

PEPPER'S GHOST ILLUSION

Create your own "hologram"

What you'll need:

- A flat, hard (but flexible) piece of clear plastic, such as recycled packaging or overhead projector sheets
- Scissors or a utility knife (adult supervision required)
- A washable marker
- Clear tape
- Pepper's Ghost template (attached below)
- A smartphone or tablet with access to YouTube

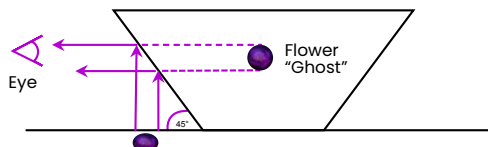
Activity setup:

1. Select a piece of flat, hard (but flexible) clear plastic from your recycling bin. It needs to be large enough to fit the template attached below. A food container or toy packaging may work.
2. Print out the template, cut it out and then trace it onto the plastic with a washable marker. No printer? No problem! Just use the template as a guide to draw the template shape onto your plastic.
3. Use your scissors or knife to carefully cut the plastic along the lines you've traced or drawn. The edges of the plastic will probably be sharp, so be sure to ask an adult for help with this step!
4. Fasten the sides of the cutout shape together with clear tape. Your assembled shape should look like an upside-down pyramid with the top cut off. This is your projection pyramid.
5. On your phone or tablet, open YouTube and visit the [Ontario Science Centre's channel](#). Select the [Create Your Own Pepper's Ghost Illusion](#) video, then place your projection pyramid on the surface of your phone or tablet. The end with the missing point should be facing down.
6. Look into your pyramid to see a magical 3D figure floating inside! This is a "Pepper's Ghost" illusion.

How does it work?

Scientist Giambattista della Porta first described the Pepper's Ghost illusion in 1584. Around 1862, the illusion was popularized by inventor and engineer Henry Dircks and chemist John Henry Pepper.

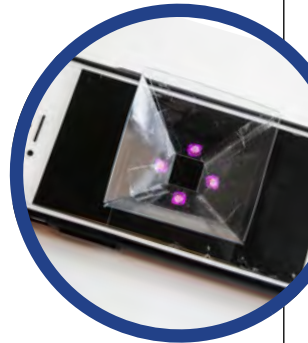
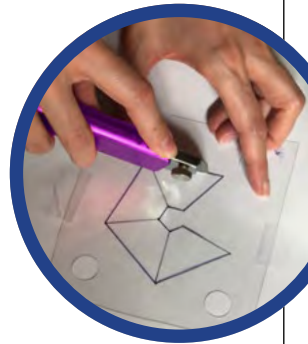
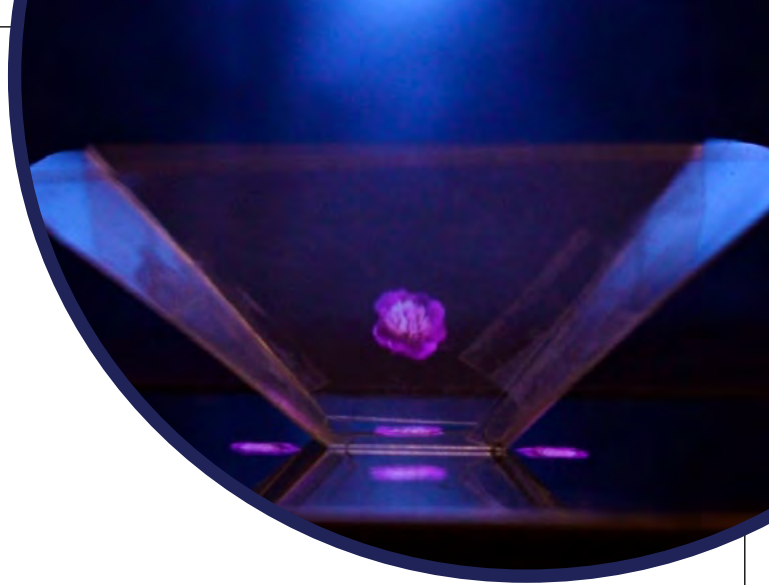
Despite its appearance, the Pepper's Ghost illusion is not a hologram. A true hologram is a three-dimensional image created by lasers without the use of lenses, while Pepper's Ghost is an optical illusion produced by reflected light. The ghostly projection appears when an image is reflected against a screen at a 45-degree angle, resulting in a virtual image that appears to have depth and float in midair.



Though you might not have known it at the time you've probably seen a Pepper's Ghost illusion before. Teleprompters make use of this illusion, and so does Disneyland's Haunted Mansion ride—remember the dancing ghosts? One of the most famous examples of the Pepper's Ghost illusion was at the 2012 Coachella Music Festival, where it was used to project a performance by the late American rapper Tupac Shakur.

Playful projections

There are lots of ways to have fun with your Pepper's Ghost illusion! You can try creating a new projection pyramid, this time with larger dimensions. Another option is to see what happens to the projected image when you change the angle of reflection. You can do this by trimming the sides of your pyramid. Or, try your experiment again using different materials—did anything change? If you're looking for a fun challenge, you can even create your own video to use with your projection pyramid!



PEPPER'S GHOST TEMPLATE

