

# POPSICLE STICK CATAPULT

## DID YOU KNOW?

Research shows that Girl Scouts are more likely than non-Girl Scouts to achieve academic excellence and overachieve when it comes to hands-on learning, reflection, decision making, and teamwork.

Through cooperative learning, doing, and keeping it girl-led, girls will practice and learn key skills that are part of the Girl Scout Leadership Experience:

- Problem solving - how to keep trying when something doesn't work the first time
- Creative thinking - trying something new and making new connections
- Communication skills - how to be a good listener
- Healthy relationships - how to work as a team

**ACTIVITY LENGTH:** 15–20 minutes

In this activity, girls will work as a team to build a catapult to see who can launch their “cannon” as far as possible. In the process, they’ll learn how to think like an engineer by using iterative design to refine and test their catapult creations.

**MATERIALS:** Jumbo popsicle sticks; rubber bands; “cannons” (marshmallows, pompoms, pencil top erasers, etc.); plastic spoons; painter’s tape

## DIRECTIONS

- 1 Have girls break off into small groups of four or five. Hand each group a set of supplies (everything except the painter’s tape).
- 2 Review the general instructions for building a catapult. Stack five popsicle sticks on top of each other, then secure the bundle with rubber bands at each end. Slide another popsicle stick perpendicularly through the bottom of the stack (it should resemble a plus sign). Use another rubber band to secure a spoon to the end of the popsicle stick you just stuck through the stack. Then use another rubber band to secure the spoon to the entire stack. Your end product should look like this:  


*Image source: creativeqt.net*
- 3 Give girls a few minutes to assemble their catapults. (Optional) Have each group come up with a group name. Alternatively, you can also label each group alphabetically (i.e. Group A, B, etc.).
- 4 After everyone has finished, have them line up in a row at one end of the room. Have each group launch their “cannon” one at a time. Use the painter’s tape to mark the spot where each group’s cannon lands.
- 5 After each group has launched their cannons, regroup as a whole and ask girls what other things they could try to make their cannons launch further.
- 6 Tell them that they’ll have a chance to tinker with their catapults before launching them again. They can use any of the other supplies to remake or tweak their catapult. Give them a few more minutes to alter their original design.
- 7 After girls are done, have them line up and try launching their cannons again. What happened this time? What worked? What didn’t?
- 8 If time allows, give girls another chance to alter their designs and launch their cannons.

# TENNIS BALL TRANSFER

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**ACTIVITY LENGTH:** 15 minutes

Girls try to carry a tennis ball across the room and place into a cup. Girls will learn how to work effectively as a group to achieve a common goal.

Note: For older program grade levels, you can skip the prep of tying the string/yarn to the washer. Instead, lay out the yarn, washer, tennis ball, and scissors separately for each group then simply explain that they have these materials to move the tennis ball into the cup across the room. This increases the difficulty of the activity and encourages them to flex their problem-solving muscles!

**MATERIALS:** Large metal washer (can be found at hardware stores); string or yarn; scissors; plastic cup; tennis ball

## DIRECTIONS

- 1 Cut the string/yarn into 3-foot lengths. You should have one piece of string/yarn per girl. Tie one end of the string to the washer. It should look like the photo below:

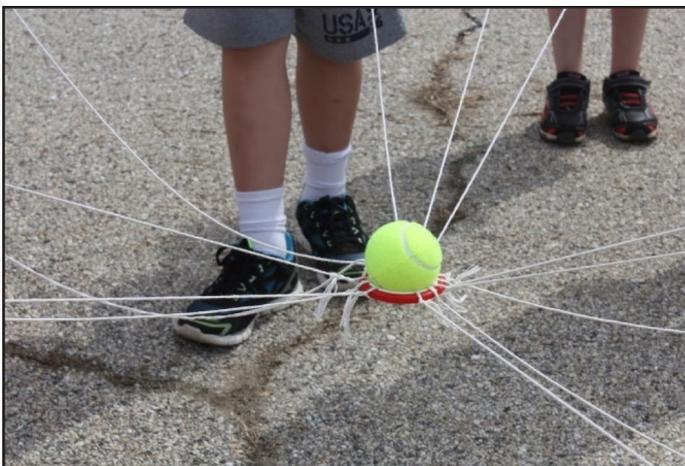


Image source: [mrslaueslittles.blogspot.com](http://mrslaueslittles.blogspot.com)

- 2 Place a tennis ball on the washer. Place the tennis ball/washer contraption at one end of the room. At the other end of the room, put a cup (standing upright) down on the floor.
- 3 Explain to girls that the goal of the game is to work as a team to get the tennis ball into the cup. They cannot touch the tennis ball, washer, or cup itself. If the tennis ball falls off the washer at any point, or if the cup tips over and the ball falls out, they have to go back to the beginning and start all over.

