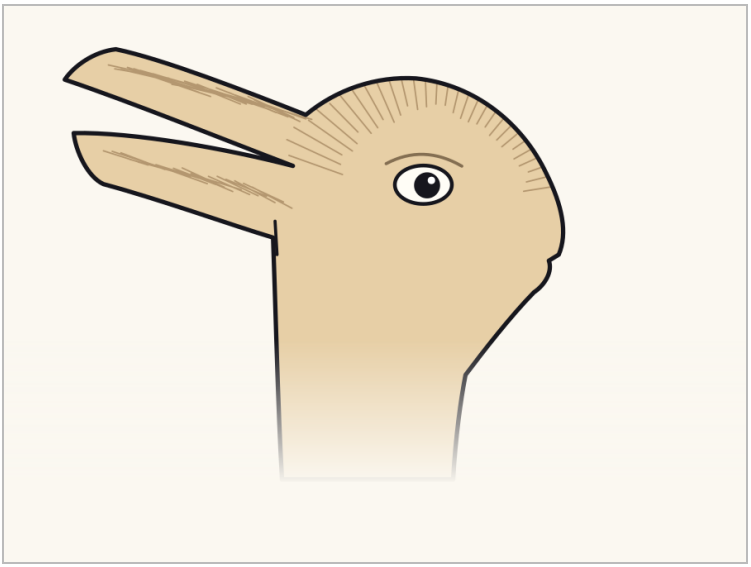
FREE PRINTABLE

Name: _____

Optical Illusions Worksheet Pack

A free worksheet pack for curious eyes, ages about 6 to 12.



Inside this pack

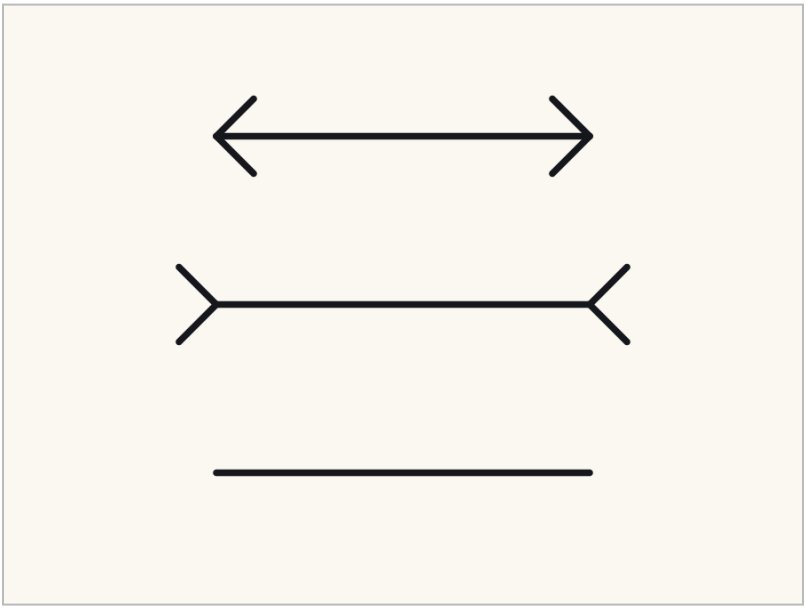
2. Which line is longer? (guess, then measure)
3. Which circle is bigger?
4. Are the lines straight?
5. What do you see first? (class survey)
6. Draw an impossible triangle
7. Make a thaumatrope (spinning picture toy)
8. Afterimage magic
9. Answers and notes for grown-ups

How to use: print in color if you can. Each page takes 5 to 15 minutes. You need a pencil, a ruler, scissors, string or two pencils, and a timer. Every illusion in this pack has a full explanation at Opticalillusions.com.

Name: _____

Which line is longer?

Your eyes can be tricked by tiny arrow shapes. Look at the three lines below. Do not measure yet!



