right-handed?
Build with your left hand.

Are you left-handed?
Build with your right hand.

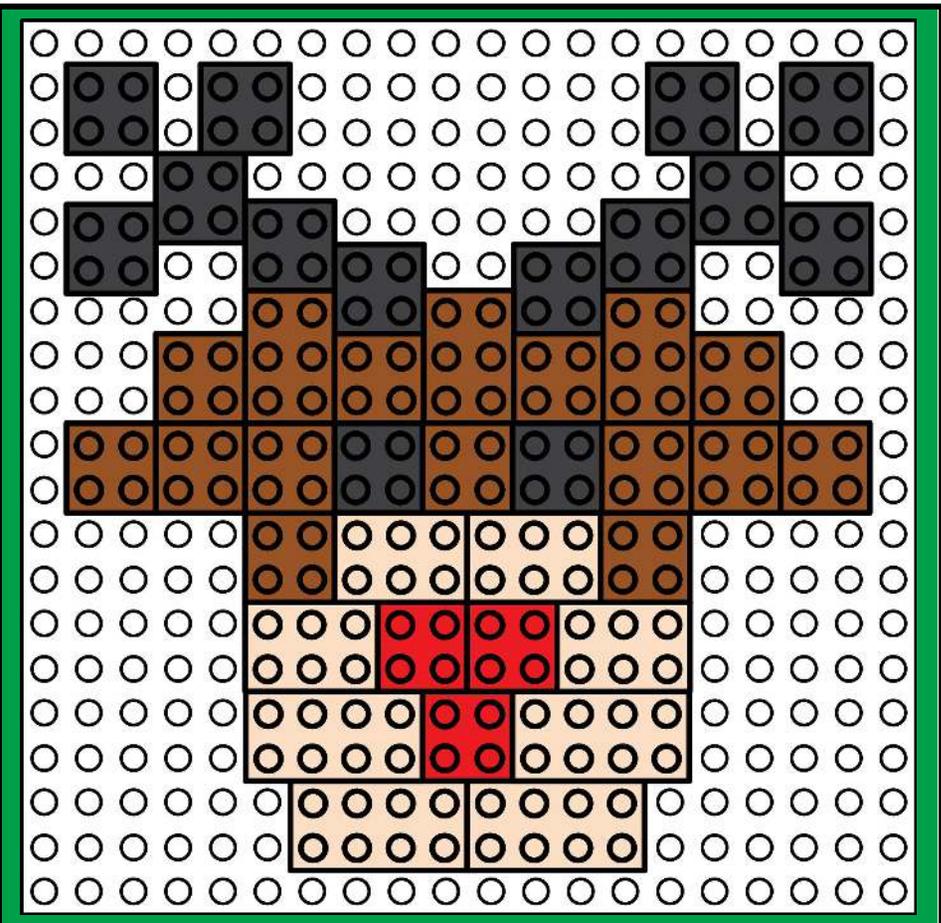
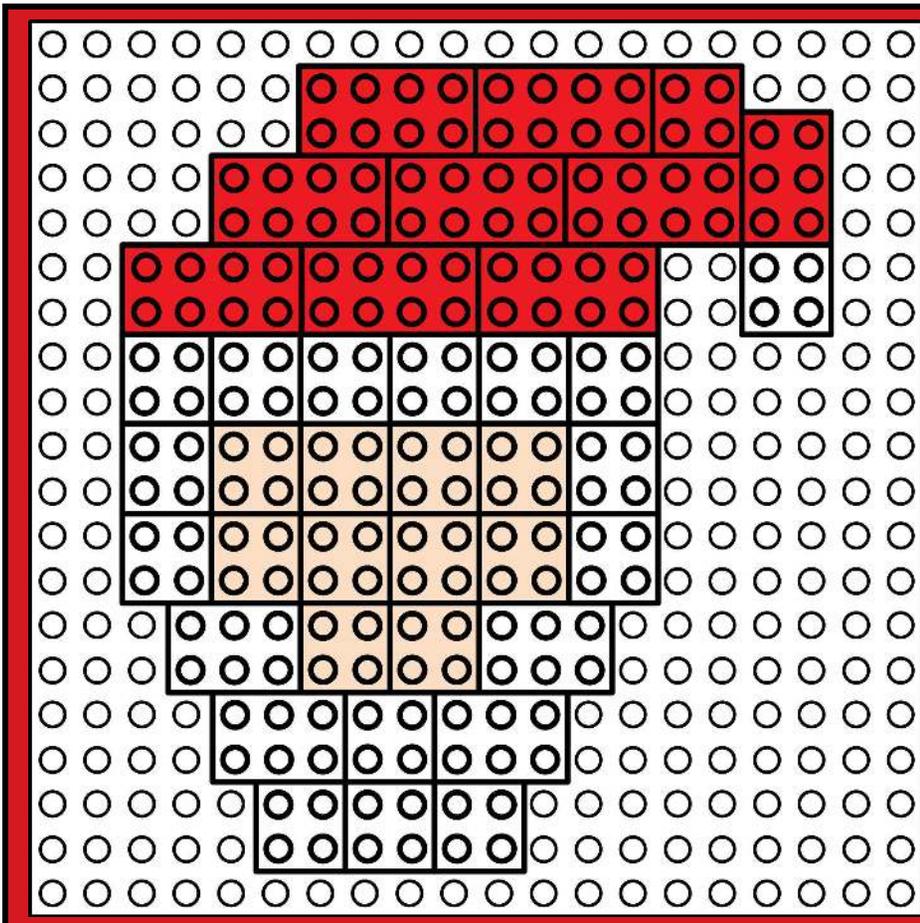


Your challenge is to build an upside down hat. Make sure you keep the



template ride-side up.



