

“In the Human Body”

EXPLORE IT

Module 16, Adventure 2

Prompt:

Illusions are things that are different than what it seems to be. They can happen when your eyes, ears, nose, mouth, or touch (and brain!) are tricked.

Create illusions for your sense of vision and touch. Try them out and have someone at home try them as well!

Materials:

- Thaumatrope:
 - 1 cup, small bowl, or something to help you trace a circle (about 2-3 inches / 5-8 centimeters size)
 - 1 Piece of paper
 - 1 Straw, dowel, pencil, or marker
 - 1 Pencil
 - Markers, crayons, or colored pencils
 - Scissors
 - Tape
- Spinning Tops:
 - 1 cup, small bowl, or something to help you draw a circle (about 3-6 inches / 8-15 centimeters size)
 - 1 Piece of paper
 - 1 Piece of cardboard
 - 1 Pencil
 - 1 Penny
 - Markers
 - Scissors
 - Tape
 - *Optional: Utility knife - ask a grown-up to help you with this part!*

- Tactile Illusions:
 - 3 pennies (or 3 of the same type of coins)
- *Optional: Explorer Notebook*

Instructions:

1. Illusions are things that are different than what it seems to be. They happen when your eyes, ears, nose, mouth, or touch (and brain!) are tricked.
2. Complete the following mini-activities to test and trick your senses!
3. After you finish the illusions, check out the last page for some more information about each one.
4. **Optical illusions:**
 - a. Optical illusions are when you see something different from what is really there. Different colors, lights, and patterns create images that can trick your eyes and brain.
 - b. **Illusion 1: Thaumatrope**
 - i. Thaumatrope are when you have two different images that look like one image when they are spinning.
 - ii. To make one, use a circular item to draw two circles on your paper.



- iii. Think of two designs you want to mix together. Like fish in the ocean, a bird in a tree, a person in a car, a circle and two eyes with a big smile.
- iv. On one circle, draw on part of the design.
- v. On the other circle, draw the other part of the design.



- vi. Tape the straw to the back of one of the circles, with the bottom of the design pointing down.
- vii. Roll up 2-3 pieces of tape and put them on the straw and the back of the first circle. Tape the second circle to the straw and the first one, with the design facing out.

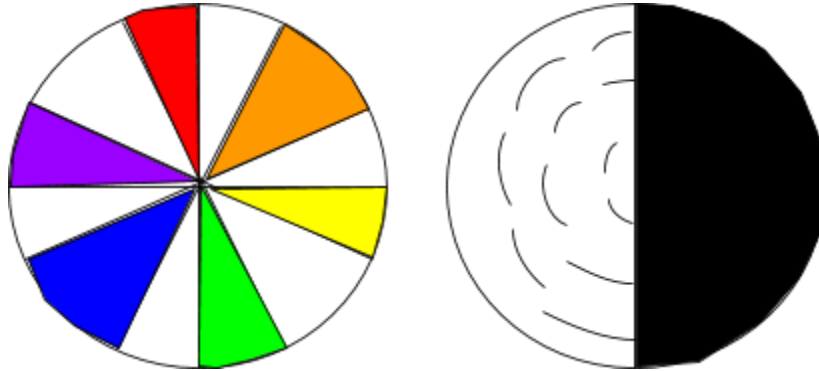


- viii. Hold the straw between your hands and rub them back and forth to make the circles spin back and forth.
- ix. Change the speed for how fast you are rubbing your hands together. What do you see?

c. Illusion 2: Spinning Top

- i. To make a top where the design looks like it is moving when you spin it, use a circular item to draw a circle on your paper. Then draw the same size circle on a piece of cardboard.
- ii. Cut out the circle on the paper.
- iii. Ask a grown-up to help you cut the circle on the piece of cardboard.

- iv. Draw a design on the paper. Use markers to color it in (markers will show better while your top is spinning.) Here are some ideas to get you started!



- v. Tape the paper to the cardboard circle.
vi. Have a grown-up help you cut into the middle of the circle so a penny can fit in. It should be tight so it holds.



- vii. Holding the top of the penny, spin the top and see what happens to your design depending on how fast it spins!

