

# Don't Sink the Sub

## Supplies

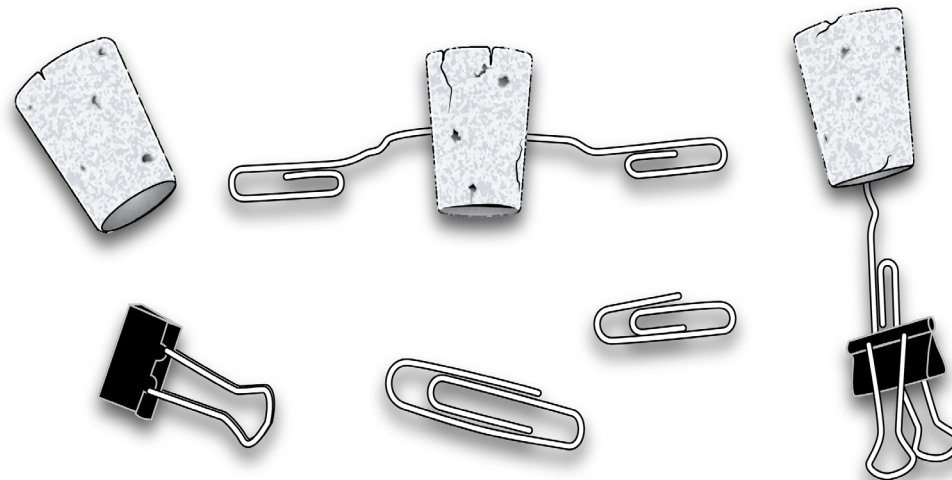
- corks
- paperclips
- binder clips

**Can you use the supplies to create a vessel that doesn't float on top OR sink to the bottom? If so, your vessel is displaying neutral buoyancy.**

## What to do

- Question – Which objects float and which objects sink? You may want to test them to see.
- Plan – Which objects do you want to use to create your vessel?
- Build – Go ahead and put your plan in motion!
- Test – Place your vessel in the water and observe whether it floats, sinks, or displays neutral buoyancy.
- Improve – Based on what you observed, think about how you might change or rebuild your vessel using a modified plan.

**Redesign and retest your vessel until you achieve neutral buoyancy.**



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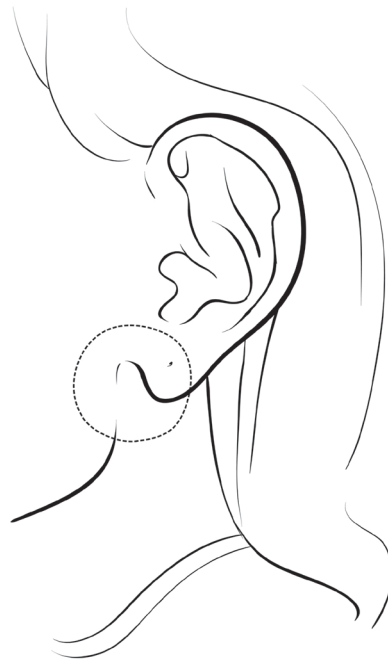
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# Genetic Trait Bracelet

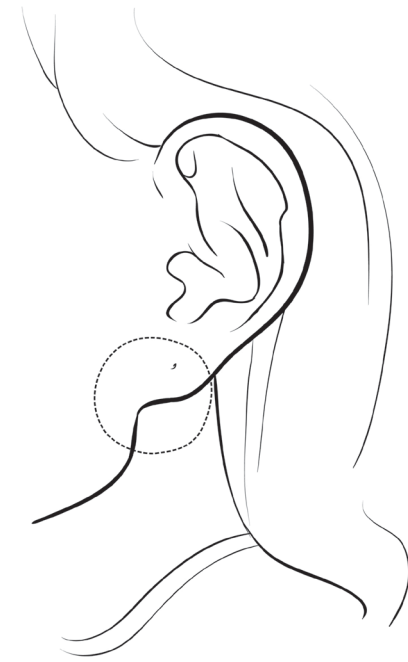
## Supplies

- pipe cleaner
- bright pink beads
- light pink beads

Take a look at your earlobes.  
Do they hang free or are they attached to your head?



