Halley’s Comet

For centuries comets have been one of our biggest mysteries. They are among the most beautiful and interesting sights in the universe. People from all over the world have been surprised—and often scared—by the sight of a comet blazing across the sky. Edmund Halley, an astronomer in the late 1600s, was very interested in comets. He studied them for most of his life.

Part of Halley’s studies involved measuring the paths of comets through the night sky. Halley learned that comets move around the Sun in the path of an ellipse. (An ellipse is like a circle that has been stretched out in one direction.) He ascertained that because comets travel in an elliptical path, the same comet could be seen from Earth again and again. This was a brand new concept during his time.

In 1682, Halley noticed a comet that was especially bright and large. He spent a long time studying it. Then it disappeared from view. Based on his calculations, Halley predicted that this bright comet would return in 1758 or 1759. This was about 75 years after he first saw the comet. However, Halley died in 1742. Thus, he was not able to see that he was correct. This same bright comet returned right on time. Not long after that, because Halley had learned so much about it, the comet was named “Halley’s comet” in his honor.

Scientists who had been following Halley’s work began to look back through history. They learned that for centuries there had been mention of a comet in the sky about every 75 years, going all the way back to 467 B.C. Often, the return of Halley’s comet seemed to coincide with important events in history. For many years people believed that Halley’s comet caused catastrophes, from sicknesses to war.

Over time scientists have learned more about comets. They now know that comets do not cause bad events. They have also learned what comets are like. All comets consist of a head and a tail. Some comet tails are longer than others. The head is made mostly of ice, plus some dust and pieces of rock. U.S. astronomer Fred Whipple coined the phrase “dirty snowballs” to describe comets. Comets move through the sky very quickly. However, their speed depends on how close they are to the Sun. When Halley’s comet is farthest from the Sun, or at its aphelion, it moves about 2,040 miles per hour. When it is closest to the Sun, or at its perihelion, it moves at an amazing 122,000 miles per hour!

For a long time scientists wondered where comets came from. Today, most scientists believe that comets come from an unseen cloud of particles called the Oort cloud. This cloud probably surrounds our solar system. It may contain somewhere between 10 and 100 trillion comets.

People today remain fascinated by this celestial time-traveler. The most recent visit from Halley’s comet was in 1985-1986. This time, scientists all over the world studied the comet. Two Soviet spacecraft, the Vega 1

Dolphins Use Mirrors to Observe Changes in Themselves

Until recently, it was not known if creatures other than chimpanzees, gorillas, orangutans, and humans could identify themselves in a mirror. Cats and dogs have been known to see themselves in a mirror and think another cat or dog was looking at them. Studies have shown that dolphins are able to use mirrors to notice the difference between themselves and other dolphins.

Dolphins have excellent memory skills. Researchers at New York Aquarium performed a test to determine if the dolphins’ high level of intelligence would include recognizing themselves in a mirror. First, researchers placed 13-year-old Presley and 17-year-old Tab in a pool with mirrored walls. Then, the dolphins were marked with nonpoisonous black ink on their heads, stomachs, or fins which they could not see without a mirror. Both Presley and Tab swam directly to the mirror, each turning and angling to expose the mark and taking a long, hard look in the mirror. It was the first time a dolphin had reacted to a mirror by examining itself.

The test was repeated with the marked location changing each time, but the reaction was always the same. The dolphins swam straight to the mirror and studied the marked spot on their bodies. They were not interested in the marks placed on their partner. Presley and Tab became the first marine mammals to demonstrate an ability to recognize themselves and to notice changes in their appearance.
and Vega 2, got a close look at the comet as it raced around the Sun. Halley’s comet should next return in 2061. Who knows what high-tech equipment will be around to study it then? However, other comets are periodically discovered making a once-in-a-lifetime visit. If you get the chance to study one of these stellar fireballs, do so. You’ll be thrilled!

<table>
<thead>
<tr>
<th>1656</th>
<th>1662</th>
<th>1694</th>
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Edmund Halley was born
Halley observes the comet for the first time
Halley visits Isaac Newton to discuss the laws of gravity
Halley focuses on the study of comets
Halley dies
The comet returns to view as Halley predicted

References


**Part 1** California English-Language Arts Standards Test

**Part 2** California Modified Assessment

1. Which of these is an OPINION based on the passage?
   A. Dolphins have good memories.
   B. Dolphins are only interested in themselves.
   C. Dolphins have a high level of intelligence.
   D. You’ll be thrilled by the sight of a comet.

2. Read these sentences.
   F. My friend Frankie loves to play soccer.
   G. Frankie loves to play soccer, my friend.
   H. My friend is Frankie he loves to play soccer.

How can these sentences BEST be combined?
F. My friend Frankie loves to play soccer.
G. Frankie loves to play soccer, my friend.
H. My friend is Frankie he loves to play soccer.

Differences between CST and CMA multiple choice items for ELA:

**CST**
- Two -columns for most items
- Four answer choices for each item
- Customary use of white space
- Standard font sizes and font (Times)

**CMA**
- One column for most items
- Three answer choices for each item
- Additional white space
- Larger font sizes and font (Helvetica)
Part 1 California Mathematics Standards Test

1. \( \epsilon + 2 \frac{1}{2} \)

Which situation could be described by the expression above?

A. Lia jogged \( \epsilon \) miles yesterday, and \( 2 \frac{1}{2} \) miles farther today.
B. Lia jogged \( \epsilon \) miles yesterday, and \( 2 \frac{1}{2} \) miles fewer today.
C. Lia jogged \( 2 \frac{1}{2} \) miles yesterday, and \( \epsilon \) miles fewer today.
D. Lia jogged \( 2 \frac{1}{2} \) miles yesterday, and \( \epsilon \) times as far today.

2. What is the volume of a cube that measures 10 inches on each edge?

F. 10 cubic inches
G. 100 cubic inches
H. 1000 cubic inches
J. 10,000 cubic inches

Part 1 California Modified Assessment

2. What is the volume, in cubic inches, of this rectangular solid?

3 in. 7 in.

F. 21 in.\(^3\)
G. 63 in.\(^3\)
H. 189 in.\(^3\)

Differences between CST and CMA multiple choice items for mathematics:

CST
- Two-columns for most items
- Four answer choices for each item
- Customary use of white space
- Standard font sizes and font (Times)

CMA
- One column for most items
- Graphics for most items
- Three answer choices for each item
- Additional white space
- Larger font sizes and font (Helvetica)
1. Which of the following converts electrical energy into motion?
   A. light switch
   B. electric stove
   C. light bulb
   D. electric fan

2. Which list gives the correct order of food traveling through the digestive system after it is swallowed?
   F. stomach, esophagus, large intestine, small intestine
   G. small intestine, large intestine, esophagus, stomach
   H. esophagus, stomach, large intestine, small intestine
   J. esophagus, stomach, small intestine, large intestine

Differences between CST and CMA multiple choice items for science:

**CST**
- Two columns for most items
- Four answer choices for each item
- Customary use of white space
- Standard font sizes and font (Times)

**CMA**
- One column for most items
- Graphics for most items (stems and options)
- Three answer choices for each item
- Additional white space
- Larger font sizes and font (Helvetica)