Water as Habitat Episode 1
Male or Female? Sea Turtles

Module 2: Correlation &
Linear Regression

Module 2 Overview:
Use bivariate data analysis to look for associations between the number of sea turtle nests and another variable. Students will use scatterplot graphs to determine if a correlation exists; Represent a possible correlation as an equation, and interpret the meaning of Pearson's correlation coefficient to state the strength of the correlation. Students will also be able to distinguish between correlation and causation.

> Focus: Scatterplots, Lines of best fit, Pearson's correlation coefficient
>
> Mathematical Standards: MAFS.912.S-ID.2.6, 3.7, 3.8, 3.9
>
> Provided Materials: Correlation & Regression Lesson PowerPoint, Student handout, Teacher Guide & Key, Student handout, Loggerhead Sea Turtle Nesting Data
>
> Necessary Materials: TI-Nspire Graphic Display Calculator
> Teaching materials are presented using the TI-Nspire, however the materials can be adapted for use of any graphing utility, APP, or website.

Module 2 Lesson Notes:

In this module, students will be asked to create scatterplots of the existing data using their graphing utility, determine whether a correlation exists, determine the strength of the correlation, write and use equations for the lines of best fit when appropriate.

1. The first provided resource is a power point designed to teach (or re-teach) the concepts of correlation and linear regression. It focuses the use of technology to that of the TI-Nspire calculator. An embedded You Tube video at the end of the PowerPoint and discusses the differences between correlation and causation.
    *   Discuss the importance of identifying outliers early on, they may or may not be an influential point. This is determined by observing the regression lines with and without the outlier. If it changes dramatically, then it is influential. They are usually identified by being horizontally far away from the other points.

2. The student handout can be used as a guided whole group activity for the first investigation question and independent work for the second. The third investigation question uses some

biological terms that need to be reviewed and defined before students will be able to understand the data.

- Students are asked to complete the table by finding totals and percentages before they begin a correlation analysis. This will ensure that they understand the terms used and how it impacts sea turtle nesting.

Module 2 Glossary:

Mathematical

1. <u>**Bivariate data**</u> – data concerning two variables (x, y)
2. <u>**Centroid point**</u> – it is the mean point found by the average of the x-values and the average of the y-values for a set of data; $(\bar{x}, \bar{y})$.
3. <u>**Correlation**</u> – relationship between two variables.
4. <u>**Line of best fit**</u> – also known as the regression line,
5. <u>**Pearson's correlation coefficient**</u> – coefficient used to measure the strength of a linear relationship between two variables; ranges between one and negative one.
6. <u>**Residual value**</u> – the vertical distance a data point is from the regression line; helps determine the goodness of fit for a regression line.
7. <u>**Scatterplot**</u> – diagram where two variables are plotted against each other on the vertical and horizontal axis so that it can be determined if one variable affects the other.

Definitions adapted from:

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

Scientific

1. <u>**Beach escarpment**</u> – An area on the beach where elevation changes suddenly due to sand erosion.
2. <u>**Crawl**</u> – Tracks and other sign left on a beach by a sea turtle.
3. <u>**False Crawl**</u> – A crawl resulting from an abandoned nesting attempt (a non-nesting crawl).
4. <u>**Nest**</u> – A crawl resulting from a nesting attempt in which eggs were deposited.
5. <u>**Nesting success**</u> – Percentage found by the number of nests divided by the number of crawls.

Definitions adapted from:

(n.d.). Retrieved January 14, 2016, from http://myfwc.com/media/3055670/crawlidentificationguidelines.pdf