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## ***Can You Hear Me Now? A Study Unit on Cell Phones*** **Introduction & History**

Since the dawn of time, people have found ways to communicate with one another. Smoke signals and tribal drums were some of the earliest forms of communication. Letters, carried by birds or by humans on foot or on horseback, made it possible for people to communicate larger amounts of information between two places. The telegraph and telephone set the stage for more modern means of communication. With the invention of the cellular phone, communication itself has become mobile.

For you, a cell phone is probably just a device that you or your friends use --to keep in touch with family and friends, take pictures, play games, or send text messages. The definition of a cell phone is more specific: it is a hand-held wireless communication device that sends and receives signals by way of small special areas called cells.

Walkie-talkies, telephones, and cell phones are duplex communication devices: they make it possible for two people to talk to each other. Cell phones and walkie-talkies are different from regular phones, because they can be used in many different locations. A walkie-talkie is sometimes called a half-duplex communication device, because only one person can talk at a time. A cell phone is a full-duplex device because it uses both frequencies at the same time. A walkie-talkie has only one channel. A cell phone has more than a thousand channels. A walkie-talkie can transmit and receive signals across a distance of about a mile. A cell phone can transmit and receive signals over hundreds of miles.

In 1973, an electronic company called Motorola hired Martin Cooper to work on wireless communication. Motorola and Bell Laboratories (now AT&T) were in a race to invent the first portable communication device. Martin Cooper won the race and became the inventor of the cell phone. On April 3, 1973, Cooper made the first cell phone call to his opponent at AT&T while walking down the streets of New York City. People on the sidewalks gazed at Cooper in amazement as he walked down the street talking on his cellular phone. Cooper's phone was called a Motorola Dyna-Tac. It weighed a whopping 2 ½ pounds (as compared to today's cell phones that weigh as little as 3 or 4 ounces).

After the invention of his cell phone, Cooper began thinking of ways to make the cell phone available to the general public. After ten years, Motorola introduced the first cell phones for commercial use. The early cell phone and its service were both very expensive. The cell phone itself cost about \$3,500.

In 1977, AT&T constructed a cell phone system and tried it out in Chicago with over 2,000 customers. In 1981, a second cellular phone system was started in the Washington, D.C. and Baltimore area. It took nearly 37 years for cell phones to become available for general public use. Today there are more than sixty million cell phone customers with cell phones producing over thirty billion dollars per year.

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## ***Can You Hear Me Now? A Study Unit on Cell Phones***

**Answer the questions from the text *INTRODUCTION & HISTORY***

1. What is a cell phone?

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2. How did the cell phone get its name?

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3. What are two of the differences between a walkie-talkie and a cell phone?

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4. Who invented the cell phone, and for what company did he work?

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5. In what year was the cell phone invented? \_\_\_\_\_

6. How did people react to Martin Cooper as he talked on his cell phone while walking down the streets of New York City?

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7. How does the size of the first cell phone compare with the size of cell phones today?

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## ***Can You Hear Me Now? A Study Unit on Cell Phones***



### **Parts of a Cell Phone**

A cell phone is not as complicated as you might think. Most cell phones have only seven major parts: a circuit board, an antenna, a liquid crystal display (LCD), a keypad, a microphone, a speaker, and a battery.

Thirty years ago, these parts would have filled the entire floor of an office building. Today they fit into a package small enough to rest in the palm of your hand.

The circuit board is the most important part of a cell phone because it contains the computer chip. One section of the chip performs high-speed calculations. Another section of the chip has a microprocessor that handles the commands that you give the cell phone when you press keys on the keypad.

Cell phones have tiny speakers and microphones that are very powerful. As the size of the cell phone decreased, so did the size of the cell phone battery.

### **How Cell Phones Work**

When you speak into a cell phone, it picks up your voice and changes the sound waves in your voice into radio waves. The radio waves then travel through the air to a receiver at a station or tower. The tower sends your call through a series of networks or cells until it reaches the person that you are calling,

When you receive a call on your cell phone, the message travels through a cellular network until it reaches a tower or base station near your cell phone. The base station then sends out radio waves that are picked up by a receiver in your cell phone. The radio waves are then changed back to the sound of a voice. A cell phone can transmit and send signals over hundreds of miles. A cell phone operates within cells, so that as you move from one place to another, the signal is passed from one cell to another. This is how someone using a cell phone can drive hundreds of miles and hold a conversation during the entire trip.

