Name _____ Reading informational text

"Jumping" Genes and More

Choose Science!

A person with *foresight* has the ability to see what will or might happen in the future. Dr. Barbara McClintock had lots of foresight. Long before the rest of the science world even knew what DNA was, this remarkable scientist made discoveries about genes and chromosomes that changed the understanding of genetics forever.

Always Independent

Born in Connecticut in 1902, Dr. McClintock grew up in Brooklyn, New York, as the middle of three children. Her father, also a doctor, encouraged his shy daughter's fierce independence and interest in science. At a time when young women were expected to look for a husband instead of a career, Dr. McClintock's parents gave her the freedom to pursue her interests and supported her desire to become a scientist.

After graduating from high school, Dr. McClintock enrolled at Cornell University's College of Agriculture. At Cornell, she earned a bachelor's degree, master's degree, and doctorate in botany. Dr. McClintock developed a love of genetics during her studies. *Genetics* is the scientific study of how genes control the characteristics of plants and animals. From 1927 until 1941, she worked with some of the top geneticists in the country, first at Cornell and later at the University of Missouri. In 1941, Dr. McClintock took a job as a research scientist at Cold Spring Harbor Laboratory on Long Island, New York. True to her independent spirit, she worked alone at this lab for the next 50 years until her death in 1992 at the age of 90.

Genes That Move

During her time at Cornell, Dr. McClintock began studying the genetics of maize, also known as Indian corn. Later, in her lab at Cold Spring Harbor, Dr. McClintock spent hours looking at maize cells in her microscope. She said of this obsession, "You're not conscious of anything else. You are so absorbed that even small things get big.... Nothing else matters. You're noticing more and more things that most people couldn't see because they didn't go intensely over each part, slowly but with great intensity." This focus on the genetics of maize led Dr. McClintock to make some of the most important discoveries in science history.

Dr. McClintock's first major discovery had to do with the behavior of chromosomes. She found that small pieces of DNA—the substance that carries genetic information in plant and animal cells—could move, or "jump," among chromosomes. (At the time, scientists thought genes stayed in one place.) Then Dr. McClintock discovered something even more amazing: these "jumping" genes could affect the activity and function of other genes. To understand the importance of this discovery, think of DNA as a cookbook. If a page from a car repair manual were to suddenly "jump" and attach itself to the middle of a recipe for chocolate cake, your dessert probably wouldn't taste or look like chocolate cake! Dr. McClintock later showed how certain genes could "turn off or turn on" certain characteristics in maize, such as the color of kernels or leaves.

It took decades before Dr. McClintock was finally recognized for her groundbreaking work. This was because she had made these discoveries before anyone even knew what DNA was. Her ideas were so far ahead of their time that many scientists simply had a hard time accepting them. Dr. McClintock explained, "They thought I was crazy, absolutely mad." Finally, in 1983, she won the Nobel Prize for Physiology and Medicine. She also received the National Medal of Science in 1970. Today modern science recognizes Dr. McClintock as one of the most influential geneticists of all time.

No Interruptions

As a child, Dr. McClintock could spend hours reading alone in an empty room. This love of solitude was evident in her career too. She worked alone in her lab at Cold Spring Harbor, and she never married or had children. Dr. McClintock didn't even have a telephone until 1986 when she was in her 80s. Instead, she requested that anyone who wanted to talk to her should write her a letter.

Answer the questions in your own words. Use the back if you need more space.

1. Why was it so unusual for Dr. McClintock's parents to encourage her to become a scientist? _____

   _____

2. Why didn't the science community react positively at first to Dr. McClintock's discoveries? _____

   _____

3. What qualities do you think Dr. McClintock had that helped her pursue her career at a time when there were few women in science? _____

   _____

4. List the vocabulary word in each paragraph that matches the meaning.

   A. Paragraph 1: the part of a cell that contains the genes which control how an animal or plant grows and what it becomes _____

   B. Paragraph 4: state in which a person constantly thinks about something

      _____

   C. Paragraph 4: knowing that something exists or is happening _____

   D. Paragraph 4: quality or state of being intense _____

   E. Paragraph 5: special purpose or activity for which something exists or is used

      _____

5. Dr. McClintock had to wait decades before the science world understood and recognized her discoveries. While she waited, she kept on working in her lab. Why do you think she did this? What do you think drove her to keep looking for new discoveries? _____

   _____

   _____

   _____

All Connected

In 1924, McClintock was hired as an assistant to a male scientist. The two worked together on a research project and wrote a report about their findings. When McClintock saw the published report in a science journal, she was furious. Her boss had put his name at the top instead of both their names. Even though women at the time were expected not to make waves in their careers, McClintock spoke up and stated that she refused to go on working for the man. Later, she chose to work alone at her lab in Cold Spring Harbor.