	My guess (cm)	Measured (cm)
Top line		
Middle line		
Bottom line		

1. Which line LOOKS longest? _____

2. Now measure each line with a ruler, from end to end (not the fins).

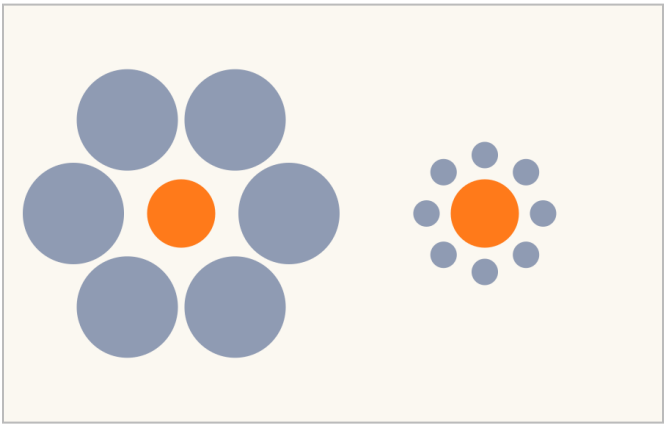
3. What did you find out? _____

Brain fact: fins pointing out make a line look longer. Fins pointing in make it look shorter.

Name: _____

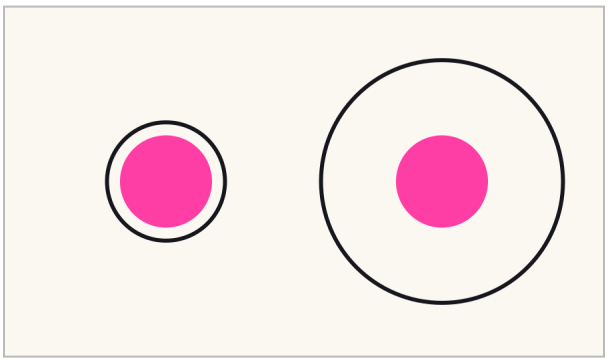
Which circle is bigger?

Look at the orange circles and the pink circles. Which one in each pair looks bigger? Circle your answer, then measure across each circle with a ruler.



Orange circles: LEFT looks bigger / RIGHT looks bigger / SAME

Left measures (cm)	Right measures (cm)



Pink circles: LEFT looks bigger / RIGHT looks bigger / SAME

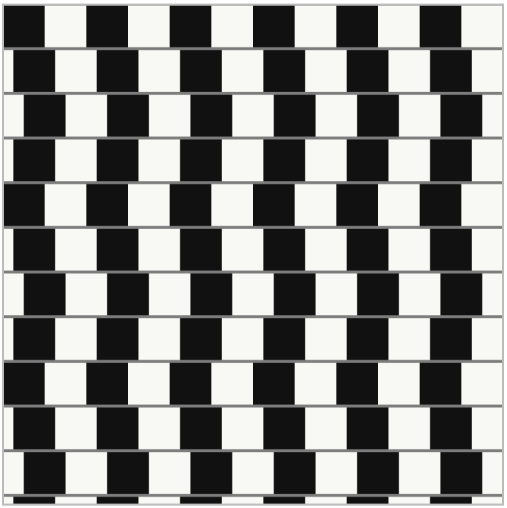
Left measures (cm)	Right measures (cm)

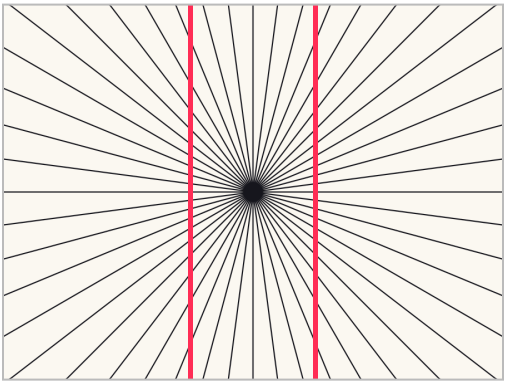
Brain fact: we judge size by comparing things with their neighbors.

Name: _____

Are the lines straight?

Do the gray lines between the rows of tiles tilt? Are the red lines curved? Guess first. Then lay the edge of a ruler or a piece of paper along each line to check.





