

SHARKS4KIDS LESSON PLAN: *Ocean Temperature and Sharks*

Teacher:

Date:

Grade Level: High School

Subject: Science

Learning Target: Students will understand and be able to analyze how sharks are tagged and temperature dictates their behavior.

Link To Standards:

Common Core: CCSS.MATH.CONTENT.HSS.ID.A.1; CCSS.MATH.CONTENT.HSS.ID.A.3; CCSS.MATH.CONTENT.HSS.ID.B.5; CCSS.MATH.CONTENT.HSS.ID.B.6; CCSS.MATH.CONTENT.HSS.ID.C.9; CCSS.MATH.CONTENT.HSS.IC.B.6; CCSS.ELA-LITERACY.RL.9-10.1; CCSS.ELA-LITERACY.RL.11-12.1; CCSS.ELA-LITERACY.RL.9-10.4; CCSS.ELA-LITERACY.RL.11-12.4; CCSS.ELA-LITERACY.W.9-10.1; CCSS.ELA-LITERACY.W.9-10.8
Next Generation Science Standards: HS-ESS3-5; ESS3.D; HS-LS2-7; RST.11-12.1; RST.11-12.2; HS-ESS3-1
Ocean Literacy Scope and Sequence: P4A; P5B; P5B.1; P5B.2; P5B.7; P5B.11; P5C.22; P5C.37; P6C.1; P6D
Climate Literacy Principles: P7

Vocabulary: climate change, conservation, ecosystem impacts, fisheries, global change, predators, range shifts, sharks

Interdisciplinary Connection: This is a science lesson, but also draws on students' literacy and mathematical abilities because students are required to draw conclusions from both reading a peer reviewed article and graphing data. Furthermore, by addressing the following questions, students will be provided insights as to how ocean warming is impacting these marine apex predators.

Essential Questions:

- What is the preferred temperature range of the studied tiger shark population?
- Does the distributional range of tiger sharks extend farther poleward in response to warming seas?
- Do seasonal migrations of tiger sharks into their northerly range occur earlier in the year in response to ocean warming?

Pre-Lesson:

Prior knowledge as to how data is collected from sharks allows for a deeper understanding and connection. It is recommended that you have a member of the Sharks4kids team give a Shark Science talk prior, watch the [How to Tag a Shark](#) video or the [Intro to Shark Science](#) video.

Resources and Materials:

- Article (<https://onlinelibrary.wiley.com/doi/epdf/10.1111/qcb.16045>): either on computer or printed out version to be distributed
- Graphing: either on computer (i.e. Google Sheets or Microsoft Excel) or by hand using graphing paper and pencil
- Tiger Shark image (<https://www.sharks4kids.com/elasmobranch-posters-4-teachers>): either computer or a printed out version to be displayed
- Tiger Shark Fact Sheet (https://www.sharks4kids.com/files/ugd/5ed219_58087ec8393c41668024c6c61ab8ab76.pdf): either computer or a printed out version to be displayed

Differentiated Lesson:

Depending on the level of your students, choose one of the following: have the students read the article's Introduction section of the article for homework, take time in class to read silently, read in small groups during class, or read aloud as a class. Have students create a prediction or formulate a hypothesis as to how water temperature and shark population will relate.

To begin, in class, show students the Tiger Shark image and see if they can identify the species. Then, ask students what they know about the Tiger Shark. Finally, display the Fact Sheet as this will be the focus species being discussed.

Depending on the level of your students, modify and choose any number of the following either as an individual, paired, small group, or entire class activity.

- Have students read the data points from Figure 1a and create a table. Based on their data table, have students make a line graph. The line graph should include a proper title, x and y-axis labels, as well as a key.
- Have students analyze the results. What do they mean? Discuss whether the interpretations support or refute their hypothesis.
- Have students interpret Figure 5 and explain what these images represent and are showing. Ask the students how the averages in sea-surface temperatures are impacting this species. *To further their understanding, have students read the article's Discussion 4.2 and 4.3 sections.*

As an extension, you can choose to revisit the lesson on Shark Science and have students present any possible limitations that could have impacted the data collection.