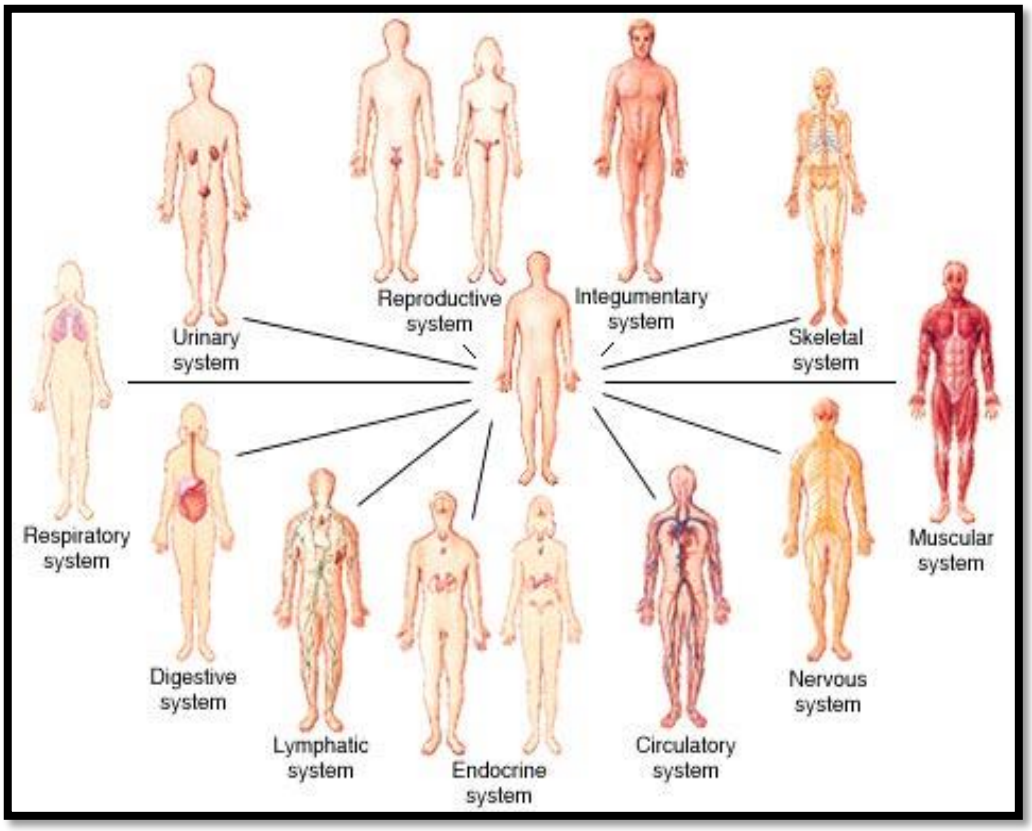
Body Systems: Nervous System Lab

Name: _____

Big Idea (5): Multicellular organisms have organ systems that enable them to survive and interact within their environment
Big Idea (6): Multicellular organisms rely on internal systems to survive, reproduce, and interact with their environment
Content (5): Basic structures and functions of body systems: Digestive, musculo-skeletal, respiratory, circulatory
Content (5): First Peoples concepts of interconnectedness in the environment
Content (6): The basic structures and functions of body systems: Excretory, reproductive, hormonal, nervous
Curricular Competency: Questioning and Predicting: Make observations in familiar or unfamiliar contexts
Curricular Competency: Questioning and Predicting: Make predictions about the findings of their inquiry
Curricular Competency: Processing and analyzing data and information: Construct and use a variety of methods, including tables, graphs, and digital technologies, as appropriate, to represent patterns or relationships in data
Curricular Competency: Planning and Conducting: Observe, measure, and record data, using appropriate tools, including digital technologies
Curricular Competency: Evaluating: Identify possible sources of error
Curricular Competency: Evaluating: Suggest improvements to their investigation methods
Curricular Competency: Processing and Analyzing Data and Information: Compare data with predictions and develop explanations for results
Curricular Competency: Applying and Innovating: Transfer and apply learning to new situations
Curricular Competency: Processing and analyzing data and information: Identify First Peoples perspectives and knowledge as sources of information
First Peoples Principles of Learning: Learning is experiential. Learning is reflective



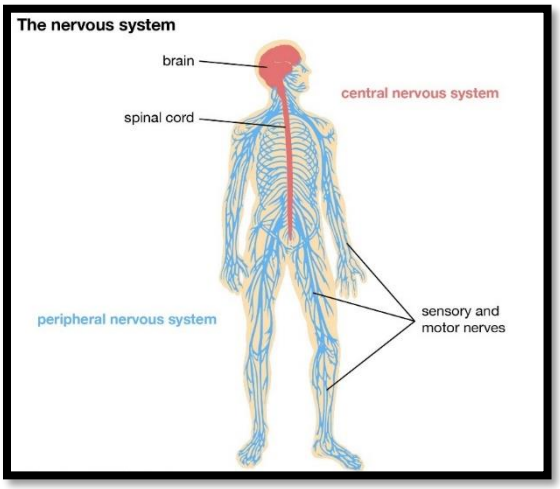
Purpose

To observe how our nervous system functions. To measure observable behaviours.