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## ***Can You Hear Me Now? A Study Unit on Cell Phones***

**Answer the questions from the text *PARTS OF A CELL PHONE***

8. How many major parts do most cell phones have?

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9. Why is the circuit board an important part of a cell phone?

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10. What does the microprocessor portion of the computer chip do?

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**Answer the questions from the text *HOW CELL PHONES WORK***

11. What happens when you speak into a cell phone?

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12. Explain how someone using a cell phone can drive hundreds of miles and hold a conversation during the entire trip.

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## ***Can You Hear Me Now? A Study Unit on Cell Phones*** **Advantages and Disadvantages**

Anyone who uses a cell phone can tell you how convenient it is to have one. They are especially useful when you are on the road traveling. If you need emergency road service or if you find yourself in a dangerous situation, a cell phone can be your best friend.

Cell phones are an effective way to keep in touch with family and friends. Cell phones are small and easy to carry around, and calls can be made anytime from any place.

However, cell phones do have some disadvantages. One of the biggest disadvantages of using cell phones is that people are tempted to use them while driving. This causes a situation called "inattention blindness." Studies have shown that drivers who use cell phones while driving were "blind" (because they did not pay attention) to roadside billboards, signs and other sources of important information around them.

According to the National Highway Traffic Safety Administration, at any given moment of the day over 500,000 drivers are talking on cell phones while driving. This means that there are a large number of people who are not giving their full attention to driving. Everyone knows that in today's traffic there should be as few distractions as possible.

Many people feel that there should be laws against using cell phones while driving. Nearly two dozen countries around the world, including Australia, Germany, Great Britain, South Africa, Greece, Ireland, Japan, Italy, Israel and Russia all have laws restricting cell phone use while driving.

The Automobile Association (AAA) recommends that cell phones not be used while driving. But if there is an emergency reason for using a cell phone, the following safety tips are recommended:

- Position your cell phone within easy reach
- Pull off the road and park in a safe place to make calls.
- Ask a passenger to make a call for you
- Keep the phone conversation short and get off the phone as soon as possible
- Use phone only when necessary

A driver who is injured in an automobile accident caused by a person who was using a cell phone has the right to sue the person for careless and negligent operation of his vehicle.

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## ***Can You Hear Me Now? A Study Unit on Cell Phones*** **Advantages and Disadvantages, part 2**

In addition to problems related to driving, there are other disadvantages to cell phones. Cell phones can be disruptive in places such as churches, theaters, and other places where quietness is needed. It is thought that ringing cell phones cause distractions in classes. Many school districts have banned cell phones use in the schools.

Some restaurant owners across the country are asking their customers to turn off the ringers on their cell phones when they enter the restaurant. Most cell phones have a vibrating feature that causes the phone to vibrate instead of ringing, and some have voice mail where messages can be stored so that they can be retrieved at more appropriate times. This makes it possible for cell phone users to continue to use their phones without disturbing the people around them.

On any occasion, good manners are always the best way to go. It is important to be considerate of others and use good common sense all the time, including when using cell phones. According to *USA Today*, millions of cell phones in use in the United States ring in theaters, libraries, churches and other inappropriate places. Cell phone users are encouraged to turn off cell phones in places where quietness is needed. If for some reason the user cannot or will not turn off the phone, they should use the vibrating feature to alert them to incoming calls without disturbing others.

Cell phone users should also consider the following rules of courtesy:

- If there is a rule against cell phones, respect it.
- Respect the personal space of those around you. Take your calls away from others.
- When speaking on the phone, speak as quietly as possible.
- Do not interrupt a face-to-face conversation to take a cell phone call.
- If you must take a call while with others, keep the call brief.
- Whenever possible, let voice mail take your calls.
- Keep your ring tones turned to a low volume.

Perhaps more serious than damage to social relations, cell phones may have effects on the health of their users. It has been found that cell phones give off radiation. Radiation can damage the cells in the body. Scientists believe that this radiation can cause changes in brain cells which can cause nausea, dizziness, depression, early memory loss, and brain tumors.