# WENDY THE WORM NEEDS YOUR HELP!

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**ACTIVITY LENGTH:** 15 minutes

Girls will work as a group to try to rescue a worm whose boat has capsized on the lake. Girls will learn how to anticipate challenges and how to overcome them and create a game plan before jumping into action.

**MATERIALS:** Gummy worms; gummy life saver candy; small clear plastic cup; paper clips; blue construction paper

## DIRECTIONS

- 1 Before girls arrive, prep your station (one station per 3–4 girls). Put a gummy life saver on a sheet of blue construction paper. Cover the life saver with a small, clear plastic cup. Put a gummy worm on top of the plastic cup. Place three or four paper clips around the edge of construction paper.
- 2 Explain the game to girls. Wendy took her boat out onto the lake to go fishing. She wasn't thinking safety-first though, because she forgot to put her life vest on! A strong wind knocked Wendy's boat over, and now she's trapped on top and her life vest is trapped underneath. Can you help Wendy? Girls should work together to achieve three goals:
  - Turn Wendy's boat right-side up
  - Get Wendy back in her boat
  - Put the life vest on Wendy
- 3 Explain the rules. Girls can only touch the paper clips. They cannot touch Wendy, the boat, or the life vest with their hands. Wendy is not a strong swimmer, so don't let Wendy fall into the "lake." Girls cannot injure Wendy (no piercing the worm with the paper clips).
- 4 Encourage girls to come up with a game plan first before diving into the challenge.

# CAN YOU SEE WHAT I SEE?

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**ACTIVITY LENGTH:** 15–20 minutes

Girls will work in pairs to try to recreate a picture only one partner can see. Girls will test their listening and verbal communication skills and understand just how difficult it can be to relay an idea that seems so clear to them to someone else!

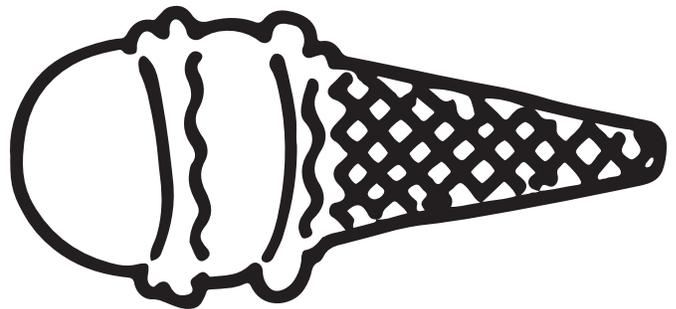
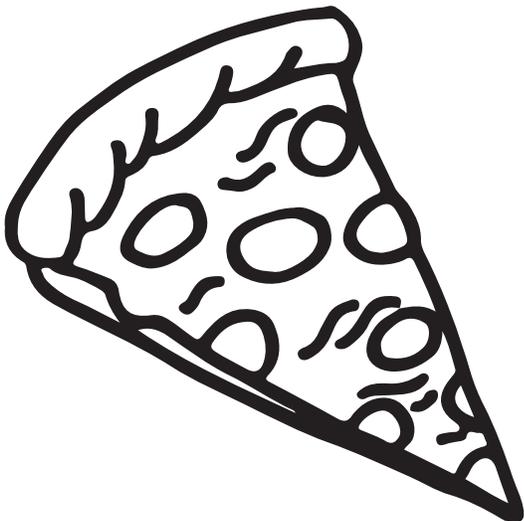
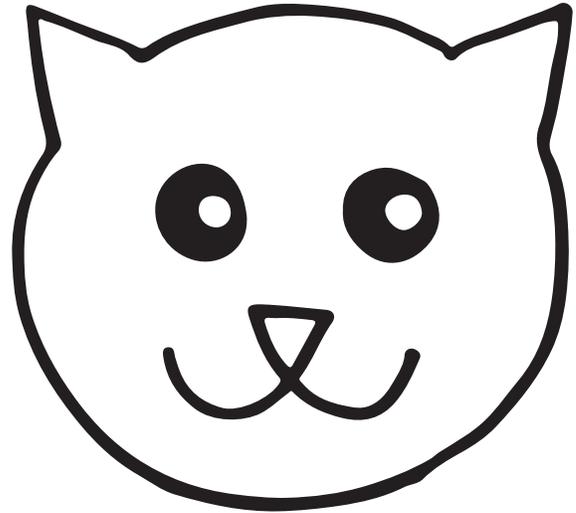
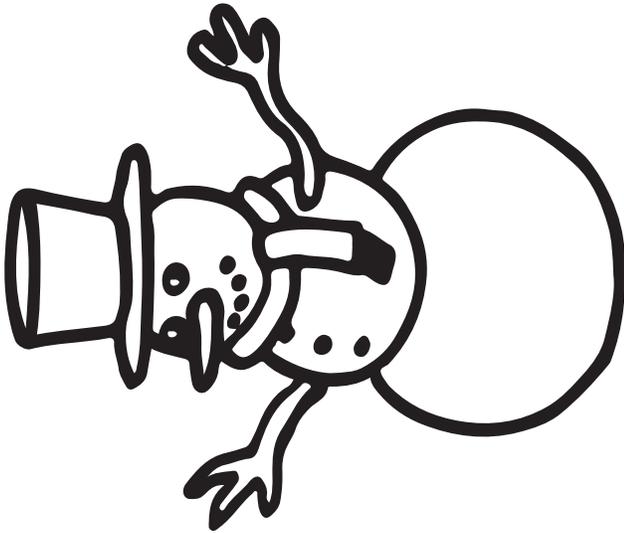
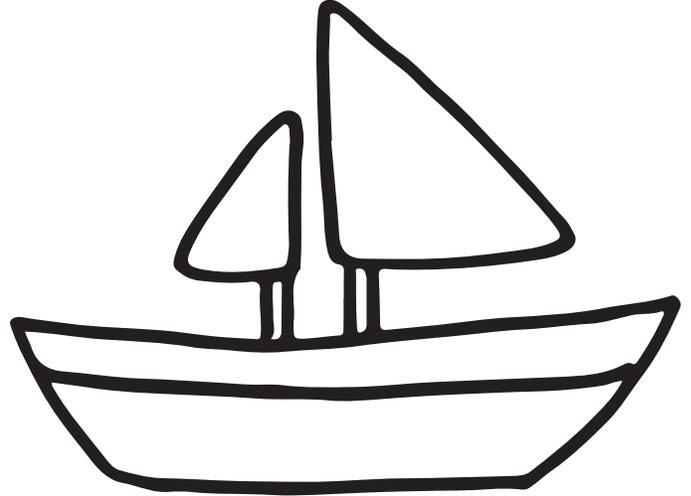
**MATERIALS:** Printout of simple drawings (examples included, or find your own); paper; pen/pencils; (optional) clipboards