5. Tactile illusions:

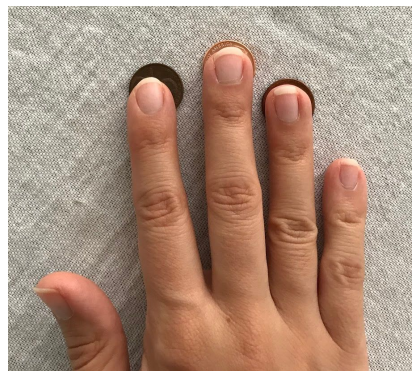
- a. Tactile illusions are when what you feel is different from reality.

b. Illusion 1: Confusing Coins

- i. Put two pennies (any two coins that are the same), in the freezer for at least 10 minutes.
- ii. Take out the coins and put them on a table with another coin (the same type of coin as the others) between the two.



- iii. Put three of your fingers - your pointer, middle, and ring fingers - on the three coins at the same time.



- iv. How do the coins feel the second you put your fingers down? Do they all feel the same or different? How about after a few seconds?
- v. Try this with someone at home without telling them what they should be feeling and see what they notice!

c. Illusion 2: Nosy Noses

- i. Cross your index and middle fingers. Close your eyes and rub your crossed fingers up and down your nose for at least 20 seconds.



- ii. What do you notice?

d. Illusion 3: Standing Challenge

- i. Sit on a chair or couch and stand up. How was it to stand up? Was it easy or difficult?
- ii. Ask someone at home to help you with this challenge.
- iii. Sit back down on the chair or on a couch. Sit all the way back, with your back firmly against the back of the chair and your feet firmly on the ground.
- iv. Cross your arms across your chest so your right hand is touching your left shoulder and your left hand is touching your right shoulder.
- v. Have someone put their finger on your forehead (not pressing in, just placing it there).
- vi. Try to stand up without moving your hands. What do you notice?

For explorers using an Explorer Notebook:

1. Write down each illusion you try and what you notice, see, or feel.

Check out the last page for a page design idea. You can use this or set up your page however you want!

Resources:

1. Take a look at more [optical illusions](#) on the National Institute of Environmental Health Sciences website.

Extensions:

The following are optional steps you can take if you want to extend this adventure:

1. Auditory illusions are when you hear something different from the real sound. Check out some auditory illusions in [this video](#) from BrainCraft.
2. Set up the tactile illusions to try with someone at home.
3. Go to the “In the Human Body” topic on Flipgrid and share what you create or notice!

Explorer Notebook

You can use this to help you set up your Explorer Notebook!

Illusions
Module 16, Adventure 2

Illusion: _____

What I noticed:

Illusion: _____

What I noticed:

Illusion: _____

What I noticed:

Illusion: _____

What I noticed:

Diving Deeper Into the Illusions

Optical Illusions:

- **Thaumatrope**
 - It should look like the two pictures are one when you rub the straw between your hands.
 - Your eyes can see a certain number of images at one time and your brain can, at times, process the image after you stop seeing it. If a new image comes up while your brain is still processing the first one, it will combine the two images so they look like they are one image. This process happens very quickly, and without you even noticing it happening!
- **Spinning Tops**
 - The image should look different when you spin the top, it often looks like it is moving and changing as it spins.

Tactile Illusions:

- **Illusion 1: Confusing Coins**
 - Many people feel three cold coins, even though the middle coin is not cold.
 - Your brain thinks the middle coin is the same temperature as the cold coins because your brain knows that two of the coins are an extreme low temperature, which is odd and your brain thinks it might be a threat. So it assumes all the coins are cold to protect you.
- **Illusion 2: Nosy Noses**
 - Many people will feel like they are touching two noses.
- **Illusion 3: Standing Challenge**
 - Even without someone putting pressure on your forehead, it is often very difficult to stand up.
 - When you stand up, you often use a lot of your body (your head, your arms, your legs) to help get your body up. When there is a finger on your forehead and your arms are crossed, your brain thinks your body can't use all the parts it needs to move in the way it usually does to stand up, so it is harder to do so.