Seals In-Depth

Objective

Given data, students will use math skills to organize, analyze, and interpret the results from a research project tracking elephant seals.

Materials

- ❑ copies of *Seals In-Depth worksheet* per student
- ❑ pencils and markers
- ❑ graph paper

Background

Recent research on the diving patterns of male elephant seals has revealed amazing data. In 1989, a small microprocessor-based time-depth recorder attached to a male elephant seal recorded a dive of 1,800 m (6,000 ft.). Male elephant seal dives can last as long as 80 minutes.

Action

1. Divide students into cooperative learning groups. Distribute materials and worksheets.
2. Ask each group to select one data set (dive depth, dive duration, or surface time). They complete the blanks on the worksheet; then design graphs or charts to represent the information. Groups should determine how to use the data in their graphs or charts (percentages, averages, frequency, or other). Groups then create two to three questions and two to three statements about the data and their work. (For example: does the data clump?)
3. After the groups have completed their data organization and analysis, have them present their work to other "scientists" in the class. Class scientists compare and contrast their work. Which graphs or charts represent the data best? Are there other ways to show the information?
4. When review is completed, ask the class, "Why do scientists want to know this information?" *Scientists seek to understand natural history, behavior such as diving and migrating, feeding strategies, habitat use, and to determine if competition exists between humans and the animals for natural resources. Research like this helps people make decisions on fishery management, land use, water recreation use, and other policies.*

Answers

1. diving depth: about 389 meters
2. dive duration: about 23 minutes
3. surface time: about 3:08 minutes

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Name _____

Treat each data box seperately; numbers do not correlate. Numbers represent only a portion of data collected.

DIVE DEPTH (m)
75
410
118
379
210
105
362
978
402
357
382
713
541
349
451

DIVE DURATION (min)
77
8
12
19
24
49
9
28
18
23
10
22
6
20
14

SURFACE TIME (min:sec)
1:56
2:25
3:30
3:45
7:21
0:30
5:47
2:19
2:31
3:22
2:56
0:41
3:31
5:02
1:18

ESTIMATE AVERAGES

1. diving depth: _____ meters

2. dive duration: _____ minutes

3. surface time: _____ minutes: seconds

CALCULATE AVERAGES

1. diving depth: _____ meters

2. dive duration: _____ minutes

3. surface time: _____ minutes: seconds

What scientists learned from the diving patterns of six male elephant seals.

- Seals were at sea for an average of 130 days. They made a total of 36,233 dives. Seal one: 7,137 dives. Seal two: 4, 292. Seal three: 5, 961. Seal four: 3, 812. Seal five: 7,714. Seal six: 7, 317.
- Seals were submerged 21 hours out of the day. They spent 15 hours either ascending or descending and 6 hours at the bottom.
- Bottom time (time spent at the bottom of a dive) accounted for about 29% of the durations of each seal's dive. Only 140 dives exceeded 1,000 m and of these, 73% had bottom times of 1 minutes or longer. Of the 40 dives that lasted 40 minutes or more, bottom time accounted for about 25%.
- The seals shared a diving depth mode of 350 to 450 m. An average of 41% of dives were to this depth. About 30% of dives were shallower. About 6% of dives were greater than 700 m.