**Brain Processing and Senses Worksheet**

**Part 1**

**Reaction Time Experiment**

What do you think your fastest reaction time will be? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What do you think your slowest reaction time will be? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| **Reaction Time Chart** |
| |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Distance (cm) | Seconds |  | Distance (cm) | Seconds |  | Distance (cm) | Seconds | | 1 | 0.05 |  | 11 | 0.15 |  | 21 | 0.21 | | 2 | 0.06 |  | 12 | 0.16 |  | 22 | 0.21 | | 3 | 0.08 |  | 13 | 0.16 |  | 23 | 0.22 | | 4 | 0.09 |  | 14 | 0.17 |  | 24 | 0.22 | | 5 | 0.10 |  | 15 | 0.18 |  | 25 | 0.23 | | 6 | 0.11 |  | 16 | 0.18 |  | 26 | 0.23 | | 7 | 0.12 |  | 17 | 0.19 |  | 27 | 0.24 | | 8 | 0.13 |  | 18 | 0.19 |  | 28 | 0.24 | | 9 | 0.14 |  | 19 | 0.20 |  | 29 | 0.24 | | 10 | 0.14 |  | 20 | 0.20 |  | 30 | 0.25 | |

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| **Reaction Time Trials** |
| |  |  |  | | --- | --- | --- | | Trial Number | Distance (cm) | Reaction Time (seconds) | | 1 |  |  | | 2 |  |  | | 3 |  |  | | 4 |  |  | | 5 |  |  | | 6 |  |  | | 7 |  |  | | 8 |  |  | | 9 |  |  | | 10 |  |  | |

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| **Analyzing Data Your Data** |
| Mean (“Average”): Add up all the numbers and then divide by how many numbers there are.  Median (“Middle Number”): Order numbers from lowest to highest. Identify the middle number or the average of the two middle numbers.  Range (“Highest Minus Lowest”): Subtract the lowest value from the highest value.  Mode (“Most Often”): Identify the number that occurs the most often. (There might be more than one.)  Outlier (“Out There”): A value in a set that is very far away from the other values. (There might not be one.)  **Mean: Write each reaction time on a line below.**  \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_+ \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_\_\_\_\_    \_\_\_\_\_\_\_\_\_ (all the numbers added up) ÷ 10 (how many numbers there are) = \_\_\_\_\_\_\_\_\_ mean  **Median: Write the reaction times from lowest to highest. If the number in the ( ) is the same, then that is your median; if the numbers are different, add them up and divide them by 2.**  \_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_ (\_\_\_\_\_ \_\_\_\_\_) \_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_\_\_\_\_ median      (\_\_\_\_\_ + \_\_\_\_\_) = \_\_\_\_\_ ÷ 2 = \_\_\_\_\_\_\_\_\_ median  **Range: Write the highest reaction time first and the lowest reaction time second. Then subtract them to find the range.**  \_\_\_\_\_ - \_\_\_\_\_ = \_\_\_\_\_\_\_\_\_ range  **Mode: Write the number(s) that come up the most times. If each number only comes up once, you won’t have a mode.**  = \_\_\_\_\_\_\_\_\_ mode  **Outlier**: **Write the number that is very far away from the other values. You might not have one.**  = \_\_\_\_\_\_\_\_\_ outlier |

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| **Analyzing Class Data** |
| Class Reaction Time Line Plot  0.05 0.06 0.07 0.08 0.09 0.10 0.11 0.12 0.13 0.14 0.15 0.16 0.17 0.18 0.19 0.20 0.21 0.22 0.23 0.24 0.25  **Class Mean: Add up all of the students means and then divide by how many students participated to find the class mean. You may use a calculator to find the class mean.**  \_\_\_\_\_\_\_\_\_ (all the numbers added up) ÷ \_\_\_\_\_\_\_\_\_ (how many students there are) = \_\_\_\_\_\_\_\_\_ class mean  **Class Median: Use the Class Reaction Time Line Plot to help you find the mean. Start by putting a dot next to the lowest number X and then one next to the highest number X. Continue this until you have one number left or two different numbers. If you have one number left, that is your class mean. If you have two numbers left, add them up and divide by 2 to find the class median.**  \_\_\_\_\_\_\_\_\_ class median \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_ ÷ 2 = \_\_\_\_\_\_\_\_\_ class median  **Class Range: Write the highest reaction time first and the lowest reaction time second. Then subtract them to find the class range.**  \_\_\_\_\_ - \_\_\_\_\_ = \_\_\_\_\_\_\_\_\_ class range  **Class Mode: Write the number(s) that come up the most times. If each number only comes up once, you won’t have a mode.**  = \_\_\_\_\_\_\_\_\_ class mode  **Class Outlier**: **Write the number that is very far away from the other values. You might not have one.**  = \_\_\_\_\_\_\_\_\_ class outlier |

**Were your predictions true for your fastest and slowest times? Explain.**

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**Part 2**

**Explain how your body and brain worked together to catch the ruler. You may use words, drawings, or a combination of both.**

**Brainstorm some common actions you do in your life that are triggered by information coming in from your senses. Come up with at least 10 different actions and identify the sense or senses that receive the information. Beside each action and its senses, list how that action helps with survival in the classroom, at home, on the playground, or other places you spend time.**

Action Sense Helps with Survival



**Sketch a diagraph of the 3D model you plan to build showing how the sensory network is involved in receiving, transmitting, and responding to input from senses. You will need to label the model with the following words: information, receptors, perception/memory, and action.**

**Part 3**

**Objective: Design a helmet to protect the brain from head injuries.**

**Ask**

**What is the problem? What do we want to design? Who is it for? What do we want to accomplish? What are the project requirements and limitations? What is our goal?**

**Research**

**Use the space below to write information from your research that will help you with building your helmet.**

**Imagine**

**Group Members: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Group Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Bring your research together and write down as many ideas and solutions that your group might want to explore.**

**Plan**

**Write/draw the plan that your group wants to move forward with and make.**

**Create**

**Draw your prototype out and label it with what you want to use to make it. List all of the supplies that you will need and what you plan to use each item for.**

**Test**

**Try dropping your egg from different heights ranging from 1 foot to 5 feet. Write down your results and discuss with your team and analyze what works and what you need to improve.**

**Improve**

**Write what improvements you made and the results from the changes.**