How Do Hot Air Balloons Work?

By Patti Hutchison

Caption: An early test flight of a Montgolfier brothers' balloon.

History of Hot Air Balloons
In 1783, two French brothers named Etienne and Joseph Montgolfier launched the first hot air balloon. It stayed in the air for about fifteen minutes before its passengers - a duck, a sheep, and a rooster - crashed to the ground. The first balloon carrying a person was launched on November 21st of that year.

How do hot air balloons work? The answer is a simple principle called buoyancy. Hot air rises in colder air because warm air is less dense than cooler air. Think of a cork, which is less dense than water, floating in a stream. This is much the same way a hot air balloon floats in the air.

Going Up
In order to launch a balloon, a burner is attached to the basket. This burner uses propane to create a flame, much like the gas grill on your back deck. The pilot controls the valve on the burner. The hot air is sent up into the envelope (fabric) of the balloon. It is trapped at the top, and the balloon is lifted up into the air. It takes about 65,000 cubic feet of hot air to lift one thousand pounds. That is why hot air balloons are so large.

Coming Down
There is a large flap of fabric at the top of the balloon called the parachute valve. A long rope is attached to this flap. In order to make the balloon go down, the pilot pulls on the rope to open the flap. Some of the hot air escapes; cooler air rushes in to fill the envelope. The balloon floats slowly downward.

Piloting a Balloon
The pilot can really only control the up and down motion. The wind does the rest of the work. The pilot can shift the balloon up or down to catch wind currents that help it glide along in the sky. The pilot never knows for sure where the balloon will land. That is why some of the crew stays on the ground in the chase vehicle. These people pick up the passengers and pack up the balloon. The passengers are then taken by car to their destination.

Uses for Hot Air Balloons
Because hot air balloons are at the mercy of the wind, they are not a very useful mode of transportation. They are mostly used for sports and fun. Many balloon rallies, races, and festivals are held throughout the year. Balloons are also used for advertising-some people fly balloons with special shapes or ads on them to promote their businesses. A peaceful ride in a hot air balloon is also a good way to do some sightseeing. Some people even get married in them!

How Do Hot Air Balloons Work?

Questions

1. When was the first manned hot air balloon flight?
   A. September 19, 1783
   B. September 19, 1738
   C. November 21, 1873
   D. November 21, 1783

2. Why do hot air balloons rise?
   A. the basket
   B. the envelope
   C. the cubic feet
   D. the propane burner

3. What part of the balloon heats the air?
   A. the basket
   B. the envelope
   C. the cubic feet
   D. the propane burner
4. When the pilot wants to go down, he opens ______.
   A. the parachute valve  
   B. his jacket  
   C. the valve on the burner  
   D. the bottom of the basket

5. It takes 65,000 cubic feet of hot air to lift ______.
   A. one hundred pounds  
   B. one thousand pounds  
   C. a sheep, a duck, and a rooster  
   D. the empty basket of the balloon

6. When he takes off, the pilot knows exactly where he will land.
   A. true  
   B. false

7. Which of these motions can the pilot of the hot air balloon control?
   A. going up  
   B. coming down  
   C. side to side  
   D. both A and B

8. Hot air balloons are a reliable form of transportation.
   A. false  
   B. true

Imagine you are flying in a hot air balloon. Tell about your experience.
Coyotes are relatives of wolves that live in North and Central America. Just like wolves, coyotes are excellent hunters. They run fast (40 miles per hour) and have acute senses of vision, smell, and hearing. As carnivores, coyotes eat nothing but meat. Thus, their diet includes animals like fish, mice, rabbits, sheep, and deer. Coyotes are not picky at their food choices. If they cannot make their own kills, they don't mind eating decaying flesh or carrion.

Coyotes have pointed ears, long snouts, grizzled buff coats, and black-tipped bushy tails. They measure 28-38 inches in body length and 12-15 inches in tail length. They weigh 20-50 pounds. Coyotes are loners who like to come out during the nighttime. Though solitary, they are not secretive. In fact, their being so vocal is a guarantee that we are more likely to hear a coyote before seeing it. Coyotes can make all sorts of sounds. They howl, yelp, and bark to announce their presence and territory, to attract a mate, to dissuade intruders, or to call to their offspring.

