



Lesson Plan – Measuring Reaction Time

Name: Vicki Schuster Mentor: _____Grade Level: 9-12 Biology School: _____ Date: _____Content Standard: 9-12 Biology-- Physiology Element(s): Standard 9 b,c,d

- **Describe desired outcomes.** Identify what students will know and be able to do. Specify key knowledge, skills and/or understandings that will result from this lesson.

As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic) despite changes in the outside environment. As a basis for understanding this concept:

b. *Students know* how the nervous system mediates communication between different parts of the body and the body's interactions with the environment.

Students will also develop analytical skills in answering the question: What factors impact reaction time?

- **Identify evidence of learning.** Clarify how students will demonstrate their understanding, knowledge and/or skills. Determine the product or assessment that will be evidence of student learning.

Data chart and questions attached.

- **List materials needed.** Determine what materials and resources you will need during the lesson.

Textbook

- **Open the lesson.** Connect students' prior knowledge, life experiences and interests with the learning goals of the lesson. Motivate, pique interest and engage the learner.

Provide background information:

The nervous system is what allows humans to physically react to stimulus because it receives and relays information to various parts of the body. The nervous system itself has two parts: the central nervous system (brain and spinal cord) and the peripheral nervous system (the cranial nerves, spinal nerves, and the ganglia). Within the peripheral system are two more divisions: motor and sensory. Even the smallest or simplest reaction to a stimulus requires an array of divisions in the nervous system to respond. Even when reactions are fast, many factors can affect a person's reaction time. In this laboratory, you will measure and compare reaction times with and without distractions.



- **Provide instruction and modeling.** Outline what you are going to teach and how. Sequence the instruction, and plan how you will differentiate the content and/or instructional methods to meet the learning needs of the students.

Explain the goal of the activity.

Describe the process students will use, while pointing to the various stages of the process on the overhead.

Review briefly how to complete the data chart.

Tell students about how long they'll have to complete the activity.

Answer any questions before students get started.

Pair students off (or explain the system students will use to partner up).

- **Facilitate guided practice.** Plan student practice and interaction with the subject matter. Differentiate the process, content and/or product(s). Specify procedures, structures and time frames.

Give students time to conduct the activity and answer the questions, while monitoring their work.

The procedure:

1. Use the table provided to record your measurements.
2. Have your partner hold his or her thumb and forefinger around the zero end of the meterstick, but do not allow them to actually touch the stick.
3. Tell your partner to focus on catching the meterstick as soon as you drop it. Remind your partner that he or she can only move their thumb and forefinger to do so.
4. Drop the meterstick between your partner's fingers.
5. Write down the measurement on the meterstick at the spot where your partner's fingers catch the meterstick. Record this information in centimeters on your table.
6. Repeat the first 5 steps 4 more times.
7. Switch partners and repeat the first 6 steps.
8. Next, join another pair of students. Have these students try to distract you while you focus on the meterstick assignment.
9. Switch roles and repeat the process until all group members have had a chance to measure their reaction distance (in centimeters) with distractors.

- **Close the lesson.** Summarize, debrief the lesson and/or foreshadow next steps.

Give students time to complete their individual questions and discuss their responses in pairs or small groups.

- **Plan independent practice or review.** Create a follow-up that students could do as homework or that could be used as review the next day.

Have students complete the Critical Thinking and Application section for homework, then share their responses as part of the following day's review activity.



OBSERVATIONS

Data Table

| Trial | Distance Ruler Falls (cm) Without Distractions | Distance Ruler Falls (cm) With Distractions |
|----------------|---|--|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| Average | | |

1. Did your distances vary in the trials without distractions? With distractions? Describe the variations in each case, if any.

2. How did your average distance without distractions compare with your average distance with distractions?

3. How did your distances without and with distractions compare with those of your partner? With those of the other pair of students?

ANALYSIS AND CONCLUSIONS

1. Why did measuring the distance the meterstick fell give a relative measure of reaction time?

2. Why was it important to have each person perform five trials?



3. What might account for variations in your reaction time without distractions? With distractions?

4. How did the distractions affect your reaction time?

5. Explain why your reaction times might be different from the reaction times of your partner and the other pair of students.

CRITICAL THINKING AND APPLICATION

1. Describe two situations in which quick reflexes would be an advantage.

2. Alcohol is a depressant and it slows the nervous system activity. Why is it dangerous for a person to drive under the influence of alcohol?

3. Could a person decrease his or her reaction time? How?
