

Technology: Dazzling Kaleidoscope!

Ages: 7 - 13

Hello everyone. This is Bill from the Okanagan Regional Library System. Welcome to the fun and inventive world of making STEAM projects in your own home. Each week, I will share a fun and interesting project that you can make using materials commonly found in your own home.

Even though we can't be together right now, we can still learn how to make exciting projects each week!

This week's project: How to Make a Dazzling Kaleidoscope.

Dazzling Kaleidoscope

Enjoy a never-ending dazzling display of colors, shapes, and patterns. A kaleidoscope has mirrors inside and some colourful objects at one end. You can make this dazzling kaleidoscope from a cardboard tube. A plastic folder, and a handful of sparkling beads.

Turn your kaleidoscope to see how the pattern changes – it is never the same twice.

The patterns you see when looking through a kaleidoscope are formed when light passes through colourful objects at one end and bounces off reflective surfaces inside. In a store-bought kaleidoscope, the reflective surfaces are mirrors, but your home made one using a plastic sheet will produce terrific patterns as well.

Materials Needed:

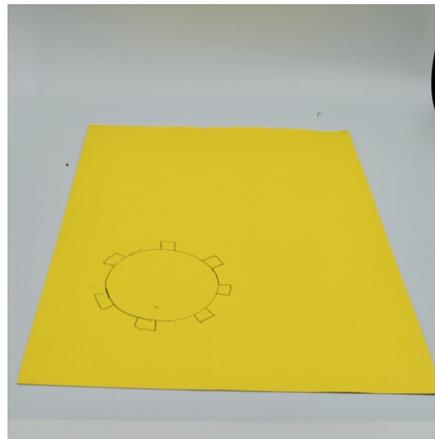
- Pencil
- Masking tape
- Cardboard tube
- Coloured beads
- Coloured paper
- Scissors
- Ruler
- Plastic Wrap
- Wax Paper



Time: 30 - 45 minutes

Steps:

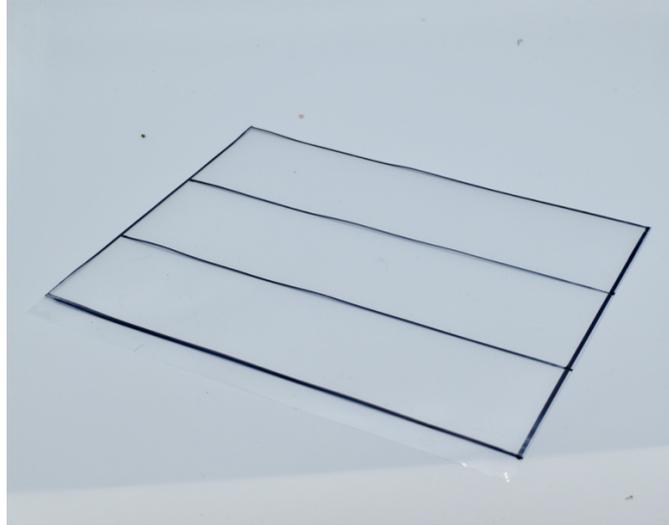
1. Stand the cardboard tube upright on one of the pieces of coloured paper, and draw around the end of the tube. Put the tube to one side, and draw six tabs around the outside edge of the drawn circle. Cut out the circle with the tabs.



2. Place the circle over one end of the tube. Stick down the tabs with tape. Make a hole in the center of the circle with the tip of the pencil. Measure the tube's length and the diameter (width) of the circle.



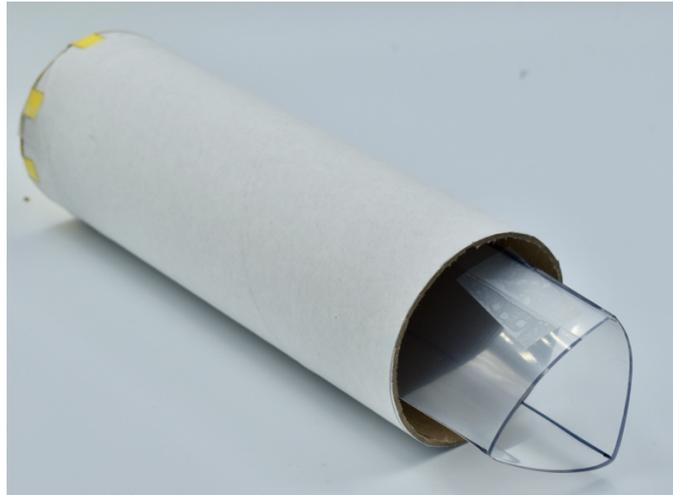
3. On the plastic folder, draw a rectangle as long as the tube and $2\frac{1}{2}$ times as wide as the tube's diameter. Draw lines to divide the rectangle into three equal parts. Then, draw a narrow tab on one side.



4. Cut out the rectangle, then score along the three inside lined with the scissors, using the edge of the ruler. Fold along the scored lines to make a triangular prism. Stick down the tab with tape.



5. Insert your prism into the cardboard tube, so that it rests against the paper circle at the end. It should fit snugly, but if not, use small pieces of tape to secure it into place.



6. Place plastic wrap loosely over the open end of the tube, and stick it in place with tape. Now put some coloured beads on top of the plastic wrap.



7. Cut a circle of wax paper, wider than the tube. Place it over the beads, then cut slits in the edge of the wax paper and tape it to the tube. Decorate the tube, if you like. Now look through the hole in the paper circle. Point the tube toward a window or light, and turn it around. Enjoy the show!



The Science behind your Dazzling Kaleidoscope

At the center of the pattern you produced by your kaleidoscope is the bead-filled triangle at the end of the cardboard tube. You can see it directly because some of the light that passes through the beads travels straight through the tube. Reflections around the central triangle are made by light that has reflected off one or more of the three shiny surfaces inside the prism. Each surface acts as a mirror, changing the direction the light travels, and so making it appear to have come from behind the mirror.

STEAM

This activity includes everything you need for a comprehensive STEAM project.

Science: Reflection of light.

Technology: Understanding how mirrors can change the direction of light.

Engineering and Art: Construction and decorating your kaleidoscope.

Math: Measuring and cutting out the parts needed for your kaleidoscope.