

REEF ENCOUNTERS

^ A spine-cheek clownfish hides in a sea anemone on a coral reef.

WARM UP

Discuss these questions with a partner.

1. What do you know about coral reefs? Can you think of any famous ones?
2. What are some threats to the world's oceans?

BEFORE YOU READ

TRUE OR FALSE A. Look at the picture and read the caption. Are the sentences below true or false? Circle T (true) or F (false).

1. Coral reefs are usually found in warm water. T F
2. Coral polyps are a type of plant. T F
3. A coral reef usually gets smaller over time. T F
4. Some coral reefs are over a million years old T F

PREDICTING B. Look quickly at the title, headings, photos, and captions on the following pages. Check (✓) the information you think you will read about. Then read the passage to check your ideas.

- | | |
|---|---|
| <input type="checkbox"/> how coral reefs are formed | <input type="checkbox"/> problems affecting reefs |
| <input type="checkbox"/> coral reef wildlife | <input type="checkbox"/> threats to coral fishermen |

CITIES BENEATH THE SEA

A For uncounted generations, trillions¹ upon trillions of coral polyps have lived and died, leaving behind a material called limestone. Prized throughout history, limestone was used to **construct** the Great Pyramids of Egypt, as well as many churches and castles. Yet the greatest limestone structures in the world are built underwater, by the coral polyps themselves. We call them reefs. They can be even larger in scale than the most impressive buildings and structures made by humans.

1 A **trillion** is 1,000,000,000,000.

A Variety of Life

- B Indeed, a living coral reef is **remarkable**, a “city beneath the sea” filled with a rich variety of life. Most coral reefs can be found in warm, **shallow** oceans. They **occupy** just a small part of the ocean floor, but host 25 percent of all ocean life.
- C Coral reefs display nature’s most **brilliant** colors. Each reef is full of colorful fish as well as coral that form wonderful patterns. In addition to their beauty, the reefs are an important food source for fish, and for humans. In fact, reef fish make up a significant percentage of the global fish catch.

◀ Mostly found in water warmed by sunlight, reefs are built by coral polyps—tiny, soft-bodied animals related to jellyfish. As more coral polyps come together, the reef grows. Some coral reefs began growing over 50 million years ago.

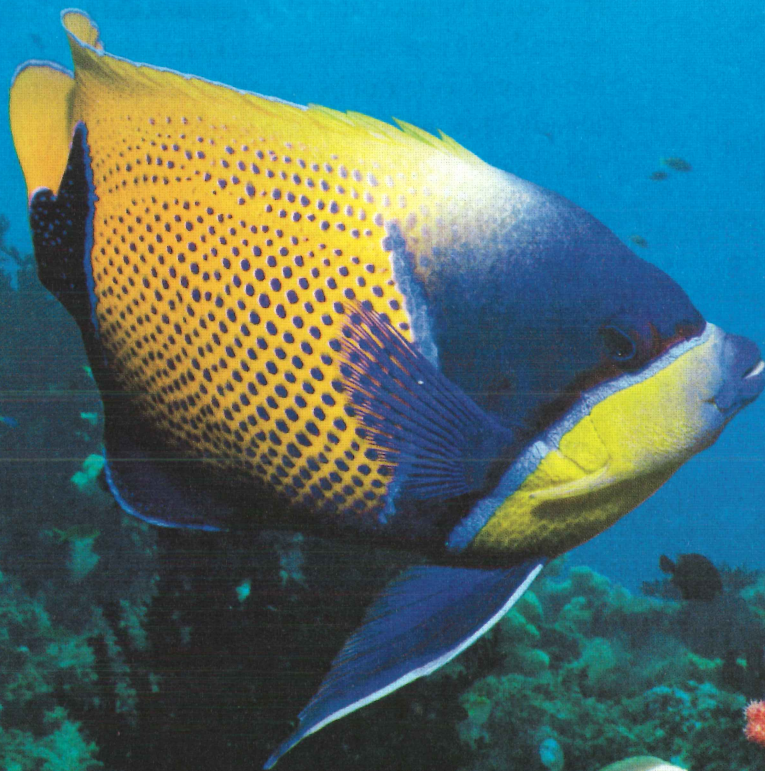
RESIDENTS OF THE REEF

Coral reefs occupy less than 1 percent of the surface area of the world's oceans, but they provide a home for 25 percent of all marine fish species. Here are some examples of the creatures that call a coral reef home.

