

Water as Habitat Episode 1

Male or Female? Sea Turtles



Module 1: Descriptive Statistics

Module 1 Overview:

Use descriptive statistics to analyze nesting data for Loggerhead sea turtles along the Atlantic Coast.

Focus: Types of Data, Bar Charts, Histograms, Box Plots, and Outliers

Mathematical Standards: MAFS.912.S-ID.1.1, 1.2, 1.3

Provided Materials: Teacher Guide, Student Graphic Organizer, Group Data Analysis Task, Group Discussion Questions, Loggerhead Sea Turtle Nesting Data, and Answer Key

Necessary Materials: 5 poster papers (one for each group), markers/colored pencils, rulers, stapler/tape, calculators

Module 1 Lesson Notes:

In this module, students will be asked to describe and classify sea turtle nesting data, create different data displays, and hypothesize about what the data may express.

1. The first student handout is a graphic organizer that can be used during whole group instruction to teach (and or review) the different types of data, whether to create a bar chart or histogram, and how to create a box plot.
 - Students should fill in the graphic organizer to keep as a reference for themselves.
 - Teachers should ensure that the students have the correct answers for the graphic organizer.
 - Teachers should emphasize the difference between discrete and continuous data. Different data displays and distributions are used for each type of data. Large sets of data can be grouped and displayed in a frequency table, indicating the number of data points within each group or category. From this point, a **bar chart** can be made for discrete data and a **histogram** can be made for continuous data.
 - A **box plot** can be used for both discrete and continuous data.
 - Students should be able to look at the spread of the data in a bar chart (or histogram) and be able to see the relationship between that display and the spread in the box plot.
2. The second student handout involves a small group task and whole group discussion.
 - For the small group task, teachers should divide the class into 5 groups – one for each year of data provided.
 - The first question has students determine if the nesting data is discrete or continuous. Students will then know whether to create a bar chart or a histogram. Teachers should circulate to each group to check the answers for #1 before students begin creating the wrong type of data display.
 - It may be helpful for comparisons between years for all groups to use the same scale along the x-axis for the bar charts and box plots. As a teacher, you may tell them what scale to use or have a discussion

about how to determine the appropriate scale. You may also discuss why it will be helpful to compare the data.

- Materials Needed: 5 posters (one for each group), markers, rulers, calculators.
 - After the groups have finished their posters, they should hang them around the room for others to see. Teachers should give students time to walk around the room and compare the different data displays.
 - After students have had a chance to compare the data from the 5 years-, they should return to their small groups to discuss the questions and come to a consensus.
 - Teachers should facilitate a classroom discussion and let students share their ideas.
3. The third student handout is the raw data for students to use to create their data displays.
- The activity can be extended to include the other counties in Florida.
 - The activity can be extended to include the use of technology, such as laptops or graphing calculators, to create the data displays.

Module 1 Glossary:

1. **Bar chart** – a chart which uses bars to give a visual representation of data; the bars can represent categories or intervals; the bars do not touch; used for discrete data
2. **Bivariate data** – data concerning two variables (x, y)
3. **Box plot** – a graphical representation of a distribution using only the five number summary
4. **Continuous data** – a measurable variable whose accuracy depends on the accuracy of the measurement device used; use a histogram.
5. **Discrete data** – data only able to have certain values; use a bar chart.
6. **Five number summary** – the minimum, maximum, median, lower and upper quartiles of the data set
7. **Histogram** – a visual representation of data using class boundaries and frequency; reserved for continuous data
8. **Interquartile Range (IQR)** – Difference between quartile 3 (Q3) and quartile 1 (Q1).
9. **Outliers** – extreme values in a distribution; Sometimes outliers are unimportant for the purposes of analysis, but sometimes they are the most important values
10. **Outlier Rule** - Mathematically, an outlier is a value that is $1.5 \bullet IQR$ above Q3 or below Q1.
11. The IQR is the Interquartile Range, or difference between Q3 and Q1.
12. **Qualitative data** – data seen as categories, sometimes called categorical
13. **Quantitative data** – information that can be counted or measured
14. **Univariate data** – data concerning one variable

Definitions adapted from:

Buchanan, L., Fensom, J, Kemp, E., LaRondie P., Stevens, & Stevens, J. (2012). *Mathematics Standard Level*. Oxford, NY: Oxford Press.