## DIRECTIONS

- 1 Break girls off into pairs. Ask each pair to sit back-to-back. Hand one girl (the “direction giver”) a picture printout and hand the other (the “drawer”) a sheet of paper and pen/pencil (and clipboard, if using).
- 2 Explain the rules: The girl holding the picture printout has to give instructions on how to draw the picture without saying what the picture actually is. For example, if the picture is of a kite, they can say “This is a rhombus with two lines like a lowercase t in the middle.” The direction giver can't give context clues either (“You can fly this outside on a windy day.”) For the first round, the drawer cannot ask clarifying questions (“Should the rhombus be big or small? What do you mean by a ‘lowercase t’?”)
- 3 Give girls a few minutes to describe/draw. Then have each pair compare their images and see which team had the most accurate drawing.
- 4 For round two, switch roles and hand each pair a new picture to draw. The drawer can now ask the direction giver yes or no questions.
- 5 After girls have finished drawing, ask them how the activity went. Was it hard to explain what you saw to someone who had no idea what you were seeing? What made the process easier?
- 6 (Optional) For older girls, you can opt to use slightly more complicated picture printouts.



# CAN YOU SEE WHAT I SEE?



# THAUMATROPE

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**ACTIVITY LENGTH:** 5–10 minutes

Girls will make a thaumatrope, a toy popular in the 19th century, that creates an optical illusion of movement.

**MATERIALS:** Paper or cardstock (cardstock works best); coloring utensils; pencils; scissors; tape

## DIRECTIONS

- 1 This activity also explains the scientific idea of persistence of vision. It works best in conjunction with the Eye-illusions activity, but can be a stand-alone as well.
- 2 Use scissors to cut out 2-inch circles out of the paper/cardstock. Give each girl two circles. Have girls draw a picture on each circle. These should be two pictures that, if combined, could form one picture. For example, draw a bird on one circle and then a cage in the other, or a fish on one and a fishbowl on the other.
- 3 After girls are done drawing, tape a pencil to the back of one of the circles. Then tape the second image on top of that (covering up the pencil). Make sure both pictures are right-side up.
- 4 Instruct girls to hold the pencil between the palms of their hands and rub back and forth quickly. What happens?
- 5 Explain that when you flip your thaumatrope back and forth, your brain thinks you are seeing the two pictures at the same time. In science, this is called persistence of vision. Your eye and brain can keep a “memory” of what you see for about a thirtieth of a second. If you flip your thaumatrope quickly enough, your brain sees that it's just one single moving picture.



Image source: [eisforexplore.blogspot.com](http://eisforexplore.blogspot.com)