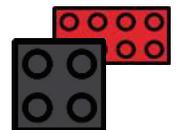


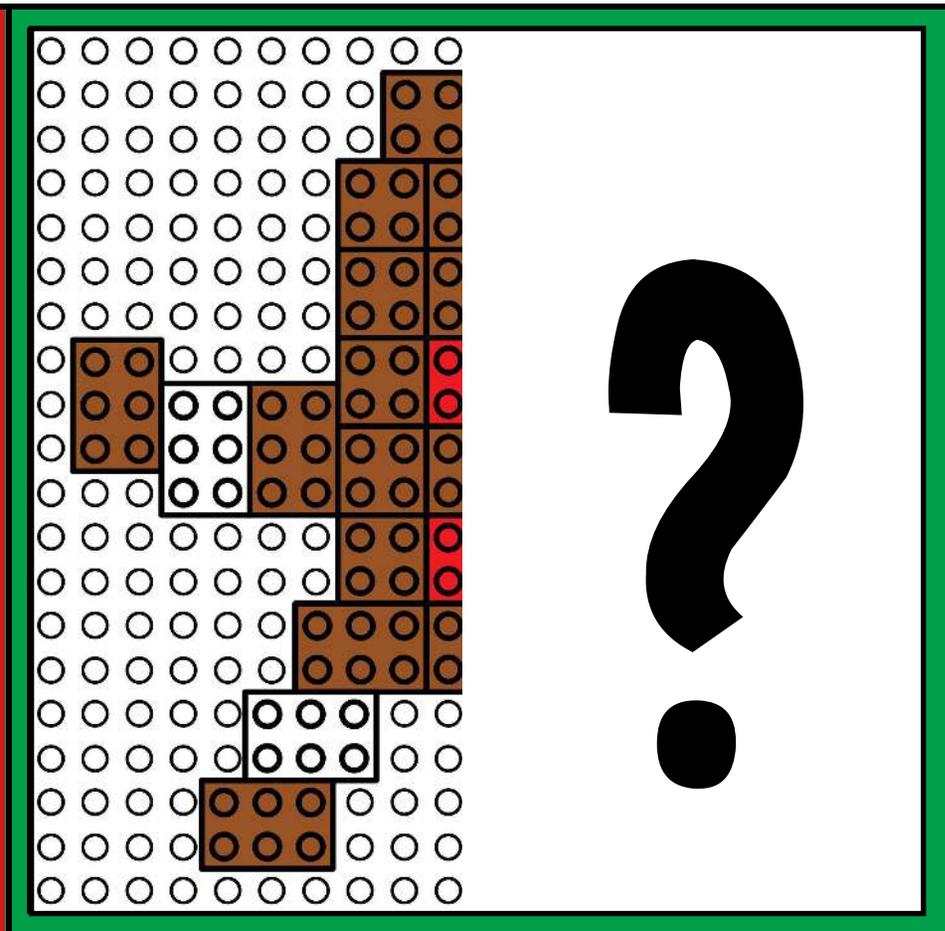
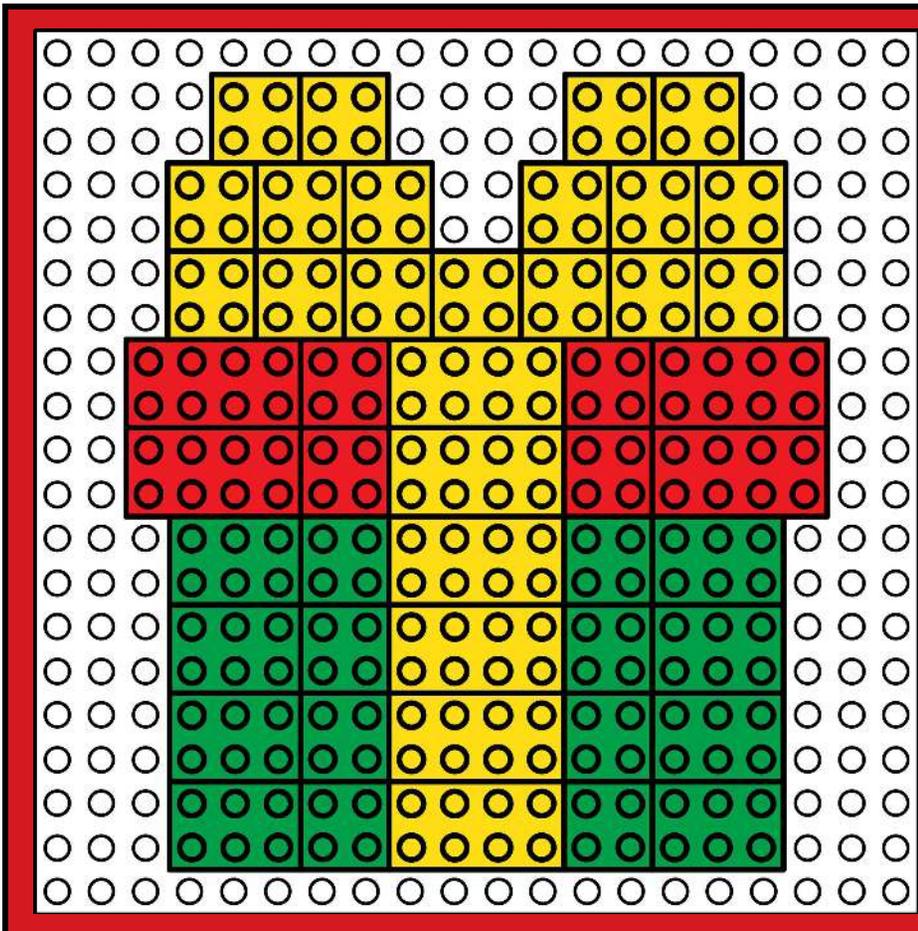
MUSIC CHALLENGE

Play your favorite holiday song. Your challenge is to build Santa before the song is over.

TWICE IS NICE CHALLENGE

Time yourself building the reindeer. Build it a second time and try to beat your first time.





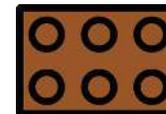
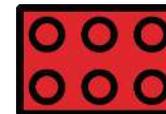
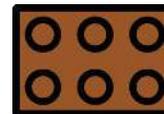
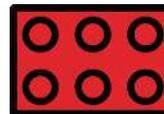
RACE CHALLENGE



Find someone to race with you.
Your challenge is to be the first person to finish building the gift.

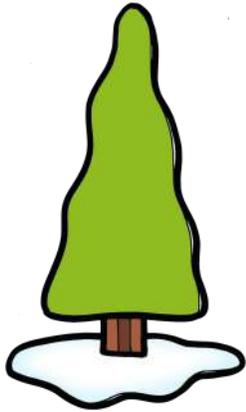
SYMMETRY CHALLENGE

The cookie is symmetrical. Your challenge is to build both halves.



MY CHRISTMAS TREE STEM INVESTIGATION PROJECT

MY TREE'S MEASUREMENTS



TREE HEIGHT:

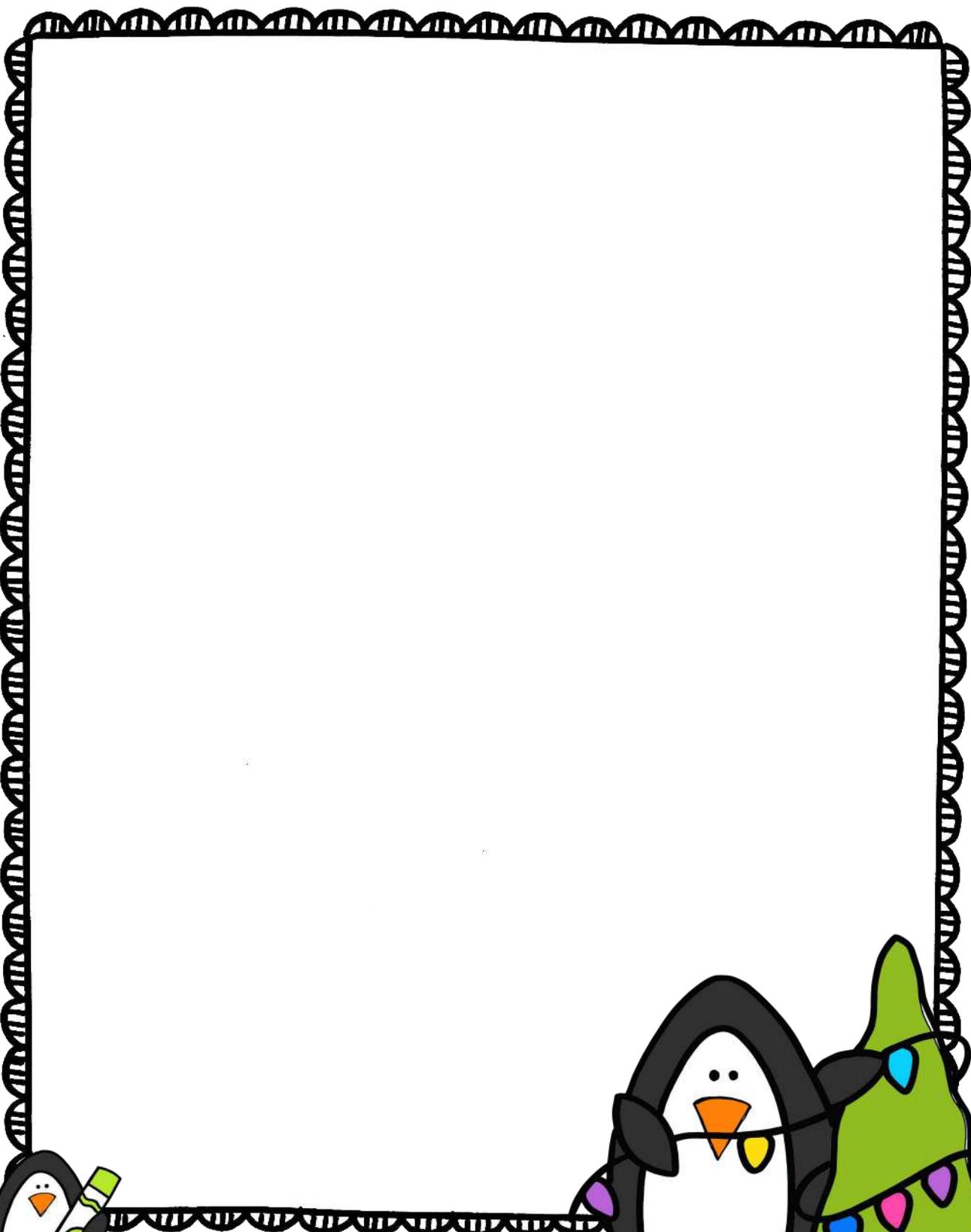
TREE WEIGHT:

