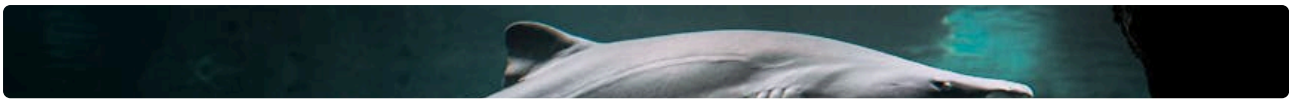

Sharks: Biology, Ecology, and Conservation

Reading Worksheet — Level F | tahricteaches.com

Sharks represent one of evolution's most successful experiments. Having **persisted** for over 450 million years, they have survived five mass extinction events that eliminated the majority of life on Earth. This extraordinary resilience reflects not rigidity but adaptability: the class Chondrichthyes—encompassing sharks, rays, and skates—has diversified into more than 500 species occupying ecological niches from shallow coral reefs to the abyssal depths of open ocean trenches.

The biological architecture of sharks is specifically suited to efficient predation. Rather than the rigid calcium-based bones of most vertebrates, sharks possess skeletons of **cartilage**, which is lighter and more flexible, enabling greater speed and maneuverability. Their skin is covered with tiny, tooth-like structures called dermal denticles, which reduce drag during swimming. Most remarkably, shark teeth are not permanently fixed; a single shark may produce and shed tens of thousands of teeth throughout its lifetime, each row replacing the last as it wears.

As apex predators, sharks play a critical **regulatory** role in marine ecosystems. By controlling the size and behavior of prey populations, they prevent any single species from dominating food webs in ways that could destabilize the broader ecosystem. Research on areas where shark populations have been depleted shows cascading effects: the unchecked growth of mid-level predators leads to the overconsumption of herbivorous fish, which in turn allows algae to overgrow coral reefs. The removal of sharks, in other words, triggers a chain of ecological consequences that extends far beyond any single species.

Human activity poses the gravest threat to shark survival. An estimated 100 million sharks are killed annually, primarily through targeted fishing for fins and meat, but also as **bycatch**—the unintended capture of non-target species in commercial fishing nets. The global shark fin trade, driven largely by demand for shark fin soup in parts of East Asia, has decimated populations of many large coastal species. Sharks are particularly vulnerable to overexploitation because of their slow reproductive rates: many species take over a decade to reach sexual maturity and produce only a small number of offspring.

Conservation efforts have expanded in recent years, with many nations establishing shark sanctuaries and implementing fin trade bans. International agreements such as CITES have listed a growing number of shark species, restricting commercial trade. However, enforcement remains inconsistent, and illegal, unreported, and unregulated (IUU) fishing continues to undermine legal protections. Changing the cultural perception of sharks—from feared predator to **ecological keystone**—may be as important as regulatory change in securing their long-term survival.

A. Vocabulary

1. persisted ____	a. fish and animals unintentionally caught while fishing for other species
2. cartilage ____	b. the ability to survive and recover from difficult conditions
3. regulatory ____	c. continued to exist over a long period of time
4. bycatch ____	d. a tough but flexible tissue found in some animals instead of bone
5. ecological keystone ____	e. relating to controlling or managing a system or population
6. apex predator ____	f. a species whose role in an ecosystem is critical to its balance
7. resilience ____	g. an animal at the top of the food chain with no natural predators
8. decimated ____	h. drastically reduced in number

B. True or False

_____ 1. Sharks have survived more than five mass extinction events in Earth's history.

_____ 2. Shark skeletons are made of the same calcium-based bone as most other vertebrates.

_____ 3. Dermal denticles reduce drag and help sharks swim more efficiently.

_____ 4. Apex predators have no effect on the behavior of prey populations.

_____ 5. The removal of sharks from an ecosystem causes no lasting damage.

_____ 6. Many shark species have slow reproductive rates, making recovery from overfishing difficult.

_____ 7. Shark fin soup demand is a major driver of the shark fin trade.

_____ 8. CITES has restricted commercial trade in some shark species.

_____ 9. IUU fishing has no effect on legal conservation efforts.

_____ 10. The article suggests that changing cultural attitudes toward sharks is part of conservation.

C. Fill in the Blanks

Word Bank: persisted, cartilage, regulatory, bycatch, ecological keystone, apex predator, resilience, decimated

1. Sharks have _____ through five mass extinctions, showing remarkable survival ability.

2. A shark's skeleton is made of lightweight _____ rather than bone.

3. As an _____, the shark controls prey populations and ecosystem balance.

4. Sharks caught unintentionally in fishing nets are counted as _____ .

5. Shark populations have been _____ by decades of overfishing and fin trade.

D. Comprehension Questions

1. What happens to marine ecosystems when shark populations are depleted? Describe the chain of effects.

2. Why are sharks particularly vulnerable to overfishing compared to other fish species?

3. What does the article suggest is needed beyond legal protection to ensure shark survival?

E. Discussion Questions

1. Should the shark fin trade be banned globally? What cultural or economic factors make this complicated?

2. How does the concept of an "ecological keystone" change how we should think about conservation priorities?

Answer Key

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A. Vocabulary: 1-c, 2-d, 3-e, 4-a, 5-f, 6-g, 7-b, 8-h

B. True/False: 1-T, 2-F, 3-T, 4-F, 5-F, 6-T, 7-T, 8-T, 9-F, 10-T

C. Fill Blanks: 1-persisted, 2-cartilage, 3-apex predator, 4-bycatch, 5-decimated

D. Comprehension:

1. Mid-level predators grow unchecked, overconsume herbivorous fish, and allow algae to overgrow coral reefs, destabilizing the ecosystem.
2. Many shark species take over a decade to reach maturity and produce very few offspring, so populations recover very slowly.
3. Changing the cultural perception of sharks from feared predators to ecological keystones.

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