Coyotes breed once a year from January to March. They usually stay with the same mate for several years or for their entire life. After a gestation period of about 2 months, a female coyote gives birth to up to 19 babies or "pups." The average litter size is 6. Pups are blind and helpless at birth, so they rely on their parents to provide nourishment and protection. When baby coyotes are about 3 weeks old, they are strong enough to venture out of their hideouts. They switch from drinking their mother's milk to eating their parents’ regurgitated (thrown-up) food at about the age of 5 weeks. Young coyotes become independent when autumn arrives. They bid farewell to their parents and set out to establish their own home range.

Coyotes are bold, cunning, and resourceful. Hence, they are not afraid of sneaking into farms to attack domesticated animals, and they don't mind going through untended garbage for something edible. Their ability to adapt to all sorts of environments is a growing concern. In recent years, coyotes have expanded from west of the Appalachians to every state of the U.S., except Hawaii. They are no longer restricted to their natural habitats like forests, deserts, and grasslands. Instead, they now dwell comfortably in urban areas. So, if you see a coyote hanging out in parks nearby your place next time, don't be surprised!

Questions

1. Where can we find coyotes?
   A. South America
   B. North America
   C. Central Asia
   D. Europe

2. Coyotes and wolves are close relatives.
   A. False
   B. True

3. Coyotes eat all of the followings, except ______.
   A. Carrion
   B. Rabbit
   C. Honey
   D. Mice

4. Which of the followings about coyotes is true?
   A. Hawaii and Alaska are the only two states in the U.S. where we cannot find coyotes.
   B. Coyotes have grizzled buff coats.
   C. Coyotes are mostly active during the daytime.
   D. In recent years, coyotes have expanded from east of the Appalachians to west.
5. Which of the following statements about coyote's breeding behaviors is NOT correct?
   A. Coyotes mate once a year from January to March.
   B. Coyotes usually breed with the same partner for several years or for their entire life.
   C. On average, a female coyote gives birth to 6 pups.
   D. Coyotes feed their offspring with regurgitated food exclusively.

6. Coyotes' top speed is 40 kilometers per hour.
   A. True
   B. False

7. Which of the following states in the U.S. can we NOT find coyotes?
   A. Hawaii
   B. Louisiana
   C. Alaska
   D. California

Suppose you see a creature of the size of a medium dog wandering nearby your house. From a distance, you cannot be sure if that animal is a wolf, a dog, or a coyote. You go to your room and take out a pair of binoculars. How will you know what animal it is you are looking at?
What Is a Cliche?
By Phyllis Naegeli

The excitement in the gymnasium heightened as gymnasts performed the last of their routines. Music being played for the floor exercise echoed through the room. The crowd applauded as Bethany finished her turn on the balance beam. After she dismounted, she walked over and sat on the bench with her friend Tami.

"That was a great routine!" said Tami. "Look, our team is ahead by three-tenths of a point now!" She pointed to the scoreboard.

"That means we should be in the finals tomorrow!" said Bethany as she pulled her sport pants on over her leotard.

"That would be great!" said Tami brightly. "Coach is going to be very excited." The girls waited for the last of their teammates to finish on the floor. After a few minutes, all the gymnasts had completed their routines, and the final scores were posted.

"We made it!" said Tami, hugging Bethany.

The girls on the team hugged each other and accepted congratulations from their coach. Then they started gathering up their things.

Tami threw her gym bag over her shoulder. "So, what are you doing tonight?" Tami asked.

"Our English assignment," said Bethany.

Tami's eyes grew wide. "You haven't done that yet? We'll be here all day tomorrow for finals. Are you sure you can get it done tonight?"

"I guess I'll have to," said Bethany with a shrug.