TREE CIRCUMFERENCE:

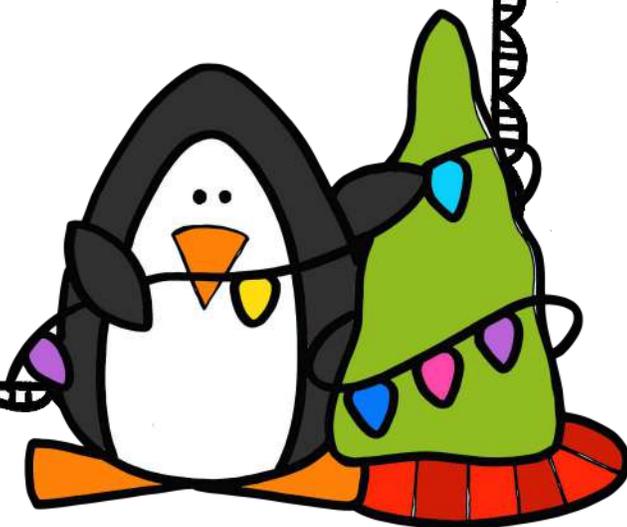
TRUNK CIRCUMFERENCE:



MY CHRISTMAS TREE STEM INVESTIGATION PROJECT



Sketch your tree.



MY CHRISTMAS TREE STEM INVESTIGATION PROJECT

TREE OBSERVATIONS



My tree feels like: _____

My tree looks like: _____

My tree smells like: _____



BRANCH AND NEEDLE SKETCH



PAPER PLANE PRINTING INSTRUCTIONS

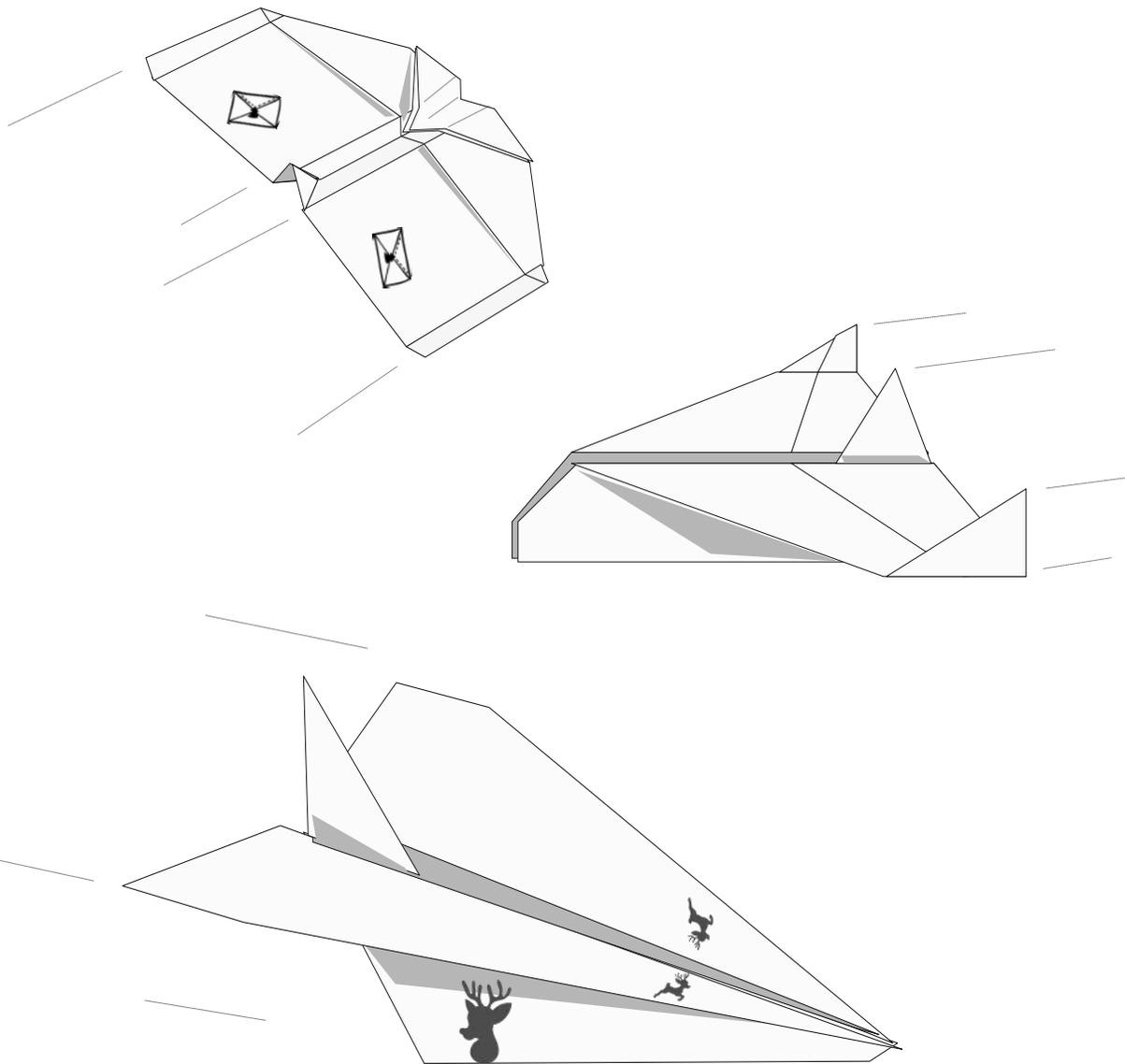
These letters are designed to print with the paper plane template on the back. Print each letter double-sided on 8.5x11 paper.

Let students write their letter to Santa. Then, have them fold their airplane following the instructions.

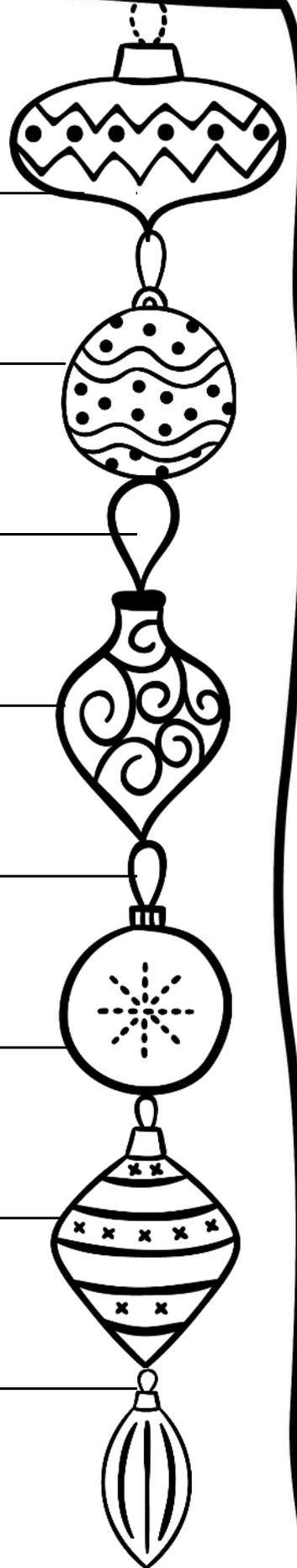
You'll need to print the letters with the plane template on the back, as well as an instruction sheet for each style plane.

