

READING PASSAGE 3.1.

JELLYFISH: A REMARKABLE MARINE LIFE FORM

When viewed in the wild, jellyfish are perhaps the most graceful and vividly coloured of all sea creatures. But few people have seen a jellyfish living in its natural habitat. Instead, they might see a dead and shapeless specimen lying on the beach, or perhaps receive a painful sting while swimming, so it is inevitable that jellyfish are often considered ugly and possibly dangerous. This misunderstanding can be partly traced back to the 20th century, when the use of massive nets and mechanical winches often damaged the delicate jellyfish that scientists managed to recover. As a result, disappointingly little research was carried out into jellyfish, as marine biologists took the easy option and focused on physically stronger species such as fish, crabs, and shrimp. Fortunately, however, new techniques are now being developed. For example, scientists have discovered that sound bounces harmlessly off jellyfish, so in the Arctic and Norway researchers are using sonar to monitor jellyfish beneath the ocean's surface. This, together with aeroplane surveys, satellite imagery and underwater cameras, has provided a wealth of new information in recent years.

Scientists now believe that in shallow water alone there are at least 38 million tonnes of jellyfish, and these creatures inhabit every type of marine habitat, including deep water. Furthermore, jellyfish were once regarded as relatively solitary, but this is another area where science has evolved. Dr Karen Hansen was the first to suggest that jellyfish are in fact the centre of entire ecosystems, as shrimp, lobster, and fish shelter and feed among their tentacles. This proposition has subsequently been conclusively proven by independent studies. DNA sequencing and isotope analysis have provided further insights, including the identification of numerous additional species of jellyfish unknown to science only a few years ago.

This brings us to the issue of climate change. Research studies around the world have recorded a massive growth in jellyfish populations in recent years and some scientists have linked this to climate change. However, while this may be credible, it cannot be established with certainty as other factors might be involved. Related to this was the longstanding academic belief that jellyfish had no predators and therefore there was no natural process to limit their numbers. However, observations made by Paul Dewar and his team showed that this was incorrect. As a result, the scientific community now recognises that species including sharks, tuna, swordfish, and some salmon all prey on jellyfish.

It is still widely assumed that jellyfish are among the simplest lifeforms, as they have no brain or central nervous system. While this is true, we now know they possess senses that allow them to see, feel and interact with their environment in subtle ways. What is more, analysis of so-called 'upside-down jellyfish' shows that they shut down their bodies and rest in much the same way that humans do at night, something once widely believed to be impossible for jellyfish. Furthermore, far from 'floating' in the water as they are still sometimes thought to do, analysis has shown jellyfish to be the most economical swimmers in the animal kingdom. In short, scientific progress in recent years has shown that many of our established beliefs about jellyfish were inaccurate.

Jellyfish, though, are not harmless. Their sting can cause a serious allergic reaction in some people and large outbreaks of them – known as 'blooms' – can damage tourist businesses, break fishing nets, overwhelm fish farms, and block

industrial cooling pipes. On the other hand, jellyfish are a source of medical collagen used in surgery and wound dressings. In addition, a particular protein taken from jellyfish has been used in over 30,000 scientific studies of serious diseases such as Alzheimer's. Thus, our relationship with jellyfish is complex as there are a range of conflicting factors to consider.

Jellyfish have existed more or less unchanged for at least 500 million years. Scientists recognise that over the planet's history there have been three major extinction events connected with changing environmental conditions. Together, these destroyed 99% of all life, but jellyfish lived through all three. Research in the Mediterranean Sea has now shown, remarkably, that in old age and on the point of death, certain jellyfish are able to revert to an earlier physical state, leading to the assertion that they are immortal. While this may not technically be true, it is certainly an extraordinary discovery. What is more, the oceans today contain 30% more poisonous acid than they did 100 years ago, causing problems for numerous species, but not jellyfish, which may even thrive in more acidic waters. Jellyfish throughout their long history have shown themselves to be remarkably resilient.

Studies of jellyfish in class known as scyphozoan have shown a life cycle of three distinct phases. First, thousands of babies known as planulae are released. Then, after a few days the planulae develop into polyps – stationary lifeforms that feed off floating particles. Finally, these are transformed into something that looks like a stack of pancakes, each of which is a tiny jellyfish. It is now understood that all species of jellyfish go through similarly distinct stages of life. This is further evidence of just how sophisticated and unusual these lifeforms are.

Questions 27-32.

Do the following statements agree with the claims of the writer in the passage?

In boxes 27-32 on your answer sheet, write:

- YES** if the statement agrees with the claims of the writer.
NO if the statement contradicts the claims of the writer.
NOT GIVEN if it is impossible to say what the writer thinks about this.

27. It is surprising that many people have negative views of jellyfish.
28. In the 20th century, scientists should have conducted more studies of jellyfish.
29. Some jellyfish species that used to live in shallow water may be moving to deep water.
30. Dr Karen Hansen's views about jellyfish need to be confirmed by additional research.
31. It is possible to reverse the consequences of climate change.
32. The research findings of Paul Dewar have been accepted by other academics.

Questions 33-36.

Choose the correct letter, A, B, C or D.

Write the correct letter in boxes 33-36 on your answer sheet.

33. What is the writer doing in the fourth paragraph?

- A. comparing several different types of jellyfish.
 - B. dismissing some common ideas about jellyfish.
 - C. contrasting various early theories about jellyfish.
 - D. rejecting some scientific findings regarding jellyfish.
34. What does the writer conclude in the fifth paragraph?
- A. Jellyfish have advantages and disadvantages for humans.
 - B. Humans have had a serious negative impact on jellyfish.
 - C. Jellyfish will cause problems for humans in the future.
 - D. Humans and jellyfish are fundamentally similar.
35. What is the writer's main point in the sixth paragraph?
- A. Jellyfish may once have inhabited dry land.
 - B. Jellyfish improve the environment they live in.
 - C. Jellyfish have proved able to survive over time.
 - D. Jellyfish have caused other species to become endangered.
36. The writer refers to the 'scyphozoa' in order to
- A. exemplify the great size of some jellyfish.
 - B. illustrate that jellyfish are biologically complex.
 - C. explain why certain jellyfish may become extinct.
 - D. suggest that scientists still misunderstand jellyfish.

Questions 37-40. Complete each sentence with the correct ending, A-F, below.

- A. it was wrong to assume that jellyfish do not sleep.
- B. certain species of jellyfish have changed their usual diet.
- C. jellyfish can be observed and tracked in ways that do not injure them.
- D. one particular type of jellyfish may be able to live forever.
- E. there are more types of jellyfish than previously realised.
- F. some jellyfish are more dangerous to humans than once thought.

37. Researchers working in Norway and the Arctic have shown that...
38. The use of DNA sequencing and isotope analysis has proved that...
39. Research into 'upside-down jellyfish' showed that...

40. Following research in the Mediterranean Sea, it has been claimed that...

GLOSSARY

<i>Key words in the questions</i>	<i>Similar words from the texts</i>	<i>Antonyms</i>
27. surprising		(1) (adj) Para 1
28. should have conducted more studies	(2) (clause) Para 1	
30. need to be confirmed by additional research		(3) (v.phr) Para 2
36. complex	(4) Last para	
37-40. do not injure them	(5) (v.phr) Para 1	
37-40. sleep	(6) (v) Para 4	
37-40. live forever	(7) (adj) Para 6	