Name_____

Barbara McClintock, Nobel Prize Winner

Our current understanding of genetics is rooted in the study of plants. While a student at Cornell University, Barbara McClintock took biology classes and the only genetics course available. She expressed a great interest in her learning. The professor then invited her to attend his second course, offered only to graduate students. She studied the behavior of chromosomes and decided to pursue an advanced degree. She would study chromosomes and their genetic content for the remainder of her career.

During her career, McClintock taught botany at Cornell and went on to become a research associate. She later taught at other universities and worked with an agricultural science program as a consultant. After earning her Ph.D., McClintock received fellowships from various schools. This enabled her to continue her studies and research. She received honorary degrees and awards of achievement from several institutions. Perhaps her most prestigious award was when she was awarded the Nobel Prize in Medicine in 1983.

Barbara McClintock worked with chromosomes and genes in maize. She focused on the relationship between plant reproduction and how some plants mutated. She discovered that chromosomes could jump during plant breeding. This means that genes can change positions on the chromosome. After more research, McClintock proved that certain genes could turn physical characteristics—such as the color of leaves—on or off. Scientists later discovered a relationship between McClintock's research on genetic mutations and bacteria that develop resistance to antibiotics. Such research helps us better understand how viruses and bacteria act.

Although her early work gained recognition in the scientific community, her later research on genetics was not initially well received. Only later, when her discoveries were confirmed by molecular biologists, did she receive additional honors. Described by a friend as a solitary person, Barbara McClintock focused her life on her research, which was her passion.

Text Questions

1. You can tell from the context of the passage that the word *chromosome* means . . .
   a. the colored part of a plant.
   b. the part of the cell nucleus that carries the genes responsible for hereditary characteristics.
   c. something that makes bacteria resistant to antibiotics.
   d. something that causes a virus.

2. Which was Barbara McClintock's most notable award?
   a. The Merit Award
   b. MacArthur Foundation Grant
   c. National Medal of Science
   d. Nobel Prize

3. Which statement from the text best describes McClintock's research?
   a. She discovered that genes can change positions on the chromosome.
   b. She received honorary degrees and awards of achievement from several institutions.
   c. She studied the behavior of chromosomes and decided to pursue an advanced degree.
   d. Barbara McClintock was a solitary person.

4. What is the main idea of the third paragraph?
   a. It describes McClintock's educational background.
   b. It provides details about her scientific career.
   c. It explains her research and its implications for science and medicine.
   d. It describes the honors and awards she received.

5. Based on what you read, what contributions did Barbara McClintock make to science and medicine?

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LIVEWORKSHEETS

Name_____

Washington's Crossing of the Delaware

Many people are aware of the historical event when General George Washington crossed the Delaware River, but few understand the difficulties involved before and after the attack.

The Continental Army soldiers were signed up for very limited amounts of time. Many of their enlistments were expiring, and many had deserted. Washington sent some men out into the area to recruit new soldiers. Normally that would have been hard to accomplish, but due to the harsh treatment of the people by British soldiers, many people wanted to fight against them.

Another concern was ice floating in the river, as well as the river itself freezing. Washington's spies had told him that when the Delaware froze over, the British were considering walking across and attacking him. Washington had to move both men and artillery across at night.

On Christmas night, 1776, Washington split his forces into three units, called columns, to cross the Delaware at three different places. Each column had to move men as well as artillery. Only Washington was able to get both across in heavy sleet and snow. One other general managed to get his men across, but when unable to successfully transport his artillery, he returned with his men to the bank.

With fewer men and less artillery than he had hoped for, Washington still decided to attack. On December 26th, he divided his troops into two units and defeated the British. There were only nine American casualties. The British sustained 120 casualties and 1,000 men were captured. Washington ordered the British supplies to be plundered and their rum destroyed prior to the return trip across the Delaware.

This victory over the British raised the spirits of the American colonists and helped turn the tide in the Revolutionary War.

Text Questions

1. Which of the following did not contribute to the difficulty of the crossing?
   a. Washington had to move both men and artillery across at night.
   b. There was ice floating in the river.
   c. They crossed in heavy sleet and snow.
   d. It was hard to recruit new soldiers.
2. What does the word *casualties* mean as it is used in the text?
   a. people who are hurt or killed in an accident
   b. people in the military who are wounded or killed in active service
   c. anything lost or destroyed by an unfortunate event
   d. anyone who is a victim of a natural disaster
3. What was the author's purpose in writing this passage?
   a. to help readers understand the challenges Washington faced
   b. to teach readers about river ice
   c. to explain how an army plans an attack
   d. to describe what happens after an attack
4. Why did Washington have to move his forces at night?
   a. The British treated their people harshly.
   b. Washington wanted his men to cross the river at three different places.
   c. Spies reported the British planned to walk across the frozen river to attack.
   d. After the attack, the forces had to make the return crossing.
5. Based on what you read in the text and your background knowledge, how did this historical event contribute to the development of the United States?

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LIVEWORKSHEETS

Name_____

Animated Cartoons

Cartoons have been around longer than you might think. In 1640, Athanasius Kircher was the first man who attempted to put drawings into motion. He drew images on layers of glass slides and had them move within a lantern, giving the appearance of movement.

In the early 1800s, it was determined that movement can also be accomplished by placing fixed images on paper. This was called "the persistence of vision." To illustrate this, John Paris invented the Thaumatrope. It was a two-sided plate with a different image on each side. Paris took an image of a bird on one side and an empty cage on the other. He used two strings and wound it so that when pulled tight, it spun and the two images "moved," creating the illusion of the bird in the cage.