Airplane Challenge

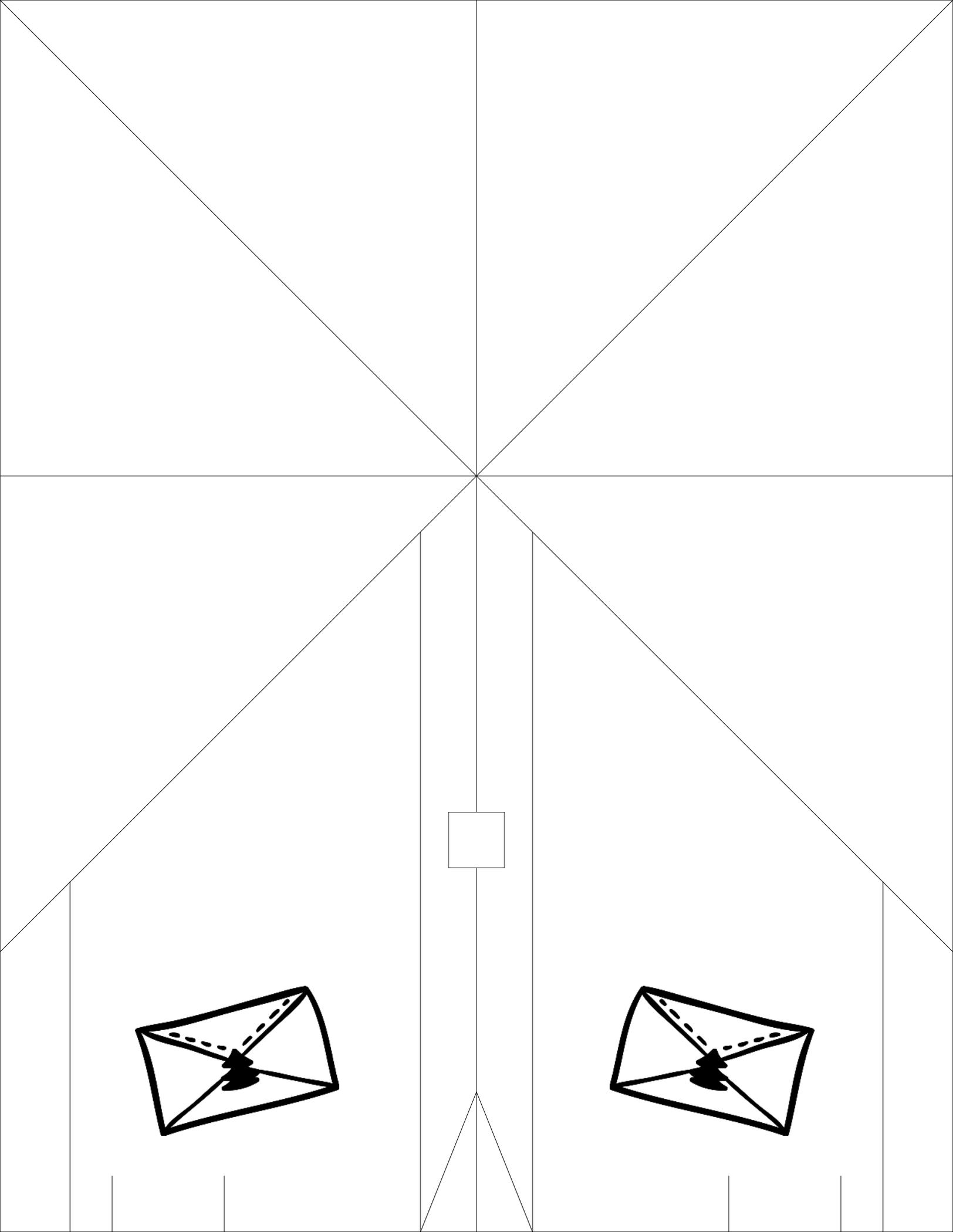
This challenge is to fold their airplane to fly the letter to Santa. See who can fly their airplane the farthest.



Dear Santa,



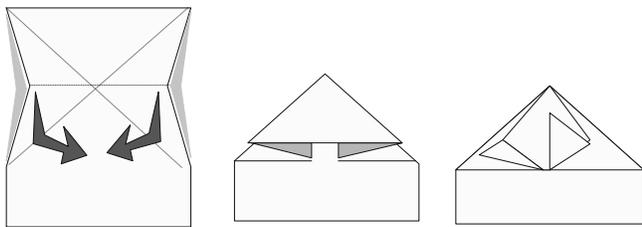
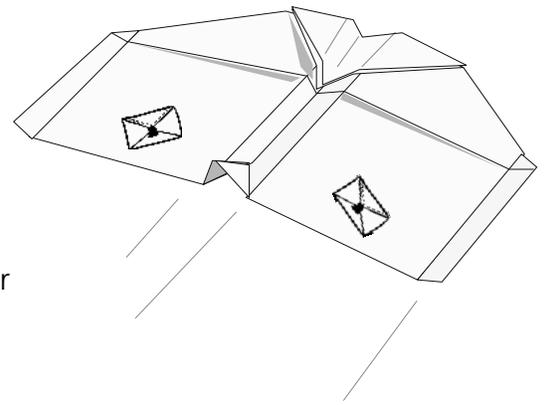
Best
Wishes



PAPER PLANE FOLDING INSTRUCTIONS

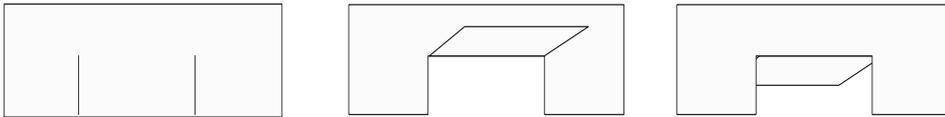
THE PLANE

- Flip the paper over so that the printed fold lines are facing down.
- First fold forward, crease and open back up along both diagonal lines. Also fold back on the horizontal line and reopen.
- Then pull and tuck the folds together as shown in the first two drawings.
- Now fold the corners of the each triangle up, almost to the center line.
- Fold the nose of the plane back.
- Fold up along the center line and then fold down each wing.
- Throw gently for distance...throw hard and up for overhead loops!



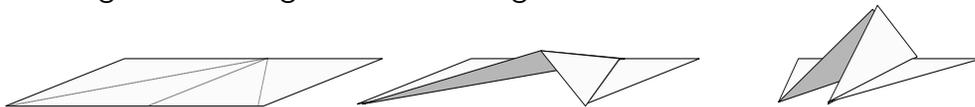
THE ADJUSTABLE FLAPS

- Cut on sides.
- Fold up to make the plane rise...fold down to make the plane drop.



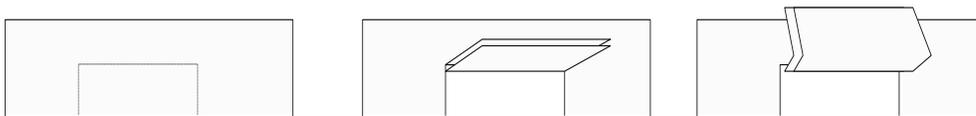
THE STICK-UP TAIL

- Bring the two angled fold lines together.



