

Title: What can we learn by tagging sharks?

Grades 3-5

Topic: Transmitting and receiving data, reading data from a map



Standards:

Massachusetts DLCS standard:

3-5.CT.c.2 Collect and manipulate data to answer a question using a variety of computing methods (e.g., sorting, totaling, averaging) and tools (such as a spreadsheet) to collect, organize, graph, and analyze data.

Understandings:

Students will understand that...

- Tracking devices vary based on how the signal and data is transmitted, stored and received.
- Shark tagging is valuable to learn about shark behaviour, physical growth and characteristics
- Shark tags either transmit data to satellite receiver or store the data in the receiver on the tag for retrieval later.

Essential Questions:

- What can we learn by following shark tracking maps?
- What can we learn about a shark from viewing its track over time?
- What can shark tags that collect data tell us about the physiology of sharks?

Students will know that...

- Transmission and retrieval of data from shark tags varies with the type of tag
- Collecting data on shark movement can teach us about shark behaviour.
- A “ping” is a signal sent from a transmitter.

Students will be able to...

- Participate in the exploration of the OSEARCH data map to discover the types of information available.
- Differentiate how a signal is sent from a SPOT vs a PSAT or acoustic tag.
- Locate a specific tagged shark on the OSEARCH map, and continue to track a shark in the classroom over time.

Assessment Evidence:

- Student responses on “I used to think, now I think” chart
- Charts can be taken back to school and displayed for further exploration or as evidence of learning on the field trip.

Resources:

- <https://www.brainpop.com/science/diversityoflife/sharks/>
- <http://www.atlanticwhiteshark.org/media/>
- <http://kids.nationalgeographic.com/explore/youtube-playlist-pages/youtube-playlist-sharks/>
- <https://www.brainpop.com/technology/communications/radio/>
- Sharktivity app- track white sharks
<https://itunes.apple.com/us/app/sharktivity-white-shark-sightings/id1097933510?mt=8>

- Global Shark Tracker app <https://itunes.apple.com/us/app/global-shark-tracker/id570772231?mt=8>
- Shark Tagging and Tracking: Separating Fact from Fiction <http://voices.nationalgeographic.org/2014/01/30/shark-tagging-tracking-separating-fact-from-fiction/>
- Following Mary Lee <https://www.youtube.com/watch?v=MoBknEKJa-g> and <https://www.youtube.com/watch?v=vhSDlpJp3PE>
- Tagging Katherine <https://www.youtube.com/watch?v=evotxXf5ePg>
- CMMC STEM Lesson Plans <http://stem.chathammarconi.org/LessonPlanViewer.php?action=CurriculumMatrix>

Activity Plan:

Prior knowledge question:

- How do marine biologists learn about sharks?
- What dangers to their survival do sharks face?

Vocabulary:

- Tags: SPOT, PSAT, acoustic
- Acoustic
- Ping
- satellite

Materials:

- (optional) Chart paper with [See/Think/Wonder](#) table (see below) to record student responses from the OSEARCH data map
- Chart paper with [“I used to think, now I think”](#) for the end of the exhibit activity. Responses may refer to the tagging, data map or anything having to do with sharks that they learned.
- Markers
- Projection screen and laptop

Suggested Procedure:

1. In the Wireless Today classroom, gather students in front of screen and share the 3 different tags, explaining how they are attached to the shark.
 - a. For the SPOT tag, view the video from OSEARCH showing how the shark is “caught”, tagged and released. Explain the need for above water exposure to connect to satellite. Tagging Mary Lee <https://www.youtube.com/watch?v=B7LbYMSZxSo>
 - b. Share the PSAT and acoustic tags explaining how they are attached to the shark and the data is collected.
2. Display the Global Shark Tracker <http://www.ocean.org/> map on the screen and zoom in on our area. Ask students what they want to know or notice about the map and offer for volunteers to come to the display laptop to click on a marker. You may want to list data gathered from the site to answer on a chart, “What can we learn by tracking sharks?”
 - a. Depending on the age or experience of your audience, you may want to utilize a “See/Think/Wonder” chart (see below) to encourage students to focus on the chart/map as a whole and the information available.
3. Click on one of the markers and view/read the information and images in the pop up window about that shark. Click on the “Shark Profile” to see more information about that shark- it will appear in the window on the left of the screen.
4. Click on “View Track” or “Where Have I Been” icons to view the track based on pings. Zoom in further so you can see ping dot markers and lines without ping markers. Ask, why might there be many pings in one area yet other areas a line without many pings? (possibly migrating

without feeding, feeding, mating)

5. You may want to show the video *Following Mary Lee* <https://www.youtube.com/watch?v=MoBknEKJa-g> to illustrate followup in the classroom. After that you can return to the OSEARCH map and find where Mary Lee is based on her most recent ping.
6. Elicit responses to the chart displaying, “I used to think, now I think” in regards to various topics discussed- tags, sharks, conservation...

Follow up suggestions/Extensions:

- Follow a specific shark by checking in once a week to note the location and other data of that shark. Students can record weekly data and make theories based on the information.
- For students who want to learn more, utilize the Think/Puzzle/Explore strategy to plan an independent or group study
http://www.visiblethinkingpz.org/VisibleThinking_html_files/03_ThinkingRoutines/03d_UnderstandingRoutines/ThinkPuzzleExplore/ThinkPuzzleExplore_Routine.html

I used to think, Now I think

http://www.visiblethinkingpz.org/VisibleThinking_html_files/03_ThinkingRoutines/03c_Core_routines/UsedToThink/UsedToThink_Routine.htm

I used to think...	Now I think...
(Record student responses here and to the right)	

See-Think-Wonder is a thinking strategy to engage students in deeper observation or thought about an artifact or image.

More information here:

http://www.visiblethinkingpz.org/VisibleThinking_html_files/03_ThinkingRoutines/03c_Core_routines/SeeThinkWonder/SeeThinkWonder_Routine.html

To encourage students to look closely at the data maps (either shark or AIS) display map on screen begin with the question, What do you see or notice on the map?

(Create chart below on chart paper to record responses)

The “see” response can be followed with, What do you think about that? What does it represent? What does it indicate? Etc.

Then followed with, What do you wonder about your “thinking” ideas?

This can be employed as an opening activity to draw attention and interest towards looking closely at the maps for information and data.

After exploring the map, information about the map can be shared by volunteer or teacher if previewed before the visit.

Another strategy would be to invite students to come up to the computer to click on various map markers and discover the types of information that can be found on the map.

What do you SEE ?	What do you THINK about that?	What does it make you WONDER ?
(Record student responses in each column)		

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