

# Where Do You Stand?: An Activity on Proprioception

**Estimated Time: 30-45 minutes**

## SUMMARY

Proprioception, often described as our “sixth sense”, describes our body’s sense of spatial awareness. Proprioceptors are specialized nerve cells within our musculoskeletal system (including joints, muscles, and tendons) that allow us to understand our body’s position in space. For instance, upon closing your eyes, you can still touch your nose with the tip of your finger because your body is able to sense the location of your nose and finger without seeing the body parts.

## WHAT YOU’LL LEARN

- Proprioception plays an important role in our coordination, posture, speech, and ability to focus.
- Proprioception is a “trainable” sense that can be improved with practice.
- Healthcare providers, including pediatricians, occupational therapists, and physical therapists, can diagnose proprioceptive disorders through a variety of tests and treat the disorders by stimulating proprioceptors.

Materials Used	Resources Used
<ul style="list-style-type: none"> <li>• Stopwatch</li> <li>• Volunteer</li> <li>• Writing utensil &amp; notepad (optional)</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="http://www.meridianathome.com/MAH/upload/Section-7-Nervous.pdf">http://www.meridianathome.com/MAH/upload/Section-7-Nervous.pdf</a></li> <li>• <a href="https://www.youtube.com/watch?v=O0jEaV88Ok8">https://www.youtube.com/watch?v=O0jEaV88Ok8</a></li> </ul>

## WHAT TO DO

There are a variety of tests used by healthcare providers to examine proprioception. Many of these activities do not require any materials and can easily be done at home with a friend or parent to learn about our “sixth sense”. Review the list of proprioceptive tests described below. Try as many or as few as you like! In each of these tests, the individual refers to the person being tested, and the tester refers to the person who is instructing the individual on how to perform the test. The roles can be reversed so everyone has a chance to practice with their proprioception!

### Finger to Nose Test:

1. The individual closes their eyes.
2. The tester touches one of the individual’s fingers.
3. The tester then instructs the individual to touch the tip of their nose with the same finger that was just touched, while their eyes remain closed.
4. Repeat with another finger on the opposite hand.
5. The individual will find that they can touch their nose even when they can’t see it!

### **Thumb Finding Test:**

1. The individual closes their eyes.
2. The tester takes one of the individual's arms and moves it from a resting position (i.e. out to the left, above the individual's head, palm up or down).
3. The tester then instructs the individual to find and touch the thumb of the hand that was moved using their opposite thumb. For instance, if the tester moved the individual's left arm so that it reaches to the side with the palm facing down, the individual should use their right thumb to identify the location of their left thumb with their eyes closed.
4. Repeat with the opposite arm and thumb.

### **Distal (of the limbs) Proprioception Test:**

1. The tester moves various joints of one side, such as the left thumb, ankle, or shoulder, while the individual watches the movement.
2. The individual then closes their eyes and is instructed to repeat the motion with the same and opposite joints. For instance, if the tester chose to make a clockwise circle with the right ankle, the individual should make a clockwise circle with both the right and left ankles while their eyes are closed.
3. Repeat with the opposite side, for as many rounds (different joints) as you would like. The individual will find that they can repeat the motion (even mirrored) without looking.

### **The Romberg Test (requires stopwatch):**

1. Have the individual stand with their feet together on a flat surface. Ensure the safety of the individual by guarding them during the test and testing them in a location where it would be safe to fall.
2. The individual will close their eyes while their feet are together. The goal is to remain still for 30 seconds without losing balance. It is likely that both individuals will find this test to be harder than they expected! Even for individuals with a strong body awareness, it is difficult to remain balanced without visual input, especially while the feet are so close together and the bodyweight is not well distributed. The Romberg test can be practiced over and over to strengthen the lower body and improve body awareness. The difficulty of the test can be increased by standing on one leg, standing on an uneven surface (i.e. a pillow or grass), and by keeping the arms across the chest/at our sides.

### **TIPS**

- While these proprioceptive tests are frequently used in medical diagnoses, please note that these tests are not meant to replace medical counsel. Many of the tests can be completed at home safely and can improve our proprioceptive skills. But if you are concerned for your student's safety during these tests, stop the activity immediately and refer to the student's pediatrician. Besides, the STEM Center puts out plenty of other weekly activities through the STEM @ Home program to be enjoyed by the students safely!
- Have a student interested in the medical field? This activity can be a great opportunity for the student to "play" doctor or physical therapist; allow the student to make observations and record notes like a patient chart.