THE FASTENING CLIP

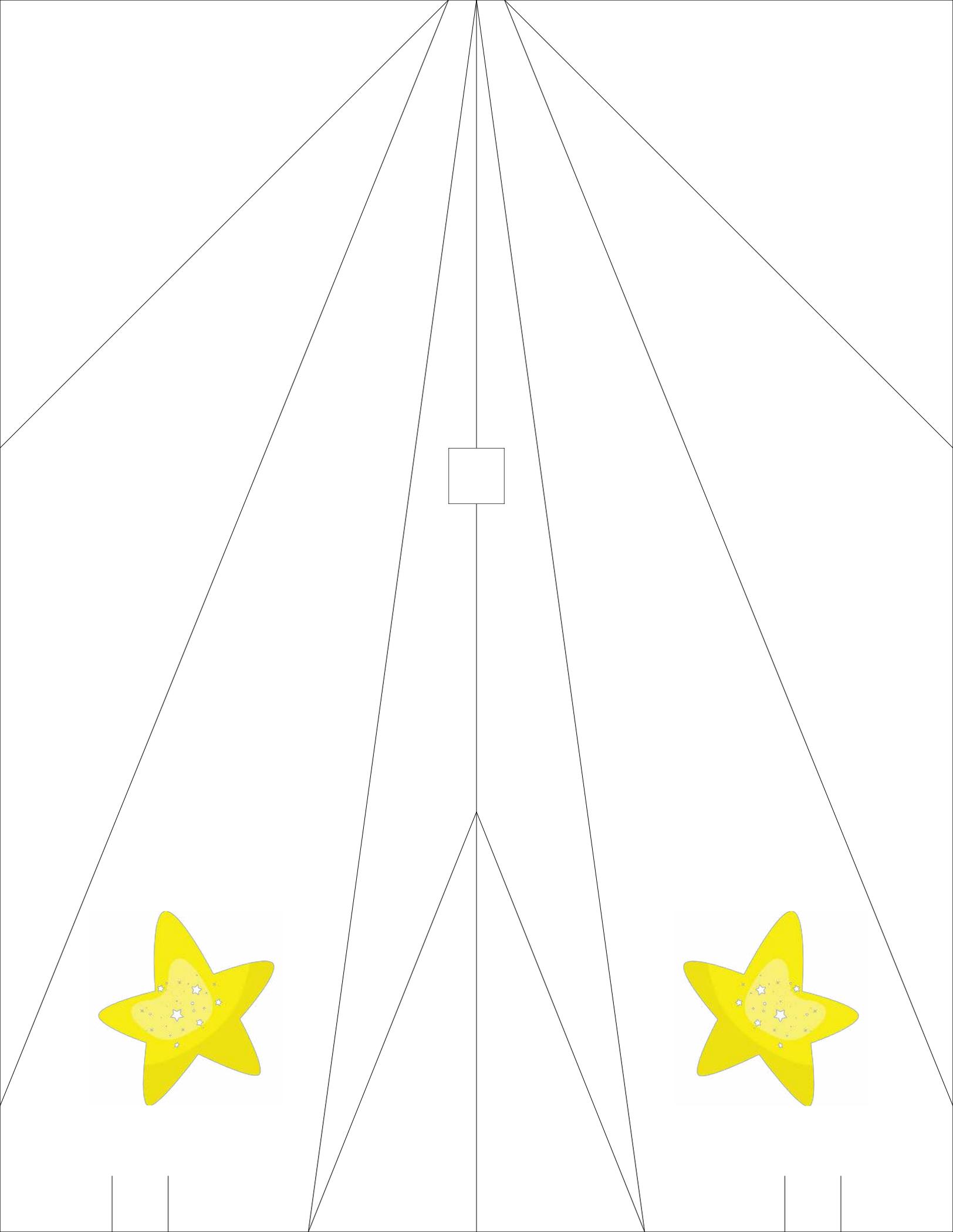
- Cut on the sides.





DEAR SANTA,

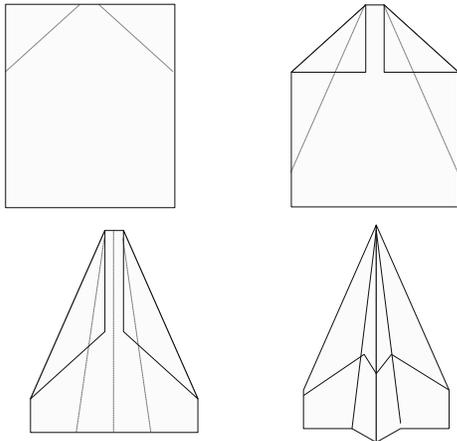
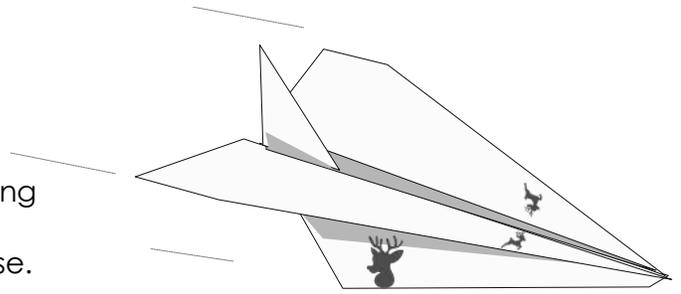
SINCERELY,



PAPER PLANE FOLDING INSTRUCTIONS

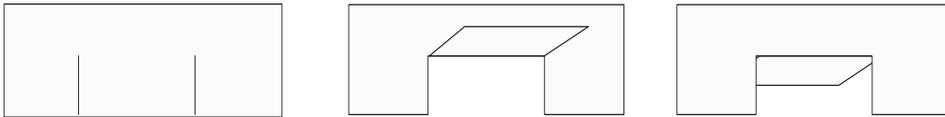
THE PLANE

- Flip the paper over so that the printed fold lines are facing down.
- Turn the corners back to the outside fold lines and crease. Repeat for the next set of folds.
- Fold up along the center line so text is inside and graphics are on the outside.
- Finally fold down each wing.



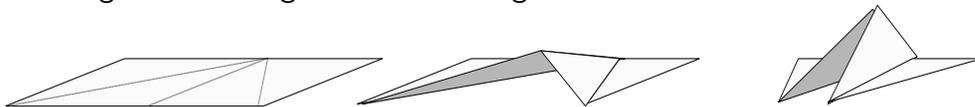
THE ADJUSTABLE FLAPS

- Cut on sides.
- Fold up to make the plane rise...fold down to make the plane drop.



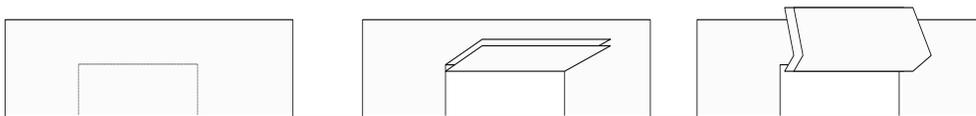
THE STICK-UP TAIL

- Bring the two angled fold lines together.