▼ Spot-banded butterflyfish



▲ A blue-girdled angelfish



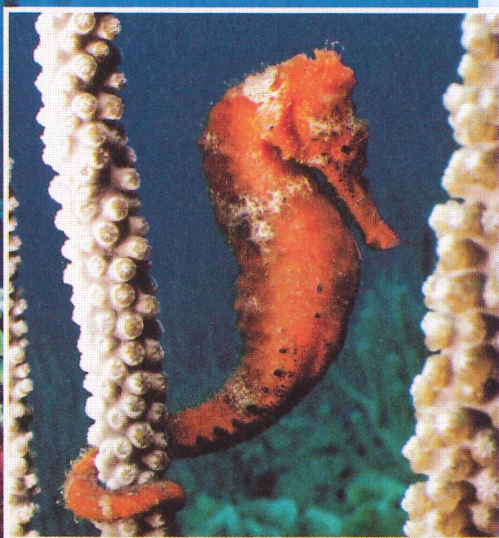
➤ A redfin butterflyfish



- ✓ A nudibranch uses its bright colors to tell predators to stay away.



- ✓ A longsnout seahorse "stands" between coral branches.



- ✓ A red jellyfish swims above a coral reef in the Philippines.



Threats to Coral Reefs

- D Various human activities can cause great harm to the world's coral reefs. For example, reefs can be damaged when the coral is taken for use in building materials, jewelry-making, or to fill aquariums.²
- E Illegal fishing methods like blast and cyanide fishing also harm the reefs. These methods can help fishermen get a good catch, but their **negative** effects on the reefs are significant. Blast fishing involves setting off bombs in the water to kill as many fish as possible. This kills most living things nearby and causes damage to the reef's structure.
- F In cyanide fishing, fishermen **release** liquid cyanide—a very dangerous and deadly **chemical**—into the reef. As a result, the fish become stunned,³ which makes them easy to collect. Meanwhile, the reef is damaged by the cyanide, which kills large numbers of coral polyps. The reef is also damaged by the fishermen who break it apart looking for the stunned fish.
- G Another threat is water **pollution**. When floods⁴ in Australia covered the Great Barrier Reef with dirty freshwater, the quality of the water changed and chemicals killed the reef life. This is happening to many reefs around the world.
- H In addition, global warming has caused many reefs to become sick. Warmer temperatures have turned them white, in a process known as coral bleaching. A 2018 UN Report predicted that up to 99 percent of the world's coral reefs may decline if global warming continues.

Reasons for Hope

- I These threats to coral reefs are very serious, but there is reason to hope that they will survive. If we take steps toward coral reef **conservation**, it is likely that these tiny creatures—which survived natural threats for millions of years—will be able to rebuild. As conservationist Robert Richmond says, "Given a chance, they can come back."

² An **aquarium** is a tank or building where sea animals are kept.

³ If an animal is **stunned**, it is confused or hurt and unable to move.

⁴ A **flood** is a large amount of water covering an area of land that is usually dry.

READING COMPREHENSION

A. Choose the best answer for each question.

GIST

1. What is the reading mainly about?
 - a. efforts to save the world's coral reefs
 - b. the kinds of animals found near coral reefs
 - c. the beauty of reefs and the dangers they face

DETAIL

2. Which statement about coral reefs is NOT true?
 - a. They are usually found in deep ocean waters.
 - b. They are among the world's most colorful places.
 - c. They can be larger than structures made by humans.

DETAIL

3. Why do some fishermen use the method of blast fishing?
 - a. to destroy the coral reefs
 - b. to kill as many fish as possible
 - c. to stun the fish and make them easier to catch

PARAPHRASING

4. What was the conclusion of the 2018 UN Report mentioned in paragraph H?
 - a. If global temperatures keep rising, almost all of the world's coral reefs could decline.
 - b. Global temperatures will continue to rise, and this may cause more coral bleaching.
 - c. The bleaching of coral reefs is likely to increase the speed of global warming.

