TOUCH SENSITIVITY

"Careful," warns your teacher. "That beaker is still hot."

Unfortunately you chose this time to ignore your teacher's caution. Your finger touches the hot glass. A nerve cell in the skin on your finger called a **sensory neuron** detects high heat. The sensory neuron sends a nerve message called a **neurotransmitter** to a nerve cell in the spinal cord called an **interneuron**. The interneuron sends another neurotransmitter to a neuron in the muscle of your finger called a **motor neuron.** This causes your finger to jerk away before you are seriously harmed.

All of this action takes place in less than a second. In fact the neurotrasmitter in the case of this reflex action travels at about **100 meters per second (**130 yards)!

Your hands and fingers have some of the most sensitive skin on your entire body. Let's do some investigation of the sensitivity of your hands and fingers. This experiment has two parts.

Materials

- Blindfold
- Stopwatch, timer, or clock
- Nine sandpaper samples
- Six cookie cutters

Procedures: Part 1

- Blindfold your partner (subject).
- Place the nine samples of sandpaper in front of your subject
- Start timing and ask your subject to place the samples in order from "smoothest" to "roughest." Do **not** stop timing until your subject has correctly ordered the samples. *NOTE: You can tell if the order is correct by looking on the underside of the samples. The **"smoothest" has the number 1** and the **"roughest" has the number 9**.*
- Record the time in **Data Table 1**.
- Switch places and repeat procedures.

Procedures: Part 2

- Blindfold your subject
- One by one place a cookie cutter in the flattened palm of your subject and ask him/her to name the shape of the cutter.
  *NOTE: Your subject **may <u>not</u> close** his/her hand around the object.*
- Record the results in **Data Table 2**.
- Repeat placing each cutter in the hand of your subject and ask them to identify the shape. This time the subject can close her/his hand around the cutter.
- Record the results in **Data Table 2**.
- Switch places and repeat procedures.
- Complete **Challenge Activities**.

Data Table 1
Time taken to place in correct order.

Your time:	Your subject's time:

Data Table 2

Subject's responses to cookie cutter shapes

Cookie cutter shape	Subject's response with palm flat	Subject' response with fingers closing

Your responses to cookie cutter shapes

Cookie cutter shapes	Your response with palm flat	Your response with fingers closing

Challenge Activities

1. How long did it take you to arrange the sandpaper samples in the correct order?

   _____

2. How long did it take your subject to arrange them in the correct order?

   _____

3. What do you think would happen to your time if you were **not** blindfolded?

   _____ Test your hypothesis. Use this space to explain what you did and what you discovered.

4. When you held your palm flat, how many of your guesses were correct about the cookie cutter shapes? _____

5. When you closed your fingers around the cookie cutters, how many of your guesses were correct? _____

6. People who are visually impaired use Braille to read. Use your pen or pencil to punch holes in a piece of paper to spell out one of the vocabularyterms found in this lesson. Then blindfold your subject and see if she/he can "read" the word. Use this space to explain what you did and what your results were.

7. If you can, go on-line to visit these websites for more information about your amazing sense of touch or **somatosensation**.
http://www.cs.brown.edu/research/graphics/research/haptics/home.html
http://www.energymedicineonline.com/news/issue3/feature3.html
http://www.microscope.org/human-anatomy/sh280.htm
http://www.kidsnetconnect.com/knc1/classroom/cara/senses.html

Idea adapted from *Neuroscience for Kids,*
http://faculty.washington.edu/chudler/neurok.html