Café wall: the gray lines look ...

[ ] straight [ ] tilted After checking they are: _____

Red lines: they look ...

[ ] straight [ ] curved After checking they are: _____

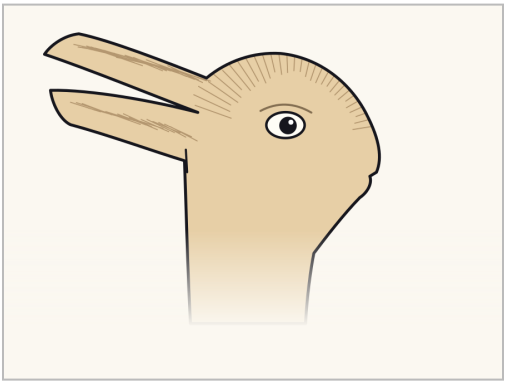
Challenge: draw your own café wall. Draw rows of black and white squares, shifting each row half a square to the side, with thin gray lines between the rows.

Draw here

Name: _____

What do you see first?

Look at each picture for just two seconds. Write what you saw FIRST. Then try to find the other picture hiding in it.



I saw first: [ ] a duck [ ] a rabbit



I saw first: [ ] a vase [ ] two faces

Class survey: count the hands!

Duck first	
Rabbit first	
Vase first	
Faces first	

Which answer was most popular? _____

Brain fact: your brain can only pick one meaning at a time, so the picture flips.

Name: _____

Draw an impossible triangle

This triangle could never be built! Each corner looks fine, but the whole shape is impossible. Learn to draw one on the dot grid below.

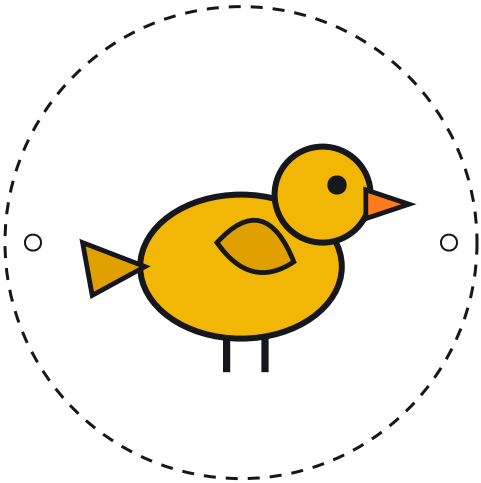


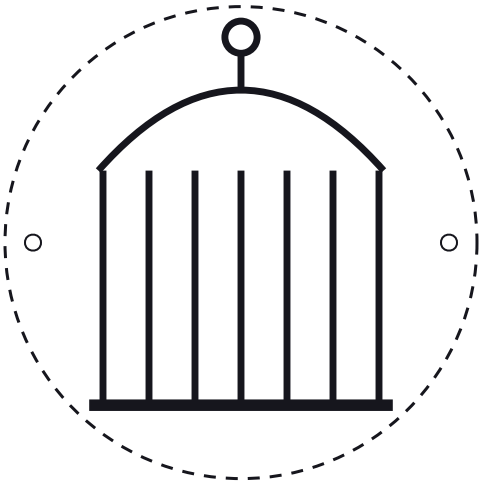
1. Draw a big triangle, pointing up, using the dots.
2. Draw a smaller triangle inside it, about one dot in.
3. Draw an even smaller triangle inside that one.
4. At each corner, extend one inner line out to the outer triangle, turning the same way (all clockwise).
5. Rub out the extra lines so each bar bends round a corner.
6. Color each side a different color.

Name: _____

Make a thaumatrope

A thaumatrope is a toy from the 1820s. Spin it fast and the bird appears inside the cage! Your eyes keep each picture for a moment, so the two blend into one.