Mathematician William Horner invented the Zoetrope in 1867. It was a roll of paper with drawings on it, placed inside a turning drum with slots. As it turned and one looked through the slots, the images appeared to move. It was actually first called The Wheel of the Devil but was later renamed the Zoetrope.

Later, in the 1800s, Thomas Edison invented the Kinetoscope, the first cinema machine. One looked into a slot where a reel of photos or pictures passed, and the images moved seamlessly.

Based on Edison's invention, images were eventually placed on film that moved at a high rate of speed. The cartoons were all hand drawn and carefully filmed to show natural movement.

Today, cartoons are made via computer technology, and the old-fashioned method of hand drawing every image is uncommon. Cartoons have expanded from being intended primarily for children to providing entertainment for all ages. After over three hundred years, they still have not lost their appeal.

Text Questions

1. Which device was invented first?
   a. the Zoetrope
   b. the Kinetoscope
   c. the Thaumatrope
   d. the cinema machine
2. What is the best way to describe animation?
   a. Still images appear to move.
   b. It brings objects to life.
   c. It is used to make movies more exciting.
   d. It can only be accomplished with computers.
3. What does the word *persistence* mean as it is used in the second paragraph?
   a. refusing to give up
   b. remaining
   c. continuing an effect
   d. repeating a question
4. Which statement best describes the first animated cinema movies?
   a. He drew images on layers of glass slides and had them move within a lantern, giving the appearance of movement.
   b. The cartoons were all hand drawn and carefully filmed to show natural movement.
   c. Today, cartoons are made via computer technology, and the old-fashioned method of hand drawing every image is uncommon.
   d. By spinning the two images, Paris created the illusion of movement.
5. What makes the techniques of animation so fascinating to people?

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LIVEWORKSHEETS

Name_____

Handheld Calculators

People today have access to "handheld" calculators in many different mediums: computers; smartphones; and small, individual calculators. Push a button here or a button there, and it computes complex calculations instantly. We think of this as "modern" technology.

One of the earliest handheld calculators first became available in the early 1960s. Personal computers came into widespread use twenty years later, and cellular phones with calculators sometime after that. Thousands of years ago, long before the invention of batteries or electricity, early versions of a calculator were already in use.

The first calculator was called an "abacus," also known as a "counting frame." An abacus looks like a wood rectangle with a series of wires stretched across. Small rocks or beads are slid along the wires. There are other types using small ropes or grooves made in hard sand along which small beads slide.

People would use an abacus to solve addition, subtraction, multiplication, division, square root, and cube root problems with amazing speed. These counting devices are so quick and portable that they are still used today in some countries among trade merchants.

Abaci were standard issue in most American grade schools until the mid 1900s. With the advent of handheld calculators, they quickly became obsolete.

Text Questions

1. Which phrase or statement best defines an abacus?
   a. a handheld calculator
   b. a wood rectangle with a series of wires stretched across; small rocks or beads are slid along the wires
   c. used for addition, subtraction, multiplication, division, square root and cube root with amazing speed
   d. quick and portable
2. Which is a synonym for the word *advent* as it is used in the fifth paragraph?
   a. coming
   b. arrival
   c. approach
   d. appearance
3. In which situation might an abacus <u>not</u> be used?
   a. by your ancestors
   b. by merchants in foreign countries
   c. by students in the 1950s
   d. by your parents at the store
4. What is the main idea of the text?
   a. A battery-operated calculator is the only way to solve arithmetic problems.
   b. Everyone should have a handheld calculator.
   c. An abacus is an effective counting device.
   d. An abacus is obsolete.
5. In what ways have handheld calculators made our lives easier?

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LIVEWORKSHEETS

Name_____

The Emancipation Proclamation

The Emancipation Proclamation was an executive order issued by President Abraham Lincoln on January 1, 1863. The power to issue an executive order is granted by the Constitution and is subject to judicial review—that is, a federal court may rule that something is constitutional or not.

It was issued during the Civil War and freed slaves in the ten states still in rebellion against the United States. The order did not make slavery illegal, make former slaves citizens, or compensate their ex-owners.

The purpose of the Emancipation Proclamation was to eliminate slavery and bring the country together.

Although issued January 1, 1863, President Lincoln never signed the order into law. A Constitutional Amendment supporting the Proclamation was ratified by the states in 1865.

When Lincoln first presented the proclamation to his cabinet in 1862, they were opposed to it. They felt it was too radical. Eventually, Lincoln overruled his cabinet and issued the order as he thought best to do.

One of the major non-slavery issues was that by issuing the order, it kept Europe from joining the war on the side of the Confederacy. Britain and France were interested in the cotton industry in the South and were prepared to become involved so as to have a part of that economy. However, the majority of Europe was against slavery. Because the Proclamation directed the attention of the war to slavery, it became an instrument in making the war an international issue.

Regardless of the particulars of issuing the Emancipation Order, it is one of the greatest documents in the history of the world.

Text Questions

1. What was the purpose of the Emancipation Proclamation?
   a. to end the war
   b. to free the slaves in the Confederate states
   c. to encourage Europe to join the war
   d. to proclaim that Lincoln was in charge of the war
2. Who proposed the Proclamation?
   a. Europe
   b. the slaves
   c. President Lincoln
   d. President Lincoln's cabinet
3. What does the word *radical* mean as it is used in the text?
   a. illegal
   b. extreme
   c. unfriendly
   d. advanced
4. Which of the following happened first?
   a. Lincoln issued the Emancipation Proclamation.
   b. Lincoln signed the Proclamation into law.
   c. Lincoln presented the Proclamation to his cabinet.
   d. The states ratified the Proclamation with a Constitutional Amendment.
5. What lasting effect did the Emancipation Proclamation have on the United States?

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LIVEWORKSHEETS