

Paragraph

Collective Behavior

- ▶ Many types of animals combine the advantages of family association with those conferred by membership in still larger groups. Bees congregate in hives; some fish move in schools; ants gather in mounds; wolves live in packs; deer associate in herds. This type of congregational, or collective, behavior gives animals such as these distinct advantages over other species that rely on more solitary behaviors. While defense of the group is a clear benefit for animals that gather in groups, another way collective species profit is through their system of foraging for food. Congregational species have developed methods, ranging from straightforward to complex, of searching for, obtaining, and transporting nutrients back to the "home" spot.
- ▶ The behavior in which a group of social animals (or insects) imitates or copies the behavior of others is referred to as *allelomimesis*. During this behavioral activity, one member, or a small group, of the species discovers the initial food source. Through signals already familiar to the group, the location of the nutrient source is communicated to a larger group of the community. This group follows the signal to the food source, and if required, in turn communicates the location to yet another group. For example, bee colonies often send out small groups of bees that scout—look for—flowers that contain the essential nutrients they require. These scouts then return to the hive and through a complicated "dance" communicate the location of the flowers to others in the hive that can use the scout's information to obtain their own food. *Alloleomimesis* is a commonly observed phenomenon in studies of insects such as bees, ants, and others.
- ▶ Scientists and other experts have long assumed that certain collective species follow *allelomimesis* almost exclusively, but this is inaccurate. The original assumption resulted in the adoption of set parameters to describe this group behavior. Actions that fell within the parameters reinforced the notion that *allelomimesis* was the predominant foraging behavior, yet, this is, in fact, not the case. More recent research by scientists indicates that *allelomimesis* is not always the prevalent form of behavior for collective groups; individuals within these species do, at times, differ in their actions, even when working toward the common purpose of acquiring nutrients. Their foraging behaviors have now been more accurately categorized into what are known as *explorative* and *sedentary* strategies.
- ▶ The differentiation of foraging strategies within a particular group seems to depend on factors such as the availability of adequate nutrients in the food supply. In other words, when a species detects an imbalance in nutrients, either instinctively, or through other natural mechanisms, their foraging strategy adapts in an attempt to compensate for this lack. For some members of a species, this displays itself through a more active role in searching for food, whereas in others, it results in a more passive reaction.
- ▶ One species that has been studied in some detail regarding this phenomenon is the social caterpillar. When food sources are adequately balanced, the species follows the pattern of *allelomimesis*; each member of the group maintains a consistent level of foraging activity with others in the search for food. In contrast, when the source becomes imbalanced the species separates into two distinguishable categories of foragers: *exploratory* and *sedentary*. The observation of this phenomenon is fascinating, in that it shows behavior contradictory to what might be assumed. The more active caterpillars, the ones that take responsibility for finding food, spend less time consuming nutrients than their less active counterparts. These *sedentary* caterpillars move more moderately than the active caterpillars, yet they take in more food.
- ▶ While it may seem that the more passive caterpillars take advantage of the active caterpillars, those that expend less energy in fact serve a vital function: maintaining group cohesion. One study, at least, suggests that colonies consisting of more active, as opposed to passive, caterpillars demonstrate less unity within their groups than when there are more passive than active ones. Apparently, because the active caterpillars tend to divide their resources among various plants to find nutrients, they lose focus on the group as a whole. On the other hand, the more *sedentary* caterpillars usually focus on one food source at a time. Therefore, they are able to keep the groups within the colony intact. Consequently, it seems a balanced proportion of active and passive caterpillars in a colony ensure that both the nutritional and communal needs of the colony are met.

When you are reading, always practice connecting pronouns and adjectives to their referents. This helps with general comprehension as well as with answering referent questions.

1. The word "those" in paragraph 1 refers to

- ☐ Ⓐ types
☐ Ⓑ animals
☐ Ⓒ advantages
☐ Ⓓ groups

2. The word "they" in paragraph 2 refers to

- ☐ Ⓐ small groups
☐ Ⓑ flowers
☐ Ⓒ nutrients
☐ Ⓓ bee colonies

3. The word "others" in paragraph 2 refers to

- ☐ Ⓐ studies
☐ Ⓑ insects
☐ Ⓒ bees
☐ Ⓓ ants

4. The word "their" in paragraph 3 refers to

- ☐ Ⓐ collective groups
☐ Ⓑ species
☐ Ⓒ scientists
☐ Ⓓ individuals

5. The phrase "this lack" in paragraph 4 refers to

- ☐ Ⓐ imbalance in nutrients
☐ Ⓑ natural mechanisms
☐ Ⓒ foraging strategy
☐ Ⓓ attempt