"Have to what?" asked Bethany's mom, who had come out of the bleachers to congratulate her daughter.

"Do my English assignment," said Bethany. "Monday is Cliché Day. I have to find five clichés and explain what they mean to the class."

"And how long have you had this assignment?" asked Mom.

Bethany hesitated. "About a week."

Mom shook her head. "Better late than never!"

Bethany frowned. "I know, I procrastinated again."

"You drive me crazy!" said Mom with a sly grin.

"I don't mean to - I've been so busy practicing that I put it off."

"As usual, you fly by the seat of your pants."

Bethany looked down at the back of her pants with a puzzled expression.

"You'll need to put your nose to the grindstone," said Mom nonchalantly.

"But I don't even know what a cliché is!" Bethany cried in despair.

"A cliché is a phrase that has become common from overuse," said Mom. "I just used four of them in our conversation."

Bethany raised an eyebrow. "Really?"

"Really!" said Mom. "Think back to our conversation. Which expressions have you heard before?"

Bethany scowled and thought about what Mom had said.

"You drive me crazy?" Bethany said hesitantly.

"That's one!" said Mom.

"Where can I find more?" asked Bethany.

"I found a great website that had hundreds," said Tami. "I can email it to you when I get home!"
"That would be great," said Bethany.

"We better go so you can start your assignment," said Mom. "Hopefully, we will see you tomorrow, Tami."

"Mom!" Bethany cried.

"If you finish your assignment, you can come to the meet," said Mom.

"Then let's get home," said Bethany. "Bye, Tami."

Tami waved to her friend.

At home, Bethany went to her room and changed. She checked her email and found that Tami had sent her the website link. She clicked on the link and loaded the page on her computer. "Wow, look at all these clichés," she said. "This is great." About an hour later, she came bounding down the stairs and ran to Mom who was sitting at the desk in the living room. "Tami sent over a link to the greatest website! Look, I have five clichés. Now I just need to figure out what they mean."

Mom turned in her chair to face Bethany. "Well let's go through them one at a time."

"The first one is 'Time sure flies when you're having fun.' I think I know what it means. When you're doing something you like to do, time seems to go by quickly."

"Very good," said Mom. "Next?"

"'A fool and his money are soon parted'." Bethany paused, deep in thought.

"If you're not careful about how you spend your money, it will soon be gone."

"That's right," said Mom. "And the third?"

"You're grasping at straws.' I'm not sure about this one."

"It means there are no alternatives left to consider, when it seems hopeless."

Bethany scribbled down the meaning on her paper. When she finished writing, she continued with her list. "'Many hands make light work.' That means when you have a job to do, it goes faster when you have help. The last one is 'Don't put off till tomorrow what you can do today.' This one applies to me. If I had done this assignment early, I wouldn't be panicking now."

"You can say that again!" said Mom.

"Is that a cliché too?" asked Bethany.

"I guess we see eye to eye now," Mom replied.

Bethany rolled her eyes and laughed. "Can I go to the meet tomorrow?"

"Have you learned your lesson?" asked Mom.

"Boy, howdy, have I ever!" said Bethany.

What Is a Cliche?

Questions

1. What does the cliché 'better late than never' mean?
   A. Don't bother doing something if you're late.
   B. If you're late, no one will care.
   C. It's better to finish something late than not at all.
   D. all of the above

2. Why did Bethany look down at the back of her pants?
   A. She thought they were torn.
   B. She didn't understand what Mom meant.
   C. She wanted to make sure she wouldn't miss the chair if she sat down.
   D. none of the above
Find five more clichés and explain what they mean.

