

Pepper's Ghost Illusion



**IMPOSSIBLE
SCIENCE**

Objective: After learning about how light reflects off of transparent materials, students will create and explain a hologram illusion.



Materials:

- Muncher Illusion Video:
- Smart Phone
- Clear Plastic Sheet at least 120 mm x 70 mm. Household items such as a clear 2L soda bottle, reusable clear plastic container or a CD case can also be utilized.
- Standard Size Paper Sheet - Graph Paper Recommended.
- Scissors
- Marker
- Clear Tape
- Ruler
- Blue-tack

Background Information

We see objects because light rays scatter from objects and enter our eyes. When we see objects in a mirror, almost all of the light rays are bounced off the mirror and back into our eyes, so we see bright images. When we bounce light off a transparent material, such as glass or plexiglass, only a portion of that light is reflected back to our eye which is why the image does not appear bright.

When the light being reflected off the surface of the glass is combined with the light coming through the glass from the original background, it creates an illusion of a transparent object.

Hook

Create the illusion and show students. Ask students to hypothesize about how the illusion might work, and share responses.

Show students [Impossible Science Video](#) to 1:51, pausing to have them write down notes or providing them with the background information above.

Ask students again to explain how the illusion works given the new information.

Perspectives in Art

Making objects look three dimensional on a two dimensional (flat) surface.

Procedure

1. Distribute materials to pairs or small groups and provide copies of the steps below.
2. Show students the remainder of the video, pausing as they follow steps.
3. Draw a 60mm by 35mm by 10mm trapezoid on graph paper.
4. Cover with clear plastic and stencil four trapezoids onto the plastic using a thin marker.
5. Cut out each trapezoid.
6. Trim off any marker marks on the edges of the plastic.
7. Using clear tape, tape the four sides together, bending the last sides together to form a pyramid.

8. [Click on this link](#) to pull up the muncher illusion video on your phone.
9. Place the pyramid in the center of the phone with the small side facing down. You may want to use a small amount of tack to hold the pyramid in place if the phone is moving at all.
10. Watch as the illusion appears from all four sides.

Assessment:

Students should create a diagram of the eye showing how light is reflected through a transparent surface such as a window, along with an explanation including observations and about how and why the illusion worked.

Students should write an explanation of why the Ames window works. They should explain that larger objects (the longer side of the window) always appear closer, making the window appear to move back

Extension:

Students should investigate how changing the lighting in the room and the size of the pyramid affects the results. Try turning off the lights, moving outdoors, or building a larger or smaller pyramid. Chart the differences and write an explanation of what might account for the changes.

Safety Note:

Adult Supervision Recommended

Watch the companion video here:



Lesson Plan by Whitney Gallagher based on the “Impossible Science” series.

Find more at impossiblescience.com

