

tpo_9_passage_3

When the Hawaiian Islands emerged from the sea as volcanoes, starting about five million years ago, they were far removed from other landmasses. Then, as blazing sunshine alternated with drenching rains, the harsh, barren surfaces of the black rocks slowly began to soften. Winds brought a variety of life-forms. Spores light enough to float on the breezes were carried thousands of miles from more ancient lands and deposited at random across the bare mountain flanks. A few of these spores found a toehold on the dark, forbidding rocks and grew and began to work their transformation upon the land. Lichens were probably the first successful flora. These are not single individual plants; each one is a symbiotic combination of an alga and a fungus. The algae capture the sun's energy by photosynthesis and store it in organic molecules. The fungi absorb moisture and mineral salts from the rocks, passing these on in waste products that nourish algae. It is significant that the earliest living things that built communities on these islands are examples of symbiosis, a phenomenon that depends upon the close cooperation of two or more forms of life and a principle that is very important in island communities. Lichens helped to speed the decomposition of the hard rock surfaces, preparing a soft bed of soil that was abundantly supplied with minerals that had been carried in the molten rock from the bowels of Earth. Now, other forms of life could take hold: ferns and mosses (two of the most ancient types of land plants) that flourish even in rock crevices. These plants propagate by producing spores—tiny fertilized cells that contain all the instructions for making a new plant—but the spore are unprotected by any outer coating and carry no supply of nutrient. Vast numbers of them fall on the ground beneath the mother plants. Sometimes they are carried farther afield by water or by wind. But only those few spores that settle down in very favorable locations can start new life; the vast majority fall on barren ground. By force of sheer numbers, however, the mosses and ferns reached Hawaii, survived, and multiplied. Some species developed great size, becoming tree ferns that even now grow in the Hawaiian forests. Many millions of years after ferns evolved (but long before the Hawaiian Islands were born from the sea), another kind of flora evolved on Earth: the seed-bearing plants. This was a wonderful biological invention. The seed has an outer coating that surrounds the genetic material of the new plant, and inside this covering is a concentrated supply of nutrients. Thus the seed's chances of survival are greatly enhanced over those of the naked spore. One type of seed-bearing plant, the angiosperm, includes all forms of blooming vegetation. In the angiosperm the seeds are wrapped in an additional layer of covering. Some of these coats are hard—like the shell of a nut—for extra protection. Some are soft and tempting, like a peach or a cherry. In some angiosperms the seeds are equipped with gossamer wings, like the dandelion and milkweed seeds. These new characteristics offered better ways for the seed to move to new habitats. They could travel through the air, float in water, and lie dormant for many months. Plants with large, buoyant seeds—like coconuts—drift on ocean currents and are washed up on the shores. Remarkably resistant to the vicissitudes of ocean travel, they can survive prolonged immersion in saltwater when they come to rest on warm beaches and the conditions are favorable, the seed coats soften. Nourished by their imported supply of nutrients, the young plants push out their roots and establish their place in the sun. By means of these seeds, plants spread more widely to new locations, even to isolated islands like the Hawaiian archipelago, which lies more than 2,000 miles west of California and 3,500 miles east of Japan. The seeds of grasses, flowers, and blooming trees

made the long trips to these islands. (Grasses are simple forms of angiosperms that bear their encapsulated seeds on long stalks.) In a surprisingly short time, angiosperms filled many of the land areas on Hawaii that had been bare.

question 1

The phrase "at random" in the passage is closest in meaning to

A finally

B over a long period of time

C successfully

D without a definite pattern

question 2

It can be inferred from paragraph 2 that the fungi in lichens benefit from their symbiotic relationship with algae in what way?

A The algae help the fungi meet some of their energy needs.

B The algae protect the fungi from the Sun's radiation.

C The algae provide the fungi with greater space for absorbing water.

D The fungi produce less waste in the presence of algae.

question 3

Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

A Some of the earliest important examples of symbiosis—the close cooperation of two or more living things—occur in island communities.

B Symbiosis—the close cooperation of pairs or small groups of living organisms—is especially important in these island environments.

C The first organisms on these islands worked together closely in a relationship known as symbiosis, which is particularly important on islands.

D It is significant to note that organisms in the beginning stages of the

development of island life cannot survive without close cooperation.

question 4

According to paragraph 3, what was the relationship between lichens and ferns in the development of plant life on Hawaii?

- A Ferns were able to grow because lichens created suitable soil.
- B The decomposition of ferns produced minerals that were used by lichens.
- C Lichens and ferns competed to grow in the same rocky environments.
- D Lichens and ferns were typically found together in volcanic areas.

question 5

According to paragraph 4, why do seeds have a greater chance of survival than spores do? To receive credit, you must select TWO answer choices.

- A Seeds need less water to grow into a mature plant than spores do.
- B Seeds do not need to rely on outside sources of nutrients.
- C Seeds are better protected from environmental dangers than spores are.
- D Seeds are heavier than spores and are therefore more likely to take root and grow.

question 6

Why does the author mention "a nut" , "a peach" , and "a cherry" ?