If your earlobes are free,  
add a **bright pink** bead.



If your earlobes are attached,  
add a **light pink** bead.

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# Genetic Trait Bracelet

## Supplies

- pipe cleaner
- blue beads
- light blue beads

Try to roll your tongue like a taco.  
Can you do it?



If you can roll your tongue,  
add a **blue** bead.

If you can't roll your tongue,  
add a **light blue** bead.

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# Genetic Trait Bracelet

## Supplies

- pipe cleaner
- yellow beads
- ivory beads

Pull your hair back from your forehead.  
Is your hairline pointed or straight?



If you have a pointed hairline,  
add a **yellow** bead.



If you have a straight hairline,  
add an **ivory** bead.

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# Genetic Trait Bracelet

## Supplies

- pipe cleaner
- green beads
- light green beads

Smile! Do you have any dimples in your cheeks?



If you have any dimples,  
add a **green** bead.



If you don't have any dimples,  
add a **light green** bead.

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# Genetic Trait Bracelet

## Supplies

- pipe cleaner
- purple beads
- light purple beads

Do you have any freckles?



If you don't have freckles,  
add a **purple** bead.



If you have freckles,  
add a **light purple** bead.

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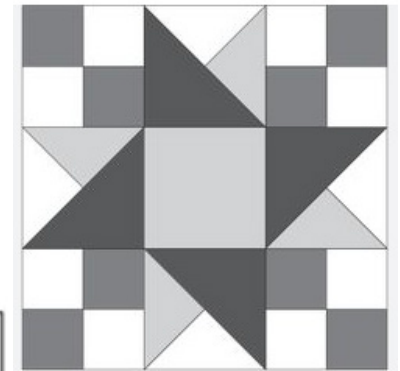
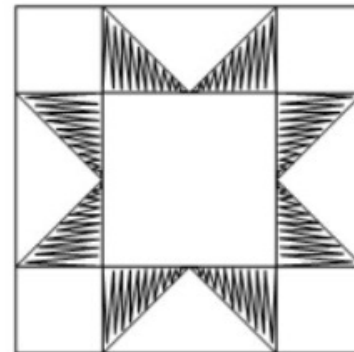
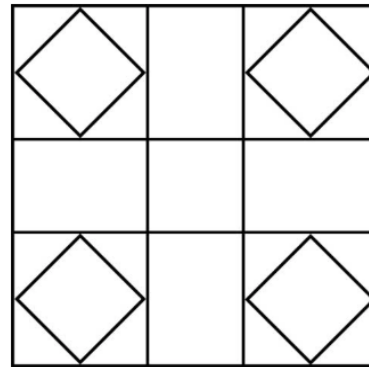
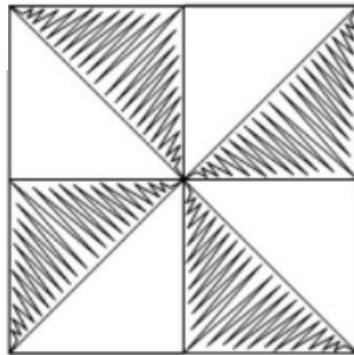
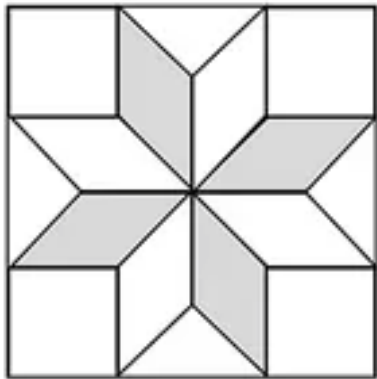
# Geometry Quilt Squares

## Supplies

- graph paper
- pencil
- ruler
- colored pencils

## What to do

1. Observe the quilt squares below.
2. Can you see lines and angles? Can you identify shapes?
3. Can you see any lines of symmetry?
4. Can you divide the pattern into fractional parts, such as in halves or in quarters?
5. Now, use a piece of graph paper and a pencil to design your own geometry quilt square. You may want to use a ruler and make faint outlines of the shapes before you color them in with the colored pencils.