3. What is a cliché?
   A. a case to carry important papers in
   B. a new phrase that nobody understands
   C. a well-known quotation from a historical person
   D. a common phrase that has been overused

4. Bethany's gymnastics team made the finals.
   A. true
   B. false

5. What lesson did Bethany learn?
   A. She shouldn't put things off.
   B. She needed to practice her gymnastics routine more often.
   C. You can always find what you need on the Internet.
   D. none of the above

6. Which cliché did Bethany say applied to her?
   A. Don't put off till tomorrow what you can do today.
   B. You drive me crazy.
   C. Many hands make light work.
   D. flying by the seat of your pants

7. How long did it take Bethany to gather five clichés?
   A. five minutes
   B. about half an hour
   C. four hours
   D. about an hour

8. Which cliché did Bethany find hard to understand?
   A. grasping at straws
   B. You can say that again.
   C. A fool and his money are soon parted.
   D. None, she understood all of the clichés she found.
Clara Barton
By Cathy Pearl

Clara Barton was born on December 25 in 1821. She was the youngest of five children. She was a quiet, shy child. Her childhood gave no hint of the strong woman that she would become.

She became a teacher in Massachusetts when she was seventeen. After teaching for several years, she decided she wanted more education. She had a year of formal schooling in New York. She then started teaching in New Jersey.

Clara worked at a school where the parents paid for her salary. Only parents with enough money could send their child to the school. One day on her way to work, Clara saw many children standing out on the streets. The parents of the children could not afford to send them to school.

Clara offered to teach for free if she was given a building. The first day, fewer than ten students came. The next day there were more than twenty. In a year, there were hundreds of students at the school. It was the first free public school in New Jersey.

She lost her job as head of the school because she was a woman. The job was given to a man. Clara moved to Washington, D.C. She then took a job as a clerk in a patent office. She was paid the same amount of money as the men who worked there. This was amazing for the time.

When the Civil War started, Clara could see that the government was not ready for the number of men that were hurt in each battle. On her own, she started to ask for donations of items like bandages and blankets. For almost one year, she asked for permission to take the supplies to battlefields.

Finally, she was given a pass to travel with army ambulances. She took the donations and used them to help soldiers. She also took the time to nurse injured men herself. She saw many of the worst battles of the war, including Antietam and Fredericksburg.

Before the war started, Clara had very little experience nursing people. She had nursed a brother for two years, but she had no other training.

As the war dragged on, the government was better at taking care of the hurt men. Clara kept nursing men until the war ended. She then threw herself into a new job. She worked hard to identify men that had gone missing during the war. She wrote letters to families and to veterans to try to figure out what had happened to many soldiers during the war.

The work made Clara very tired. Her doctor told her to take a trip to Europe and rest. But rest was something that Clara didn't know how to do. While there, war broke out between France and Prussia. During the war, Clara saw a new group in action. This group was called the Red Cross.

The Red Cross had been started in 1864. The main idea was to help people during wartime. People could get help no matter what side they were on during the war.

Clara came back to the United States. She wanted to start a Red Cross here. The government did not like the idea at first. The Civil War had just ended. No one could imagine the country being in another war ever again. The government agreed to the Red Cross in 1881. It would give help during natural disasters.

The Red Cross did not help during a war for a long time. At first, it helped during major floods in different parts of the country. It also helped people during an outbreak of yellow fever in Florida. The first war it helped in was the Spanish-American War.

In 1904, Clara resigned as president of the Red Cross. She had never married during her life. She retired to her home and died on April 12, 1912. She is buried in a family plot less than a mile from where she was born.

Clara Barton is known as the "Angel of the Battlefield." Her strong beliefs enabled her to start an organization that is still helping many people in the country almost one hundred years after her death.
Clara Barton

Questions

1. What year did the government agree to a Red Cross in the United States?
   A. 1881
   B. 1864
   C. 1904

2. In what state did Clara start a free school?
   A. New Jersey
   B. New York
   C. Massachusetts

3. What did Clara do right after the Civil War ended?

4. In what war did the United States Red Cross first offer help?
   A. Spanish-American War
   B. Revolutionary War
   C. Civil War

5. How old was Clara when she started teaching school?

6. Why did Clara lose her job as head of the free school she had started?
   A. She never wanted the job.
   B. She quit.
   C. She was a woman.

Clara Barton was called the "Angel of the Battlefield." How do you think she earned that nickname? Do you think it fit what she did?