There is no certain connection between cell phone use and health problems. However, until further studies are done, most scientists suggest that people should limit the length of time spent talking on cell phones.

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### ***Can You Hear Me Now? A Study Unit on Cell Phones***

**Answer the questions from the text *ADVANTAGES AND DISADVANTAGES***

13. What are some ways that cell phone can be beneficial?

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14. What is “attention blindness”?

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15. List some countries that have banned the use of cell phone driving.

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16. List some safety tips for using cell phones while driving.

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17. What are some disadvantages of using cell phones?

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18. How can radiation from cell phone phones affect the body?

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## ***Can You Hear Me Now? A Study Unit on Cell Phones*** **Cell Phones of the Future**

To make cell phone use and driving safer, cell phone companies are coming up with numerous safety features. Some companies are providing headsets, speakerphones, and voice-activated dialing where telephone numbers are spoken instead of being dialed by hand.

One new technology that promises to make driving safer for cell phone users is a piece of equipment that allows you to have make and receive calls while your phone is anywhere in your car --even in the trunk! The car is wired so that calls come through the car's speaker and you can speak through the car's microphone. This way, calls are made and received without having to touch any buttons, dials or even the phone itself.

If you think that cell phones are cool now just wait a few more years. Scientists and engineers predict that cell phones called "smart phones" will interact with other appliances in the home to turn appliances such as dishwashers on and off even while you are not at home.

One university research group is developing "context aware" cell phones. These phones will sense where the user is and act accordingly. For example, these phones will not ring while you are having a face-to-face conversation with someone. They will remind you of the best time to return an important phone call. They will remember to ring if they are lying on the desktop and vibrate if they are in your pocket or purse. They will ring loudly where there is lots of noise and softly if you are in a quiet place.

In the next few years, it is predicted that cell phones will have a small computer that can scan anything in a store. Then with the push of a button, the desired store products can be purchased.

Cell phone users can also look forward to having disposable phones. These cell phones will be made of paper, and will be extremely small and lightweight. They will cost about \$20 and will include 60 prepaid minutes. When the battery dies and the minutes are used up, the phone can be tossed away or it may be recycled.

Another predicted cell phone of the future is sensor phones. These phones will contain a sensor device that lets you know if someone is tampering with your luggage or breaking into your house.

Fitness phones will help to keep you in shape. They connect to a treadmill. If you run faster on the treadmill the music plays faster. If you slow down, the music slows down too.

"Torture-proof" cell phones will withstand water, dust, and will be shockproof. If dropped down a flight of stairs, the phone will continue to operate as usual.



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## ***Can You Hear Me Now? A Study Unit on Cell Phones***

**Answer the questions from the text *CELL PHONES OF THE FUTURE***

19. What new technology promises to make driving safer for cell phone users?

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20. What are “smart phones”?

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21. Explain how “context aware” cell phones will work. Give some examples.

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22. Describe the disposable cell phone of the future.

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## ***Can You Hear Me Now? A Study Unit on Cell Phones*** **Creative Thinking Activities**

- Suppose that an alien came to earth from another planet and it was your job to explain what a cell phone is, how it works and how to use it. Write what you would say.
- Write an imaginary story about how your cell phone was used to save your life or the life of someone in your family.
- Design an award and a certificate to present to Martin Cooper for inventing the cell phone.
- Make posters for display throughout your school about the dangers of driving while using cell phones.
- Make a presentation to an elementary class on the subject of cell phones.
- Who uses cell phones the most? Conduct a survey or research the topic and report your findings.
- How many students in your class own cell phones? How many in your grade own cell phones? How many in your school own cell phones? How can you gather this information from the students?
- Imagine that people could use cell phones to communicate with animals. Act out a cell phone conversation between you and a pet.
- The Month of July is National Cell phone month. Make a poster reminding people to practice good cell phone manners.
- Design your own unique cell phone. Tell what your cell phone will do that no other cell phone can do. Be creative. Draw a version of your telephone.
- Create a timeline to show the progress of communication, from smoke signals to cell phones. Be sure that your timeline is clear and accurate.

