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Dick Blick Art Materials
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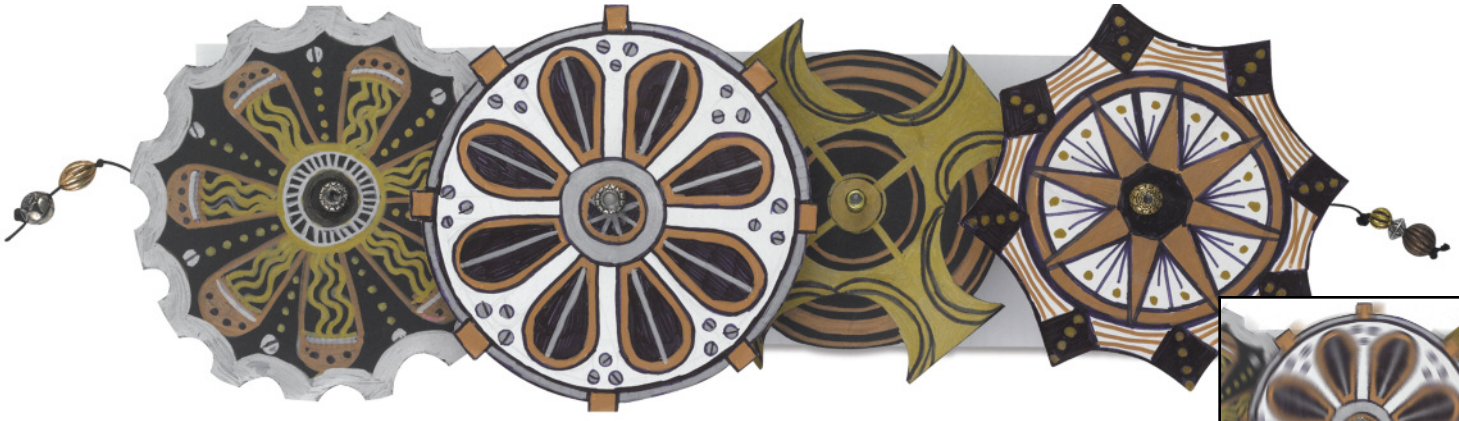
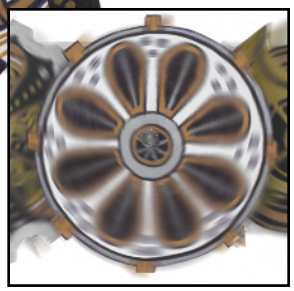


# "Art-O-Motion" Mechanical Sculpture (art + science)



*It spins!*

Art that is designed to incorporate motion is classified as Kinetic Art. Encompassing a wide variety of techniques and styles, the movement in the artwork may be caused by a viewer, by wind currents, by water flow or by mechanical means.

In 1913, Marcel Duchamp mounted a spinning bicycle wheel onto a stool to make what is considered the first kinetic sculpture. The wheel required the interaction of a viewer, but later experiments incorporated pulleys and motors to create motion, such as Duchamp's "Rotary Demisphere (Precision Optics)."

Many artists possess parallel interests in physics and engineering, and have combined physical science and creativity into amazing pieces of mechanical sculpture.

This lesson plan describes a method for creating a simple, pulley-operated sculpture that may be a springboard for inventing more complex designs at higher grade levels. Students design "gears" that are mounted to wooden spools and turned simutaneously with a connecting pull-string. Whether gently turning or rapidly spinning, the finished piece will provide delightful interaction between the art and the viewer.

**Grade Levels** 5-12

*Note: Instructions and materials are based upon a class size of 25 students. Adjust as needed.*

## Materials

Blick® Deluxe White Posterboard, 8-ply 22" x 28" (13104-1302); need 1/4 sheet per student

Artline® Drawing Pens, Set of 6 Black, varied widths (22128-1069); share 4 sets across class

Sargent Art® Liquid Metals Markers, Set of 6 (22304-1006); share five sets across class

Wooden Spools, package of 60 (60444-1060); need four spools per student: **NOTE - this pkg has spools sized appropriately for this project. Other pkgs of spools, including the 144-piece pkg will have openings of varied sizes**

Scratch-Art® Sticks, package of 100 (14907-1045); need four sticks per student

Metallic Pony Beads, package of 250, Gold (60771-9010) or Silver (60771-9330); need 8-12 beads per student

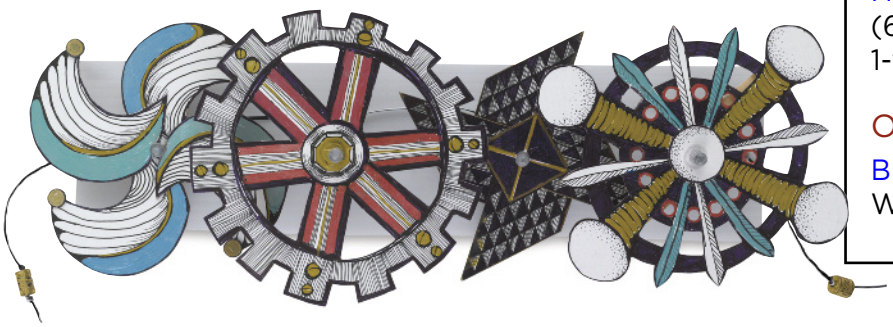
Weldbond® Adhesive, 4-oz (23819-1004); share three bottles across class

Corrugated Plastic Panels, White, 20" x 30" (13215-1043); divide one sheet among 10 students

Nylon Jewelry Cord, 25-yd spool, Black (60616-2025) or White (60616-1025); need 1-yd per student

### Optional Materials

Blick® Foamboard, 20" x 30", 3/16" thick White, package of 25 (13209-1023)



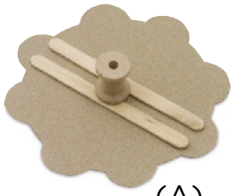
## Preparation

1. Cut the corrugated plastic panels into 4″ x 15″ pieces (10 per sheet). The sheets may be cut on a paper trimmer, with a utility knife or with a large pair of scissors. Note: Foamboard may be substituted for corrugated panels; however, it will be less durable.
2. Cut the posterboard into 11″ x 14″ pieces.