"'Jumping Genes' and More"

Answer Key

1. At that time, women were expected to get married rather than pursue a career.
2. Dr. McClintock was so ahead of her time that many scientists did not understand her findings.
3. Answers will vary.
4. A. chromosomes
   B. obsession
   C. conscious
   D. intensity
   E. function
5. Answers will vary.

Name _____ Reading informational text

Living Among Chimpanzees

Choose Science!

Jane Goodall never dreamed of becoming a scientist. She simply wanted to go to Africa, live with wild animals, and write books. In the 1930s and 1940s, there were few female scientists to look up to. It was Goodall's mother who provided her with the inspiration she needed to follow her dreams: "You'll have to work hard, take advantage of opportunities and never give up." It was advice Goodall would follow, with unexpectedly significant results.

Animal Behavior Enthusiast

Jane Goodall was born on April 3, 1934, in London, England. At an early age she was fascinated by animals, liking nothing better than observing native birds and animals and then drawing sketches of them. Goodall also loved to read, particularly books about animal behavior. After graduating from high school, she worked as a secretary. She also got a second job as a waitress so she could save money for her dreamed-of trip to Africa. When a friend invited Goodall to come to Kenya, Africa, Goodall jumped at the chance. Once there, she was introduced to famous paleontologist and anthropologist Louis Leakey. Little did she know that he would change her life forever.

Leakey was looking for someone to study chimpanzees in the wild. He hired Goodall, even though she'd never been to college and had no formal education in animal behavior. In fact, Leakey thought her lack of training was a plus. He believed it gave Goodall a more open mind and would make her the perfect observer. In 1960, Goodall moved to the Gombe Stream Game Reserve in the African nation of Tanzania. Her dream was starting to come true.

New Discoveries

Goodall began the challenge of getting the chimps at Gombe to accept her. She says of her first attempt: "I remember my first day, looking up from the shore of the forest, hearing the apes and the birds, and smelling the plants, and thinking this is very, very unreal. Then I started walking through the forest and as soon as a chimp saw me, it would run away." Goodall found she could get no closer than 500 yards from the chimps before they took off. Finally, a male chimp (who Goodall later named David Greybeard) let Goodall watch him as he looked for food. Later, more and more chimps in David Greybeard's troop, or group, allowed her to observe them. Goodall built trust with the chimps using a system that involved offering bananas. She also imitated their behavior and even ate their food. After two years of seeing Goodall every day, the chimps not only showed no fear of her but also would seek her out to see if she had any bananas.

The relationship Goodall carefully built with the chimpanzees opened the door for her to observe behaviors no one had ever seen before. She was the first scientist to observe chimpanzees eating meat. At the time, scientists thought they ate only plants. Goodall also saw that the chimpanzees could make tools. Before this observation, scientists had thought only humans could make tools. She also observed that the chimps had a complex social system that included a "language" of about 20 individual sounds. Goodall's groundbreaking observations became one of the most remarkable studies of primates in modern times.

In 1965, Goodall finally went to college, receiving a PhD in ethology (the study of animal behavior). In 1977, she cofounded the Jane Goodall Institute for Wildlife Research, Education, and Conservation. Since her days living among chimpanzees, Goodall has worked passionately to educate the public about the endangered habitats of wild chimpanzees and the ethical treatment of animals.

What's in a Name?

Goodall gave names to the chimps—such as Fifi, Goliath, and Passion—that reflected what she saw as their personalities. Other scientists objected to this practice, saying it was wrong to give human traits to animals. Goodall pushed back on their objections, arguing that animals do indeed have personalities: "You cannot share your life with a dog, as I had done…, or a cat, and not know perfectly well that animals have personalities and minds and feelings."

Answer the questions in your own words. Use the back if you need more space.

