

Traveling with Only the Wind and a Sail

Do you know how a sailboat uses the wind to take the sailor where he or she wants to travel?

¹ Many people today are asking which energy sources are the safest and most efficient. In fact, there is one resource that creates no pollution and can be found almost anywhere, even right outside your front door—wind! Human beings have been using wind as an energy source for thousands of years. One of the main ways people have used wind is to propel boats across water, a form of transportation called *sailing*.

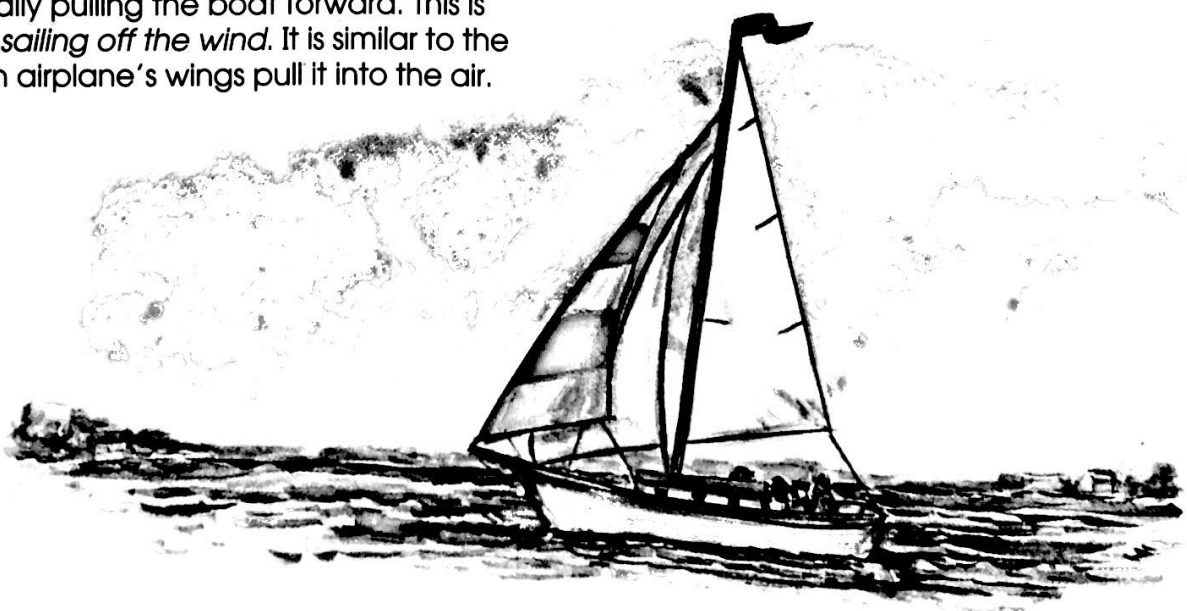
² Sails are large pieces of cloth suspended above the boat. They are used to catch the wind and move the boat forward. When the wind comes from behind the boat, the process is pretty simple. The boat is pushed in the same direction the wind is blowing. This is called *sailing before the wind*. But what if you don't want to go in that direction? Sailing would not be a very good way to travel if you could only move where the wind took you.

³ The sail is designed to rotate so that it can be used in different ways depending on the direction the wind is blowing. When the wind comes from the side, the sail is turned so that the air moving across it creates a vacuum. Now, instead of pushing, the wind is actually pulling the boat forward. This is called *sailing off the wind*. It is similar to the way an airplane's wings pull it into the air.

⁴ One problem still remains. How do you sail straight into the wind? The answer is that you cannot. When the wind is blowing from the front of the boat, the sailor must zigzag back and forth to go in that direction. First, the boat sails off to the right of the wind. Then, the sail is quickly rotated to the opposite side, and the boat sails to the left of the wind. This is called *tacking*.

⁵ Although the sail is the most visible part of the boat, an equally important element is located beneath the water. The keel is like a fin that comes out of the bottom of the boat and keeps it moving forward. When the wind is blowing from the side, the boat naturally wants to turn and travel in the opposite direction. Extending down into the water, the knifelike shape of the keel slices through the water and holds the boat in a forward position. Both the sail and the keel are needed to get the boat to its destination.

⁶ The next time you feel a cool breeze or a gust of wind sweeps a piece of paper from your hand, think about the power of the wind. It's strong enough to take you anywhere you'd like to travel, just as long as you have a strong sail and the knowledge to harness the power of the wind.



1. What does it mean to *sail before the wind*?

2. Why does a sail need to be able to rotate?

3. When does a sailor need to travel in a zigzag pattern?

4. What purpose does a sailboat's keel serve?

5. Check the phrase that best describes the author's purpose.

___ to share information about how a sailboat works

___ to entertain the reader with a story about funny experiences with sailing

___ to inform the reader about great sailors of the past century

6. Check the line beside the word that best describes what type of selection this is.

___ informational

___ fiction

___ autobiography

7. In paragraph 6, what does *harness* mean?

8. The author compares the keel to a _____.

9. When the wind pulls a boat forward, it is called _____.