

Paragraph

► The Hubble telescope, named after the prominent astronomer Edwin Hubble, was launched into space with great fanfare on April 25, 1990. Although there are many powerful telescopes at various locations on Earth, the Hubble telescope was expected to be able to provide much better images because it would be able to operate from the vacuum of space, without interference from the Earth's atmosphere. By launching the Hubble telescope into space, NASA hoped to revolutionize space and Earth science. The Hubble telescope is distinct from other orbiting telescopes in that, to date, it has been the only telescope designed for maintenance and repair while it is orbiting in space. A major part of the original concept for the telescope was planned around the ability to send astronauts up to the telescope to service it if any damage or interference occurred to removing the telescope from orbit, thus possibly losing previous images during the time that the telescope would be grounded for repair. Therefore, both the design and the orbit path for the telescope needed to be carefully orchestrated to ensure the greatest ease of access to the telescope. In order to service the telescope, plans are to have the telescope travel to Earth in order to reflect images, many of which have been extremely illuminating to scientists as they study outer space.

► It has been fortunate that the original of the Hubble telescope planned in advance for a repair mission. When the telescope was launched, a malfunction in the main mirror was revealed, which led to a distortion of the images that the telescope reflected back to researchers on Earth. Though scientists realized the problem with the main mirror almost immediately after the launch of the telescope, it was not until the first repair mission was sent to the telescope. During this mission, the mirror was repaired in a unique fashion; rather than replacing the mirror, an impossibility while the telescope was in orbit, new optical components were added to the telescope to correct the reflection of the light. This is known as a *fix*, and the mirror is often referred to as *eyeglassed* by correcting what the main mirror *sees*.

► The mission to repair the mirror was not the only trip arranged by NASA to maintain the Hubble telescope at its optimal operating capacity. A second repair mission took place after that, and up to the last, the last occurring in 2009. During each mission, astronauts fixed, updated, and replaced components essential to the operating success of the telescope. The final mission's goal was to make sure the telescope would operate successfully for another 20 years. This mission was only able to be completed initially, it was canceled because of safety concerns surrounding the space shuttle program. However, after much public debate, NASA approved the rescheduling of the mission, to the dismay of the Hubble team.

► Due to the cost not new to the Hubble team. Originally, the telescope was completed and scheduled to be sent into orbit in 1983, but the catastrophic accident of another space shuttle launch delayed the mission. The delayed launch caused the team to deeply shaken in the program and no longer willing to push a space project that would require manned service trips on a regular basis. NASA first had to demonstrate significant improvements in its safety systems before it was permitted to launch the telescope. In addition, once launched, the initial transfer of images back to Earth was delayed by a malfunction in the telescope's software. Astronomers were able to correct the problem using the telescope relied on data from charts prepared in the 1950s. These charts proved to be inaccurate, and caused the astronomers to misinterpret the data of the Hubble.

► Due to the success of the Hubble telescope, many researchers have joined the various project, most of the people that participated, as well as the researchers that study the telescope's images, would likely deem the project worth the hardships that were endured. The field of astrophysics, in particular has been transformed by the images sent back. One of the most remarkable images, in particular, is the Hubble Deep Field image, which shows the rate at which the universe is expanding to a far more accurate degree than has ever been possible. Not only has the telescope assisted with numerous scientific breakthroughs, it has also greatly improved public relations for astronomy. Many of its breathtaking images have been released to the public, creating a stronger interest in the field of astronomy.

17. Why does the author mention "many powerful telescopes at various locations on Earth" in paragraph 1?

- Ⓐ to emphasize the need for telescope at various locations on Earth
- Ⓑ to show that the Hubble telescope was different from other telescopes
- Ⓒ to indicate how the atmosphere improves the quality of information from space
- Ⓓ to emphasize the difference between the Hubble telescope and other telescopes

18. Why does the author use the phrase "as opposed to" in paragraph 2?

- Ⓐ to show that the Hubble telescope operates in a different way
- Ⓑ to explain that NASA's design to repair the telescope in orbit did not support the idea of a repair
- Ⓒ to contrast two different methods of repairing the telescope
- Ⓓ to emphasize that repairing the telescope in orbit was dangerous

19. Why does the author include the phrase "in a unique fashion" in paragraph 3?

- Ⓐ to describe an unusual or uncommon
- Ⓑ to highlight an unusual approach to repairing the mirror
- Ⓒ to explain how the telescope continued to reflect images after the repair
- Ⓓ to indicate that the method used to repair the telescope was strange

20. The author includes the phrase "in a unique fashion" in paragraph 3 in order to

- Ⓐ show that NASA's decision to send up another repair team was fully supported
- Ⓑ emphasize that some people were not pleased about NASA's decision to send up another repair team

21. "Why does the author use the term "eyeglassed" in paragraph 4?"

- Ⓐ to explain an effect the telescope has on images
- Ⓑ to describe the telescope's importance to NASA
- Ⓒ to demonstrate that the Hubble telescope extends for long distances
- Ⓓ to explain how the telescope functioned the function of the telescope's main mirror

22. The author includes the phrase "to the dismay of the mission's opponents" in order to

- Ⓐ show that NASA's decision to send up another repair team was fully supported
- Ⓑ emphasize that some people were not pleased about NASA's decision to send up another repair team

Learn to quickly identify words and phrases that signal an example is being presented; for example, for instance, such as, like.