## Can you design a quilt square that...

...includes three different shapes?

...shows a line of symmetry?

...can be divided into fractional parts?

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# I Spy with my Microscope Eye

## Supplies:

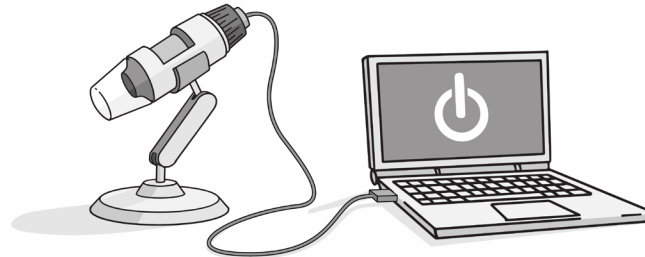
- Digital Microscope interfaced with a computer

## Notes:

- The scope can be used when held in your hand or clipped into the stand.
- Make sure the cap has been removed from the plastic tip.
- Take care to ensure objects (including fingers) do not come into contact with the microscope lens.
- The buttons on the scope will not work with most computers.

## What to do

1. Hold the microscope right up against an object. The clear plastic tip will help prevent the object from coming directly into contact with the microscope lens. Do not touch the lens.
2. Turn the small wheel on the cord to adjust the brightness of the lights on the scope.
3. You should be able to see an image on the computer screen. You may need to move the scope or the object to ensure it is in the viewing field of the microscope lens.
4. Turn the big silver wheel on the scope until the object comes into focus.
5. To get a clear image, you may also need to move the scope either closer to or farther away from the object.



## I Spy Challenges:

What do you see if use the microscope to look at:

- Your skin
- Your fingerprint
- Your fingernail
- Your hair
- Your clothing

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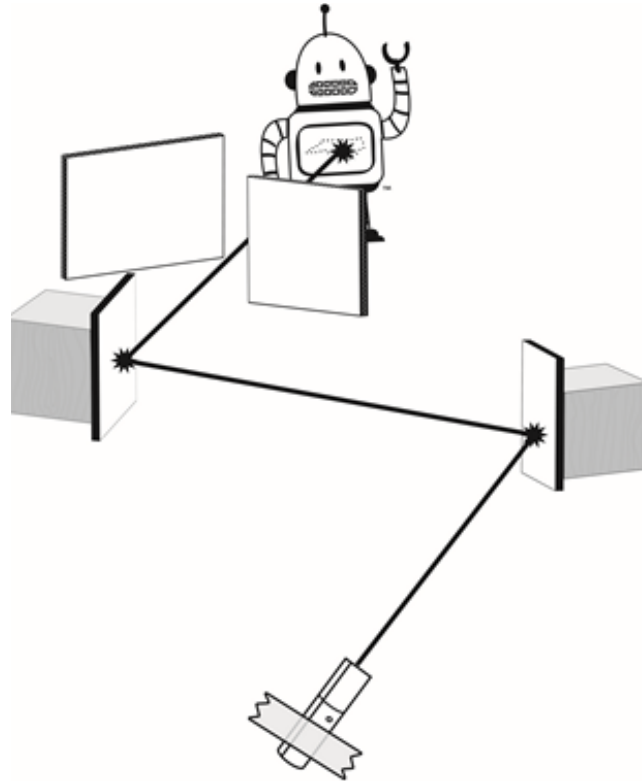
# Light the Way

## Supplies

- 1 laser pointer\*
- 2 mirrors attached to wood blocks
- 2 cardboard easels
- 1 cut-out Kelvin

## \*SAFETY NOTE

- The laser pointer should remain taped to the work station surface.
- Do not deliberately look or stare into the laser beam.



## What to do

1. Start with one mirror and the Kelvin card.
  2. Turn on the laser pointer and allow the light to hit the mirror at an angle.
  3. Move Kelvin into the reflected light. (Notice that the light is reflecting at an angle!)
  4. Place a cardboard easel in front of Kelvin. (Notice that the light is absorbed by cardboard and not reflected!)
  5. Move Kelvin, then add a second mirror to catch the light reflected from the first mirror and reflect it onto Kelvin. (See the diagram.)
- CHALLENGE: Move a cardboard easel (or two!) to partially block off Kelvin. Can you move the mirrors in order to still light the way?