- A To indicate that some seeds are less likely to survive than others
- B To point out that many angiosperms can be eaten
- C To provide examples of blooming plants
- D To illustrate the variety of coverings among angiosperm seeds

question 7

According to paragraph 5, a major reason that coconuts can establish themselves in distant locations is that their seeds can

- A survive long exposure to heat on island beaches
- B float and survive for long periods in ocean water
- C use saltwater for maintenance and growth
- D maintain hard, protective coats even after growing roots

question 8

According to the passage, which of the following characteristics do spores and seeds have in common?

- A They may be surrounded by several layers of covering.
- B They are produced by flowering plants.
- C They may be spread by wind.
- D They are able to grow in barren soils.

question 9

Look at the four squares [] that indicate where the following sentence could be added to the passage. Where could the sentence best fit?

When the Hawaiian Islands emerged from the sea as volcanoes, starting about five million years ago, they were far removed from other landmasses. Then, as blazing sunshine alternated with drenching rains, the harsh, barren surfaces of the black rocks slowly began to soften. Winds brought a variety of life-forms. Spores light enough to float on the breezes were carried thousands of miles from more ancient lands and deposited at random across the bare mountain flanks. A few of these spores found a toehold on the dark, forbidding rocks and grew and began to work their transformation upon the land. Lichens were probably the first successful flora. These are not single individual plants; each one is a symbiotic combination of an alga and a fungus. The algae capture the sun's

energy by photosynthesis and store it in organic molecules. The fungi absorb moisture and mineral salts from the rocks, passing these on in waste products that nourish algae. It is significant that the earliest living things that built communities on these islands are examples of symbiosis, a phenomenon that depends upon the close cooperation of two or more forms of life and a principle that is very important in island communities. Lichens helped to speed the decomposition of the hard rock surfaces, preparing a soft bed of soil that was abundantly supplied with minerals that had been carried in the molten rock from the bowels of Earth. Now, other forms of life could take hold: ferns and mosses (two of the most ancient types of land plants) that flourish even in rock crevices. [] These plants propagate by producing spores—tiny fertilized cells that contain all the instructions for making a new plant—but the spore are unprotected by any outer coating and carry no supply of nutrient. [] Vast numbers of them fall on the ground beneath the mother plants. [] Sometimes they are carried farther afield by water or by wind. [] But only those few spores that settle down in very favorable locations can start new life; the vast majority fall on barren ground. By force of sheer numbers, however, the mosses and ferns reached Hawaii, survived, and multiplied. Some species developed great size, becoming tree ferns that even now grow in the Hawaiian forests. Many millions of years after ferns evolved (but long before the Hawaiian Islands were born from the sea), another kind of flora evolved on Earth: the seed-bearing plants. This was a wonderful biological invention. The seed has an outer coating that surrounds the genetic material of the new plant, and inside this covering is a concentrated supply of nutrients. Thus the seed's chances of survival are greatly enhanced over those of the naked spore. One type of seed-bearing plant, the angiosperm, includes all forms of blooming vegetation. In the angiosperm the seeds are wrapped in an additional layer of covering. Some of these coats are hard—like the shell of a nut—for extra protection. Some are soft and tempting, like a peach or a cherry a cherry. In some angiosperms the seeds are equipped with gossamer wings, like the dandelion and milkweed seeds. These new characteristics offered better ways for the seed to move to new habitats. They could travel through the air, float in water, and lie dormant for many months. Plants with large, buoyant seeds—like coconuts—drift on ocean currents and are washed up on the shores. Remarkably resistant to the vicissitudes of ocean travel, they can survive prolonged immersion in saltwater when they come to rest on warm beaches and the conditions are favorable, the seed coats soften. Nourished by their imported supply of nutrients, the young plants push out their roots and establish their place in the sun. By means of these seeds, plants spread more widely to new locations, even to isolated islands like the Hawaiian archipelago, which lies more than 2,000 miles west of California and 3,500 miles east of Japan. The seeds of grasses, flowers, and blooming trees made the long trips to these islands. (Grasses are simple forms of angiosperms that bear their encapsulated seeds on long stalks.) In a surprisingly short time, angiosperms filled many of the land areas on Hawaii that had been bare.

question 10

Directions: An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some answer choices do

not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

A. Algae are classified as symbiotic because they produce energy through the process of photosynthesis.

B. The first successful plants on Hawaii were probably lichens, which consist of algae and fungi living in a symbiotic relationship.

C. Lichens helped create favorable conditions for the growth of spore-producing plants such as ferns and mosses.

D. Seed-bearing plants evolved much later than spore-producing plants, but both types of plants had evolved well before the formation of the Hawaiian Islands.

E. Unlike spores, seeds must move to new habitats in order to have a strong chance of survival and growth.

F. Seed-bearing plants arrived and spread quickly in Hawaii, thanks to characteristics that increased their seeds' ability to survive and to move to different areas.