OREGON MARINE SCIENTIST
AND EDUCATOR ALLIANCE

Teacher Guide: Filling in the Energetic Calculations Spreadsheet

Swimming on an Empty Shark Tank

Resources:
1. Energetic Calculations spreadsheet ([xls](#))
2. Tailbeat Frequency Figures ([pdf](#))
3. Tailbeat Frequency Calculations Worksheet ([pdf](#))
4. Energy Costs Worksheet ([pdf](#))

OVERVIEW: The students will use the *Tailbeat Frequency Figures* to find information they need for the "Student Worksheet" tab of the *Energetic Calculations Spreadsheet*. With the exception of calculating the Tailbeat Frequency, the values of interest will be automatically calculated, and the students simply need to fill in the values. There is a Master Worksheet Template the instructor can use as a reference and check sheet.

Energetic Calculations Spreadsheet - <u>What to fill in</u>
The naming code (COLUMN A) is what scientists use to identify each individual. This is unique based on some consistent naming scheme. But, it's not very personal. The students can add an individual name to each shark- these should be consistent across the class to prevent confusion.

You can choose to delete the naming code (COLUMN A) location (COLUMN C) and sex (COLUMN D) and have the students enter them from the graphs. These are already populated on the worksheet to reduce the workload, but can be easily deleted and entered by the students.

The student can enter the length of the shark from the graph into (COLUMN E). This will automatically calculate the weight of the animal (COLUMN F). Weight is important for estimating the energetic requirements because energetic need is dependent on your mass.

Time for tailbeats (COLUMN G) can be found on the graphs. This is the amount of time it takes for the shark to complete 10 tailbeats. Once entered, the students can determine the tailbeat frequency- how many tailbeats/second (COLUMN H).

Using standard tailbeat conversion models (don't worry about knowing those), entering the tailbeat frequency will automatically calculate the speed (COLUMN I) and the amount of energy the animal needs to eat in a day to stay alive (COLUMN L). Use COLUMN L- Energy requirements- to answer the questions in the *Energy Costs Worksheet*.