

3D Educational Resources

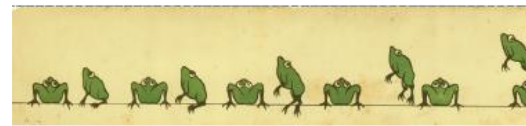
CREATE YOUR OWN ZOETROPE DRAWINGS

A zoetrope can be something that inspires a lot of creativity! In this activity, your students will draw their own images for this device.

ONTARIO CURRICULUM LINKS

For this activity, your students will plan and create their own animated sequences for a zoetrope. This activity can be connected to multiple aspects of the Ontario school curriculum, our suggested link is:

- Grade 8: The Arts (Visual Art)



Grades

2 – 8

Age Range

6 – 14 years

MATERIALS

1 – Set of 3D zoetrope parts
1 – Printout zoetrope drum template*
1 – Pen (BIC® pens work particularly well)
1 – Scissors

1 – Printout of the zoetrope blank strip template or zoetrope pre-drawn template*
1 – Tape
Pencil, crayons (something to draw)

* Note: Print the drum template onto a tabloid-sized piece of cardstock (279 mm x 432 mm or 11" x 17"). Print the other templates onto tabloid-sized pieces of paper. When printing do not "print to fit"; make sure it prints at 100%. If possible, have your printer print "edge to edge".



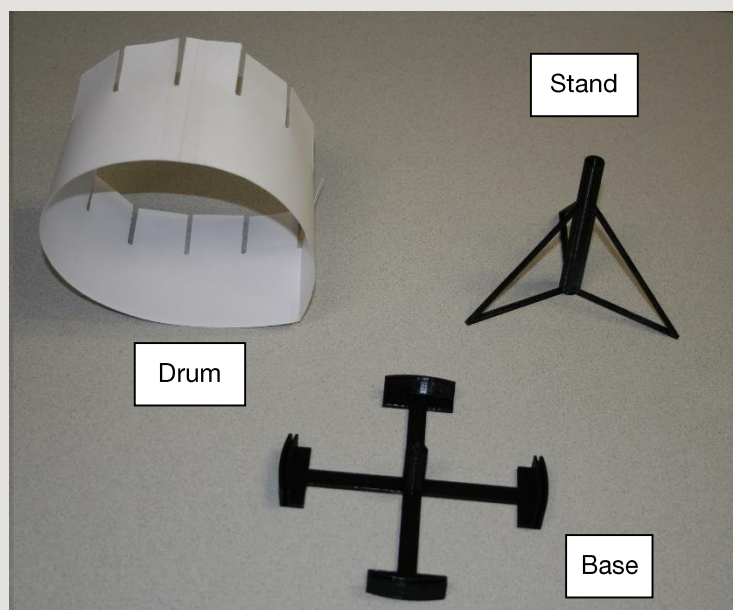
INSTRUCTIONS

The exact template that you use with your class will depend on age. For younger students, you can use the **zoetrope pre-drawn template** of faces, on which your students will only need to add mouths. We've included an example of what could be done. For older students, you can use the **zoetrope blank strip template**, on which your students can decide what images they want to draw.

1. Ask your students to plan what they want to draw on each of the panels of the zoetrope strip. A good idea is to have them sketch their ideas on a piece of rough paper before actually drawing it onto the zoetrope strip. Some general hints that you can give them:
 - i. Keep things simple.
 - ii. Have the strip begin and end with similar images. This way, the zoetrope strip will show a continuous sequence of images when spun. This is called a "looping animation".
2. Cut out the strips from either the **zoetrope pre-drawn template** or the **zoetrope blank strip template** along the dotted lines.
3. Have your students draw their planned image sequence on the strips. Leave about 1.2 cm of blank space at the bottom if you're using the **zoetrope blank strip template** to ensure that the base doesn't interfere with the animation.
4. To use these newly designed strips, your student will need to build a zoetrope. To do this, follow the instructions below. Note, these instructions are very similar to the ones found in the "Build your own zoetrope" activity.

Zoetrope Construction

For these instructions, the following naming conventions will be used:





Constructing the Drum

1. Using the dotted lines, cut out one of the drums from the **zoetrope drum template**. If your printer cannot print edge to edge, extend the top and bottom of the zoetrope drum so that the edges of the paper serve as the drum's edge (similar to what it looks like when viewed as a PDF).
2. Form a cylinder by attaching one side of the drum to the other. For best results, slightly overlap the edges by about 2 mm.

Making the Zoetrope Strip

1. Attach the ends of the zoetrope strip to form a cylinder. The greyed-out section at the end of the strip can overlap the other end. If your printer is not able to print "edge to edge" you can use the paper's margin to serve as this tab.

Building the Zoetrope

1. Place the pen in the stand. Make sure that it is pointing upward and that the top of the pen extends at least 4 cm beyond the top of the stand.



2. Insert the bottom edge of the drum into the slots at the ends of the arms of the base.





3. Place the cylindrical zoetrope strip into the zoetrope drum. For best results, ensure that each image is directly across from a slit in the drum.



4. Insert the base with the drum and strips onto the pen in the stand.
5. Your zoetrope is now ready!





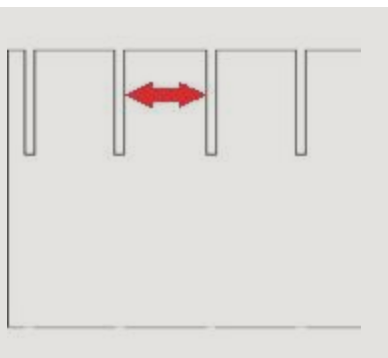
Try this! You and your students can increase or decrease the number of slits in the zoetrope drum, and, thus the number of panels in the zoetrope strip. To do this, you will need to use the **zoetrope rectangle template** to re-design the zoetrope strips and you will need to re-design the **zoetrope drum template**.

Re-designing the Zoetrope Strips

1. Determine the number of panels (or slits) you wish to have.
2. Determine the width of the panels on the zoetrope strip. To do this, use the equation below:
$$\text{Width of each panel (in cm)} = 41.9 \div (\text{number of panels})$$
3. Draw the panels onto one of the rectangles of the **zoetrope rectangle template**. You should end up with something that looks like the **zoetrope blank strip template** that you used earlier in this activity.

Re-designing the Zoetrope Drum Template

1. Draw a rectangle on a piece of tabloid-sized paper that has the same height (10.2 cm) and length (43.0 cm) as the drum used in the activity above.
2. Determine the distance from the edge of one slit to the edge of the next one (see red arrow in the image below), using the following equations:
 - i. Length taken up by slits (in cm) = (number of slits) \times 0.3
 - ii. Length taken up by tabs (in cm) = 43 - (Length taken up by slits)
 - iii. Distance between slits (in cm) = Length taken up by tabs \div (number of slits)



3. Draw the slits onto the rectangle that you drew in step 1 just above. The height of the slits should be 3.9 cm; the width of the slits should be 0.3 cm.

Build the Zoetrope

You can now build your new zoetrope following the steps outlined earlier in this activity.

Ingenium – Canada’s Museums of Science and Innovation has more than 110 000 artifacts in its collection, including many about the zoetrope and zoetrope strips. You can explore the collection at:

ingeniumcanada.org/ingenium/collection-research/collection.php.