Materials

- 1 ruler / meter stick / stick
- 1 flash

Background Information

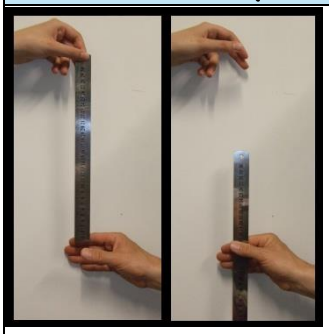


The nervous system includes **the brain, spinal cord, and a complex network of nerves**. This system sends messages back and forth between the brain and the body. The brain is what controls all the body's functions. The spinal cord runs from the brain down through the back. It contains threadlike nerves that branch out to every organ and body part. **This network of nerves relays messages back and forth from the brain to different parts of the body.**

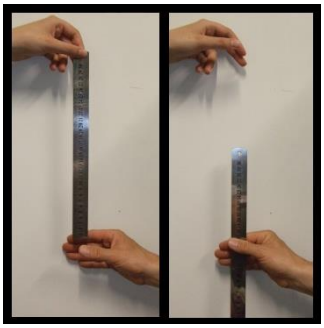
The nervous system uses tiny cells called neurons to send messages back and forth from the brain, through the spinal cord, to the nerves throughout the body. Billions of neurons work together to create a communication network. Different neurons have different jobs. For example, sensory neurons send information from the eyes, ears, nose, tongue, and skin to the brain. Motor neurons carry messages away from the brain to the rest of the body to allow muscles to move. These connections make up the way we think, learn, move, and feel. They control how our bodies work – regulating breathing, digestion, and the beating of our hearts.

Predictions: Curricular Competency: Questioning and Predicting: Make predictions about the findings of their inquiry

You will be asked to make predictions about the lab.

What you will experiment with	What your predictions are
 You will be asked to catch a falling ruler as fast as you can, without knowing when it will be dropped. This is testing your reaction time.	How long will it take you to catch the ruler? Will you catch it after the ruler has dropped 1 cm? 2 cm? 10 cm? What is your prediction, and why is that?
 You will be asked to see if you can see someone's pupils dilate.	How long will it take your pupils to dilate, after being exposed to light? A second? More than a second? Less than a second? Why is that?
 You will be asked to poke your partner with one or two points, to see if your partner will feel that it is one or two points.	Will you be able to sense if it is one or two points? Will your body have a hard time telling the difference between one and two points? Why is that?

Procedure: Planning and Conducting: Observe, measure, and record data, using appropriate tools, including digital technologies



