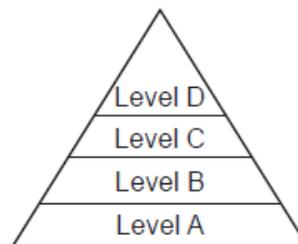


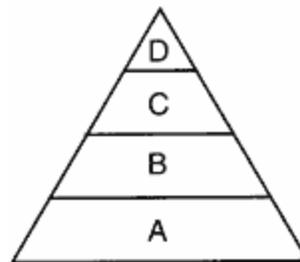
Name:

- Which organism is considered an exception to the cell theory because it has a noncellular structure?
  - alga
  - bacterium
  - virus
  - moss
- Many biotic factors affect individuals in a population. An example of an organism being directly affected by a biotic factor is
  - a squirrel cannot find a mate
  - a flood washes away a maple tree
  - a plant is in a dark room
  - a chipmunk finds a rock pile to use for a home
- A finite resource in the environment that keeps a population from steadily increasing is known as
  - dynamic equilibrium
  - a limiting factor
  - a reproductive enzyme
  - ecological succession
- Which process will result in a gain of energy in an ecosystem?
  - photosynthesis in algae cells
  - digestion in hummingbirds
  - ATP synthesis in fungi
  - respiration in maple tree cells
- The sequence that best illustrates the flow of energy through an ecosystem is
  - sunlight → plant → wolf → rabbit
  - plant → sunlight → rabbit → wolf
  - sunlight → plant → rabbit → wolf
  - wolf → rabbit → plant → sunlight
- The flow of energy in an ecosystem is best described as energy moving in
  - one direction from the Sun to the producers and then to the consumers
  - one direction from a consumer to a producer and then to the Sun as heat and light
  - two directions between the producers that are present
  - two directions, back and forth, between the producers and the consumers

- Which level of the pyramid below is correctly paired with the type of organism that would most likely be found at that level in an ecosystem?



- Level *A* - producers
  - Level *B* - carnivores
  - Level *C* - herbivores
  - Level *D* - decomposers
- Which sequence of terms is in the correct order from simplest to most complex?
    - cells → tissues → organs → organ systems
    - tissues → organisms → cells → organ systems
    - cells → tissues → organ systems → organs
    - organs → organisms → organ systems → cells
  - The diagram below represents an energy pyramid.



At each successive level from *A* to *D*, the amount of available energy

- increases, only
  - decreases, only
  - increases, then decreases
  - remains the same
- A food web is more stable than a food chain because a food web
    - transfers all of the producer energy to herbivores
    - reduces the number of niches in the ecosystem
    - includes alternative pathways for energy flow
    - includes more consumers than producers

# Worldwide Loss of Bees a Growing Concern

Alissa Fleck



When we think of bees, we think of pesky, buzzing insects that sting us and ruin outdoor gatherings. We might wonder: how badly can we possibly need bees? The truth is, bees are an incredibly important part of our ecosystem on earth—no matter how annoying they may be to humans. Unfortunately, bees have been disappearing around the world for some time now, and their mass disappearance continues to present new problems around the planet.

According to Reuters news source, scientific researchers have been trying desperately for the past 15 years to understand why honeybees around the world are dying off at frighteningly high rates. Over 1 million bee colonies disappear every year, never to return, Reuters reporters noted in 2012.

Kevin Hackett, the national program leader for the bee and pollination program at the U.S. Department of Agriculture (USDA), called the massive honeybee disappearance “the biggest general threat to our food supply.”

How could something so small be so important to us humans? Bees are used to pollinate many crops, for instance a large portion of California’s almond crop, which relies heavily on bee pollination. Bees are also essential for the pollination of apple and citrus fruit crops. Without the pollination by bees, these plants are unable to reproduce and may die off.

The mass deaths of honeybees have been linked to something known as Colony Collapse Disorder (CCD)—a mysterious loss of bee colonies with many potential causes—as well as a variety of pesticides, parasites, and diseases, all of which hurt bee populations. Other possible causes include land development and changes in agricultural practices around the world.

There are numerous kinds and species of bees, and honeybees are not the only ones disappearing in large quantities. Bumblebees can be added to the list of pollinators whose

widespread disappearance worries scientists. While the dangers of losing bees, such as the damage to our food supplies, have long been known, researchers are uncovering even more distressing information about the loss of these ecologically crucial insects.

According to researchers who published their findings in the Proceedings of the National Academy of Sciences in 2013, the disappearance of bumblebees offers new cause for concern: certain plants are having difficulties reproducing with the loss of their bumblebee pollinators, and are at higher risk for extinction.