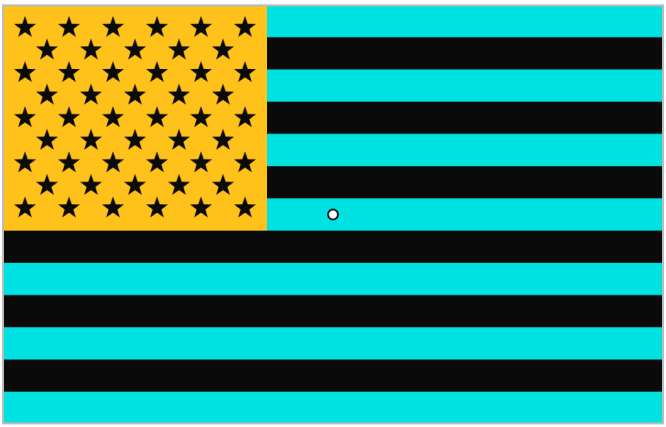
1. Color the bird. Cut out both circles along the dashed lines.
2. Glue them back to back with the cage UPSIDE DOWN behind the bird.
3. Glue the circles onto thin card to make them stiff.
4. Punch the two small holes and tie a loop of string through each.
5. Twist the strings, then pull them tight so the disc spins. Watch the bird go into the cage!

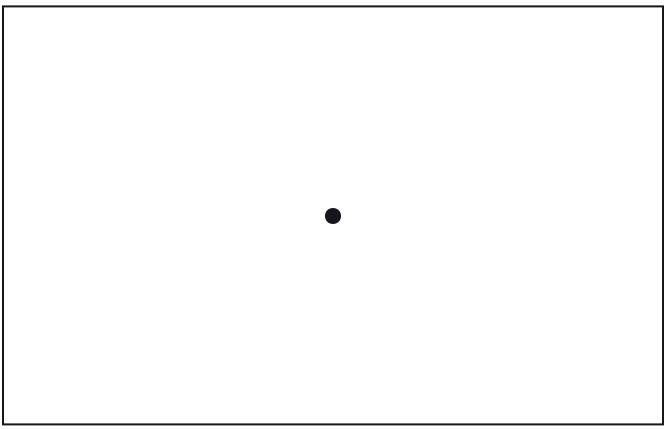
No string? Tape the disc to the top of a pencil and roll it fast between your hands.

Name: _____

Afterimage magic

Stare at the white dot in the middle of this strange flag for 30 seconds without moving your eyes. Then quickly look at the dot in the empty box below. What colors do you see?





The colors I saw: _____

Brain fact: tired color cells make you see the opposite colors for a few seconds.

Tip: if staring makes you feel uncomfortable, stop and blink. That is fine!

Name: _____

Answers and notes for grown-ups

Page 2 · Which line is longer?

All three lines are exactly the same length. Fins pointing outward make a line look longer; arrowheads make it look shorter (the Müller-Lyer illusion, 1889).

Page 3 · Which circle is bigger?

Both orange circles are the same size, and both pink circles are the same size. The surrounding circles and rings change how big they look (the Ebbinghaus and Delboeuf illusions).

Page 4 · Are the lines straight?

Yes. The café-wall mortar lines are perfectly straight and parallel, and the red lines in the ray picture are perfectly straight (the café wall and Hering illusions).

Page 5 · What do you see first?

There is no right answer. Each picture has two meanings and the brain can only hold one at a time. In one study, more children saw a rabbit first at Easter and a duck first in October.

Page 6 · Impossible triangle

Each corner is a possible right angle, but the three cannot join in real space. It is called the Penrose triangle after Lionel and Roger Penrose (1958); Oscar Reutersvärd drew one in 1934.

Page 7 · Thaumatrope

Spinning shows both pictures in quick turns. Your visual system blends images that change faster than about ten times a second, so you see one combined picture. The toy became popular in London in 1825.

Page 8 · Afterimage

Staring tires the cells that respond to each color. When you look at white, the rested cells win and you see the opposite colors: red, white and blue instead of cyan, black and yellow.

Safety note for grown-ups

Some illusions on Opticalillusions.com involve motion, flicker or long stares. Children who are sensitive to motion or have photosensitive epilepsy should skip the moving illusions and take breaks. Everything in this pack is still and printed.