THE FASTENING CLIP

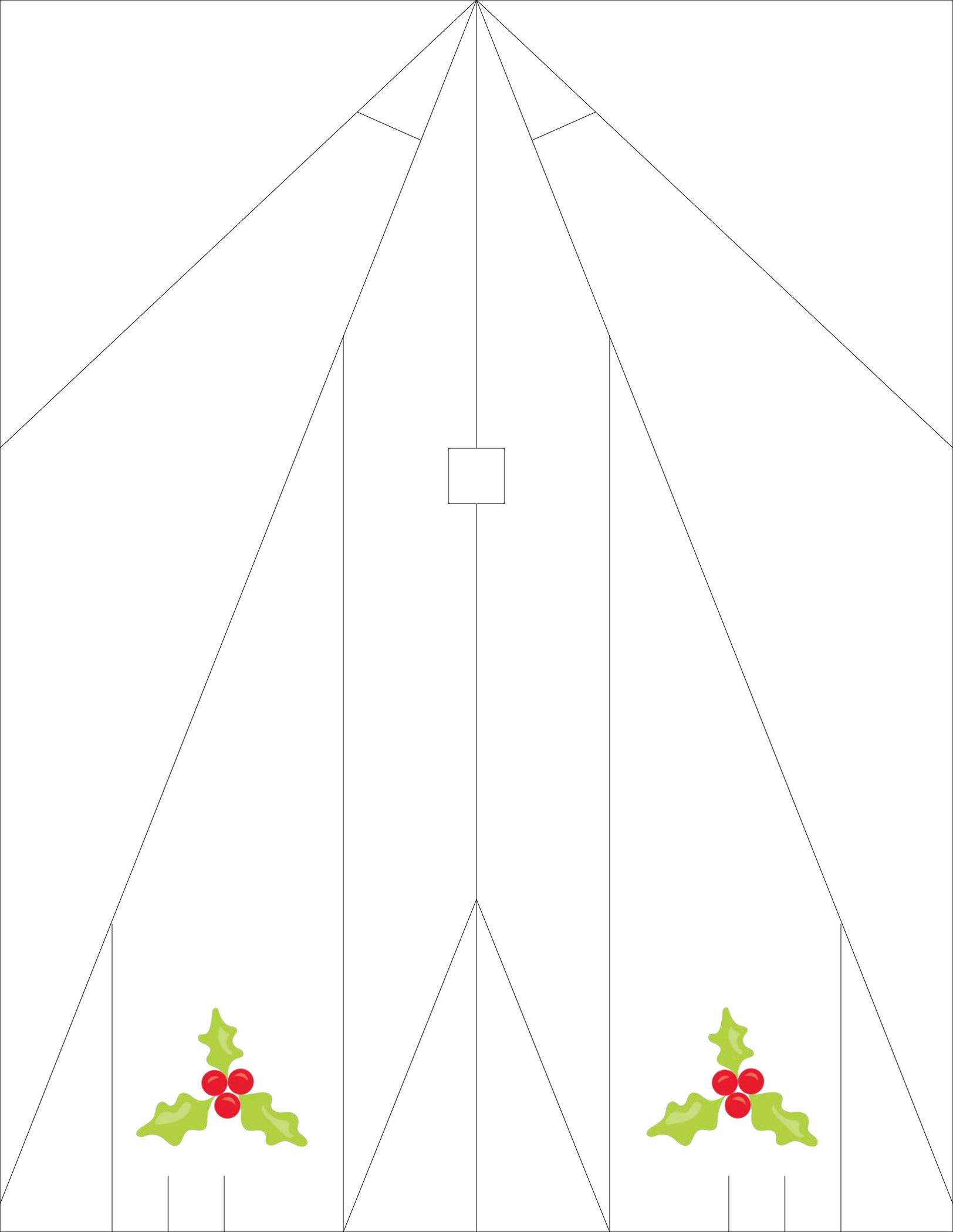
- Cut on the sides.



DEAR SANTA,

SINCERELY,

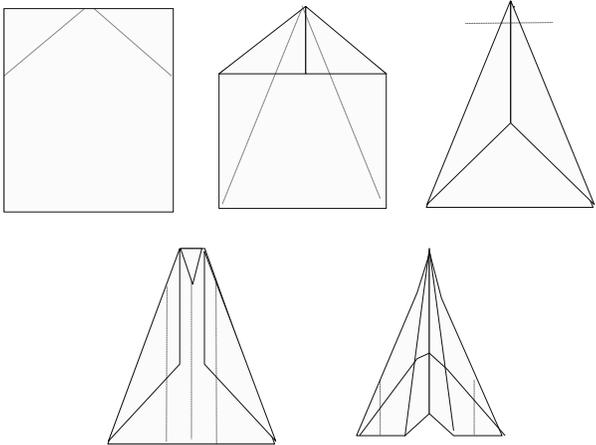
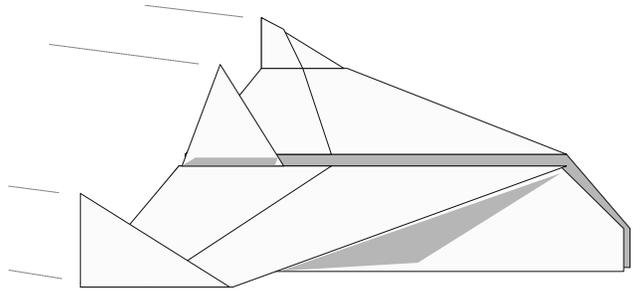




PAPER PLANE FOLDING INSTRUCTIONS

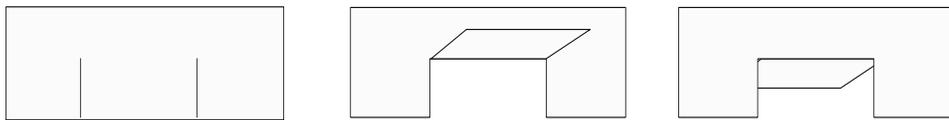
THE PLANE

- Flip the paper over so that the printed fold lines are facing down.
- Fold the corners up along the outside fold lines and crease down. Repeat for the next set of folds.
- Fold the nose back, as shown.
- Fold up along the center line so the lines and graphics are on the outside.



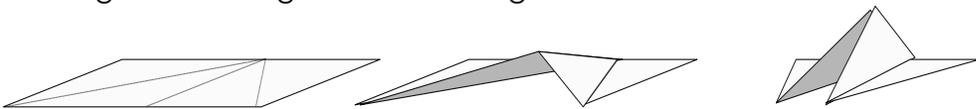
THE ADJUSTABLE FLAPS

- Cut on sides.
- Fold up to make the plane rise...fold down to make the plane drop.



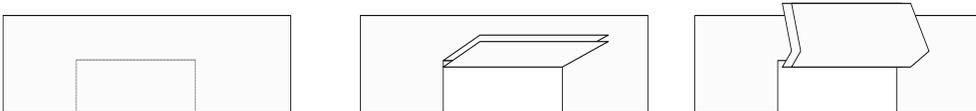
THE STICK-UP TAIL

- Bring the two angled fold lines together.



