Water as a Habitat: Episode 5
What's Lurking in the Waters?

Module 3: Are Lionfish Derbies Effective?
Teacher Guide: Use of Formulas

Module 3 Overview:
Module 3 focuses on the use and manipulation of multi-variable formulas. The content is centered on lionfish derbies being used as a method to estimate population samples.

Focus: Use and rearrange formulas; Make inferences and estimations based on observational data.

Mathematical Standards: MAFS.912.A-CED.1.4, MAFS.912.N-Q.1.1-1.3, MAFS.912.S-IC.2.6

Provided Materials: Teacher Guide, Student Handout and Answer Key

Necessary Materials: Calculator

Module 3 Lesson Notes:

In this module, students will be given three formulas to apply to a case study of lionfish population near Cozumel, Mexico. They will be asked to interpret their findings, as well as rearrange formulas.

Module 3 Glossary:

1. **Catchability** is a concept in fishery biology which reflects the efficiency of a particular fishery. Its quantitative magnitude is expressed by the **catchability coefficient**, which relates the biomass abundance to the capture or fishing mortality.
2. **Catchability Quotient** – The comparison of the abundance of fish compared to the number of fish caught. For this investigation, the measure of effort is assumed to be the same.
3. **Estimated population** – The calculated number of fish living in an area at a specified point in time. The estimated population is calculated using a component of change model that incorporates information on population increases and decreases over a specified time.
4. **Lionfish derby** – Fishing tournaments designed with the sole purpose of capturing lionfish as a method to remove fish from the ecosystem. control the population.
5. **Population Density** – Number of fish per unit of area.
6. **Hectare** – Unit of area equal to 10,000 m^2 or about 2.5 acres.

Definitions and exercises adapted from the following resources:

Arreguin-Sanchez, F. (1996). Catchability: A key parameter for fish stock assessment. *Reviews in*

Fish Biology and Fisheries, *6*(2), . doi:10.1007/bf00182344

www.census.gov

http://www.sefsc.noaa.gov/earlylifehistory/PDFs/Lionfish_Derby_Guide.pdf