MAIN IDEA

5. Which sentence best expresses the main idea of the final paragraph?
 - a. Governments around the world are working to save coral reefs.
 - b. There is hope because conservationists have already saved many reefs.
 - c. With our help, coral reefs can continue to survive.



^ A coral polyp

UNDERSTANDING AFFIXES

Review this reading skill in Unit 5B

B. In each sentence from the reading, write a definition for the **bold** word.

1. For **uncounted** generations, trillions upon trillions of coral ... (paragraph A)

Definition: _____

2. Each reef is full of **colorful** fish ... (paragraph C)

Definition: _____

3. ... these tiny creatures ... will be able to **rebuild** ... (paragraph I)

Definition: _____

Understanding Cause-and-Effect Relationships

Understanding cause-and-effect relationships within a text is an important part of reading comprehension.

A *cause* is an action that makes something happen. An *effect* is a result of that action. Certain connecting words show these relationships. In these examples, the cause is *the heavy rain* and the effect is *the flood*.

The heavy rain **caused / resulted in / was the reason for** *the flood*.

There was heavy rain. **Therefore, / Consequently, / As a result,** *there was a flood.*

There was heavy rain, **so** *there was a flood.*

Because of / As a result of *the heavy rain,* *there was a flood.*

To improve your understanding of certain texts, it can be useful to summarize any cause-and-effect relationships in a chart.

IDENTIFYING
CAUSES AND
EFFECTS

A. Circle the causes and underline the effects in this text.

Not all reefs begin naturally. For example, an ocean current may encounter a man-made object, like a sunken ship. As a result, the water around the ship may become rich with tiny animals called plankton. A lot of small fish gather there to feed on the plankton. Consequently, larger animals are attracted to the ship. Because the ship has many little openings, many creatures also have a place to hide. In time, the ship becomes covered in polyps. As a result, it no longer looks like a ship at all.

UNDERSTANDING
CAUSES AND
EFFECTS

B. Use the information in activity A to complete the chart.

Causes	Effects
1. Ocean current encounters sunken ship.	
2. A lot of small fish gather there to feed.	
3.	Many creatures have a place to hide.
4.	

CRITICAL THINKING Evaluating Ideas

Look at the suggestions for protecting coral reefs. Rank them 1–4 (1 = the best idea). Discuss your ideas with a partner and explain your reasons.

___ ban all fishing near coral reefs

___ ban people from selling coral products

___ stop tourists from diving near reefs

___ start a campaign to raise awareness

VOCABULARY PRACTICE

DEFINITIONS A. Read the information. Then match each word in **red** with its definition.

Not all coral is found in warm, **shallow** water. Some coral polyps can survive in cold water at the bottom of the ocean. But even there, they're not safe. Fishing boats—called bottom trawlers—pull heavy nets across the ocean floor. These nets have a very **negative** effect on deep sea coral and the **remarkable** sea life around it. Because the **conservation** of these corals is important, the United States has a law that prevents bottom trawling in over a million square kilometers of ocean off its Pacific coast.

1. harmful or bad _____
2. the opposite of *deep* _____
3. special and amazing _____
4. taking care of the environment _____



^ A heavy net is dragged across the ocean floor by a bottom trawler.

WORDS IN CONTEXT B. Complete the sentences. Circle the correct options.

1. If you catch a fish and then **release** it, you *don't keep / keep* it.
2. If you **construct** a house, you *build / buy* it.
3. If you **occupy** a place, you *stay / leave* there.
4. In a city with high levels of **pollution**, the air is likely to be very *clean / dirty*.
5. A color that is described as **brilliant** is probably very *bright / dark*.
6. People often create **chemicals** in a *library / science lab*.