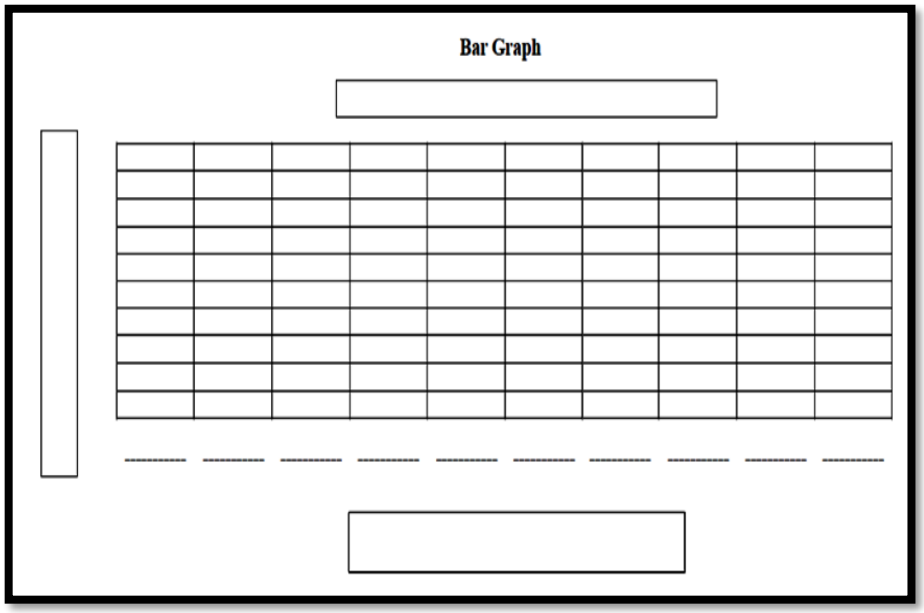
Reflex Physiology

1. Stand facing a friend. Hold a meter stick above their open hand. Do not let them know when you are going to drop the ruler. You will drop the ruler with the number '0' pointed towards the ground.
2. Drop the ruler into their open hand. They will grab the ruler. Measure the point at which their hand grabbed on to the ruler. The goal is for your friend to grab on to the ruler faster than you can. Record the point at which (the #) where they grabbed on to the ruler. Repeat this 10 times per person, and record your data below:

Distance before ruler was caught	Person: _____	Person: _____
#1		
#2		
#3		
#4		
#5		
#6		
#7		
#8		
#9		
#10		

Curricular Competency: Processing and analyzing data and information: Construct and use a variety of methods, including tables, graphs, and digital technologies, as appropriate, to represent patterns or relationships in data

Graph your results (you can either graph your own, in a single-bar graph, or choose to graph your results in addition to your partner's results in a double bar graph)



Procedure: Planning and Conducting: Observe, measure, and record data, using appropriate tools, including digital technologies

Autonomic Reflexes

1. Work with a friend. Observe what their pupils (the black part of the eye) look like.
2. Have your friend sit near a light source. Have your friend close their eyes for 2 minutes, with their eyes covered by their hand, or a piece of paper.
3. After 2 minutes with their eyes closed, have your friends suddenly open their eyes as wide as possible. Record what you see. Do this 3 times for each person.

	Drawing of eyes before darkness	Drawing of eyes after darkness
#1		
#2		
#3		

What did you notice about the pupil dilation (widening)? How long did it take? Record your observations.

Curricular Competency: Processing and Analyzing Data and Information: Compare data with predictions and develop explanations for results

Compare your predictions with the results. Were they similar? Dissimilar? Discuss.

The somatosensory system

The somatosensory system is the largest sensing system in your body. This system produces sensory feedback whenever you come in physical contact with your environment. This sensory feedback includes body position, sensing the movement of your body and limbs, pain, temperature, and finally touch.

Working with a friend you are going to test each other's two-point threshold. A two-point threshold test seeks to find at what distance apart does a person perceive one point as two separate points.

To test this, two points start together touching the skin. Incrementally, they are pulled further apart and reapplied to the skin until the subject can clearly tell there are two different points.

You will take measurements from four different body part locations: Fingertip, Forearm, Thigh and Calf. The test subject must always keep their eyes closed!

Procedure: Planning and Conducting: Observe, measure, and record data, using appropriate tools, including digital technologies

1. Have your partner sit still, with their arm on the table. Their eyes must be closed.
2. Start with your partner's finger tip. Use either one pencil, or two, and gently place the tip of the pencil(s) on your friend's finger. With your friend's eyes closed, they need to tell you whether they feel one pencil, or two pencils touching their skin.
3. Write down what they say. If they say "I feel one pencil", then under the section '# of points', write down "1". If they say "I feel two pencils", then under the same section, write down "2". Experiment with different locations on the same fingertip, and different distances between the points. Make sure to alternate between using one pencil, and two. Depending on the location on the body, and the distance between the points, your friend will at times, believe that they only feel one point, when in fact, there are two. Write down your results as a pair of numbers: the first number is how many points you used, and the second number is how many were felt:

	How many were felt on the **Fingertip**	How many were felt on the **Forearm**	How many were felt on the **Thigh**	How many were felt on the **Calf**
Example	2-1	1-2	2-2	1-1
Trail #1				
Trial #2				
Trial #3				
Trial #4				
Trial #5				
Trial #6				
Trial #7				
Trial #8				
Trial #9				
Trial #10				

Curricular Competency: Processing and Analyzing Data and Information: Compare data with predictions and develop explanations for results