1. How did meeting Louis Leakey change Goodall's life?_____

   _____

2. How did Goodall build trust with the chimpanzees she observed in the wild?_____

   _____

3. Why was Goodall's observation about chimps making tools so extraordinary? _____

   _____

4. List the vocabulary word in each paragraph that matches the meaning.

   A. Paragraph 3: an area of land set apart _____

   B. Paragraph 4: followed as a pattern, model, or example_____

   C. Paragraph 5: introducing new ideas or methods _____

   D. Paragraph 5: mammals that include apes and monkeys _____

   E. Paragraph 6: morally good and right _____

5. Goodall did not have female role models from the science world to look up to. Do you think it is important to have role models? Why or why not? What role models do you look up to and why? _____

   _____

   _____

   _____

   _____

Tools and Termites

Just what "tool" did David Greybeard make when Goodall first observed him in the wild? As Goodall watched through her binoculars, David took a twig, bent it, and stripped off its leaves. Then David stuck the twig into a termite nest and used it scoop the insects into his mouth. Goodall says, "At that time, it was thought that humans, and only humans, used and made tools... yet I had just watched a chimp tool-maker in action. I remember that day as vividly as if it was yesterday."

"Living Among Chimpanzees"

Answer Key

1. He hired her to observe chimpanzees in the wild.
2. She used a system that involved offering bananas to the chimps.
3. At the time, scientists thought only humans could make tools.
4. A. reserve
   B. imitated
   C. groundbreaking
   D. primates
   E. ethical
5. Answers will vary.

Name _____ Reading informational text

From Math to the Moon

Choose Science!

Long before tablets and laptops, Katherine Johnson's job was to be a "computer." As a research mathematician for NASA, she turned a passion for math into a career that helped put a man on the moon. And it all began with counting.

A Head for Numbers

As a child, Katherine Johnson loved one thing: counting. She says, "I counted everything. I counted the steps to the road, the steps up to church, the number of dishes and silverware I washed…anything that could be counted, I did." Johnson's brilliant mind and knack for numbers revealed itself at an early age. Born in 1918 in West Virginia, Johnson started high school when she was only ten and graduated from high school at 14. When she later attended West Virginia State College, a math professor named Dr. Claytor recognized Johnson's remarkable talent and told her, "You'd make a good research mathematician and I'm going to see that you're prepared." Johnson graduated from college at 18 with degrees in both mathematics and French.

After college, Johnson got a teaching job, one of the only career options open to a black woman at that time. While at a family gathering in 1952, a relative told Johnson something that changed her life. The National Advisory Committee for Aeronautics, or NACA, was hiring African American women to work as "computers." These women analyzed data and performed mathematical calculations for NACA's engineers. Johnson decided to apply for the job. She was hired and started working in NACA's West Area Computing unit, a group composed entirely of female African American mathematicians. Johnson became known in the program for being a whiz at calculations and for asking questions. She did not just want to do her work; she wanted to know the "whys," "hows," and "why nots" of the programs she was working on. At the time, Johnson's unit did not attend any briefings or meetings with NACA's engineers. Johnson asked if she could attend the meetings. NACA's engineers began to depend on Johnson and see her as a leader and an invaluable member of the team.

NASA Superstar

In 1958, NACA became the National Aeronautics and Space Administration (NASA). Johnson was asked by NASA to help determine how to get a human into space and back. She saw this huge feat as simply a matter of basic geometry. Johnson helped plot the path of Alan Shepard's historic 1961 journey as the first American in space. Her next challenge was to help with the difficult calculations that would send a man in orbit around Earth. By this time, NASA had started using electronic computers to do their calculations, with Johnson and others in her group verifying the calculations. Astronaut John Glenn, the astronaut for the first orbit around Earth, thought it was too risky to put his trust in a computer. He told the engineers to "get the girl"—Johnson—to check every computer calculation by hand. Glenn said, "If she says they're good, they're good; then I'm ready to go." Johnson later went on to do the calculations for the historic Apollo 11 moon landing. She also helped to develop NASA's Space Shuttle program.

Johnson retired from NASA in 1986. Since then, she has received numerous awards, including the Presidential Medal of Freedom in 2015. In 2016, NASA named a new building after her, the Katherine G. Johnson Computational Research Facility. That same year, author Margot Lee Shetterley published *Hidden Figures: The American Dream and the Untold Story of the Black Women Mathematicians Who Helped Win the Space Race*. The book became an Oscar-nominated film in 2016.