COLLOCATIONS C. The nouns in the box are often used with the word **negative**. Complete the sentences with the correct form of the words in the box.

effect meaning response thought

1. The word *skinny* has a more negative _____ than the word *slim*.
2. There was a largely negative _____ to the government's plans to increase income tax.
3. Playing video games late at night can have a negative _____ on your sleep.
4. Sports psychologists believe that negative _____ can affect an athlete's performance.

BEFORE YOU READ

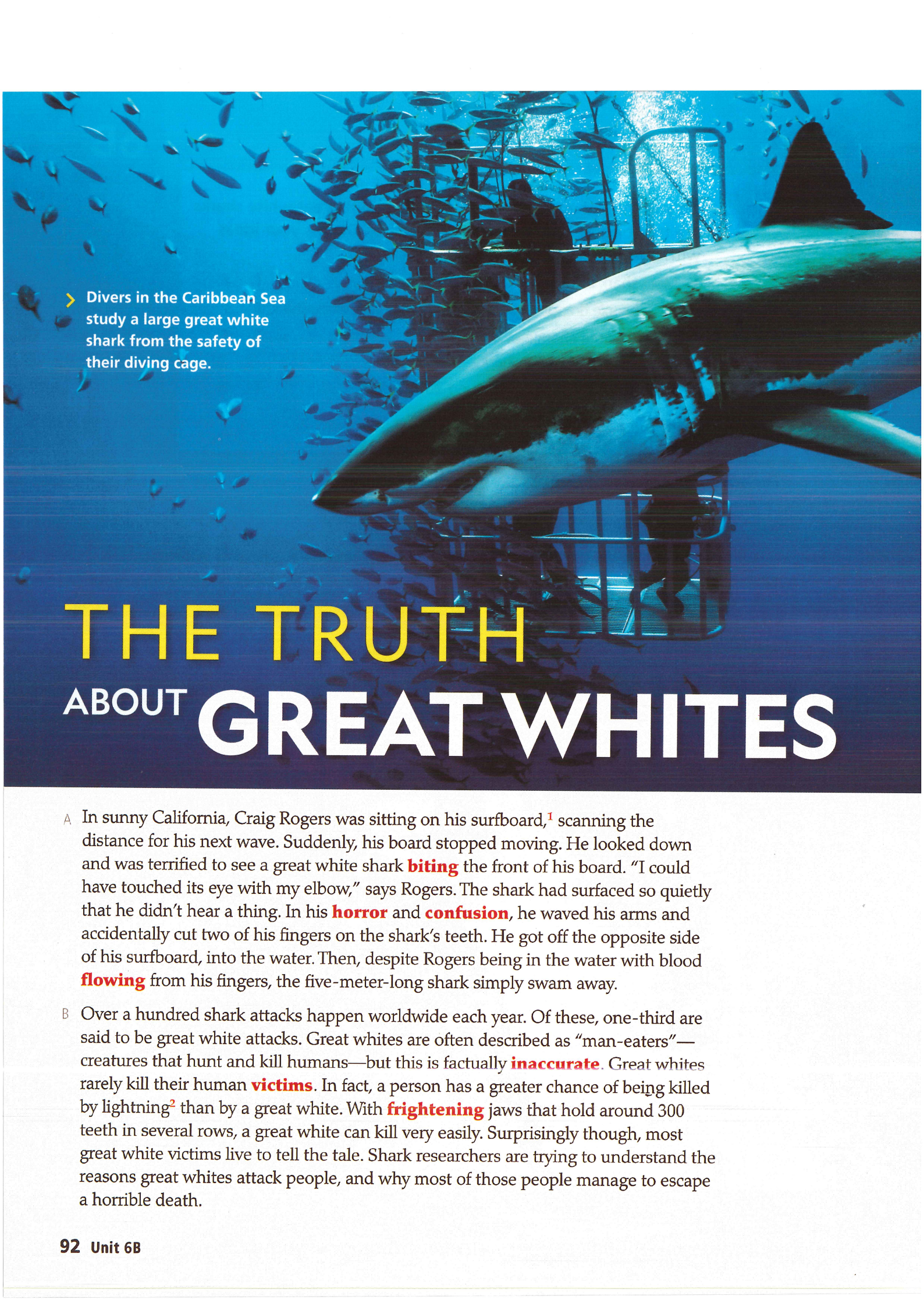
QUIZ A. Do you think the following statements about great white sharks are true or false? Circle **T** (true) or **F** (false). Discuss your ideas with a partner.

