



In Class Exercises (ICE)



Figure 1: A great white shark (*Carcharodon carcharias*).

The great white shark (*Charcharodon carcharius*) is a magnificent animal that is perfectly adapted to its environment (see Figure 1).

This creature is feared and maligned by many people because of the image of the shark as a mindless, savage, sadistic killer from movies like “Jaws.”

In reality, far more people are killed each year by both bees and lightning¹ than are bitten (let alone killed) by all shark species combined.

It was long thought that the habitat of the great white included only North America, southern Africa, Australia, New Zealand and Japan. However, evidence has accumulated to suggest that great whites may also live in the Mediterranean sea².

In 1974, an anonymous reporter³ claimed to have seen a large Great White Shark off the coast of Sicily. Since then, Mediterranean Shark trust has collected information about sightings - mainly from southern Italy.

Number of Sharks (P)	13	16	21
Relative Growth Rate $(\frac{1}{P} \frac{dP}{dt})$	1.5	1.4	1.2

Table 1: Data collected for large shark sightings off the southern Italian coast.

¹ Source: G. H. Burgess. “Shark attack and the International Shark File.” in S. H. Gruber (Ed.) (1990) “Discovering Sharks.” Highlands, NJ: American Littoral Society.

² Source: Florida Museum of Natural History. Between 1890 and 1999, there were 64 reliable reports of unprovoked shark attacks in the Mediterranean. 38 of these have been attributed to great white sharks. Definitive evidence of white shark presence in the Mediterranean was provided on 27 August, 1998, when sport anglers filmed a large great white shark about 22 miles of the northern Italian coast, near the town of Senigallia. As soon as the film was made public, anxious Italian authorities closed all of the beaches on Italy’s northern Adriatic coast.

³ Anon. (1974) “Lo squalo di Favignana.” *Il Subaqueo*, **41**, August-September 1974. (In Italian.)

- **Based on the information provided in the table, find a differential equation that would do a good job of describing the shark population.**

- **Experts from the University of Florida estimate that when fifty or more sharks are living along a stretch of coastline, even tourists will start to notice them. Prior to 1984, no tourists at the Italian resort had spotted a shark. Is there a danger of tourists spotting sharks in the future? (The grid given below might be helpful.)**