Johnson spends time today talking with students about the many opportunities that are available through math and science. She encourages them to pursue careers in STEM—science, technology, engineering, and mathematics—saying, "Some things drop out of the public eye and will go away, but there will always be science, engineering, and technology. And there will always, always be mathematics. Everything is physics and math."

Asking Questions to Help Others

When Johnson was a student in Dr. Claytor's college class, she could sometimes see that others in her class did not understand a lesson: "I would ask questions to help them. He'd tell me that I should know the answer, and I finally had to tell him that I did know the answer, but the other students did not." Even then Johnson was working to help others understand and appreciate the math that she loves.

Answer the questions in your own words. Use the back if you need more space.

1. How did Johnson's college math professor impact her professional career? _____

   _____

2. What did Johnson and her coworkers in the West Area Computing unit do?_____

   _____

3. How did Johnson make an impact on space exploration as a mathematician? _____

   _____

4. List the vocabulary word in each paragraph that matches the meaning.

   A. Paragraph 2: natural ability _____

   B. Paragraph 3: having value too great to be estimated _____

   C. Paragraph 4: deed _____

   D. Paragraph 4: path taken by one body circling another body _____

   E. Paragraph 4: proving or checking the accuracy of _____

5. Katherine Johnson had a natural curiosity that caused her to ask questions when others would not. How do you feel about asking questions? How could a willingness to ask questions help you in your education, career, and personal life? _____

   _____

   _____

   _____

   _____

Words to Live By

Johnson says that her father was a huge influence on her life. She particularly remembers her dad saying this: "You are as good as anyone in this town, but you are no better than any of them." Johnson taught this lesson to her own children and let it guide her through her schooling, career, and every other part of her life.

"From Math to the Moon"

Answer Key

1. He encouraged and helped her to become a research mathematician.
2. They analyzed data and performed mathematical calculations for NACA's engineers.
3. She helped work the calculations for the first journey into space by Alan Shepard. She checked the calculations for John Glenn's orbit of the Earth. She did the calculations for man's first landing on the moon and worked on developing NASA's Space Shuttle program.
4. A. knack
   B. invaluable
   C. feat
   D. orbit
   E. verifying
5. Answers will vary.

Name _____ Reading informational text

A Head and Heart for Science

Choose Science!

Doctor, engineer, scientist, Peace Corps volunteer, business owner, astronaut—which would you rather be? Dr. Mae Jemison decided she didn't have to choose and became all of these and more!

"I Want to Be a Scientist"

Dr. Jemison was born in Decatur, Alabama, on October 17, 1965. When she was three years old, her parents moved the family to Chicago, Illinois, for better educational opportunities. As a young student, Dr. Jemison could often be found in the school library reading books about all types of science, especially astronomy. When asked by her kindergarten teacher what she wanted to be when she grew up, she immediately replied, "I want to be a scientist." Dr. Jemison explains that there was one thing about science that spoke both to her head and her heart: "...it was the creativity that drew me to it. The possibilities. Understanding what was going on in the world around me." That excitement about the possibilities of science never left the young girl.

At the age of only 16, Dr. Jemison earned a scholarship to Stanford University. She graduated in 1977 with a degree in chemical engineering and a second degree in African American studies. Not done with her education yet, Dr. Jemison then decided to get her medical degree and become a doctor. During her time in medical school, she volunteered in Cuba, Kenya, and a refugee camp in Thailand. These experiences planted a seed of interest in working to help developing countries. (A *developing country* is a country that has little industrial and economic activity and where people in general have low incomes.) After finishing medical school, Dr. Jemison became a volunteer for the Peace Corps in the African nation of Sierra Leone, where she served as a medical officer from 1983 to 1985.

Answering the Call of Space

Though she was now a doctor and an engineer, Dr. Jemison had not lost her early interest in astronomy. She decided to apply to join NASA's astronaut training program. It was a bold move: "I was always aware of space exploration...and I always assumed I would go into space. And that's despite the fact that there were no women, and it was all white males." In 1987, she was accepted and became the first African American woman ever admitted to the astronaut program. Five years later—on September 12, 1992—she would head to space, becoming the first African American female astronaut. On the shuttle Endeavor, Dr. Jemison worked as a science-mission specialist. In this role, she would conduct experiments on weightlessness and motion sickness on the crew and herself. Dr. Jemison would spend more than 190 hours in space before returning to Earth. After making this historic flight, she spoke about the need for society to recognize that women and people of color can contribute if only given the chance.