6. The word "what" in paragraph 5 refers to

- ☐ Ⓐ foragers
☐ Ⓑ observation
☐ Ⓒ phenomenon
☐ Ⓓ behavior

7. The word "ones" in paragraph 6 refers to

- ☐ Ⓐ resources
☐ Ⓑ colonies
☐ Ⓒ caterpillars
☐ Ⓓ groups

8. The word "they" in paragraph 6 refers to

- ☐ Ⓐ active caterpillars
☐ Ⓑ resources
☐ Ⓒ groups
☐ Ⓓ sedentary caterpillars

Paragraph

The Smartphone Revolution

- ▶ Smartphones have rapidly increased their dominance in the mobile phone market in recent years, accounting for more than half of all mobile phones sold globally. These multifunctional devices have revolutionized the way in which users communicate, correspond, and interact with the world, and others, around them. Since smartphones have combined the tasks of previously separate devices into one exceptionally efficient product, their appeal to consumers cannot be overestimated. Prior to the modern development of the smartphone, people required a combination of machines, such as computers, televisions, PDAs (Personal Digital Assistants), and cameras to accomplish all of the functions that are currently handled with a single piece of technology.
- ▶ While smartphones have only been in existence since the 1990s, the original concept was introduced in 1973 by Theodore Paraskevakes. In that year, the innovative entrepreneur obtained a patent for his idea of uniting the functions of data processing activities, intelligent applications, and visual displays with those of a telephone. At that time, Paraskevakes made note of such tasks as banking and bill paying in his outline; two commonplace activities many users today perform with their smartphones. Paraskevakes may have come up with his concept of an advanced phone as a result of his earlier success with transmitting electronic data through telephone lines, a process that became the foundation for the "Caller ID (Identification)" function available on virtually all contemporary phones. Since beginning his engineering work in 1968, Paraskevakes has obtained over 20 patents worldwide which are based on this technology.
- ▶ Despite the fact that it took almost 20 years to bring the first smartphone to market, once it appeared, subsequent generations of enhanced versions have emerged with increasing frequency, offering consumers a variety of brands from which to choose. In 1992, the IBM Corporation demonstrated a prototype of a phone that incorporated PDA capabilities with traditional phone functions. A couple of years later, an improved version was put on the market for the public. By this time, several competitors were working on their own adaptations of what would later be called a "smartphone," and by the end of the first decade of the twenty-first century, the popularity of the smartphone approached that of its predecessor, the "feature" phone.
- ▶ Though mobile phones are divided into three categories—those that provide only basic phone and text services, feature phones, and smartphones—the line between a feature phone and a smartphone is still somewhat blurred. In general, a feature phone differs from a smartphone in that it provides access to less functions than the smartphone does, although it does have a variety of functions over and above those of a basic mobile phone. One of the challenges of distinguishing between feature phones and smartphones is that, with the rapid evolution of successive generations of phones, the features exclusive to yesterday's smartphones are often found on today's feature phones. So while modern feature phones may still be behind in terms of the capabilities of their smartphone contemporaries, they may in fact be more advanced than smartphones of just a few years ago. For example, in the early part of the first decade of the twenty-first century, functions such as GPS (Global Positioning System) and Wi-Fi (Wireless Fidelity) access belonged solely to smartphones, whereas, by the end of that decade, many feature phones had evolved to include these functions.
- ▶ One characteristic that most people agree differentiates smartphones from feature phones is the use of "apps," application programs designed specifically for the individual operating systems of smartphones. These apps are programs that can be downloaded directly onto the smartphone, or downloaded through a website. Apps have become one of the most popular features of smartphones in recent years, and cover a wide range of fields. Some apps, such as word processing or spreadsheet programs, help users complete tasks. Other apps provide information, such as weather or location. Still others are a source of entertainment, allowing for books and music to be downloaded, or for games to be played on the smartphone screen. For example, *Angry Birds*, one of the most popular apps on the market when it was created, was a game first devised for the Apple iPhone. Its enormous fame led to versions being devised for other smartphone operating systems, and then for other devices, such as computers and gaming consoles.

9. The word "their" in paragraph 1 refers to

- ☐ Ⓐ smartphones
☐ Ⓑ tasks
☐ Ⓒ separate devices
☐ Ⓓ consumers

10. The word "those" in paragraph 2 refers to

- ☐ Ⓐ intelligent applications
☐ Ⓑ functions
☐ Ⓒ data processing activities
☐ Ⓓ displays

11. The word "this technology" in paragraph 2 refers to

- ☐ Ⓐ contemporary phones
☐ Ⓑ telephone lines
☐ Ⓒ electronic data
☐ Ⓓ Caller ID

12. The phrase "an improved version" in paragraph 3 refers to

- ☐ Ⓐ a variety
☐ Ⓑ a phone
☐ Ⓒ a PDA
☐ Ⓓ a prototype

13. The word "its" in paragraph 3 refers to

- ☐ Ⓐ the first decade
☐ Ⓑ the public
☐ Ⓒ the smartphone
☐ Ⓓ the feature phone

14. The word "they" in paragraph 4 refers to

- ☐ Ⓐ feature phones
☐ Ⓑ capabilities
☐ Ⓒ contemporaries
☐ Ⓓ functions