

At the same time that Kleinrock was growing absorbed in the problems of network connection, the United States government was ramping up its investment in science and technology research. The Soviet Union's famous launch of a satellite called Sputnik had been an embarrassment for the United States—the United States thought that it should be the leader of space travel. Eisenhower created a branch within the Department of Defense to ensure that the scientific leadership of America wouldn't be eclipsed again in the future. This new organization, the Advanced Research Projects Agency (ARPA), became one of the major engines of technological innovation throughout the 1960s and 1970s.

In 1962, while Kleinrock was finishing up graduate school, ARPA created a new department devoted to computer science. The head of this division was J.C.R. Licklider, a fellow scientist at MIT who also worked on network structures.

"He was one of those visionaries who foresaw the advantages of combining humans with computer," said Kleinrock of his former colleague and boss. "He created a concept called man-computer symbiosis, recognizing that if you put the two together, you could get very significant results." Licklider ran into political problems at ARPA and ultimately left to return to MIT, but not until he had planted the idea of networking as a concept worthy of funding.

Bob Taylor took over ARPA's computer science division in 1966 and reinvigorated the project. Taylor had been funding different projects in computer science departments at universities across the country and realized it was growing too costly to give each department the machines and resources to do every task. What he needed was a way for geographically far-flung research centers to somehow share each other's computing resources. Taylor needed to create a network. The man he brought in to build it, Larry Roberts, happened to be Kleinrock's old officemate at MIT.

"We were all intimately familiar with each other's work so when they asked, Roberts said, 'Look, I know exactly what this technology should be and I know it can work. Len Kleinrock has already proven it,'" recalled Kleinrock. "And bang, the project came to life. After a number of years, it came to action."

And so it was that all of the men were crowded into the room watching a long grey cable. An air conditioner hummed in the background, fighting against both the heat outside and the heat generated by the massive machine in the room. Cheers broke out when they saw that the information was flowing, but the real test was to come a few weeks later.

The first message between two computers was sent on October 29, 1969. This time the room was empty, except for Kleinrock and one other engineer. They didn't know that it was such an important milestone so there was no camera or tape recorder. The two men were trying to log onto a computer at the Stanford Research Institute and successfully got through two letters of the message "login" before the system crashed.

“It was not until this thing called the Internet hit the consumer world that we recognized this network was really important. At that point we looked back and said, ‘What was the first message ever sent on the Internet?’” Kleinrock remembered. “Samuel Morse sent, ‘What hath God wrought?’ Alexander Graham Bell said, ‘Come here Watson I need you.’ Neil Armstrong had his giant leap. These guys were smart and they understood media. We had no such concept but the message we created, ‘lo,’ [short for ‘login’] that’s the most prophetic, succinct, powerful message we could have come up with by accident.”

Name: _____ Date: _____

1. What was Len Kleinrock attempting to do for the first time in history?

- A He was attempting to build a computer.
- B He was attempting to send a telephone message.
- C He was attempting to send information between a computer and a router.
- D He was attempting to combine humans and computers.

2. How does the author describe the mood of Kleinrock and the others in the room with him?

- A They were nervous and impatient.
- B They were bored and tired.
- C They were angry and frustrated.
- D They were cheerful and relaxed.

3. Read the following sentences: "The Soviet Union's famous launch of a satellite called Sputnik had been an embarrassment for the United States—the United States thought that it should be the leader of space travel. Eisenhower created a branch within the Department of Defense to ensure that the scientific leadership of America wouldn't be eclipsed again in the future. This new organization, the Advanced Research Projects Agency (ARPA), became one of the major engines of technological innovation throughout the 1960s and 1970s."

Based on this information, what can be concluded?

- A The Department of Defense was separate from the Advanced Research Projects Agency.
- B The United States and the Soviet Union worked closely together on science and technology research despite their political differences.
- C The United States government was hesitant to support science and technology research because it was too expensive and complex.
- D The United States government heavily supported science and technology research as a way to keep its leadership in the world.

4. Why was it important for computers in different locations to be able to communicate with each other?

- A America and the Soviet Union needed to be in touch over scientific issues.
- B Scientists were getting bored with the work they were doing.
- C It was too expensive for computers in different places to do every task on their own.
- D It would make it easier for the Americans to spy on the Soviet Union.

5. What is the main idea of this passage?

- A Len Kleinrock's work led to the creation of the Internet.
- B The United States lost the technological race to the Soviet Union.
- C Len Kleinrock hoped to create the Internet, but his attempt failed after the computer system crashed.
- D The Internet was created as a result of an enormous accident.

6. Read the following sentences: "The Soviet Union's famous launch of a satellite called Sputnik had been an embarrassment for the United States—the United States thought that it should be the leader of space travel. Eisenhower created a branch within the Department of Defense to ensure that the scientific leadership of America wouldn't be **eclipsed** again in the future."

As used in the passage, what does the word "**eclipsed**" mean?

- A surpassed
- B destroyed
- C punished
- D wasted

7. Choose the answer that best completes the sentence below.

The United States was eager to invest more in science and technology research, _____ after the Soviet Union's launch of Sputnik.

- A because
- B instead
- C finally
- D particularly

8. Why had Len Kleinrock and the other computer scientists gathered to observe the computer and the router?

9. What did Bob Taylor, who was in charge of computer science at ARPA, need to do in order to reduce the cost of different computer science projects at universities across the country?

10. Why was Len Kleinrock's work on network connection a significant development in computer science? Use information from the passage to support your answer.

Teacher Guide & Answers

Passage Reading Level: Lexile 1050

1. What was Len Kleinrock attempting to do for the first time in history?

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8. Why had Len Kleinrock and the other computer scientists gathered to observe the computer and the router?

Suggested answer: They wanted to see whether information could successfully flow between the computer and the router through a long, grey cable that connected the two machines.

9. What did Bob Taylor, who was in charge of computer science at ARPA, need to do in order to reduce the cost of different computer science projects at universities across the country?

Suggested answer: Bob Taylor needed to create a network that would allow geographically far-flung research centers to somehow share each other’s computing resources.

10. Why was Len Kleinrock’s work on network connection a significant development in computer science? Use information from the passage to support your answer.

Suggested answer: Students should explain that Kleinrock’s work proved that information could be exchanged between two different computers. This milestone would allow scientists to further develop this technology so that computers in different locations could communicate with one another, allowing scientists and others to cut their research costs and improve access to information. These improvements in communications and access to information meant scientists could work more efficiently and effectively on different projects.

Students may also explain that Kleinrock’s work on network connection was a precursor to the Internet because it established the basic technology that the Internet was built upon.