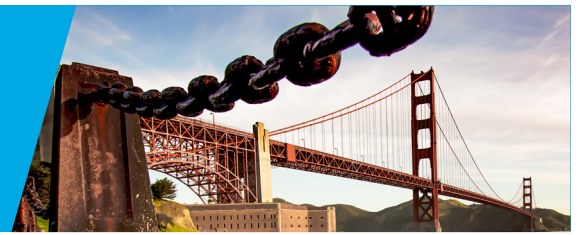


CURIOSITY AT HOME

ILLUSION OF FORCED PERSPECTIVE

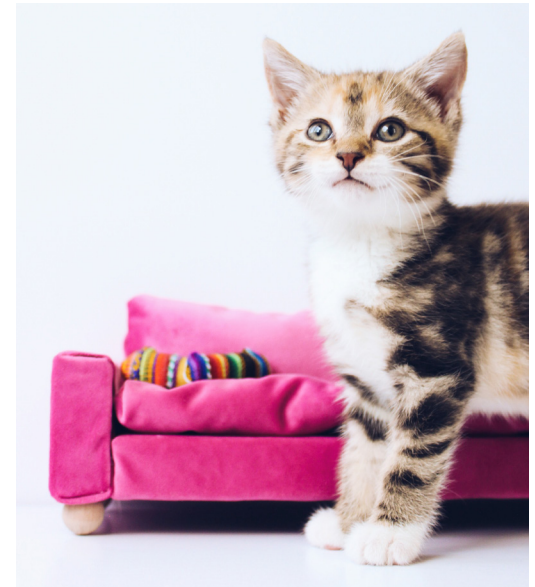


Have you ever seen pictures that look like a person is squeezing a large building between their fingers? Or holding another person in their hand? We know buildings are larger than our hands and people can't fit in our palms, so how are these pictures taken? It all has to do with a special optical illusion called forced perspective.

Forced perspective is a technique that allows us to make objects look farther away, closer, larger or smaller than they really are! By putting objects closer or farther away from the camera lens, we are able to trick our vision. This is a popular technique used in movies, photography, art, and architecture! In this activity, we are going to experiment with some forced perspective of our own to make a small object look bigger than us in a photograph!

PROCEDURE

- Have one person hold the camera and the other person set up the object and themselves for the pictures.
 - If working alone, set up the camera in a place where it will stand up on its own. Make sure to have the 10 second self-timer on!
- Start by taking 3 photographs that explore perspective.
 - **First Photo:** You and the object are next to each other, the same distance from the camera
 - **Second Photo:** You are far from the camera, about 10 feet away or more, and the object is close to the camera, about 5 inches away (make sure you can see both you and the object in the image).
 - **Third Photo:** You are close to the camera and the object is far from the camera; make sure you can see both you and the object in the image!
- Compare the three pictures and record what you observe in your science notebook.
 - In which did the object look bigger than you? Why do you think that is?
 - How far away do you and the object need to be placed to make the object look bigger than you?



MATERIALS

- Paper or science notebook
- Pencil, pen, or marker
- A camera or a device with a camera (phone, tablet etc.)
- A tripod or holder for the camera (if you are working by yourself)
- A small toy, stuffed animal or household item (less than 12 inches tall works well)
- Yourself!
- Inside or outside space to move around in

Experiment continued on next page...

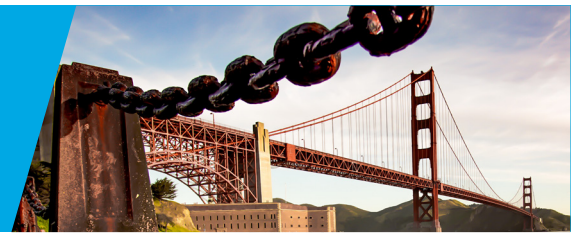


Show us how you're being curious! Share your results with us.



CURIOSITY AT HOME

ILLUSION OF FORCED PERSPECTIVE



TRY THIS

- Now that we know how close our object needs to be to the camera to look bigger than us, come up with a fun way to interact with the object, where the object is still large and you are small!
- Try taking the picture with the camera really low to the ground. How does your photograph change?
- Try taking the picture with the camera really high up. How does your photograph change? What is different?
- Using a measuring tape, measure the distance between you and the object. Try different distances and record in your science journal what each image looked like each time.
- What else could you experiment with? Get creative! Go online for great examples of forced perspective for inspiration.



