The Legacy of Louis Pasteur

It is hard to imagine today, but in the mid-1800s, doctors and scientists knew very little about what made people sick. They knew about bacteria, but they did not realize bacteria caused many diseases and illnesses. In fact, many scientists at the time believed that bacteria, insects, and other living things could spring to life from nonliving material such as rotten meat. One person more than any other was responsible for changing the world’s minds: a French scientist named Louis Pasteur.

Bacteria
Pasteur was a determined scientist who led the field with his innovative ideas. He was the first to show that all living things, including bacteria, come from living parents, and he also helped to advance understanding of how bacteria cause diseases. His persistent work lasted several decades and led to important developments in health and medicine.

In the early 1860s, Pasteur tested the theory of spontaneous generation, the idea that living things could be created from nonliving things. He placed broth inside flasks and sealed them so that no living thing could enter. He slowly heated the broth, believing that it would kill any bacteria in the flasks, and then he let the flasks sit for more than a year. No bacteria appeared in the flasks. When he finally broke the seals to the flasks, however, bacteria began to grow in the broth. The results of this experiment proved that spontaneous generation was not real.

The experiment also gave the world a method for killing harmful bacteria. Today, the process is known as pasteurization. The milk you drink undergoes this process. It is heated at high temperatures for a short time, and then quickly cooled. Pasteurization does not change the taste of milk, but the heat kills any bacteria that could make you sick.

What Causes Disease?
Pasteur’s work also led to advances in medicine. In the late 1860s, France was at war with Prussia, a kingdom in what is now Germany. Wounded soldiers flooded the hospitals of Paris. Pasteur believed that bacteria were causing deadly infections that took many soldiers’ lives. How were the harmful bacteria reaching the wounded soldiers? Pasteur was certain that the doctors treating the soldiers were using dirty instruments loaded with bacteria.
Pasteur began working with a doctor who agreed with his ideas about cleanliness. This doctor, named Joseph Lister, began to use an antiseptic, a substance that kills bacteria, on soldiers’ wounds. Soon, doctors began to use antiseptics to wash their hands and surgical equipment. Using equipment that was sterile, or free from bacteria, produced amazing results, and more and more soldiers began to survive their surgeries.

Pasteur had demonstrated that many illnesses were caused by bacteria, but his work did not stop there. In another experiment, he grew weakened bacteria in a laboratory and then placed them in animals’ bodies. The animals developed resistance to the diseases caused by that type of bacteria. In other words, they became immune to the disease.

At the time, a disease called anthrax was spreading in cows and sheep. Building on the work of Edward Jenner, a scientist who developed a vaccine for smallpox in the 18th century, Pasteur grew weakened anthrax. He then used the weakened bacteria to develop a successful vaccine. When treated with Pasteur’s vaccine, cows and sheep were able to fight off the deadly disease.

**Pasteur’s Legacy**

Louis Pasteur’s remarkable discoveries were among the most important in the history of medicine. Since his time, scientists have developed vaccines to prevent many different diseases, and pasteurization, the process named for him, has saved countless people from illness caused by spoiled foods. Few scientists before or since have had as great an impact on so many lives.
Now answer Numbers 1 through 5. Base your answers on “The Legacy of Louis Pasteur.”

1. This question has two parts. First, answer part A. Then, answer part B.

   **Part A:** Which sentence best summarizes the author’s point of view about doctors and scientists in the mid-1800s?
   
   A. They could not help their patients.
   B. They knew very little about bacteria.
   C. They introduced many exciting and new ideas.
   D. They were very similar to modern doctors and scientists.

   **Part B:** Which detail from the text best supports your answer in part A?
   
   A. Edward Jenner developed a vaccine to prevent smallpox.
   B. Joseph Lister began to use an antiseptic on soldiers’ wounds.
   C. Louis Pasteur developed a process for killing harmful bacteria.
   D. Many scientists believed life could arise from nonliving material.

2. Read the sentence from the text.

   His persistent work lasted several decades and led to important developments in health and medicine.

   Which words have the same connotation as the word persistent? Select three options.

   A. determined
   B. endless
   C. enduring
   D. relentless
   E. stubborn
   F. tireless
Put the achievements from Pasteur’s life in the correct sequence. Write each achievement in the correct section of the chart.

| First
| Second
| Third
| Fourth
| Fifth
| Sixth

**Achievements:**
- Pasteur developed a vaccine to prevent anthrax.
- Pasteur developed the process of pasteurization.
- Pasteur saved the lives of soldiers having surgery.
- Pasteur found a way to build up immunity to diseases.
- Pasteur proved that spontaneous generation is not real.
- Pasteur worked with a doctor who started using antiseptic.
4 Read the sentences from the text.

Pasteur’s work also led to advances in medicine. In the late 1860s, France was at war with Prussia, a kingdom in what is now Germany. Wounded soldiers flooded the hospitals of Paris.

Which word from the sentences has a positive connotation?