1. Most shark attacks are by great white sharks. **T F**
2. Most people do not survive an attack by a great white shark. **T F**
3. There is more chance of being killed by lightning than by a great white shark. **T F**
4. Great white sharks have around 300 teeth. **T F**

SKIMMING B. Skim the passage and check your ideas in activity A.

- ✓ **Great white sharks attack their prey at speeds of up to 40 kilometers an hour.**





> Divers in the Caribbean Sea study a large great white shark from the safety of their diving cage.

THE TRUTH ABOUT GREAT WHITES

- A In sunny California, Craig Rogers was sitting on his surfboard,¹ scanning the distance for his next wave. Suddenly, his board stopped moving. He looked down and was terrified to see a great white shark **biting** the front of his board. “I could have touched its eye with my elbow,” says Rogers. The shark had surfaced so quietly that he didn’t hear a thing. In his **horror** and **confusion**, he waved his arms and accidentally cut two of his fingers on the shark’s teeth. He got off the opposite side of his surfboard, into the water. Then, despite Rogers being in the water with blood **flowing** from his fingers, the five-meter-long shark simply swam away.
- B Over a hundred shark attacks happen worldwide each year. Of these, one-third are said to be great white attacks. Great whites are often described as “man-eaters”—creatures that hunt and kill humans—but this is factually **inaccurate**. Great whites rarely kill their human **victims**. In fact, a person has a greater chance of being killed by lightning² than by a great white. With **frightening** jaws that hold around 300 teeth in several rows, a great white can kill very easily. Surprisingly though, most great white victims live to tell the tale. Shark researchers are trying to understand the reasons great whites attack people, and why most of those people manage to escape a horrible death.



✓ Great whites can be found in seas all over the world. In some places, such as Australia and South Africa, they are protected.



- C One of the most common explanations for great white attacks is that great whites don't see well. It is thought that they often mistake a person for a seal or sea lion—a very **tempting** snack. However, there is reason to doubt this. Some research now shows that great whites can actually see—and identify seals—very well. When attacking seals, great whites shoot up to the surface and bite with great **force**. However, when they approach humans, they often move in slowly and bite with less force. “They take a bite, feel them over, then move on,” says Peter Klimley, author of *The Secret Lives of Sharks*.
- D Shark experts like Klimley believe that great whites “attack” because they are actually curious animals that like to investigate things. They believe that it's possible great whites use their bite not just to kill and eat, but also to **gather** information. According to this idea, once a great white identifies what it is biting, it simply lets go.
- E Even though such experiences are unlucky for people like Craig Rogers, perhaps when sharks bite surfboards, other objects, or even people, they are just trying to learn what they are.

1 A **surfboard** is a long, narrow board used for surfing.

2 The bright flashes of light and electricity often seen in the sky during rainstorms is **lightning**.

READING COMPREHENSION

A. Choose the best answer for each question.

GIST

1. What would be the best alternative title for the reading?
 - a. How to Survive a Shark Attack
 - b. Why Great Whites Kill Humans
 - c. Great Whites: Facts and Fiction

DETAIL

2. After Craig Rogers fell into the water, _____.
 - a. the shark swam away
 - b. the shark bit his fingers
 - c. the shark bit his surfboard

PURPOSE

3. What is the purpose of paragraph C?
 - a. to explain why great whites don't see well
 - b. to provide advice on what to do if you see a great white
 - c. to give possible reasons why great whites don't kill humans

REFERENCE

4. In the last sentence of paragraph C, the word *them* refers to _____.
 - a. people
 - b. teeth
 - c. great whites

FACT OR SPECULATION?

5. Which statement is a fact and not speculation?
 - a. Great whites are not able to see well.
 - b. Great whites bite to get information.
 - c. Great whites eat seals and sea lions.