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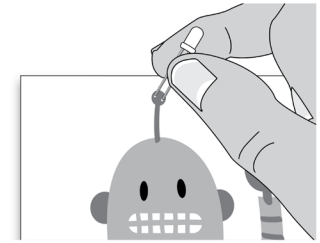
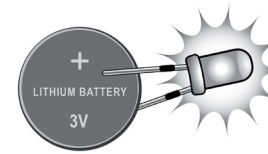


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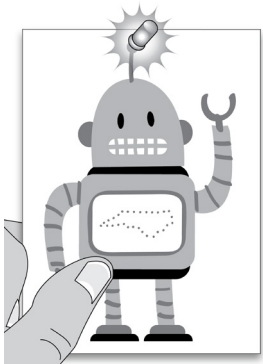
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# Paper Circuit Robot



## Supplies

- 1 Paper Circuit Robot template
- 1 LED
- 1 pencil
- 3 strips of aluminum foil
- 5 pieces of tape
- 1 battery (note: batteries will remain on the table)



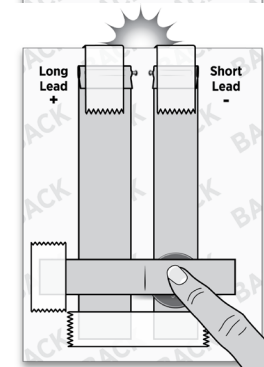
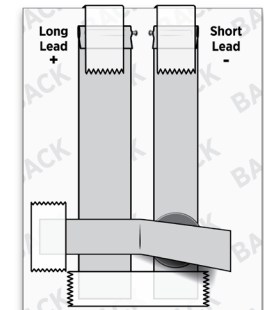
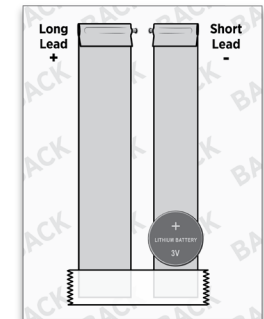
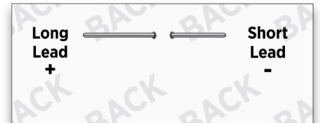
## What to do

1. Test the LED by touching the long lead on the positive (+) side of the battery and the short lead on the negative (-) side of the battery to be sure it lights up.
2. Position the long lead to the right and the short lead to the left, then poke the leads through the robot's antenna on the template.
3. Flip the template over. Bend the leads to open them and confirm the long lead is now on the left and the short lead is now on the right. Label the two sides of the circuit with a + and - as shown on the illustration.
4. Wrap one end of a strip of aluminum foil tightly around each lead and lay both foil strips flat and vertical on the template. Tape down the bottoms of both vertical strips. Place a battery on top of the negative (-) side of the circuit, making sure it is not on top of the tape and that the positive (+) side of the battery is facing up.
5. Place a third strip of aluminum foil so it is horizontal across the vertical strips and the battery, but not on top of any tape. Then tape the left side of the third strip, making sure the tape does not touch the vertical strip.
6. Make sure the aluminum foil is still tight around each lead and tape the tops of the vertical strips such that the tape is only touching foil and not directly on the leads.

## Test your paper circuit robot

Touch the horizontal aluminum foil strip onto the positive (+) side of the circuit and on the top (+) side of the battery. This creates a closed circuit which allows the electricity to flow and the LED light bulb to convert electrical energy into light energy.

Lifting the foil out of contact with the battery will break (or open) the circuit so the LED is no longer lit.