Dr. Jemison left NASA in 1993. She moved on to her next career by founding a technology company that looks at how to use technology to help developing countries. For example, her company developed a satellite-based telecommunications system to improve health in West Africa. She also created The Earth We Share, an international summer camp for middle- and high-schoolers. The camp focuses on improving science literacy and problem-solving skills. Dr. Jemison has received many honors and awards, including being inducted into the National Women's Hall of Fame in 1993. Though she faced many obstacles as a woman and an African American, Dr. Jemison never gave up: "The issue is...what do you do with the obstacles that people put in front of you. You can buy into them, or you can give the obstacles back to that person. It doesn't mean that it's easy, but you can go around and you can create another path sometimes. But if you focus in on only that obstacle, then it's very hard to move forward, because that's where your attention will be drawn." Those are wise words from a determined woman who "just wanted to go into space."

Star Trek Star

There is another interesting "first" on Dr. Jemison's resume. She loved the television series *Star Trek: The Next Generation*. One of the show's stars heard that Dr. Jemison was a fan. So he arranged for Dr. Jemison to play a character named Lt. Palmer in one of the episodes. This made Dr. Jemison the first real astronaut to appear on the space-themed show!

Answer the questions in your own words. Use the back if you need more space.

1. What obstacle did Dr. Jemison face as she tried to become an astronaut? _____

   _____

2. How do you know that Dr. Jemison was a determined person? _____

   _____

3. What experiences in Dr. Jemison's life probably influenced her to start a technology company that helped developing countries? _____

   _____

4. List the vocabulary word in each paragraph that matches the meaning.

   A. Paragraph 2: scientific study of stars, planets, and other objects in space _____

   B. Paragraph 3: someone forced to leave a country because of war or for political or religious reasons

      _____

   C. Paragraph 4: thought something was true or probably true without knowing that it was true

      _____

   D. Paragraph 5: communication from a distance _____

   E. Paragraph 5: knowledge that relates to a specific subject _____

5. Dr. Jemison went to college and earned several different science degrees. Why do you think she did this? What do you think drove her to pursue so many different careers? _____

   _____

   _____

   _____

   _____

Early Inspiration

Dr. Jemison never believed that a career in science was beyond her abilities. An early mentor, her Uncle Louis, made sure she noticed the science that was all around her. As Dr. Jemison and Uncle Louis gazed up at the night sky, he would explain astronomy and even Einstein's theory of relativity to the young girl. Because her uncle shared his love of science with her, Dr. Jemison states, "I always assumed that I was supposed to be able to understand these things."

"A Head and Heart for Science"

Answer Key

1. There had never been a female African American astronaut before.
2. Answers will vary.
3. Answers may vary but could mention that she spent time visiting developing countries as a volunteer; she was interested in science and probably had knowledge about satellites from her years as an astronaut; as a doctor, she was interested in people having good health.
4. A. astronomy
   B. refugee
   C. assumed
   D. telecommunications
   E. literacy
5. Answers will vary.

Name _____ Reading informational text

A Curious Mind Makes History

Choose Science!

It was uncommon for a woman in the late 1800s to become a scientist. It was even rarer for a woman to triumph in the field of science. But triumph was exactly what Marie Curie did.

A Thirst for Knowledge

Marie Curie was born Maria Sklodowska on November 7, 1867, in Poland. Her mother died when Marie was only 10. Marie's father, a science teacher, encouraged his bright and inquisitive daughter in her studies. But he could not afford to send her to college. So Marie went to live with her sister Bronya in Paris, France. Once there, Marie worked out a unique deal with her sister: while Bronya attended university classes, Marie would get a job to support them both. After graduation, Bronya would work while Marie attended the university. During this arrangement, Marie got a job as a governess. She spent her spare time reading about physics, math, and chemistry. She eventually earned both a physics degree and a mathematics degree from Sorbonne University.

