

CURIOSITY AT HOME

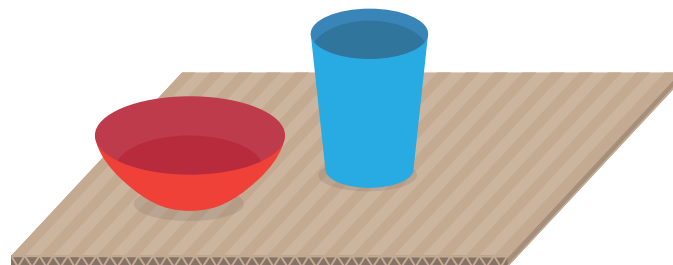
MAKE YOUR OWN SPIROGRAPH



Our laser artists use light to create patterns.
Make your own spirograph to create your own patterns.

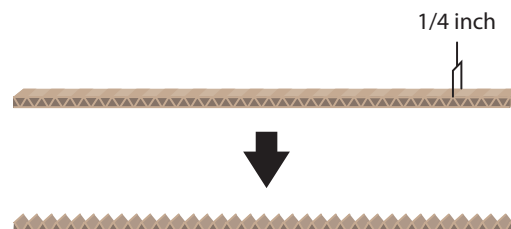
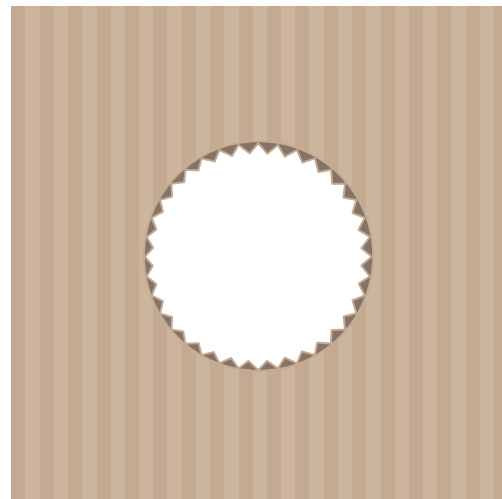
MATERIALS

- Corrugated cardboard
- 2 cups, bowls, or other round objects of different sizes
- Scissors
- Glue
- Safety Pin or sewing needle
- Colored pencils or pens
- Paper



PROCEDURE

- Trace the larger round object on a piece of cardboard.
- Carefully cut out the center of the circle using scissors leaving a clean hole in the center of the cardboard.
- Cut a small strip about $\frac{1}{4}$ inch wide of corrugated cardboard making sure to cut perpendicular to the ridges
- Peel off one side of the cardboard to expose the ridges.
- Glue the non-ridge side of the cardboard strip to the inside edge of the circular hole left in your original piece of cardboard. You may need to use more than one strip. You should now have a cardboard 'donut' with a ridged inside edge. This is the spirograph frame.
- On another piece of cardboard, trace the smaller circular object.
- Carefully cut out the circle.
- Cut a small strip about $\frac{1}{4}$ inch wide of corrugated cardboard making sure to cut perpendicular to the ridges.
- Peel off one side of the cardboard to expose the ridges.
- With the ridges facing out, glue the strip of cardboard along the edge of your cut-out circle.
- Take a pin or sewing needle and poke a hole large enough for your pen tip or pencil lead to poke through somewhere in your circle. You should now have a smaller circle with a ridged outer edge. This is your spirograph pattern maker.



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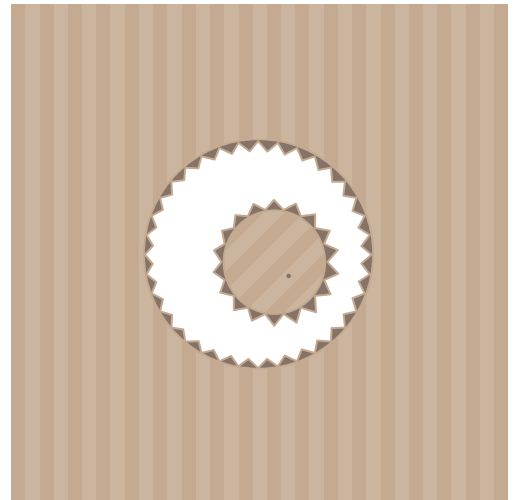
MAKE YOUR OWN SPIROGRAPH

PROCEDURE – CONTINUED

- On another piece of cardboard, trace the smaller circular object.
- Carefully cut out the circle.
- Cut a small strip about $\frac{1}{4}$ inch wide of corrugated cardboard making sure to cut perpendicular to the ridges.
- Peel off one side of the cardboard to expose the ridges.
- With the ridges facing out, glue the strip of cardboard along the edge of your cut-out circle.
- Take a pin or sewing needle and poke a hole large enough for your pen tip or pencil lead to poke through somewhere in your circle. You should now have a smaller circle with a ridged outer edge. This is your spirograph pattern maker.

Now, let's make patterns!

- Place a piece of paper underneath the spirograph frame.
- Place the spirograph pattern maker inside and next to the edge of the spirograph frame.
- Place a colored pencil or pen in the hole in the spirograph pattern maker.
- Use the pen or pencil to move the spirograph pattern maker along the inside edge of the spirograph frame. Be sure to hold down the spirograph frame firmly so it doesn't move. This will create a pattern on the paper.



EXPLORE MORE

- Make different size spirograph frames.
- Make different size spirograph pattern makers.
- Add additional holes in the pattern maker closer to the center of the circle.
- Add additional holes in the pattern maker closer to the edge of the circle.
- Make an oval shaped spirograph frame.



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Here are some Questions you can explore together.

K-2 GRADE EXPLORATION

- Is your pattern symmetrical or asymmetrical?
- Where else around the house can you find patterns?
- What objects do you see that are symmetrical?
- What objects do you see that are asymmetrical?

3-5 GRADE EXPLORATION

- Put an additional hole in the spirograph pattern maker closer to the **center** of the circle. How does your pattern change?
- Put an additional hole in the spirograph pattern maker closer to the **edge** of the circle. How does your pattern change?
- Using different sized spirograph frames and pattern makers, what patterns can you make?
- Using different shaped spirograph frames such as an oval, what patterns can you make?

6-8 GRADE EXPLORATION

- What are the three variables that change the pattern?
- Keeping two of the three variables the same, how does the pattern change when you change one variable at a time. Record your observations in the chart below.

Variable	Observations in pattern change



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