A advances
B kingdom
C wounded
D flooded

5 With which statements would the author most likely agree? Select two options.

A Pasteur was a pioneer in the field of medicine.
B Pasteur knew more than most modern scientists.
C People become doctors today because of Pasteur.
D People today are healthy partly because of Pasteur.
E Pasteur was the most important figure of the 19th century.
F Pasteur would have accomplished more if he were a doctor.
Dinosaur Discoveries

Two hundred years ago, the word “dinosaur” did not exist in the English language. The word had not been invented yet because people did not know dinosaurs had ever existed. People had known about dinosaur bones for centuries, but they were not exactly sure what the bones were. For example, a large dinosaur bone was found in England in the 1670s. Scientists thought it was the thighbone of an elephant. Through the years, many bones were discovered. Scientists examined them, but they believed the bones were from large lizards.

Early Discoveries

In the early 1800s, a series of discoveries were made that would lead scientists to some exciting new conclusions. Around 1815, a British geologist named William Buckland found some big teeth that he determined were from a very large lizard, which he named *Megalosaurus*. It was the very first dinosaur to be named. Soon after, a doctor named Gideon Mantell and his wife Mary Ann, also British, discovered bones and teeth from a very large animal. Upon investigation, they appeared to be from a plant-eating reptile. Scientists were excited about the Mantells’ find because all known reptiles were meat eaters. This animal, named *Iguanodon* because it looked like an iguana, was the first reptile anyone knew of that ate plants.

In 1842, a British scientist named Sir Richard Owen compared the bones discovered by Buckland, the Mantells, and others. Owen noticed that the bones had some features of reptiles and some features of birds, and he concluded that these animals belonged in their own group, which he called *dinosaur*. Owen made up the new word based on the Greek *deinos* and *saurus*, meaning “terrible lizard.”

A complete dinosaur skeleton was discovered in New Jersey in 1858. The bones were put together and mounted to create the very first display of a dinosaur. The skeleton created a sensation around the world as people reacted with excitement to the enormous animal. It provided the final, clinching proof that dinosaurs had actually existed.
Learning More

The dinosaur discoveries opened up many new possibilities for paleontologists. These scientists study fossils, the remains of plants and animals that lived long ago. Paleontologists were enthusiastic about the strange reptiles from the past, and in the following decades, hundreds of dinosaur skeletons were discovered around the world. By studying the new fossils, paleontologists were able to learn a lot about the physical features of dinosaurs. For example, a dinosaur with large hind limbs and much shorter front limbs likely walked on two feet.

For many years, though, paleontologists did not know how dinosaurs actually lived. They believed dinosaurs were not friendly to each other and did not care for their young. Then in the 1970s, a paleontologist named Jack Horner made an interesting discovery in Montana. Horner found nests and eggs that belonged to a type of dinosaur he named Maiasaura, meaning “Good Mother Lizard.” Because of the way the nests were organized, Horner thought they were part of a dinosaur colony, and he concluded that Maiasaura dinosaurs actually had a family life. It was the first time that evidence showed dinosaurs could actually be good parents.

Paleontologists continue to make discoveries and they continue to propose new theories about dinosaurs. For example, until recently many paleontologists thought that the huge Tyrannosaurus Rex was a vicious predator, but new studies suggest that these kings of dinosaurs may have traveled in packs as scavengers. Every day, new discoveries are made about these fascinating creatures. As scientists gather evidence, they get a better picture of how dinosaurs lived.
Now answer Numbers 6 through 10. Base your answers on “Dinosaur Discoveries.”

6 Read the sentence from the text.

The skeleton created a sensation around the world as people reacted with excitement to the enormous animal.

Which word has a similar connotation to the word \textit{sensation}?

A awareness
B reaction
C response
D thrill

7 Read the sentence from the text.

For example, a dinosaur with large hind limbs and much shorter front limbs likely walked on two feet.

Which point does this evidence \textit{best} support?

A Scientists learned a lot about dinosaurs from fossils.
B Scientists did not know how dinosaurs actually lived.
C Scientists still propose new theories about dinosaurs.
D Scientists did not think dinosaurs cared for their young.
Sort the words from the list. Write each word in the chart to show if it has a positive connotation or a negative connotation.

<table>
<thead>
<tr>
<th>Positive Connotation</th>
<th>Negative Connotation</th>
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**Words:**
- discoveries
- vicious
- predator
- fascinating
- terrible
- possibilities
- enthusiastic
9 This question has two parts. First, answer part A. Then, answer part B.

**Part A:** Which sentence best summarizes the author’s point of view of Jack Horner?

A. He was lucky to make the discoveries he did.
B. He knew less about dinosaurs than people realize.
C. He made important discoveries as a paleontologist.
D. He was popular with both paleontologists and the public.

**Part B:** Which evidence from the text best supports the author’s point of view?

A. descriptions of dinosaur bones
B. data about one kind of dinosaur
C. the story of an early paleontologist
D. the findings of many paleontologists

10 With which statements would the author most likely agree? Select two options.

A. Our ideas about dinosaurs are still changing today.
B. Most dinosaur bones on Earth have already been discovered.
C. Paleontologists are a main connection to the world of dinosaurs.
D. Paleontologists have a difficult job that most would not want to do.
E. The Iguanodon is the most important dinosaur discovery in history.
F. If it weren’t for William Buckland, dinosaurs would remain undiscovered.
Now answer Number 11. Base your answer on “The Legacy of Louis Pasteur” and “Dinosaur Discoveries.”

11 How do the authors of both texts present facts and evidence to support their points of view? What types of evidence do the authors use to show how scientific theories can change over time? Support your answer with information from both texts.