Life in a Lab

When Marie met fellow scientist Pierre Curie in Paris, little did she know that they would become the dynamic duo of the science world. Marie and Pierre were soon married. They got jobs working in a poorly equipped lab at the School of Chemistry and Physics in Paris. The couple had to take up teaching just to make ends meet. In the lab, Marie began studying the invisible rays given off by the radioactive element uranium. She noticed that samples of pitchblende, a mineral that contains uranium, were much more radioactive than pure uranium. She hypothesized that the large readings of radioactivity proved that pitchblende contained an undiscovered element that was extremely radioactive. She and Pierre got to work testing her theory. They eventually were able to extract a black powder from the pitchblende that was more than 300 times more radioactive than uranium. They named this new element polonium after Marie's home country of Poland. Further experiments produced another discovery: there was a second new element in pitchblende that was even more radioactive than polonium! The Curies named this element radium. In 1903, the couple was awarded the Nobel Prize for Physics for their work with radioactivity, making Marie the first woman to win a Nobel Prize.

Only a few years later, Pierre was killed in Paris when he accidentally stepped in front of a horse-drawn carriage. Though grieving, Marie took over Pierre's teaching job at Sorbonne University, becoming the school's first female professor. She continued their scientific research. In 1911, Marie earned another Nobel Prize, this time in the field of chemistry. She became the first person—man or woman—to win two Nobel Prizes.

Sadly, the discoveries that Marie and her husband made led to her death in 1934. The almost daily exposure to high doses of radiation was the cause. Marie, who used to carry small vials of radium in the pocket of her lab coat, died of aplastic anemia, a condition that happens when your body stops producing enough red blood cells. Though she met many obstacles along the way—including skeptics who believed that the world of science was no place for a woman—Marie used her brilliant mind to change the world. She once said, "Life is not easy for any of us. But what of that? We must have perseverance and above all confidence in ourselves. We must believe that we are gifted for something and that this thing must be attained."

Dangerous Artifacts

Marie Curie kept notebooks of her experiments and lab work. The notebooks and other personal items are housed in the national library of France. Even though they are over 100 years old, the notebooks are still so radioactive that they have to be kept in lead boxes! Curie's furniture and other belongings are so radioactive that visitors have to wear protective clothing.

Answer the questions in your own words. Use the back if you need more space.

1. How did Marie Curie "triumph" in the science world? _____

   _____

2. What was Marie Curie's hypothesis about pitchblende?_____

   _____

3. How did Marie Curie respond to her husband's tragic death? _____

   _____

4. List the vocabulary word in each paragraph that matches the meaning.

   A. Paragraph 3: having or producing a powerful and dangerous form of energy called radiation

      _____

   B. Paragraph 3: to withdraw something by a chemical process _____

   C. Paragraph 5: condition of being in the presence of something _____

   D. Paragraph 5: small, closed container especially for liquids _____

   E. Paragraph 5: people who question or doubt something _____

5. Marie Curie made amazing scientific discoveries, yet pursuing them proved to be dangerous to her. If you were a scientist and believed you were close to making a major discovery, would you continue your work even if there were dangers in doing so? Why or why not? _____

   _____

   _____

   _____

   _____

Images and Injuries

When World War I broke out in 1914, Marie Curie developed small, portable X-ray machines that could be used to diagnose injuries on the battlefield. These machines were nicknamed "Little Curies." She and her teenage daughter Irene even X-rayed wounded soldiers on the front lines. The technology Curie developed is similar to what is used by the powerful X-ray machines of today.

"A Curious Mind Makes History"

Answer Key

1. Answers will vary.
2. She believed there was an undiscovered element in pitchblende that was extremely radioactive.
3. She grieved but kept working; she took over his university teaching job and continued their research.
4. A. radioactive
   B. extract
   C. exposure
   D. vials
   E. skeptics
5. Answers will vary.

Name _____ Reading informational text

Nature Writer, Biologist, Inspiration

Choose Science!

As a child, Rachel Carson loved exploring the forests and streams on her family's Pennsylvania farm. Remarkably, this small-town girl would go on to become a renowned marine biologist, an author of best-selling books about the natural world, and the inspiration for today's environmental movement.