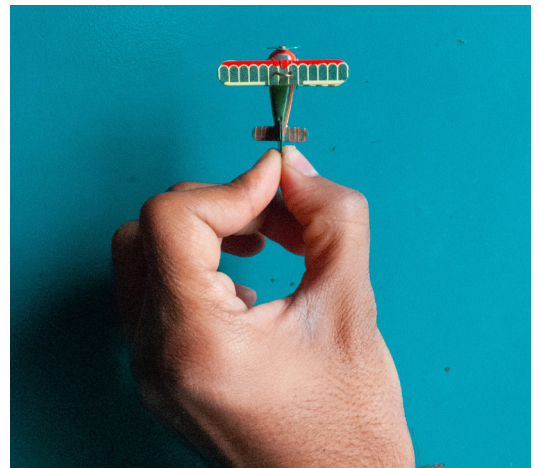
DID YOU KNOW

By placing smaller objects closer to the camera and larger objects farther away, we are intentionally changing the perspective, or the way we view, the photograph. Since the smaller objects are closer to the camera, they appear bigger. The farther the distance away from the camera, the smaller the object will look. By controlling the distance of objects to the camera, and changing the view point, or location of the camera, we can fool our eyes and brains into thinking objects are bigger or smaller than they really are.

A long time ago before we could use computers to make special effects in movies, filmmakers had to use real props. Imagine a movie scene with a giant dinosaur chasing a human. Instead of building a life-size dinosaur, people used a small model of a dinosaur that was placed close to the camera so it looked giant!

Movies don't just use this technique for dinosaurs, they also use it for humans! For example, in many scenes in the Harry Potter series, to make Hagrid the half-giant look very big, they put smaller versions of normal objects around Hagrid such as a tiny water glass, a tiny table, and tiny food. Meanwhile they just put normal sized objects around Harry and his friends. This really gives the illusion that Hagrid is much larger than everyone else.

Forced perspective is also used in architecture. For example, Sleeping Beauty's castle in Disneyland and Cinderella's castle in Disney World uses forced perspective to make the castle look much taller than it really is. The top of the building is smaller, which makes it seem farther away, creating the illusion of a tall building!

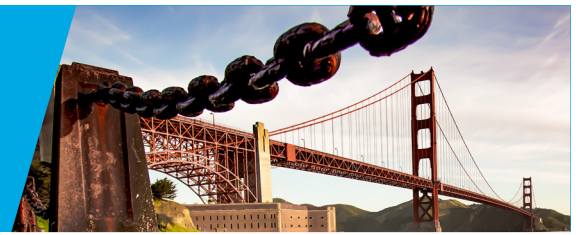


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CURIOSITY AT HOME

ILLUSION OF FORCED PERSPECTIVE



K–2 GRADE EXPLORATION

Here are some questions you can explore together.

- Look straight ahead and pick an object in your house that is far from you. Cover one eye and keep looking at the object. Can you cover up that object with your hand?
- Now move so you are close to the object. You might find that the object is much bigger than your hand! Why does it look so small from far away?
- If you want to take a picture that makes you look larger than an adult at home, should you stand close to the camera or far away? Where should the adult stand? Try it and test your guess!



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CURIOSITY AT HOME

ILLUSION OF FORCED PERSPECTIVE



3–5 GRADE EXPLORATION

Explore the following questions and write your observations in your science notebook.

- Can you take a photograph that makes it look like you're a **giant**? Write down in your science journal a prediction of how you could do this.
- Can you take a photograph that makes it look like you've **shrunk**? Write down in your science journal a prediction of how you could do this.
- If you wanted to make a photograph look like you are **upside down**, how could you do that? Write down all the ways you brainstormed!
- Pick one of the above predictions you made and test it by taking the photo as you described it. Did it work? If it didn't as you planned, how do you need to change your plan to create the desired effect?



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CURIOSITY AT HOME

ILLUSION OF FORCED PERSPECTIVE



6–8 GRADE EXPLORATION

Explore the following questions and write your observations in your science notebook.

- When we draw or paint, how do we use forced perspective on a 2-Dimensional surface to give it the appearance of depth? Can you draw a cube on a flat piece of paper?
- Why do you think our brains perceive this size difference the way that they do?
- Can you think of any famous photos, movies, or paintings that use forced perspective in their work?
- Why do you think that this technique is useful in the film and photography industry?
- Imagine you are directing a movie. Write or draw your movie idea in your science journal or on a piece of paper. Be detailed and add things like costumes and background designs into your design! Pick one of the scenes from your movie, and try to create it in a photo or short video using objects you have at home. Did forced perspective help create the illusion you wanted? What other special effects are needed?



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