^ A great white shark tooth (pictured here in actual size) can measure more than six centimeters long.

UNDERSTANDING
MAPS AND
INFOGRAPHICS

Review this
reading skill
in Unit 5A

B. Look at the map on the previous page. Complete each sentence (1–3) with the correct ending (a–d). One ending is extra.

- a. off the coasts of countries close to the equator
- b. off the southern coast of Tasmania
- c. off the southern coasts of Australia and South Africa
- d. in the cold waters near the North and South Poles

1. Great white sharks can be found all year round ____.
2. There are no great white sharks ____.
3. Great white sharks are only occasionally found ____.

READING SKILL

Recognizing Contrastive Relationships

Writers use certain words and phrases to indicate a contrast between ideas presented in a text. It is important to identify and understand these phrases in order to fully comprehend the passage. The words and phrases in **bold** below are common examples.

*I'm a good swimmer, **but / yet** I rarely go swimming.*

*I'm a good swimmer. **However**, I rarely go swimming.*

Though / Although / Even though *I'm afraid of the water, I went swimming.*

*I went swimming **though / although / even though** I'm afraid of the water.*

*I went swimming in the sea **despite / in spite of** the bad weather.*

Despite / In spite of *the bad weather, I went swimming in the sea.*

RECOGNIZING CONTRAST

A. These sentences are from the reading. Circle the correct connecting words. Look back at Reading B to check your answers.

1. Then, **but / despite** Rogers being in the water with blood flowing from his fingers, the five-meter-long shark simply swam away.
2. A great white can very easily kill. Surprisingly, **although / though**, most great white victims live to tell the tale.
3. It is thought that they often mistake a person for a seal or a sea lion—a very tempting snack. **However / Even though**, there is reason to doubt this.
4. **Even though / However** such experiences are unlucky for people like Craig Rogers, perhaps when sharks bite surfboards, other objects, or even people, they are just trying to learn what they are.

UNDERSTANDING CONTRAST

B. Combine each pair of sentences using the word or phrase in parentheses.

1. Great white sharks are dangerous. They rarely kill humans. (**even though**)

2. Great white sharks are often seen off the coast of Australia. Surfing is popular there. (**however**)

CRITICAL THINKING Analyzing Reasons

- ▶ Look back at paragraphs C and D of the reading. What are the two explanations for great white shark attacks that the author mentions? Note your answers below.

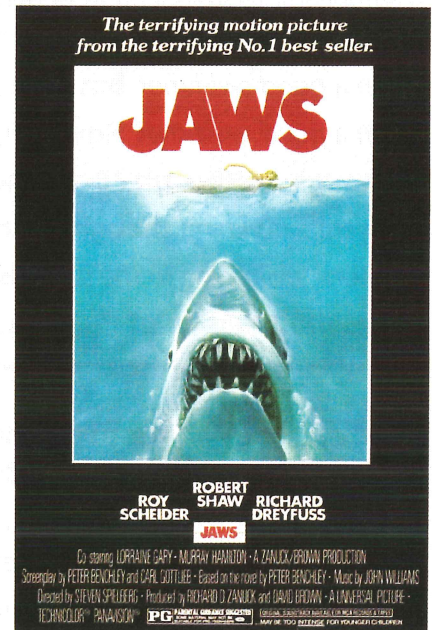
- ▶ Which explanation does the author think is more likely? How do you know? Discuss with a partner.

VOCABULARY PRACTICE

COMPLETION A. Complete the information with words from the box. One word is extra.

bite confusion flow horror inaccurate victims

In 1974, writer Peter Benchley wrote the famous novel *Jaws*, about a killer shark that hunts its human ¹_____. The next year, Steven Spielberg made a movie of the same name. While the movie was popular, it led to some ²_____ about the true nature of great whites. The movie made the great white into a symbol of ³_____ and death. However, the behavior of the shark shown in *Jaws* is actually ⁴_____. The truth is that great whites rarely ⁵_____ humans. Years later, Benchley and Spielberg both felt bad about creating a false image of these creatures.