How do your predictions compare with your findings? Why is that? _____

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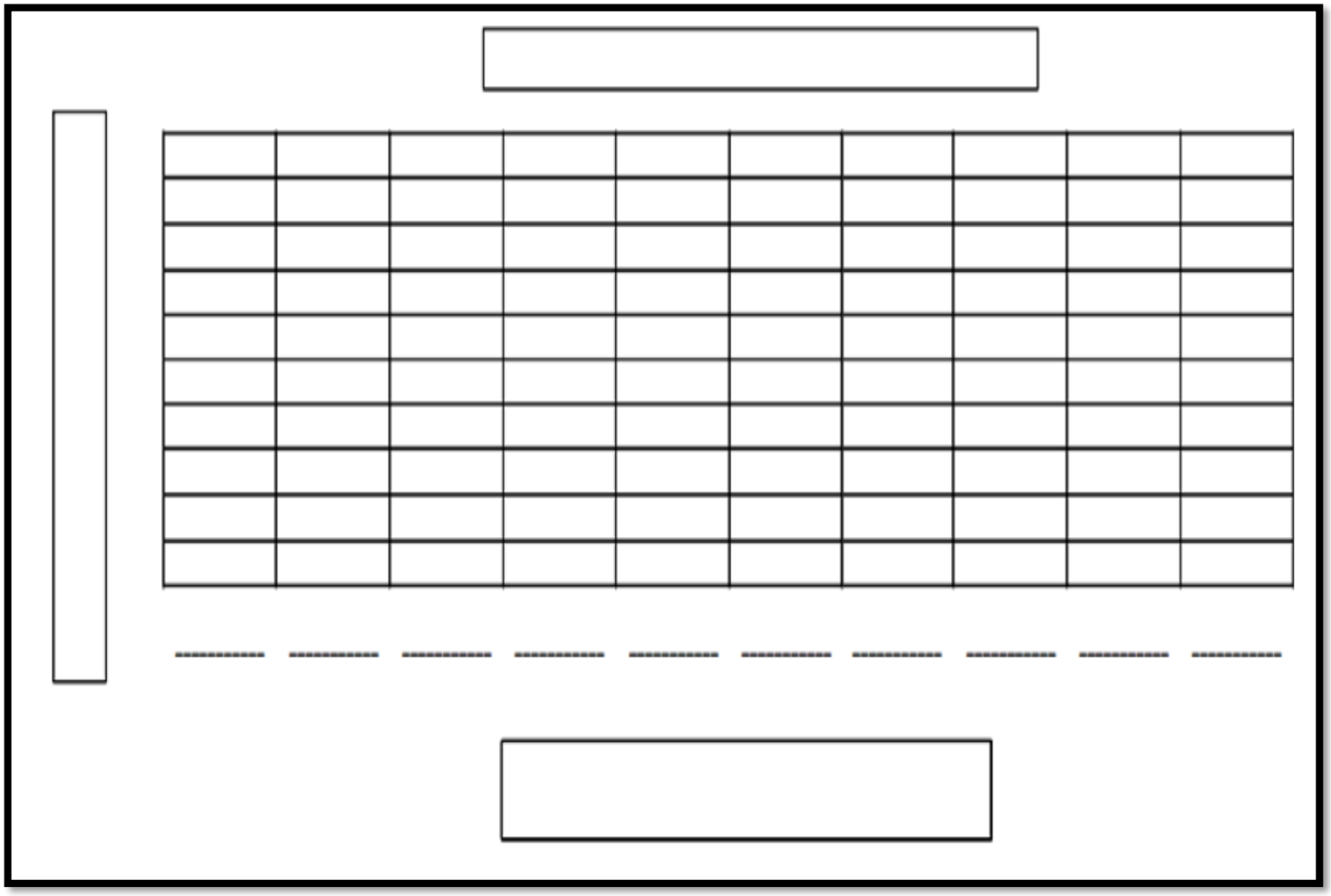
Curricular Competency: Processing and analyzing data and information: Construct and use a variety of methods, including tables, graphs, and digital technologies, as appropriate, to represent patterns or relationships in data

Graph your results below using a double bar graph. Choose one colour to represent the actual amount of touch points, and another to represent the 'reported' amount of touch points.



Curricular Competency: Planning and Conducting: Use equipment and materials safely, identifying potential risks. How did you ensure safety while doing this lab?

Curricular Competency: Evaluating: Identify possible sources of error. What are the limitations of this lab?

Curricular Competency: Evaluating: Suggest improvements to their investigation methods

Design a lab, like this one, which would be better at testing circulation or pulse rate. How would you do a better job of testing circulation? What would be more realistic?

Emerging	Developing	Proficient	Extending
Most sections completed. Answers are legible, and mostly reasonable.	All sections completed. Answers are legible, and reasonable.	All sections completed thoroughly. Answers are neat, logical, and reasonable.	All sections completed thoroughly. Answers are neat, logical, reasonable, and insightful.