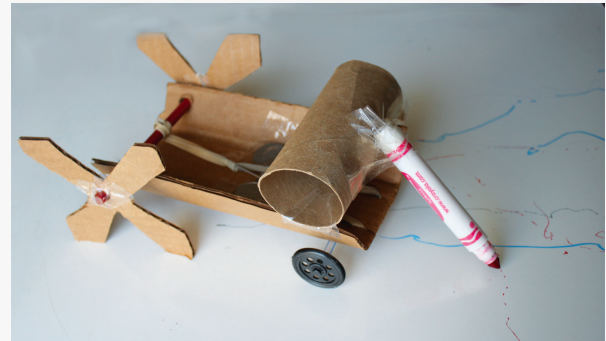


Random robot

Most robots are specifically designed to do a particular task, often one that would be tiresome or dangerous for humans. Creating art usually isn't tiresome or dangerous, but it is interesting to compare your child's own artwork to art created by a rubber band-powered contraption designed to move across paper and create abstract art! You'll need:

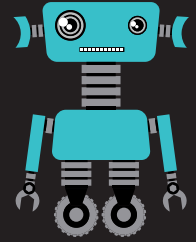
Supplies

- Corrugated cardboard
- Pencil and different colored markers
- Rubber bands
- Hard, white, mint candies with a hole in the middle (or other items that work as wheels)
- Other items to test: old compact discs, washers, sticky foam, skewers, LEGO blocks, etc.
- Blank paper and an abstract drawing created by your child
- Toilet paper tubes
- Ruler, scissors, tape
- Plastic drinking straws
- Coins (or other items to use as weights)



Directions

1. Fold a 6-inch square of cardboard into thirds so it looks like a trough. This is the body.
2. Cut two 4-inch squares of cardboard and on each, draw an "X" from corner to corner. Then measure and mark $\frac{1}{2}$ inch to the right and left of each line. Connect these marks so that your "X" is now 1 inch wide. Cut out the 4 smallest triangles created by your "X" and make a hole in the very center of each "X."
3. On the body, poke one hole close to the end of each folded side. Make sure the holes are directly across from each other and are big enough for a pencil axle to spin freely.
4. Put a pencil through the body and attach the "X" wheels on each end with tape.
5. On the other end of the body, tape the straw under the back end. Slip a candy onto each end of the straw and bend and tape the straw ends to stop the candies from coming off.
6. Loop two rubber bands together and then loop one end around the pencil axle. Cut two small slits into the back end of the body and slide the free end of the rubber bands into the notch.
7. Mount the toilet paper tube across the back end of the body, taping it to the sides.
8. Take the thin marker and attach it to the center of the toilet paper tube so that it drags behind the body like a tail. It needs to drag in order to draw. *(Continued on next page)*



Random robot

Directions *(continued from previous page)*

- Put a large sheet of paper on the floor and uncap the marker. With the device on the paper, wind the rubber band by turning the pencil axle. The more you wind, the more energy the rubber band stores and propels your bot. Let go and see what it draws! How does it compare to what your child has drawn?
- Change or add more markers, try other wheel types, use more or fewer rubber bands or experiment with other materials. If you have access to a small motor, you can also make a vibrobot that makes art: www.wired.com/geekdad/2012/05/ff_artbot



Other robots to make

5 Real Robots Made From Everyday Stuff

www.wired.com/geekdad/2012/08/robots-everyday-stuff

GoRobotics: How to Make a Robot

www.robotshop.com/blog/en/robots/gorobotics/tutorials/how-to-make-a-robot

American Society for Engineering Education: The BristleBot

<http://teachers.egfi-k12.org/activity-do-it-yourself-bristlebot>