WORDS IN CONTEXT

B. Choose the correct words to complete the sentences.

- Most but not all rivers **flow** / **force** into the sea.
- Seeing a shark in the water is a **frightening** / **tempting** experience.
- Shark researchers often put food in the ocean. Its **tempting** / **gathering** smell attracts the sharks.
- Serious damage from a shark bite is due to the size and sharpness of its teeth, rather than the **flow** / **force** of its bite.
- Each year, great white sharks **gather** / **flow** near Cape Town to eat seals, which are plentiful in South Africa's water.

WORD PARTS

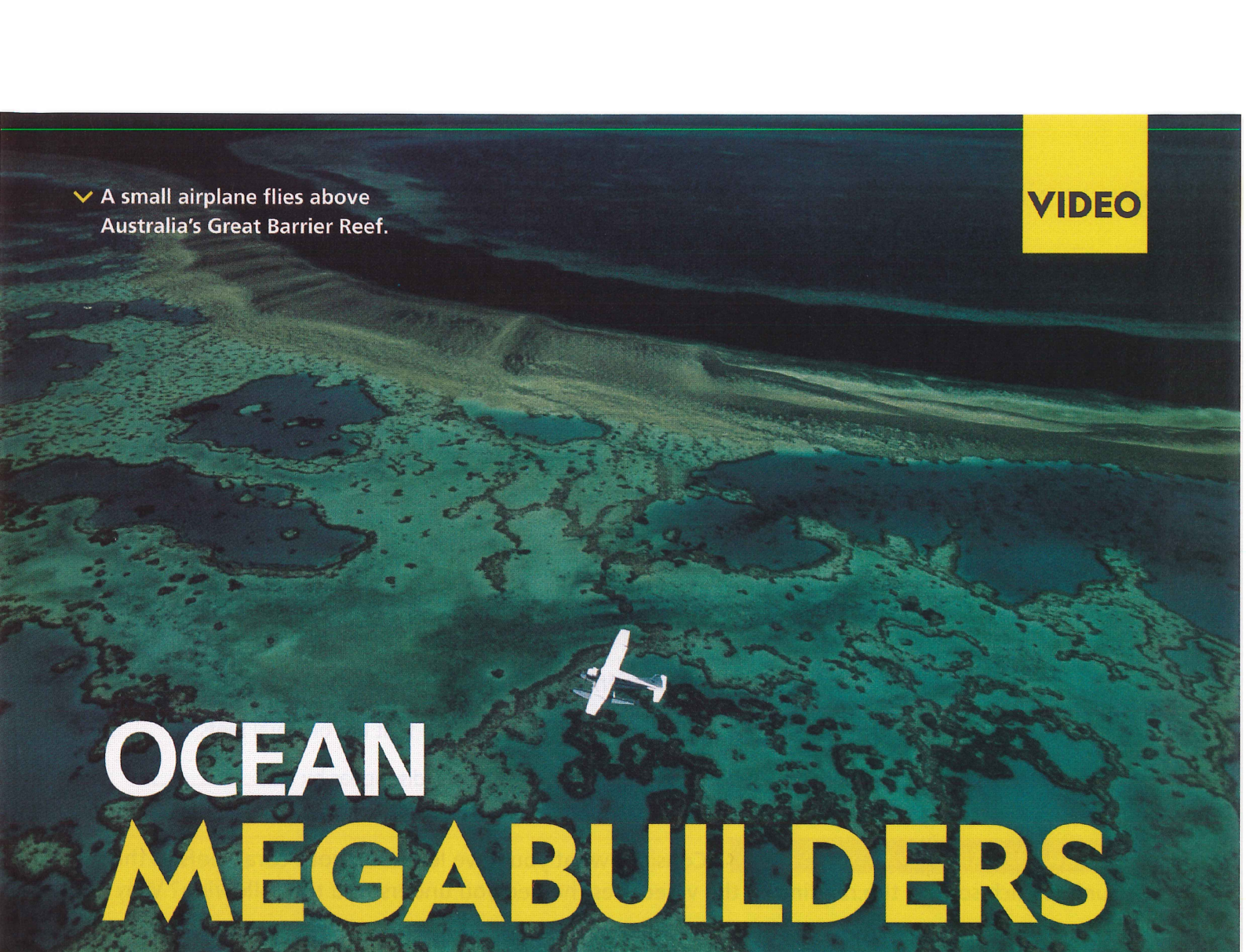
C. The word **inaccurate** is formed using the prefix *in-*. The prefix can be added to other words to make their opposite. Complete the sentences with the words in the box.

