



MAKE YOUR OWN 3D HOLOGRAM



IS IT A GHOST OR IS IT TECHNOLOGY?

Using an old magic technique and an empty pop bottle, let's create our own 3D holograms at home!



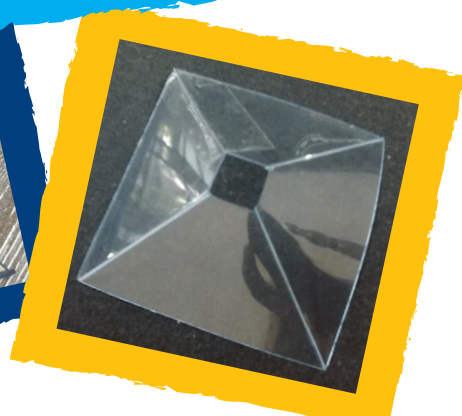
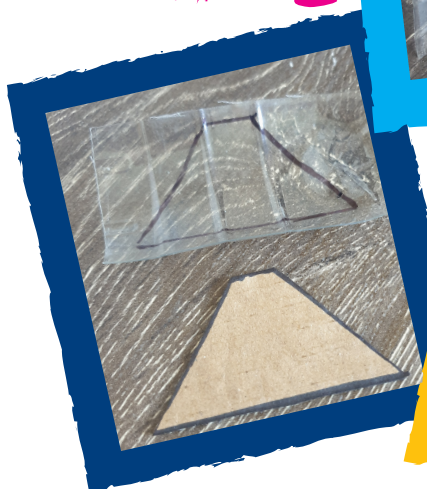
YOU WILL NEED

- Plastic bottle
- Craft knife or scissors
- Clear tape
- Pen
- Ruler
- Smartphone



WHAT TO DO:

- Using your craft knife or scissors, cut off the neck of the bottle just below the lid.
- Cut the rest of your bottle in half just below the label - throw away the bottom half of the bottle.
- Flatten the bottle length-ways so it folds in half, and then again so it folds into quarters.
- Cut along the folds so you have 4 equal pieces of plastic.
- Using the template on the next page, or a pen and a ruler, draw and cut out 4 trapezoid shapes from the bottle pieces.
- Use the clear tape to stick the 4 plastic trapezoids together in a pyramid shape.
- On your smartphone search for *3D Hologram* on YouTube.
- Place your plastic pyramid in the centre of the video, play the video and turn off the lights!





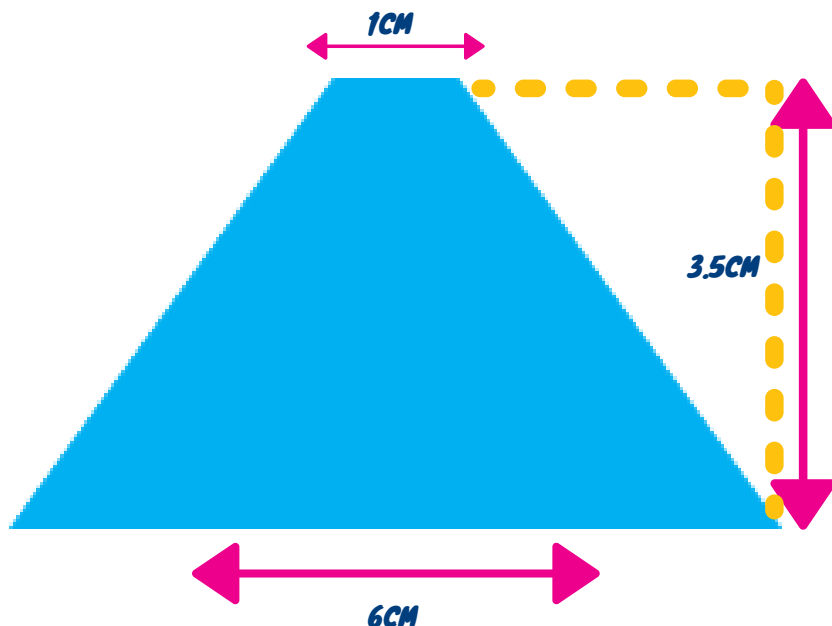
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HOW DOES IT WORK?



- Four symmetrically opposite variations of the same image are projected onto the four faces of the pyramid.
- By principle, each side projects the image falling on it to the center of the pyramid.
- These projections work in unison to form a whole figure, which creates a 3D illusion.



IN THE REAL WORLD

- Our 3D hologram works on the principle of PEPPER'S GHOST.
- This is an illusion technique originally used by magicians to create ghosts, and is now used in theatres, theme parks and museums worldwide.
- Using large flat mirrors rather than small pieces of plastic, an image can be projected for viewers.
- This technique is used in Walt Disney World's ride *The Haunted Mansion* to create the illusion of ghosts for visitors.



EXPLORE FURTHER

Can you double or triple the trapezoids' dimensions to create a larger hologram? Try using a 2 litre drinks bottle and tablet instead of a phone.

For more resources and videos search for the following:

- [BBC Bitesize Light Refraction](#)
- [What is the Peppers Ghost effect inside the Haunted Mansion?](#)
- [Musicians, holograms and Peppers Ghost](#)

COMPETITION TIME!

- Complete 4 challenges and submit an entry to our poster competition to be in with a chance of winning an EDT Experience Day at your school.
- For funded schools, you have the opportunity to receive the Industrial Cadets Challenger Award - click [here](#) for full details.
- Share a photo or video of your experiment with us on social media and use the hashtag #STEAMstars

