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Course: Life and Marine Science Tracking
Live Marine Animals

Grade level: 11-12

Topic of focus: Green Sea Turtle tracking and
conservation

Standards Addressed:

NGSS, Science and Engineering Practices

Analyzing and Interpreting Data

Scientific investigations produce data that must be analyzed in order to derive meaning. Because data patterns and trends are not always obvious, scientists use a range of tools—including tabulation, graphical interpretation, visualization, and statistical analysis—to identify the significant features and patterns in the data. Scientists identify sources of error in the investigations and calculate the degree of certainty in the results. Modern technology makes the collection of large data sets much easier, providing secondary sources for analysis.

Using Mathematics and Computational Thinking

In both science and engineering, mathematics and computation are fundamental tools for representing physical variables and their relationships. They are used for a range of tasks such as constructing simulations; statistically analyzing data; and recognizing, expressing, and applying quantitative relationships.

Engaging in Argument from Evidence

Argumentation is the process by which explanations and solutions are reached.

NGGS, Nature of Science Practices

Scientific Knowledge Is Open to Revision in Light of New Evidence

High School (9-12)

- Scientific explanations can be probabilistic.
- Most scientific knowledge is quite durable, but is, in principle, subject to change based on new evidence and/or reinterpretation of existing evidence.
- Scientific argumentation is a mode of logical discourse used to clarify the strength of relationships between ideas and evidence that may result in revision of an explanation.

All NGSS Science Standards from

NSTA: Access the Next Generation Science Standards by Topic

(<https://ngss.nsta.org/AccessStandardsByTopic.aspx>)

Time needed: 3 48 minute class periods

Lesson Rationale: This lesson on Green Sea Turtle tracking and conservation is designed so that students build an understanding of how tracking is conducted, some examples of scientific questions that can be answered by looking at tracking data and how tracking data can guide management decisions such as the designation of no fishing areas. Students are completing these activities as a culminating activity in their short unit on Sea Turtles. They have previously watched a webcast on Sea Turtles by the Dauphin Island Sea Lab about adaptations, evolution and physiology. They have also attended an online class about general turtle life history, local sea turtle strandings and rescues and reproduction including *arribadas* of Kemp's Ridley and Olive Ridley Sea Turtle species.

Objectives:

- 1) Students will be able to identify the Greater Everglades region including Everglades National Park, Dry Tortugas National Park and the Florida Keys protected areas.
- 2) Students will analyze the tracks of Green Sea Turtles from two distinct populations including one from the Dry Tortugas Sea Turtle Group
- 3) Students will apply new vocabulary to understanding an article written by a scientist about her research.
- 4) Students will evaluate how findings of how Sea Turtles are using habitats in the Dry Tortugas and in coastal estuaries in the western coast of the Everglades should influence conservation decisions.

Lesson procedures:

Engage: Students will examine maps, tracks and read an article written by a scientist about the Green Sea Turtle Populations in Southwest Florida (see attached presentation and article).

Explore and Explain: Students will complete the Sea Turtle Tracking Lab comparing the tracks of two Green Sea Turtles from distinct areas including one turtle from the Dry Tortugas area (see attached lab).

Elaborate: Students will examine new research studies by Kristen Hart on habitat use in the Dry Tortugas and the use of coastal mangrove regions by juvenile green sea turtles to come up with recommendations for management strategies in the Greater Everglades Region

Evaluate: Students will write a paragraph using the Claims-Evidence -Reasoning model and share it during an online live class. The paragraph will answer the question, "What conservation measure should be enacted to protect the Green Sea Turtles of the Florida Everglades Ecosystem?"

Resources:

Hart, K. (n.d.). Hotspot and Risk Analysis for Sea Turtles in the Florida Keys National Marine Sanctuary. Retrieved April 15, 2020, from https://www.usgs.gov/centers/wetland-and-aquatic-research-center-warc/science/hotspot-and-risk-analysis-sea-turtles?qt-science_center_objects=0#qt-science_center_objects

Hart, K. (2008). Tracking Sea Turtles in the Everglades. *Endangered Species Bulletin*, (Fall), 26–29. Retrieved from https://www.fws.gov/endangered/news/pdf/bulletin_fall2008.pdf

Hart, K., & Fujisaki, I. (2010). Satellite tracking reveals habitat use by juvenile green sea turtles *Chelonia mydas* in the Everglades, Florida, USA. *Endangered Species Research*, 11, 221–232. Retrieved from https://archive.usgs.gov/archive/sites/sofia.usgs.gov/publications/papers/habuse_turtles/index.html