A Nature Writer Is Born

Carson was born in rural Pennsylvania in 1907. As a young child, she had two passions: nature and writing. Carson's mother taught her daughter the names of plants and the sounds of animals. By the age of 10, Carson was writing for children's magazines. She said of that time, "I can remember no time, even in earliest childhood, when I didn't assume I was going to be a writer." Carson started college in 1925 as an English major, but changed to biology. While taking part in a summer research project on the Maine coast, she saw the ocean for the first time. It was love at first sight. After graduating from college and getting a graduate degree in zoology, Carson was hired by the U.S. Bureau of Fisheries, where she became a junior aquatic biologist—and one of only two women who worked at the Bureau at a professional level. For 15 years, Carson cranked out brochures and other materials for the public to read. When the Bureau became the U.S. Fish and Wildlife Service, Carson was promoted to editor-in-chief.

When she wasn't working at the Bureau, Carson focused on submitting nature and conservation articles to magazines and newspapers. She also wrote several books about aquatic life. Her first book, *Under the Sea Wind* (1941), was about the interactions between a sea bird, an eel, and a fish. *The Sea Around Us* (1951) was her next book. It has been described as "a biography of the sea." The success of this second book—which became an international bestseller—allowed Carson to quit her job, buy a small home on the coast of Maine, and write full-time. A third book, *The Edge of the Sea* (1955), focused on the marine ecosystems of the east coast. Each of these books explained the beauties of life in and near the sea using rich scientific details and poetic language. In them, Carson also expressed concerns about the impact humans had on the natural world.

Launching a Movement

During her time at the U.S. Fish and Wildlife Service, Carson became alarmed about the danger of pesticides, especially a pesticide known as DDT. These chemicals were widely used by farmers to kill insects. In her fourth book, *Silent Spring* (1961), Carson questioned the effect of pesticides on ecosystems and humans. The book created an uproar and made pesticides a major issue in the United States. Some people, including manufacturers of pesticides, criticized Carson's views about the balance of nature. But Carson did not back down. In a rebuttal to a spokesman for the insecticide industry, she said: "Now, to these people, apparently, the balance of nature was something that was repealed as soon as man came on the scene. Well, you might just as well assume that you could repeal the law of gravity." A presidential advisory committee backed up Carson's research, and the use of DDT was soon banned. Even more importantly, the American public had been awakened to human-generated threats to the environment.

Carson died from cancer in 1964 at the age of 57. To honor her work to protect the environment, the U.S. Fish and Wildlife Service named one of its refuges near her Maine home as the Rachel Carson National Wildlife Refuge. The work of this remarkable biologist and writer also led to the creation of the Environmental Protection Agency (EPA). Most importantly, Carson called people to see their connection to the natural world and their responsibility to take care of it: "Wildlife, it is pointed out, is dwindling because its home is being destroyed, but the home of the wildlife is also our home."

Legislation Legacy

Not only did Carson's book *Silent Spring* start the modern-day environmental movement, it also led to the passage of several new laws. These laws include the Clean Air Act (1963), the Wilderness Act (1964), the National Environmental Policy Act (1969), the Clean Water Act (1972), and the Endangered Species Act (1973).

Answer the questions in your own words. Use the back if you need more space.

1. How did Carson become interested in marine biology as a career?_____

   _____

2. What was *Silent Spring* about? _____

   _____

3. How did Carson's two careers—marine biologist and writer—combine to make the world aware of dangers to the environment? _____

   _____

4. List the vocabulary word in each paragraph that matches the meaning.

   A. Paragraph 3: relating to water _____

   B. Paragraph 4: argument or proof that something is wrong _____

   C. Paragraph 4: officially made a law no longer valid _____

   D. Paragraph 5: place that provides shelter or protection _____

   E. Paragraph 5: gradually becoming smaller _____

5. Do you agree with Rachel Carson's belief that "the home of the wildlife is also our home"? Why or why not?

   _____

   _____

   _____

   _____

   _____

All Connected

Even though she never married, home life was important to Carson. She was the wage earner and caretaker for her elderly mother, her sister, and two young nieces. She also adopted a four-year-old grandnephew. Like family connections, Carson believed that nature and humans were connected, and that people had a responsibility to take care of the natural world.

"Nature Writer, Biologist, Inspiration"

Answer Key

1. She was part of a research project on the Maine coast, where she saw the ocean for the first time.
2. *Silent Spring* was about the effect of pesticides on the environment and humans.
3. Answers will vary.
4. A. aquatic
   B. rebuttal
   C. repealed
   D. refuge
   E. dwindling
5. Answers will vary.