## Process

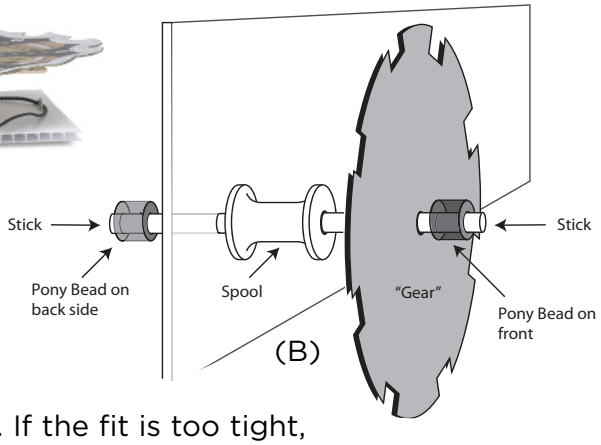
1. On the posterboard, each student will design four “gears” of varying sizes and styles. Begin by making four circles using a compass or a circular object as a template. Measure to find the exact center of each circle, and mark the center with a dot.

   With markers and drawing pens, draw details to turn the circles into “gears.” Draw spokes, cogs or bolt heads, make a gear with a mechanical appearance, or make a completely whimsical spinning whirly-gig. Use a variety of lines and patterns. Cut out the gears.
2. Using the pointed end of a scratch stick, create a hole in the middle of each gear. The hole should be large enough that the stick glides easily through it.
3. As an option for strength and stability, turn the gears over and glue craft sticks onto the back, taking care not to cover the center hole. Glue a spool directly over the hole onto the craft sticks, see (A).



(A)

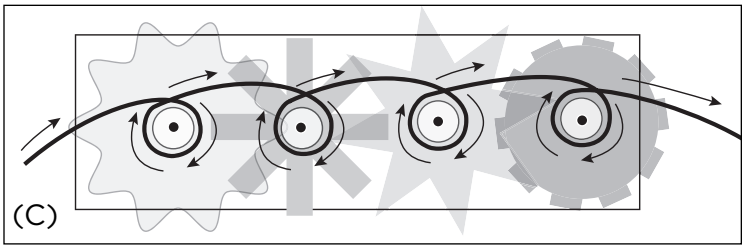
4. Place the gears on the panel to determine spacing and order, and mark their locations with dots. Drill a hole through the panel using a nail or awl. Press the scratch stick through the hole — it should be a snug fit.
5. Determine the length needed for the scratch stick to become an axle. It will need to extend 1/4″ from the back side and 1/4″ to 1/2″ from the front side of the gear. Cut the scratch stick with a sturdy pair of scissors (this will probably need to be done by an adult).
6. Thread a pony bead over one end of the stick. Because pony beads and scratch sticks vary slightly in size, this may be a very tight fit or it may fit loosely. If the fit is too tight, use sandpaper to reduce the diameter of the stick slightly to receive the bead. Place a drop of glue in the center of the bead to hold it in place. Insert the stick through the back side so that the bead fits flush against the panel.




(B)

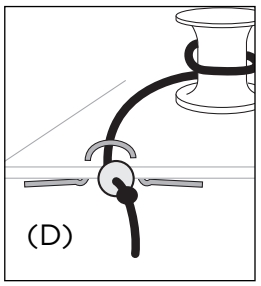
   Thread the spool over the front side of the stick and secure it in place with at least one pony bead. See (B) for assembly illustration.

   NOTE: Make sure the spool is flush with the panel, but still loose enough to rotate. If the spool is too loose, the ribbon, lacing or cord may drop behind it and lock up the motion.



(C)

7. Wrap ribbon, lacing or cord around the spools from one side to the other, forming a single loop around each, see (C). Do not use yarn, as it will create too much friction. Pull gently to make the gears turn.
8; Make any adjustments needed by adjusting the tightness of the front pony bead. As a final step, place a drop of glue in the front pony bead to secure it in place.
9. To keep the cord from unwinding, make a “stop” on both ends of the panel by drilling two small, side-by-side holes and making a loop with a small piece of wire. Bend the wire ends under the back side of the panel to secure them, see (D).



(D)

## Options

1. Use Crescent® Color Posterboard (13113-) or Peacock® Metallic Posterboard (13124-) instead of White Posterboard.
2. The gears can be made from any rigid material, such as recycled plastics and cardboard.

## National Standards for Visual Arts Education

Content Standard #2 Using knowledge of structures and functions

**K-4** Students describe how different expressive features and organizational principles cause different responses.

**5-8** Students employ organizational structures and analyze what makes them effective or not effective in the communication of ideas.

**9-12** Students create artworks that use organizational principles and functions to solve specific visual arts problems.

Content Standard #5 Reflecting upon and assessing the characteristics and merits of their work and the work of others

**K-4** Students understand there are different responses to specific artworks.

**5-8** Students analyze contemporary and historic meanings in specific artworks through cultural and aesthetic inquiry.

**9-12** Students identify intentions of those creating artworks, explore the implications of various purposes, and justify their analyses of purposes in particular works.