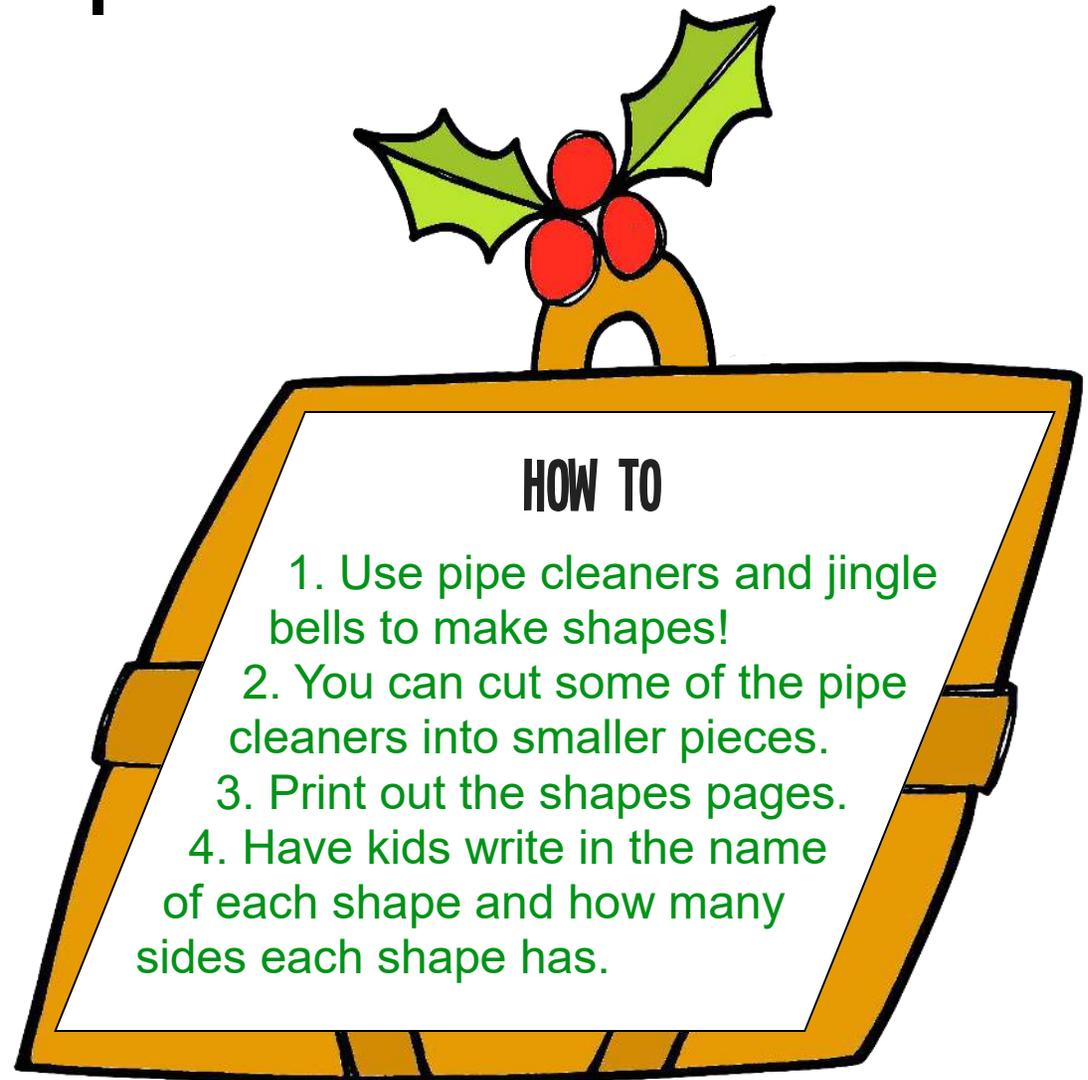
THE FASTENING CLIP

- Cut on the sides.



JINGLE BELL STEM

BUILDING SHAPES | CHRISTMAS MATH PLAY





WHAT IS THIS SHAPE?

HOW MANY SIDES?



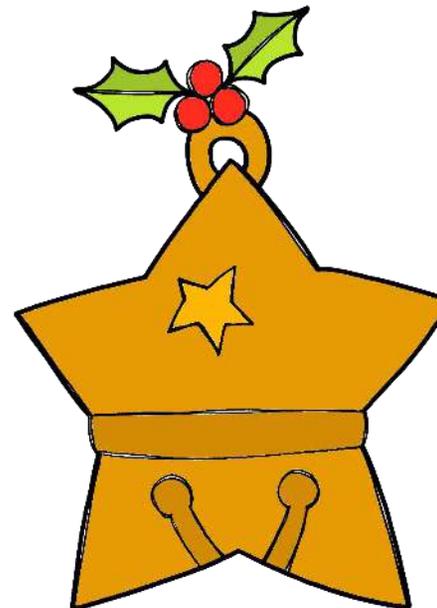
WHAT IS THIS SHAPE?

HOW MANY SIDES?



WHAT IS THIS SHAPE?

HOW MANY SIDES?



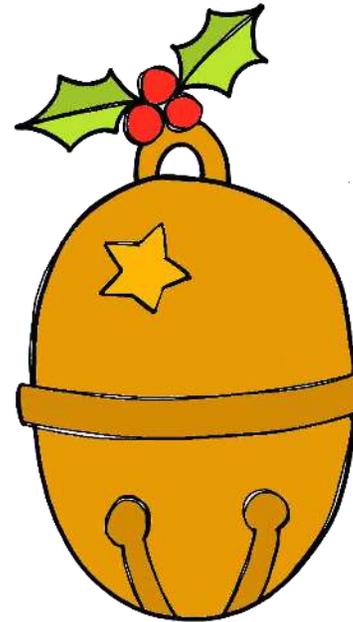
WHAT IS THIS SHAPE?

HOW MANY SIDES?



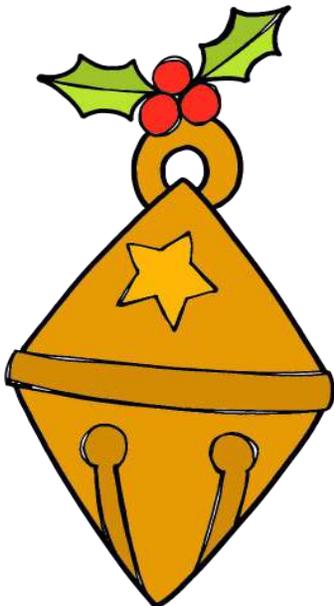
WHAT IS THIS SHAPE?

HOW MANY SIDES?



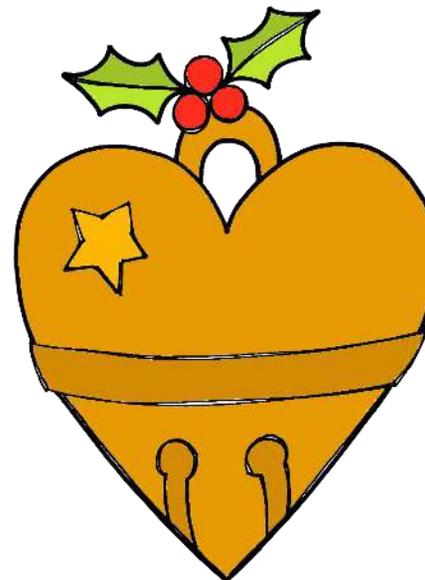
WHAT IS THIS SHAPE?

HOW MANY SIDES?



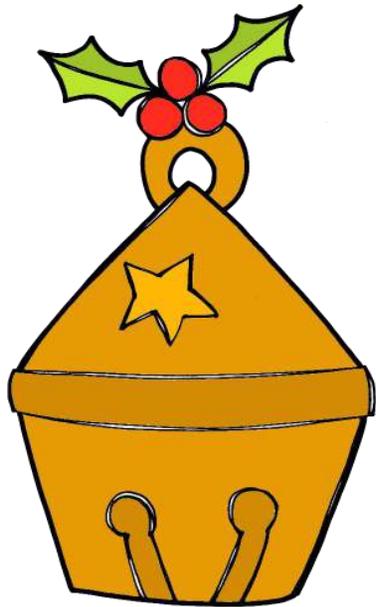
WHAT IS THIS SHAPE?

HOW MANY SIDES?



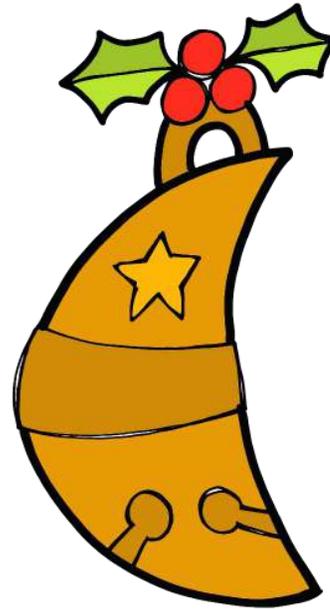
WHAT IS THIS SHAPE?

HOW MANY SIDES?



WHAT IS THIS SHAPE?

HOW MANY SIDES?



WHAT IS THIS SHAPE?

HOW MANY SIDES?