Two scientists, who conducted research on the impact of bumblebee loss on plant reproduction, found that when a particular species of bumblebee was removed from the pool of pollinators, other bees did not completely take over the pollinating duties. Instead, with less competition from the bees which had been removed from the pool, the remaining bumblebees flew between many different plants and were less likely to be faithful to one kind of plant.

The researchers noted this experiment had damaging effects. For instance, the larkspur, a purple wildflower, requires pollination from its own species—other larkspurs—to survive. The researchers found with fewer bumblebees, the remaining bees were “less faithful” to a particular plant, meaning the larkspur was unable to survive as it would have before the loss of bumblebees.

This particular study highlights the importance of bees to the continuation of, not just our food supply, but also all biodiversity, as the effects of this study do not end with the larkspur plant alone, but point to a much larger issue. The larkspur is just one example of this issue.

In 2012, the USDA and Environmental Protection Agency (EPA) released a joint statement discussing the issue of bee loss, and the search for a solution to the cycle of problems caused by bees dying off.

The organizations concluded: “No single silver bullet will solve the problems affecting honey bees and other pollinators.”

In terms of solutions, the organizations proposed: “Habitat enhancement...targeted pesticide use, improved colony management techniques and improved disease and pest resistant stocks of bees are collectively needed to improve the health of honey bee colonies.”

“It is imperative that we increase honey bee survival both to make beekeeping profitable,” the statement noted, “but more importantly to meet the demands of U.S. agriculture for pollination and thus ensure of [sic] food security.”

**Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_

1. What problem does this article mainly discuss?

- A) Bees can sting us.
- B) Bees can ruin outdoor gatherings.
- C) Bees are disappearing around the world.
- D) Bees are annoying to humans.

2. Experts think that pesticides, parasites and diseases, as well as land development and changes in agricultural practices around the world, are some possible causes of bee death.

According to this article, what is the most important effect of this new bee shortage?

- A) Researchers are publishing new findings.
- B) Many crops will be unable to survive without pollination.
- C) Scientists are studying bees.
- D) Gardeners are having a harder time growing larkspurs.

3. In the article, Kevin Hackett, the national program leader for the bee and pollination program at the U.S. Department of Agriculture (USDA), calls the massive honeybee disappearance “the biggest general threat to our food supply.”

What evidence from the article supports his claim?

- A) Honeybees are not the only ones disappearing in large quantities.
- B) Bees are used to pollinate many food plants, such as California’s almond crops, apple crops and citrus fruit crops.
- C) The larkspur, a purple wildflower, requires pollination from its own species—other larkspurs—to survive.
- D) Over 1 million bee colonies disappear every year, never to return.

4. Leaders from the U.S. Department of Agriculture (USDA), researchers from the National Academy of Sciences, and the USDA and Environmental Protection Agency (EPA) are all reported to be working hard to understand and solve the problem of the disappearance of honeybees. Based on this evidence, what can be concluded about the organizations trying to solve this problem?

- A) The organizations do not play an important role in keeping humans and the environment safe.
- B) The organizations play an important role in keeping humans and the environment safe.
- C) The organizations are dealing with a problem that is not relevant to their focus.
- D) The organizations are being forced to deal with a problem they do not care about.

5. What is this article mostly about?

- A) threats to bees' health from human development
- B) the origins of the crops we eat
- C) the science of bee pollination
- D) the causes and effects of bee death around the world

6. Read the following paragraphs:

“In 2012, the USDA and Environmental Protection Agency (EPA) released a joint statement discussing the issue of bee loss, and the search for a solution to the cycle of problems caused by bees dying off.

“The organizations concluded: ‘No single **silver bullet** will solve the problems affecting honey bees and other pollinators.’

“In terms of solutions, the organizations proposed: ‘Habitat enhancement...targeted pesticide use, improved colony management techniques and improved disease and pest resistant stocks of bees are collectively needed to improve the health of honey bee colonies.’”

As used in the passage, what does the phrase “**silver bullet**” mean?

- A) a complex solution
- B) an easy solution
- C) a pollinating bee
- D) a dangerous pesticide

**7.** Choose the answer that best completes the sentences below.

Bees are an incredibly important part of our ecosystem on Earth—no matter how annoying they may be to humans. \_\_\_\_\_, bees have been disappearing around the world for some time now, and their mass disappearance continues to present new problems around the planet.

- A) Instead
- B) First
- C) However
- D) Finally

**8.** What has the mass deaths of honeybees been linked to?

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**9.** List two reasons why the USDA and Environmental Protection Agency (EPA) believe that “it is imperative that we increase honey bee survival.”

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**10.** Explain the impact honeybees and humans have on each other. Use evidence from the text to support your answer.

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