

# Understanding Rates of Change and the OCEARCH Shark Tracker

## Activity Guide

### Purpose

Students use real-time data to track ocean animals on the OCEARCH website to calculate different animals' speeds across different time intervals. They form a conjecture about whether the data is useful for different time intervals and think of ways the data could be made more accurate and useful across shorter periods of time.

### Context

This activity is most useful to introduce the derivative in a Calculus 1 course. Students should already be able to calculate a rate of change given distance and time.

### Texts and Materials

- Understanding Rates of Change and the OCEARCH Shark Tracker (worksheet provided)
- OCEARCH website for data to interpret:  
[OCEARCH Shark Tracker](https://www.ocearch.org/tracker/): <https://www.ocearch.org/tracker/>

### Details

Students should work in small groups of 2 or 3 to explore data on the [ocearch.org](https://www.ocearch.org) website using their smartphones, laptops, or tablets in the classroom. Students could spend 5 to 10 minutes exploring the website and viewing the different animals being tracked. The instructor could guide students to find the distance and time data for example animals as a whole group before moving into smaller groups.

Students then collect data within their small group. They should calculate the average rates of change of different animals to get an idea of how the data is collected and how the data is useful or not. Students are asked to make a conjecture about how the data could be made more accurate.

This activity may take about 20 to 30 minutes at the start of a lecture on defining the derivative.

### Alternative Mode of Instruction Adaptation

This activity may be adapted to a synchronous online lesson using breakout rooms and permitting students to share their screens within their groups after the instructor has introduced the OCEARCH website.

*Additional activities and guides are available:*

[Context-Driven Tasks for Calculus](https://www.csulb.edu/math/context-driven-tasks-for-calculus): <https://www.csulb.edu/math/context-driven-tasks-for-calculus>