Name: _____ Date: _____

Knowing Where Your Hand Is in the Dark

Circle group

Close your eyes and lift one arm. Bend your elbow. You still know where your hand is. You cannot see it, but you know. This sense is called proprioception. Most people never notice it.

Your body has small sensors inside it. Muscles have sensors that feel stretch. Tendons are the cords that join muscle to bone. They tell the brain how hard a muscle is pulling. Joints tell the brain how far they are bent. The signals go along nerves to the spinal cord and the brain. The brain uses them to make a map of where your body is.

This map helps you every day. A typist finds the keys without looking. You can walk down a dark hall and stay on your feet. A basketball player can look at the court while dribbling. The hand is tracked by feel, so the eyes do not have to watch it.

The sense can be upset. Your foot falls asleep when you sit on it. The nerves cannot send their reports, so the foot feels odd and clumsy. Some people lose this sense because of a rare nerve problem. They can still move, but they must watch their limbs and think hard about each step. That is very tiring. Most of us never have to think about it.

Questions

1. What is proprioception?

_____

_____

2. What do the tendons tell the brain?

_____

_____

3. Where do the signals go?

_____

_____

4. Why can a basketball player look at the court while dribbling?

_____

_____

5. Why does a foot that fell asleep feel clumsy?

_____

_____

6. What must people who lose this sense do to move?

_____

_____

Words to know

proprioception: the sense of where your body parts are
tendons: tough cords that join muscles to bones
joints: places where two bones meet and can bend
sensors: tiny parts that detect changes and send signals

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Knowing Where Your Hand Is in the Dark

Triangle group

Close your eyes and raise one arm, then bend your elbow. You can describe exactly where your hand is, even though you cannot see it. Scientists call this sense proprioception, and it works so smoothly that most people never notice it until something disturbs it.

Proprioception depends on sensors buried inside the body. Muscles contain tiny stretch detectors, and the tendons, which are the cords that join muscle to bone, report how hard a muscle is pulling. The joints add their own signals about how far they are bent. All of this information travels along nerves to the spinal cord and brain, where it is combined into a constantly updated map of the body's position.

This internal map explains many everyday skills. A typist can find the right keys without looking, and a person can walk down a dark hallway without losing balance. A basketball player can dribble while watching the court instead of the ball, because the hand's motion is tracked by feel rather than by sight. Practice helps the brain use these signals more skillfully, which is one reason that trained dancers and gymnasts look so smooth.

The sense is easy to disturb. When a foot falls asleep after you sit on it, the nerves cannot send their usual reports, so the foot feels strange and clumsy until the signals return. People who lose this sense because of a rare nerve condition can still move, but they must watch their limbs closely and concentrate on every step, which is tiring. Proprioception works quietly in the background, and that frees your attention for everything else you want to do.

Questions

1. What is proprioception?

_____

_____

2. What do the tendons report to the brain?

_____

_____

3. Where does the position information travel?

_____

_____

4. How can a basketball player dribble while watching the court?

_____

_____

5. Why does a foot that fell asleep feel clumsy?

_____

_____

6. What must people who lose this sense do in order to move?

_____

_____

Words to know

proprioception: the sense of where your body parts are
tendons: tough cords that join muscles to bones
joints: places where two bones meet and can bend
sensors: tiny parts that detect changes and send signals
disturbs: upsets or interrupts something that was working

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Knowing Where Your Hand Is in the Dark

Square group

If you close your eyes, raise one arm, and bend your elbow, you can still describe precisely where your hand is, even though it is completely hidden from view. Scientists call this ability proprioception, and it operates so seamlessly that most people remain unaware of it until something interferes with it.

Proprioception relies on sensors distributed throughout the body. Muscles contain microscopic stretch detectors, and the tendons, the strong cords that anchor muscle to bone, report how forcefully a muscle is pulling. The joints contribute their own signals about the angle at which they are bent. All of this information travels along nerves to the spinal cord and the brain, where it is merged into a continuously updated map of the body's position.

That internal map accounts for a great many ordinary skills. A typist can locate the correct keys without glancing down, and a person can cross a dark hallway without losing balance. A basketball player can dribble while scanning the court rather than the ball, because the motion of the hand is monitored by feel instead of by sight. Practice helps the brain interpret these signals with greater skill, which is one reason trained dancers and gymnasts appear so fluid.

Nevertheless, the sense is surprisingly easy to disrupt. When a foot falls asleep after you have sat on it, the nerves cannot deliver their usual reports, so the foot feels strange and clumsy until the signals return. People who lose this sense through a rare nerve condition can still move, but they must keep a close watch on their limbs and concentrate on every step, which is exhausting. Proprioception works quietly in the background, and that frees your attention for everything else you hope to accomplish.

Questions

1. What is proprioception, and why do most people not notice it?

_____

_____

2. What do the tendons report to the brain?

_____

_____

3. Where does all of the position information end up?

_____

_____

4. How is a basketball player able to dribble while scanning the court?

_____

_____

5. Why does a foot that has fallen asleep feel strange and clumsy?

_____

_____

6. What must people who lose this sense do in order to move?

_____

_____

Words to know

proprioception: the sense of where your body parts are
tendons: tough cords that join muscles to bones
joints: places where two bones meet and can bend
sensors: tiny parts that detect changes and send signals

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

For the teacher: Knowing Where Your Hand Is in the Dark

Each student sheet carries a shape, not a level. The same topic and facts, written three ways.

Circle: Knowing Where Your Hand Is in the Dark

Easier · 217 words · Flesch-Kincaid grade 2.2

1. The sense of where your body parts are, even when you cannot see them.
2. How hard a muscle is pulling.
3. Along nerves to the spinal cord and the brain.
4. The hand is tracked by feel, so the eyes do not have to watch it.
5. The nerves cannot send their usual reports to the brain.
6. Watch their limbs and think hard about each step.

Triangle: Knowing Where Your Hand Is in the Dark

This passage · 270 words · Flesch-Kincaid grade 8.6

1. The sense of where your body parts are and how they are moving, even without looking.
2. How hard a muscle is pulling.
3. Along nerves to the spinal cord and brain.
4. The hand's motion is tracked by feel, so the eyes are free to watch the court.
5. The nerves cannot send their usual position reports until the signals return.
6. They must watch their limbs closely and concentrate on every step.

Square: Knowing Where Your Hand Is in the Dark

Harder · 288 words · Flesch-Kincaid grade 10.9

1. It is the sense of where your body parts are, and it works so smoothly that people only notice it when it is disturbed.
2. How forcefully a muscle is pulling.
3. It travels along nerves to the spinal cord and brain and becomes a map of the body.
4. The hand's motion is monitored by feel rather than sight, so the eyes are free.
5. The nerves cannot deliver their usual position reports until the signals return.
6. They must keep a close watch on their limbs and concentrate on every step.