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# Parachutes

## Supplies:

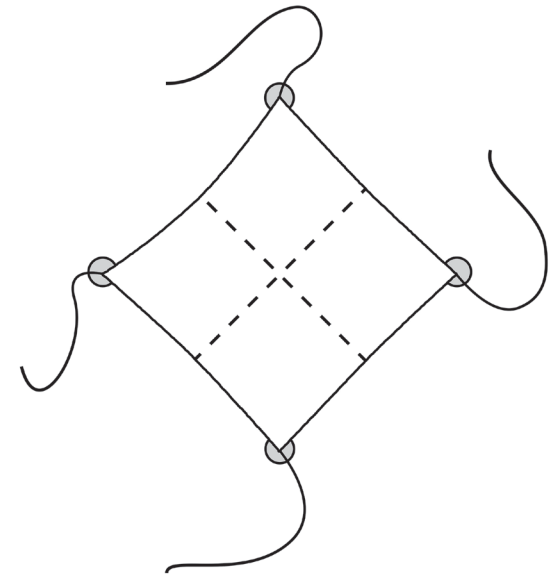
- 1 napkin
- 1 paper clip
- 4 pieces of string
- 4-5 pieces of masking tape

## What to do

1. Cut four equal length pieces of string, each approximately 12 inches long.
2. Unfold a paper napkin so that it is laying flat.
3. Use a piece of masking tape to secure one piece of string at each corner of the napkin.
4. Bring the loose ends of the strings together and thread them through one end of a paperclip.
5. Fold the loose ends of the string up to form a loop (the paperclip should hang down from the loop).
6. Tie a knot or wrap a piece of masking tape around the loose strings to secure the loop and the paperclip.

## Test your parachute

- Hold your parachute up so that the strings and paperclip hang down, then drop.
- Mark your spot with a sticky note (optional)
- Are there any changes you could make to your parachute to make it land more accurately?



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# Pinwheel Power

## Supplies

- 1 pinwheel template
- 1 pencil with eraser
- 1 push pin
- scissors

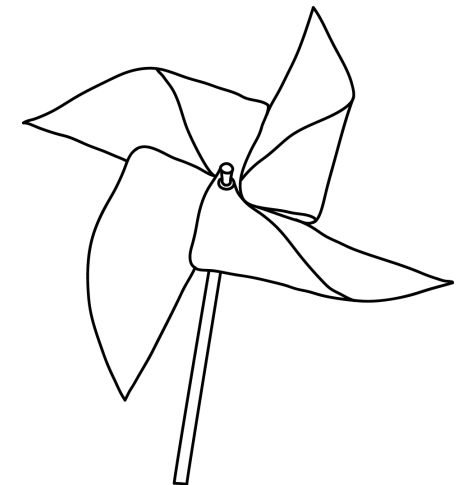
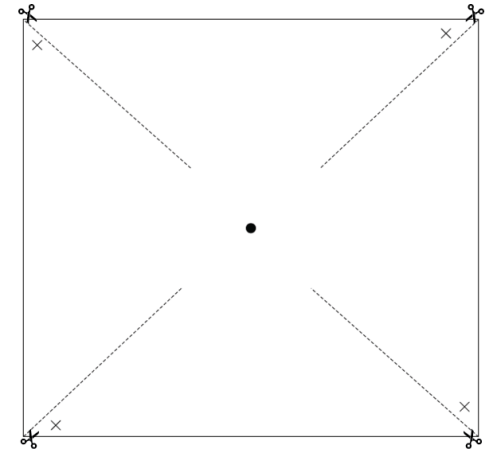
## Note

Experiment at home:

- Direct the air from a hairdryer on a low setting toward the pinwheel.
- Create a breeze by waving a piece of cardboard at the pinwheel.
- Take the pinwheel outside on a windy day to see wind power in action.

## What to do

1. Cut out one square template for your pinwheel.
2. Cut on each of the four dotted lines. Be careful not to cut all the way across the template.
3. Write your name on your pinwheel template. You can also decorate it with markers if you wish.
4. Create your pinwheel's blades by pulling each corner marked with an X to the middle of the template. Don't fold the blades. The blades will need to be gently curved, or looped, so they can catch the wind.
5. Arrange the tips of the four corners so they overlap each other on the template's center dot.
6. Push the pin through the center of the template. Make sure the pin goes through the tips of all four corners to hold the blades in place.
7. Push the pin into the side of the pencil eraser. The pencil is now the pinwheel's handle.
8. Hold your pinwheel out in front of you so the front of the pinwheel is at a right angle to your body. Then swing your arm from side to side to push the pinwheel through the air and make the blades spin.
9. If the pinwheel seems stuck, you may need to loosen the push pin slightly to reduce the friction between the blades and the eraser.
10. If an electric fan is available, hold the pinwheel in front of the fan to watch it whirl!



