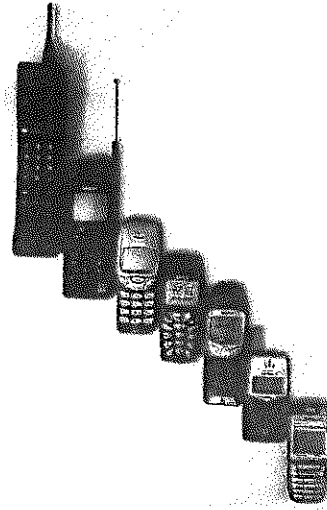


Using Cellphones and Computers to Transmit Information

By Alissa Fleck



Modern technology can do some pretty incredible things. It's possible, with current technological capabilities, to transmit digital information over long distances using coding and decoding processes without losing the contents of the original information. The best part is we don't have to do anything besides send the message and wait for it to be received.

Consider, for instance, the cellular phone. It wasn't until the early 1980s that this mobile variation on the standard telephone was even available for people to use. Now, it seems like everyone has a cellphone, sending and receiving information in speedy ways invisible to the human eye.

There's so much going on below the surface of what we can see when we use our cellphones. One difference between a mobile phone and a traditional landline telephone is you can move the cellphone just about anywhere geographically and still use it to talk to other phone users. No matter how far away you are from someone you call, you can usually still understand each other's voices over the phone, thanks to radio waves and something called a cellular network.

It took many evolutions in phone technology to get where we are today, but the current cellphone wirelessly transmits information by connecting to a cellular network. Mobile phone operators provide these cellular networks, which function with the help of cellphone towers, and then calls are made over what is known as a radio link. Through this process, information—in this case, voice input—is broken down and reassembled over the radio link, so the person on the other end instantaneously hears what is said.

In other words, as you speak into the phone, your voice is converted into an electrical signal, transmitted in the form of a radio wave by these towers, and then converted back into the sound of your voice by the phone on the receiving end. All this happens in the blink of an eye while you chat over the phone without any distortion.

The process of transmitting digital information is not exclusive to telephones. Computers are another instrument that can receive, decode and convert information, though typically this information is not a person's voice, but written content.

We may take for granted the ease with which we can pass along information with computers and the Internet, but many forces are hard at work processing information to make computers easier for us to use and communication more reliable.

The first computer showed up around 1941, but it was much more limited in its capabilities than computers now. In fact, computers are everywhere—sometimes they are so small we do not think of them as computers at all, though they serve the same function as the computers we have at home, the office or school.

Much like cellular telephones, computers were actually first used to transmit sensitive information across geographical spaces by the military at a point when government officials worried it would be possible to knock out a country's entire telephone grid.

Computer engineers began finding ways to link their computers together in order to share information among them. This linking began with just a couple of computers and grew to the millions which connect regularly today. Ultimately, that's how what we know as the Internet was developed.

Wireless computer networking is also similar to cellular phone use in that computers use the same networks our mobile phones use.

While you speak into the telephone using your voice, you typically insert data into your computer by typing on the keyboard. You may decide to share information through an email or access information on a website by typing in or visiting what is known as a hyperlink.

When you use the Internet to share and access information, you connect to the relevant network. You can send a message from your computer to another computer anywhere in the world and it will arrive almost immediately, going through many different networks in the process.

Still, the information you send does not travel in a single piece as it might through the standard mail service; instead, it is broken down into smaller digital information. As with a cellphone, the information you send is fragmented into tiny pieces and then reconstructed once it's reached its destination. Along with your message comes other information, for instance about ordering, or how the message should be restructured to make sense to the reader. Your message will also include more basic data about where it came from and where it is supposed to go.

Computers and the Internet require many high-tech and complicated pieces to run properly, but something known as a router is a key instrument that keeps information being sent from one computer to another going along the correct pathway. The Internet also relies on telephone wires and satellite links for wireless information sharing.

It's important to note that for the Internet to work as it does, many companies have to agree to work with one another. The Internet is really a collection of networks working together toward a common goal of allowing information to be shared.

Name: _____ Date: _____

1. What are two examples of technology that send information over long distances?
 - A the human eye and computers
 - B government officials and computers
 - C cellphones and the human eye
 - D cellphones and computers

2. What does the author compare to cellphones in this passage?
 - A The author compares companies to cellphones.
 - B The author compares engineers to cellphones.
 - C The author compares computers to cellphones.
 - D The author compares cellular networks to cellphones.

3. A cellphone sends and receives information in a speedy way invisible to the human eye.

What evidence from the passage supports this statement?

- A When a person speaks into a cellphone, his or her voice is broken down and reassembled over a radio link, so the person on the other end instantaneously hears what is said.
 - B When computers first showed up around 1941, they were used to transmit sensitive information across geographical spaces by the military because of worries government officials had.
 - C Although people may take for granted the ease with which they can pass along information through computers, many forces are at work to make computer communication more reliable.
 - D Like cellphones, computers can receive, decode, and convert information, though typically this information is written content rather than someone's voice.

4. What is one way that computer use has changed over time?
 - A Computers were first used in homes, schools, and offices to send different kinds of information, but now they are used only by the military to send sensitive information.
 - B Computers were first used by the military to send sensitive information, but now they are used in homes, schools, and offices to send different kinds of information.
 - C Computers used to send a person's voice from one place to another, but now they send only written content.
 - D Computers used to send a person's voice from one place to another, but they have been gradually replaced by landline telephones.

5. What is this passage mostly about?

- A computers, the Internet, and how the military uses technology to protect people
- B cellphones, landline telephones, and the reasons people have trouble hearing each other over the phone
- C mobile phone operators, government officials, and companies that work with one another
- D cellphones, computers, and how they send information from one place to another

6. Read the following sentence: "It's possible, with current technological capabilities, to **transmit** digital information over long distances using coding and decoding processes without losing the contents of the original information."

What does the word "transmit" mean in the sentence above?

- A harm
- B fold
- C hear
- D send

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

Information is transmitted by different kinds of modern technology, _____ cellphones and computers.

- A in conclusion
- B instead
- C especially
- D never

8. According to the passage, what are cellphones used for?

9. How does a cellphone transmit information using cellular networks?

10. At the end of the passage, the author writes, "The Internet is really a collection of networks working together toward a common goal of allowing information to be shared." Could cellphones be described in the same way? Explain your answer using evidence from the passage.