Paragraph

► In many species, members of the species exhibit aggressive behavior toward one another, often with a focus on territoriality, the fight for exclusive control of a particular area. The level of violence in territorial aggression varies widely from species to species. Some species rely on nonlethal contests for control of territory that involve threatening displays, such as roars, growls, or barks, or even charges. Other species, however, value their territory to the point of being willing to seriously injure or even kill other members of their own species.

► Two common types of territoriality in animals are feeding and mating. Animals often search out habitats that are the most appropriate for providing their essential survival needs, especially in terms of food. Once a particular species has found this habitat, it often becomes necessary to defend it against other members of the same species that may be interested in the same location. At the same time, the animal is attempting to push out encroachers, those that move in on its territory, it must also attract suitable mates to the area. Therefore, the animal tends to use specific behaviors to control the level of violence of its environment. Its displays or courting will change to reflect how the animal views the other animal, especially, aggressive, growling, or threatening. In most cases, however, more aggressive behavior will be directed toward animals seen as threats.

► Other animals defend their territory in addition to feeding and mating are shelter and in the protection of the young. When an animal chooses a territory, it is not just a home there, particularly if it extends to many. This homebuilding process is referred to as "nesting," even though the structure may not actually be a nest for the animal's babies. Nesting adds value to the territory because the animal has expended time and energy in making the nest, and in the protection of the young. As the nest grows, it has additional value to the protective parent. As the value of the territory increases, the animal may correspondingly increase its territorial behaviors to defend the area from others. In other words, an animal may concede its territory to a competitor more easily if it has no young present, but will defend its territory more ferociously if it has young present.

► Most birds, for example, are known to be territorial to some extent, though, the territorial behaviors exhibited by most species are limited to singing contests, which can go on for days, or threatening postures with wings fanned or extended. The swan, on the other hand, is quite unlike other birds in this respect. The swan may seem particularly elegant and serene as it glides across the surface of a lake; however, male swans are, in reality, territorial birds that will defend their territory to the death. The size of the lake, no matter how large the lake is, males will engage in ferocious contests, with their necks entwined as they attempt to cause mortal injury to each other.

► Some animals do not defend their territory, but instead defend the members of their own kind, but are often faced with the need to wage battle against other species for the same area. In this situation, when different species are involved, other factors come into play besides food, shelter, and protection of the young. One common method used to measure the intensity of territorial behavior is the "hawk versus dove" game, in which the "hawk" represents a species known to be more aggressive and a "dove" symbolizes a typically nonconfrontational species. In this model, the tendencies of the involved species (whether they are likely to fight or not) are measured in a variety of ways are used to predict the outcome. For example, when a "hawk" and a "dove" come into conflict, it is almost certain that the hawk will prevail, due to its more aggressive nature. However, when two "hawks" or two "doves" confront one another, the outcome is far less predictable, and in this case, the outcome is based on the size of the animals, the proximity of other suitable territories, and the maturity of each contender. For instance, when two "doves" are battling for the same location, the younger nesting dove has a clear advantage over the older dove that has just entered the territory.

GLOSSARY

1. hawk—a predatory species of bird characterized by a short, hooked beak, broad wings, and curved claws

2. dove—a small, non-predatory bird, related to the pigeon, and often used to symbolize peace

25. Why does the author include "the fight for exclusive control of a particular area" in paragraph 1?

- Ⓐ It presents an argument against a previously stated point.
- Ⓑ It provides a definition of a previously stated term.
- Ⓒ It presents a second area of focus of aggressive behavior.
- Ⓓ It introduces a new idea to be further developed in the paragraph.

27. Why does the author mention "nesting" in paragraph 3?

- Ⓐ To provide a name for the animal homebuilding process.
- Ⓑ To emphasize that only birds engage in territorial behavior.
- Ⓒ To compare how different a bird's nest is from other animals' nests.
- Ⓓ To explain that birds are not the only animals that build nests

28. The author uses the phrase "in other words" in paragraph 3 to

- Ⓐ introduce a new example
- Ⓑ repeat a previous point in an alternative way
- Ⓒ suggest that previous examples were not adequately explained
- Ⓓ focus the reader's attention on the main idea of the paragraph

29. Why does the author mention "hanging contests" in paragraph 4?

- Ⓐ to demonstrate that birds create beautiful sounds
- Ⓑ to provide an example of unusual behavior by birds
- Ⓒ to show very violent aggressive some bird behavior is
- Ⓓ to demonstrate that some types of territorial behaviors are not very aggressive

30. In paragraph 2, the author mentions "appealing, gentle displays" with "aggressive behavior" in order to

- Ⓐ explain how different animals protect their territory
- Ⓑ give an example of successful and unsuccessful defense strategies
- Ⓒ illustrate how animals change behavior depending on purpose
- Ⓓ show that animals have no control over their behavior

31. The author mentions the "hawk versus dove" game?

In paragraph 5 in order

- Ⓐ to indicate that swans are really rather affectionate
- Ⓑ to explain how long swans' necks are
- Ⓒ to point the fact that the swans are only pretending to hurt one another
- Ⓓ to explain the image for the reader of fighting swans

32. Why does the author mention "the relative size of the animals" in paragraph 6?

- Ⓐ to highlight that the animals will only fight other animals that are similar in size
- Ⓑ to point out that the animals that are commonly related to one another
- Ⓒ to indicate that size is not a factor in a territorial fight
- Ⓓ to explain that size can play a part in some territorial battles