WHAT IS THIS SHAPE?

HOW MANY SIDES?



WHAT IS THIS SHAPE?

HOW MANY SIDES?

GINGERBREAD HOUSE CHALLENGE

SUPPLY IDEAS



Graham Crackers



Shoebox



Icing



Construction Paper



Milk Carton



Candy Canes



Ruler



Gumdrops



Toothpicks



Other Candies



CHALLENGE

Using any materials you have available, construct a gingerbread house.

GINGERBREAD HOUSE CHALLENGE



NAME YOUR HOUSE:



© littlebinsforlittlehands.com

BUILDING MATERIALS:

	_____		_____
	_____		_____
	_____		_____
	_____		_____

WORDS I WOULD USE TO DESCRIBE MY HOUSE:

_____	_____
_____	_____
_____	_____

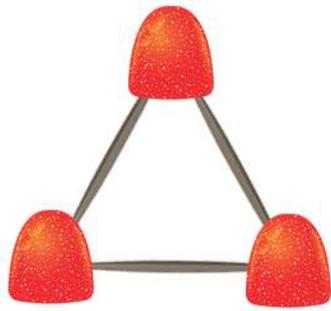


DRAW YOUR HOUSE



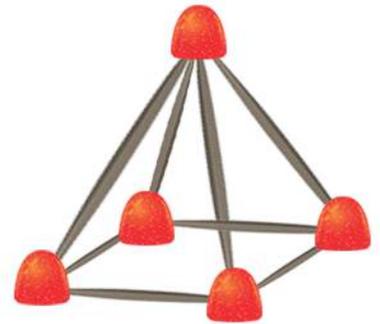
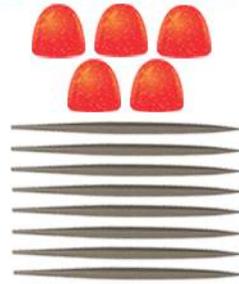
CReAtE A tRIANGLe (20)

You Need



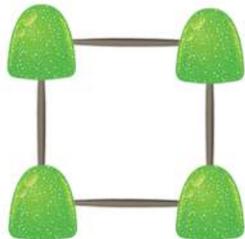
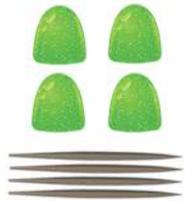
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You Need



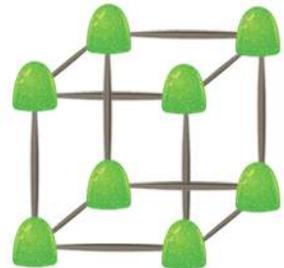
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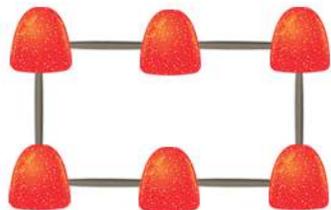
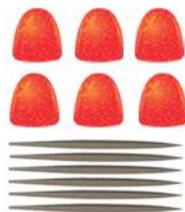
CReAtE A CuBe (30)

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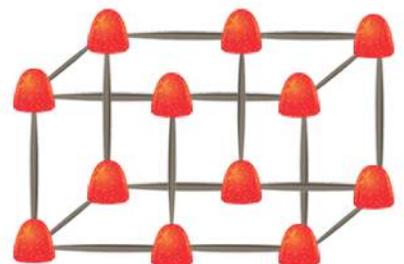
CReAtE A ReCTANGLe (20)

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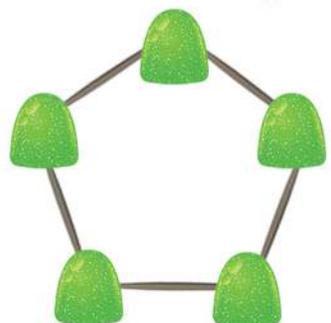
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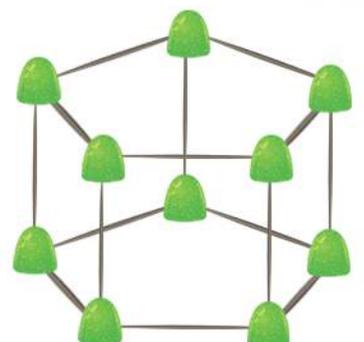
CReAtE A PeNTAGON (20)

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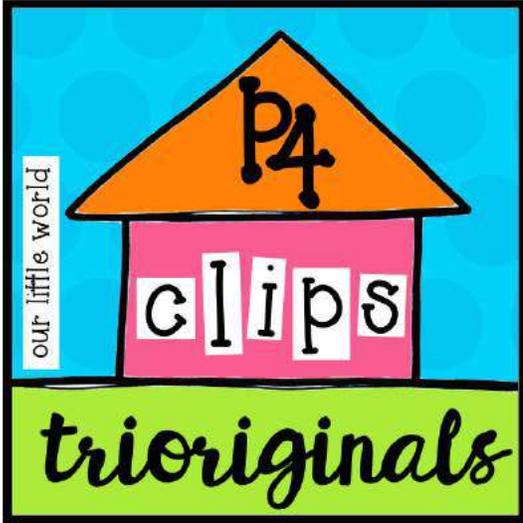
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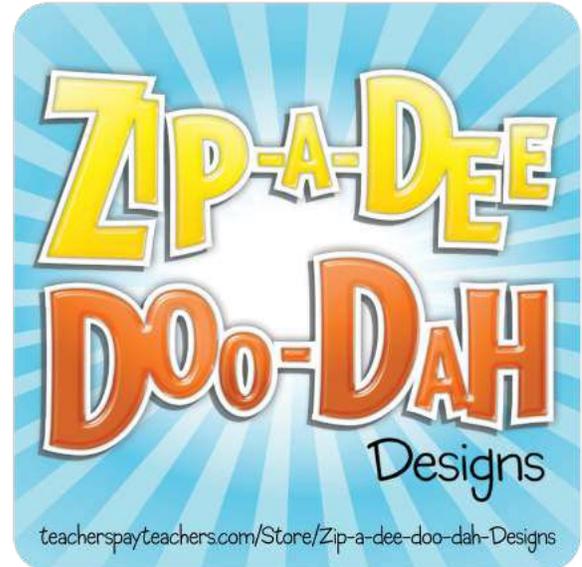
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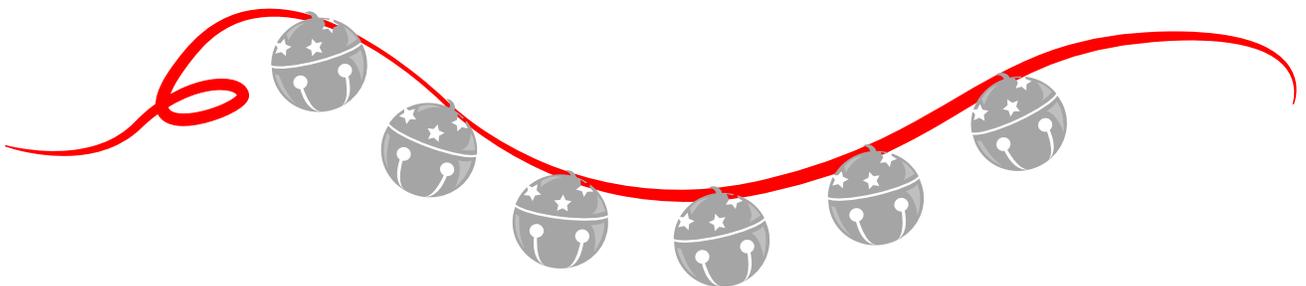


Kari Bolt

children's illustrator



<http://www.teacherspayteachers.com/Store/Zip-a-dee-doo-dah-Designs>



LITTLE BINS FOR LITTLE HANDS

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