complete correct expensive

- Though scientists know a lot about sharks, their knowledge is still in_____.
- The idea that sharks are man-eaters is largely in_____.
- Scientists are looking for new, in_____ ways of collecting data about sharks.

✓ A small airplane flies above Australia's Great Barrier Reef.

VIDEO



OCEAN MEGABUILDERS

BEFORE YOU WATCH

PREVIEWING A. Read the information. The words in **bold** appear in the video. Match each word with its definition.

Located off the coast of Australia, the Great Barrier Reef Marine Park **stretches** for over 3,000 kilometers. It provides a **habitat** for thousands of diverse species of sea creatures. All these creatures depend on the coral polyp **colonies** that make up the reef. Sadly, in 2016, scientists found that 30 percent of the reef's corals died as a result of a heatwave. Today, scientists **warn** that it may be too late to save much of the reef and its beautiful coral, but they are trying to find ways to stop the damage.

- | | | |
|------------|---|---|
| 1. habitat | • | • a. (v) to tell someone about possible danger |
| 2. colony | • | • b. (n) a place where something can live |
| 3. warn | • | • c. (v) to cover an area or distance |
| 4. stretch | • | • d. (n) a large group of individuals that live in the same place |

QUIZ B. What do you remember about coral reefs from Reading A? Discuss the questions below with a partner.

1. Are coral reefs mainly found in warm or cool waters around the world?
2. What is the name of the tiny creatures that make up coral reefs?
3. What material is used in the building of coral reefs?

WHILE YOU WATCH

GIST A. Watch the video. Check your answers in Before You Watch B.

COMPLETION B. Read the notes below. Complete the information as you watch the video again.

Coral Reef Facts:

- A reef is made up of animals called polyps. Biggest polyps are the size of a ¹_____.
- The Great Barrier Reef is the ²_____ coral reef in the world. It is around ³_____ years old.
- Coral reefs provide habitats for ⁴_____ percent of all sea creatures.
- By studying limestone layers, scientists learn about the Earth's past ⁵_____.
- About ⁶_____ million people depend on fish that live on coral reefs.
- Scientists think that without action, many reefs will disappear by ⁷_____.

CRITICAL THINKING Evaluating Sources

Consider what you have learned about coral reefs in this unit. Which source, the reading or the video, best helped you understand the following? Why?

how coral reefs are formed

the threats facing coral reefs

why coral reefs are important

what we can do to protect coral reefs

VOCABULARY REVIEW

Do you remember the meanings of these words? Check (✓) the ones you know. Look back at the unit and review any words you're not sure of.

Reading A

- | | | | | |
|------------------------------------|------------------------------------|---------------------------------------|-------------------------------------|------------------------------------|
| <input type="checkbox"/> brilliant | <input type="checkbox"/> chemical* | <input type="checkbox"/> conservation | <input type="checkbox"/> construct* | <input type="checkbox"/> negative* |
| <input type="checkbox"/> occupy | <input type="checkbox"/> pollution | <input type="checkbox"/> release* | <input type="checkbox"/> remarkable | <input type="checkbox"/> shallow |

Reading B

- | | | | | |
|---------------------------------|------------------------------------|--------------------------------------|-----------------------------------|--------------------------------------|
| <input type="checkbox"/> bite | <input type="checkbox"/> confusion | <input type="checkbox"/> flow | <input type="checkbox"/> force | <input type="checkbox"/> frightening |
| <input type="checkbox"/> gather | <input type="checkbox"/> horror | <input type="checkbox"/> inaccurate* | <input type="checkbox"/> tempting | <input type="checkbox"/> victim |

* Academic Word List