

Experiment Overview

How do you know when your hand touches something? How do you know if something brushes against your shoulder? As you learned in *A Nervous Journey*, neurons of the nervous system sense things in the environment and send those signals to the brain for analysis. Each neuron can only send one signal at a time. If two points touch the same neuron, it can still only send one signal to the brain. This means, your brain would only sense one thing touching you, even when there are two.

Knowing this, do you think you need the same number of nerves in every part of your body? Think about your fingertip, arm and back. In which of these places might your nerves be closer together? Make your predictions and see for yourself in the experiment below!

Hypothesis

Explain which part of your body (fingertip, arm or shoulder) will be most sensitive and explain why:

If _____
then _____
because _____

Materials

- 1 ruler with centimeters
- 1 Paperclip
- Paper and a pencil

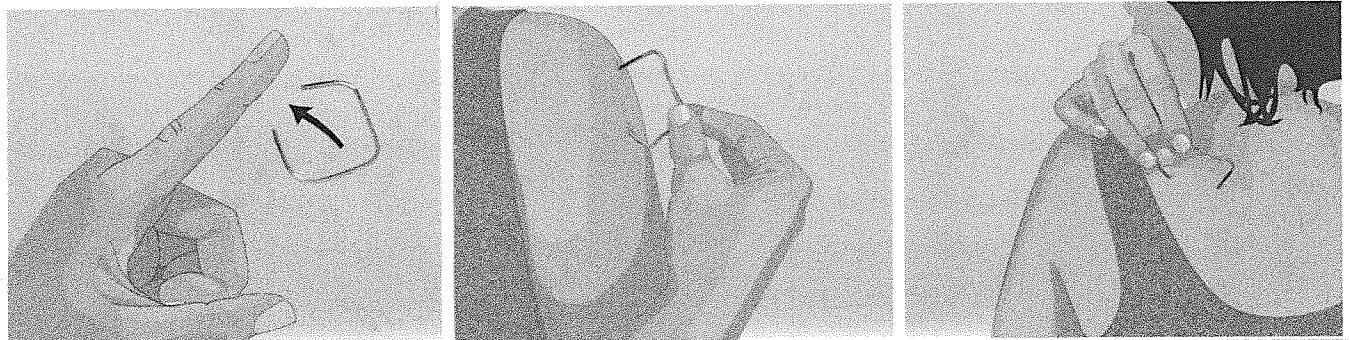
Procedures

Step 1: Open your paper clip. Spread the ends and use the ruler to measure the distance between them. Adjust them until they are exactly 4cm apart.

Step 2: Touch both ends of the paper clip to your finger tip. A gentle touch is all that is required. If you feel both ends, write a "2" in the first square in the chart as shown in the example above. If you only feel one paper clip end, that means both ends of the paper clip are touching the same neuron. If this happens, write a "1" in the appropriate square in your table.

Step 3: Repeat this on your upper arm and back, and record your results in your table. (Hint: If you have a hard time reaching your back, ask a partner for help.)

Step 4: Using your ruler, push the paper clip ends 1/2 centimeter closer together. Repeat steps 2 and 3, bringing the paper clip ends closer each time until they are touching.



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Use the table below to record your results.

Distance between paperclip ends	Fingertip	Upper arm	Back
4 cm			
3.5 cm			
3 cm			
2.5 cm			
2 cm			
1.5cm			
1 cm			
.5 cm			
ends touching			

Analysis and Conclusions:

1. What was the independent variable in this experiment? How do you know?

2. What was the dependent variable in this experiment? How do you know?

3. What patterns did you see in your data?

4. Which part of the body was least sensitive?

5. Which part of the body is most sensitive? Why do you think that is?

6. Was your hypothesis supported? Why or why not? Use your data to explain your answer.

7. What further questions does this experiment raise, and what could you do to investigate the answers to those questions?