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## ***Can You Hear Me Now? A Study Unit on Cell Phones*** **Answers**

1. **What is a cell phone?** A cell phone is a wireless communication device that sends and receives signals by way of small special area called cells.
2. **How did the cell phone get its name?** The cell phone gets its name from the small special areas called cells where signals are sent and received.
3. **What are two differences between walkie-talkies and cell phones?** (any two of the following) A walkie-talkie is sometimes called a half-duplex communication device, because only one person can talk at a time. A cell phone is a full-duplex device because it uses both frequencies at the same time. A walkie-talkie has only one channel. A cell phone has more than a thousand channels. A walkie-talkie can transmit and receive signals across a distance of about a mile. A cell phone can transmit and receive signals over hundreds of miles.
4. **Who invented the cell phone and for what company did he work?** Martin Cooper invented the cell phone while working for Motorola.
5. **In what year was the cell phone invented?** The cell phone was invented in 1973.
6. **How did people react to Martin Cooper as he talked on his cell phone while walking down the streets of New York?** People gazed at Martin Cooper in amazement as he walked down the streets of New York City talking on his cell phone.
7. **How does the size of the first cell phone compare with the size of today's cell phones?** Martin Cooper's cell phone weighed a whopping 2 ½ pounds, while today's cell phone weigh as little as three ounces.
  
8. **How many major parts do most cell phones have?** Most cell phones have a circuit board, an antennae, a liquid crystal display (LCD) (the screen), a keypad, a microphone, a speaker, and a battery.
9. **Why is the circuit board an important part of the cell phone?** The circuit board is a most important part of the cell phone because it contains the computer chip
10. **What is the function of the microprocessor portion of the computer chip?** The microprocessor handle commands that you give the cell phone when you press keys on the keyboard.
11. **What happens when you speak into a cell phone?** When you speak into a cell phone, it picks up your voice and changes the sound waves into radio waves. The radio waves then travel through the air to a receiver at a station or tower. The tower sends your call through a series of networks or cells until it reaches the person that you are calling.
12. **Explain how someone using a cell phone can drive hundreds of miles and hold a conversation during the entire trip.** A cell phone operates within cells so that as you move from one place to another, the signal is passed from one cell to another.

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## ***Can You Hear Me Now? A Study Unit on Cell Phones***

13. **What are some ways that cell phone can be beneficial?** When traveling, if you need directions or emergency services, or if you are in a dangerous situation, a cell phone can be your best friend. Cell phones are an effective way to keep in touch with family and friends.
14. **What is “inattention blindness”?** Inattention blindness is a situation in which drivers who use cell phones while driving were blind to (did not pay attention) to roadside billboards, signs and other sources of important information around them.
15. **List some countries that have banned cell phone use while driving.** Some countries that have banned cell phone use while driving are: Australia, Germany, Great Britain, South Africa, Greece, Ireland, Japan, Italy, Israel, and Russia.
16. **List some safety tips for drivers who have to use cell phones while driving.** Some safety tips for those drivers who have to use their cell phones while driving are:
- Position your phone within easy reach
  - Pull off the road and park in a safe location to make calls
  - Ask a passenger to make the call for you
  - Keep the phone conversation short
  - Use phone only when necessary
17. **What are some disadvantages of using cell phones?** Cell phones can be disruptive in places such as churches, schools, and other places where quietness is needed; they can be dangerous while driving.
18. **How can radiation from cell phones affect the body?** Radiation from cell phones can cause changes in brain cells which can cause nausea, dizziness, depression, memory loss and brain tumors.
19. **What new technology promises to make driving safer for cell phone users?** One piece of equipment that allows you to have make and receive calls while your phone is anywhere in your car --even in the trunk! The car is wired so that calls come through the car’s speaker and you can speak through the car’s microphone. This way, calls are made and received without having to touch any buttons, dials or even the phone itself..
20. **What are “smart phones”?** Smart phones will interact with other appliances in the home turning appliances off or on even while you are away from home.
21. **Explain how “context aware” cell phones will work. Give examples.** Context aware phones will sense where the user is and ring accordingly. For example, these phones will not ring and interrupt a face-to-face conversation. They will remember to ring if they are on a desk and vibrate if they are in a pocket or purse. They will ring loudly if there is noise and softly in a quiet place.
22. **Describe the disposable cell phone of the future.** The disposable cell phone will be extremely small and lightweight. They will cost about \$20 and will include 60 pre-paid minutes. They can be discarded when all minutes are used up or recycled.