| Name: | Date: |
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Indigenous Environmental Data Science

# Module 1: Monitoring Fisheries for Heavy Metal Contaminants

| **Task**   * Check when complete, OR   think🧠 and write ✏️ a response when prompted. | |
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| **Lesson 1.1: R Basics and Calculating Screening Values**  Learning Goals:   * Identify the function name that loads packages * Recognize objects including variables, vectors, and data frames * Calculate values using mathematical operations and functions * Generate a scatterplot using ggplot2 * Describe the relationships between body weight, weekly servings, and screening values (safe limits) | |
| **Loading Packages** | |
| A toolbox (package) contains tools (functions) that perform specific math tasks that are typically used in data science.  🧠Question: What is the name of the function that loads a package of interest?  ✏️ Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| **Creating Objects in R** | |
| An object is like a container or a box that holds data or information. You can give this box a name, and then use that name to look at or change what's inside the box later.  🧠Question: Which object(s) were created to calculate consumption rate?  ✏️ Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| **Calculating Screening Values for Mercury in Fish** | |
| Calculate the safe limit of consumption of fish per week for someone that is 160 lbs:  ✏️ 160 lbs = \_\_\_\_\_\_\_\_\_\_  ✏️Change the value for weight or days per week, and record the changes to the safe limit in the table below.   | Weight (lbs) | Number of days per week | Screening Value (μg/g/day) | | --- | --- | --- | |  |  |  | |  |  |  | |  |  |  | |  |  |  | | |
| **Creating Vectors** | |
| A vector is a list of the same type of object (i.e., numbers, words, TRUE/FALSE). A vector is an object, but not all objects are vectors.  🧠Question: What function was used to create vectors?  ✏️ Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| **Creating a Data Frame from Vectors** | |
| A data frame in R is a way to organize data in a table, similar to a spreadsheet. In a data frame, each column holds a group of related values (like weight, servings, and screening value), and each row represents one item or person.  🧠Question: Provide an example of a time when you have created a data frame. It could be in any class and be made by hand or using something like Microsoft Excel or Google Sheets.  ✏️ Answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| **Visualizing Screening Value vs. Servings per Week with ggplot2** | |
| part 2 methylmercury limits graph 1.png  🧠Question: What is the relationship between screening value and the number of servings?  ✏️Answer: | |
| part 2 methylmercury limits graph 2.png  🧠Question: How would you describe this graph and the relationship between screening value, consumption rate, and weight? What happens to the distribution in screening values as the servings per week increase?  ✏️Answer:  🧠Question: With this information in mind, consider how to make decisions with the data on mercury content in fish–how should we consider the screening value for different ages? For example, what screening value would be safe for children, who weigh less than the average adult?  ✏️Answer: | |