



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Group: \_\_\_\_\_

## Pollinators

Lexile 990L



1. Since the first flowering plants, nearly 160 million years ago, a variety of organisms have worked cooperatively with plants to help with the pollination process. Flowering plants are known as angiosperms. Today, angiosperms are the most diverse group of land plants. According to the fossil record, angiosperms became the dominant plant about 80 million years ago, outnumbering their ancestor plant, gymnosperms. Conifers, the most-known gymnosperms, have tough cones that house ovules and are pollinated by wind. Prior to flowering plants, plants, such as gymnosperms, had to rely on wind and chance to pollinate.
2. The development of flowers has changed the way plants pollinate. Angiosperms have many unique adaptations. First, they have a structure called a flower, which contains all of the plant's reproductive organs. When flowers are pollinated, the pollen produces sperm that fertilizes egg cells in structures called ovules, which are located in the ovary of a flower. The fertilized egg cells develop into seeds, which contain plant embryos. Over time, the flowers of many angiosperms have become specially colored and scented. Many plants have also begun to offer a supply of a sugary liquid called nectar. Many different types of animals live on the food from within flowers. Many wonderful and valuable relationships have formed between flowering plants and pollinators.
3. Plants need to pollinate their flowers in order to produce seeds. Animals need to eat nutrient-rich foods. Enter the concept of mutualism. Mutualism is the symbiotic relationship that exists when both organisms benefit from their partnership. During the pollination process, the animals benefit by eating the nutrient-rich pollen and nectar from the flowering plants. The plants benefit because, as their flowers are pollinated, it result in seed production. Seeds allow new offspring to grow. While there are many different types of pollinators, these symbiotic relationships tend to be very specific. Flowers generally have adaptations, which make them more suitable to one type of pollinator, or, sometimes, just one specific species.
4. Pollinators also help to maintain a healthy genetic makeup of many flowering plant populations. As insects and animals browse plants for food, they transfer pollen from plant to plant. This increases the genetic diversity of the plants, bringing more variety to the plant populations and more resistance to events like disease. Some of the best known, and most useful, pollinators for modern agriculture are bees, or more specifically,

European honeybees. To house the bee colonies, beekeepers build containers that are rented to fruit and nut tree growers as well as other farmers. In fact, bees pollinate the majority of the food supply in the United States. Bees, however, either the European honeybees or bumblebees, are not the only pollinators that exist in this country or in the world.

- 5 Other important pollinators, such as moths and bats, also have a mutualistic relationship with angiosperms. These nocturnal organisms pollinate crops. These animals stay awake and feed during the night. This allows for the pollination of flowers that only open when it is dark outside. Moths feed on the nectar from flowers. Flowers that are pollinated by moths often have a long, skinny tube between the pollen and the nectar. This shape is adapted to one particular moth species. The length of the tube matches the length of the pollinating moth's tongue. Some bats also feed on the nectar from flowers. Flowers that are pollinated by bats must be large and sturdy. They are also light in color, such as yellow or white, so that bats can see them more easily at night. The pollen sticks to the hairs on their faces as they push their heads into the flower to drink. The pollen is then carried to the next flower the bat visits. If you enjoy eating mangos or guavas, you have enjoyed the results of bat pollination.
- 6 Birds, especially hummingbirds, can also pollinate flowers as they drink its nectar. Hummingbirds use a lot of energy as they hover in mid-air. Plants that have a mutualistic relationship with pollinating hummingbirds produce a large amount of nectar. They are often red or orange. Hummingbirds can see these colors more easily. Since birds do not have a strong sense of smell, flowers pollinated by hummingbirds generally have little scent.
- 7 Would you believe that there are plants that are pollinated by flies? In fact, flies are a very important type of pollinator. For the most part, species of flies that pollinate move from flower to flower, drinking nectar and spreading pollen just like bees do. Very small flies, such as midges or gnats, are especially important in pollinating small flowers, such as those of the cocoa tree, which results in chocolate. This is the mutualistic relationship formed between angiosperms and other pollinators. There are a very small number of plants that break the pattern and are pollinated by flies that do not benefit from the relationship. These plants are known as carrion flowers, or corpse flowers. Their blooms smell like rotting meat. Flies that eat rotting meat are drawn to these flowers when searching for food or a place to lay their eggs. Their leg hairs pick up pollen as they search the flower. When they travel to the next flower, they transfer the pollen. This is not mutualism because only the plant benefits—the flies do not.
- 8 Many other animals are also considered pollinators. There are butterflies, of course, and beetles too. There is a palm tree in Madagascar that is pollinated by lemurs. There are even plants pollinated by nectar-drinking lizards! As you can see, bees are not the only pollinators in the world. Angiosperms and animal pollinators have formed vital mutualistic relationships that benefit both types of organisms.



- 1** In Paragraph 1, we learn about angiosperms and gymnosperms. Which of the following statements are true?
- A** Angiosperms appear in the fossil record about 160 million years ago.
  - B** Gymnosperms were originally the dominant, tall plant in the fossil record.
  - C** Conifers are pollinated by wind and chance.
  - D** All of the above
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- 2** What is an advantage of the mutualistic relationship between angiosperms and animals?
- A** The animals gain nutrient-rich foods, and the angiosperms' egg cells are fertilized.
  - B** The animals benefit, but the angiosperms are neither helped nor harmed.
  - C** The genetic diversity of both animals and angiosperms will increase.
  - D** All of the above
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- 3** Nocturnal animals are important pollinators. What niche do they specifically fill?
- A** They eat the nectars of angiosperm flowers.
  - B** They fly from plant to plant.
  - C** They pollinate the flowers that only open at night.
  - D** They have a mutualistic relationship with angiosperms.



**4** What animal is responsible for the pollination of the majority of the food sources in the United States?

- A** Bees
  - B** Moths
  - C** Beetles
  - D** Birds
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**5** Which of the following is not an example of mutualism?

- A** Moths drinking nectar and pollinating night-blooming flowers
  - B** Bees drinking nectar and pollinating many angiosperms of our food supply
  - C** Beekeepers maintaining colonies of bees and moving them to different farms and orchards
  - D** Conifers and grasses spreading their pollen with the wind
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**6** A non-mutualistic relationship between flies and carrion flowers is described in Paragraph 7. The plants are pollinated and benefit from the relationship. If the flies are not harmed, what type of relationship has been described?

- A** Predation
- B** Parasitism
- C** Commensalism
- D** Competition