

Top Speeds at Sea



Objective

Students will use time and distance to calculate the top speeds of two dolphin species and compare them to other marine animals' speeds.

Materials

- copies of *Top Speeds at Sea* worksheets per student
- pencils
- calculator

Background

Accurate, documented swim speeds of toothed whales (odontocetes) are rare, and only a small percentage of species have been measured. In general, toothed whales are the fastest-swimming of the marine mammals. Within the toothed whales, species in the family Delphinidae (dolphin) are the fastest. Killer whales may be the fastest dolphin. They can swim in bursts of speed as fast as 45 kph (28 mph), but probably only for a few seconds at a time. They usually cruise at less than 13 kph (8 mph); they can cruise slowly for long periods of time. Ganges and Indus River dolphins generally swim slowly. For them, a burst of speed is about 5.4 kph (3 mph). For just a few minutes, the fastest human swimmer may reach a speed of about 6.4 kph (4 mph). Most human swimmers are much slower.

A whale's characteristic fusiform shape is quite energy-efficient for swimming. Compared to other body shapes, this shape creates less drag (the opposing force an object generates as it travels through water). Blubber smooths the contour of a whale and contributes to its streamlined shape.

Some fast-swimming toothed whales "porpoise" at the surface: they swim fast enough to break free of the water, flying up and out and then back under in one continuous movement, which they generally repeat. Porpoising uses less energy than swimming fast at the surface. Certain toothed whales, such as common dolphins, sometimes ride ocean swells or a boat's bow or stern wake. Riding a wave or a wake, a dolphin can go almost twice as fast using the same energy cost.

Action

1. Distribute the *Top Speeds at Sea* worksheets to students. Read through the directions to make sure each student understands what to do.
2. When students have complete the worksheets, provide them with the correct answers so they may compare their calculations and responses.

Answers

1. $2.25/15 = X/60$ (60 divided by 15 multiplied by 2.25 = 9 mph; 14.4 kph)
2. $1.58/5 = X/60$ (60 divided by 5 multiplied by 1.58 = 19 mph; 30 kph)
3. $8.3/10 = X/60$ (60 divided by 10 multiplied by 8.3 = 50 mph; 80 kph)

4. $2/3.5 = X/60$ (60 divided by 3.5 multiplied by 2 = 34 mph; 54 kph)

Discussion Questions

1. Marlin
2. Moving fast takes more energy, decreases feeding opportunities, and can result in getting separated from a pod or group.
3. Much slower
4. Streamlined shapes, smooth skin, and strong, flexible tails.

Top Speeds at Sea



Name _____

Scientists timed several marine animals to figure out their top speeds. Read the descriptions of what the scientists observed, then calculate how fast each swimmer was going in miles per hour and in kilometers per hour (1 mile per hour = 1.6 kilometers per hour). Use the back of this worksheet for your calculations.

1. king penguin

In pursuit of a school of fish, a king penguin was observed “porpoising,” or plunging in and out of the sea as it moved forward. The penguin traveled 2.25 miles in 15 minutes. How fast was it going?

Answer: _____ mph, or _____ kph

2. striped dolphin

A group of striped dolphins had been frightened by the noise from a large ship. The dolphins took off at top speed, traveling 1.58 miles in 5 minutes. How fast were they going?

Answer: _____ mph, or _____ kph

3. marlin

A marlin was captured, equipped with a radio transmitter, then released. The fish immediately swam off at top speed, sending a signal back to the ship. It traveled an astounding 8.3 miles in 10 minutes. How fast was it going?

Answer: _____ mph, or _____ kph

4. Dall’s porpoise

Observing from a study ship, a scientist watched a Dall’s porpoise speed along the coast of an island that was 2 miles long. The porpoise covered the distance in 3.5 minutes. How fast was it going?

Answer: _____ mph, or _____ kph

Discussion

Which animal had the fastest speed? _____.

Large whales can move quickly when threatened, but usually move more slowly. Why do you think that is?

_____.

How do these top speeds compare with the fastest land animal — the cheetah — that can run up to 70 mph?

_____.

In what ways are dolphins’ bodies adapted to make them fast swimmers?

_____.