Body Tricks: Hole In Hand

What you need

- Paper tube (use an empty paper towel roll or two empty toilet paper tubes stuck together)

What to do

1. With your right hand, hold a paper tube to your right eye, and keep both eyes open.
2. Put your left hand up against the left side of the tube – with fingers up and the palm facing you – about two-thirds of the way down the tube.

What do you see?

What is happening?

Humans and many other animals have binocular vision, which means that each eye sees a slightly different version of the world, and the brain merges these two images. In this activity, your right eye sees the hole at the end of the tube, and your left eye sees your hand. When these images are sent to your brain, it puts the two images together, forming a hand with a hole in it.

Body Tricks: Proprioception

What you need

- Yourself

What to do

1. Raise both hands above your head; keeping your hands and fingers still.
2. With your eyes closed, quickly touch your nose with your right index finger and then try to touch your left thumb.
3. Quickly repeat the process trying to touch each fingertip - always touch your nose in between touching each finger.
4. Switch hands and try again.

How successful were you in finding each fingertip?

Did you improve with time?

Was there a difference between your right and left?

What is happening?

This activity is challenging because without wiggling your fingers, or looking up at your hand, your brain is unsure of the location of these parts of your body when you try to touch them. Proprioreceptors are receptors that respond to stretch or pressure. These receptors are located throughout our body including in muscles, joints and the inner ear and send signals to our brain when we move. This paired with visual cues is how we have a sense of our body's position.

Body Tricks: Shrinking Arms

What you need

- Yourself
- A wall

What to do

1. Extend one arm out at shoulder level so that the very tips of your fingers are just touching the wall.
2. While remaining in the same spot, bring your arms back towards your body and rub them vigorously.
3. Extend your arm out again.

Do your fingers still touch the wall?

What is happening?

When you rub your arms, you are contracting the muscles. These contractions make your muscles shorter for a brief period of time, so your arm does not extend as far the second time you try to touch the wall.

Body Tricks: Floating Finger

What you need

- Yourself

What to do

1. Hold your index fingers about 1-inch apart, facing each other at arms-length from your body.
2. Look between your fingers and focus your attention beyond them into the distance.

Do you see the floating finger?

What happens if you slide your fingers closer together or farther apart?

What is happening?

Our eyes have muscles that change the shape of the lens to adjust to seeing objects close-up or far away. In this activity, your eyes are focusing in the distance past your fingers, as well as on your fingers themselves, which are closer. These different visual signals are sent to the brain, resulting in this illusion.

Body Tricks: Floating Arm

What you need

- Yourself
- A wall

What to do

1. Stand near a wall, lift your arm out to the side, and push it hard against the wall while counting to 30.
2. Step away from the wall and let your arm relax at your side.

What happens to your arm?

What is happening?

When you move, your brain sends electrical signals to your muscles, which starts the release of calcium from storage centers into the muscle cells, causing the muscles to contract. Once the muscles move and relax, the calcium returns to these storage centers.

When you pushed against the wall, calcium was released into your muscles, but since you could not move your arm, the calcium remained in your muscles. So, when you moved away from the wall, your muscles moved and relaxed without a conscious effort as the calcium returned to storage.

Body Tricks: Concrete Foot

What you need

- Yourself
- A wall

What to do

1. Stand so that one foot and the side of your head are against a wall.
2. Try to raise the foot that is farthest from the wall out to the side.

Were you able to lift your foot?

What is happening?

Gravity is a force of attraction between objects that we generally think of as the force that makes stuff fall down and keeps us on the Earth. Our center of gravity is the area of our body where our weight is centered – generally around our midsection. As long as the center of gravity stays over our feet, we can stand and walk. In this experiment you've moved your center of gravity towards the wall, so you cannot lift your foot without shifting your center of gravity over your feet.

Body Tricks: Depth Perception

What you need

- Yourself

What to do

1. Hold your index fingers out in front of you. They should be pointing towards each other, be held arms-length away from you and about shoulder width apart.
2. Close one eye, and then try to touch your fingertips together.
3. Now try with both eyes open.

Was it easier with one or two eyes open?

What is happening?

Having two eyes that see slightly different views of the world is one factor in depth perception or judging how far away objects are. It is easier to touch your fingertips together with both eyes open because each eye sees the image from a slightly different angle, and this combined view helps you to distinguish distance.

This is an example of how binocular vision, in which both eyes are used together, contributes to depth perception. Individuals who have use of only one eye can experience depth perception using other visual cues.

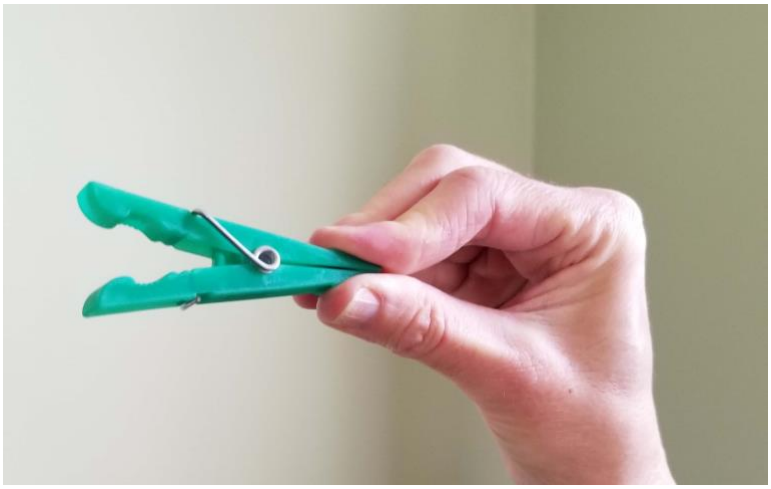
Body Tricks: Clothespin Workout

What you need

- Yourself
- Clothespin (or a small rubber ball, binder clip – something that requires effort to squeeze)

What to do

1. Hold a clothespin (or other object) between the thumb and index finger on your dominant hand (the one you use the most).
2. Open and shut (or squeeze) it as fast as you can while counting to 30.



How does your hand feel?

Did it become more difficult to do?

What is happening?

Your muscles require energy in the form of a chemical called adenosine triphosphate or ATP to move. Muscles normally produce this chemical by using oxygen, and this is called aerobic respiration. When the muscle cells do not receive enough oxygen, they begin to work anaerobically or without oxygen, producing a byproduct called lactic acid. When muscles do a lot of work quickly, lactic acid builds up which greatly reduces their ability to contract. Eventually exhaustion results and contraction stops due to the lack of oxygen and increase in lactic acid. This is called *muscle fatigue*.