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# Reading Trees

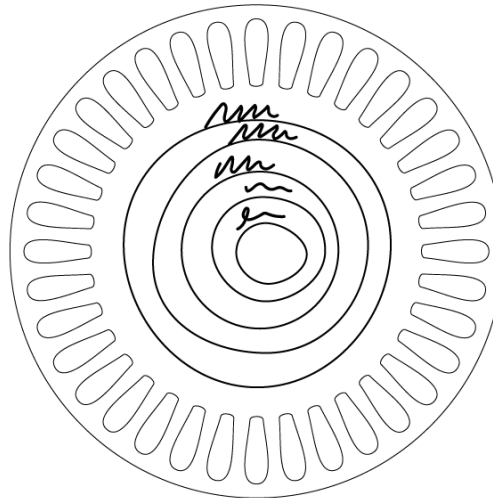
## Supplies:

- 1 paper plate
- 1 marker

## What to do

1. Draw a small circle in the center of your paper plate. This is to represent your birth.
2. The bumpy ridges of the paper plate are the bark of the tree cookie and will not be a year of growth.
3. Draw circles around the center circle, out toward the bumpy edge. There will be one circle for every year old you are.
4. Include important events in your life - like moving to a new place, when you started school, when you broke a bone, and so on.

**What would these events look like as a mark on a tree ring?**



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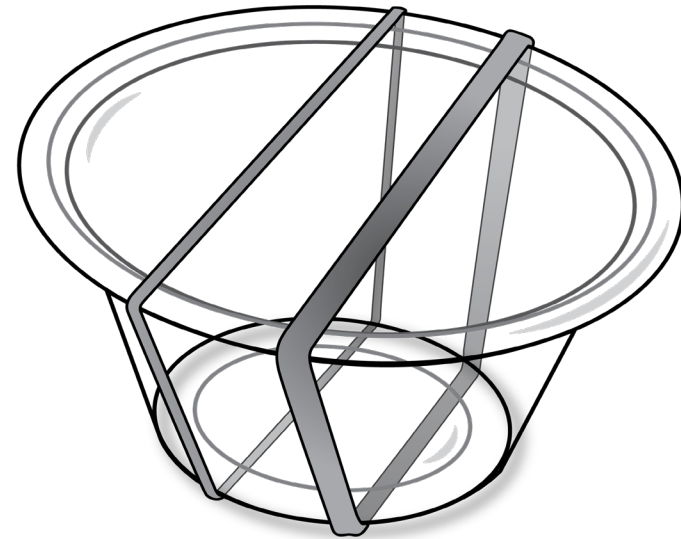
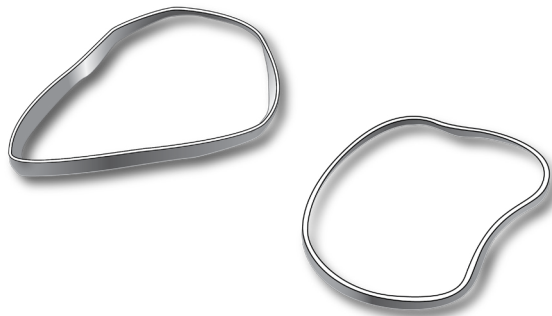
# Rubberband Guitar

## Supplies

- 1 cup
- 1 thin rubberband
- 1 thick rubberband

## What to do

1. Select two rubberbands - one that is thinner and one that is thicker than the other.
2. Wrap both rubber bands around the cup so that they are stretched across the cup's opening.



## Test your Rubberband Guitar

- Use your finger to pluck each of the rubber bands and observe. How is the sound being created?
- Do you hear the difference when you pluck the thinner rubberband versus the thicker rubberband? Why?
- You can also use your finger to strum across both rubberbands.
- Can you play a song with your Rubberband Guitar?

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