

MCMS
7th Grade
NTI Packet
Day 18

MCMS

7th Grade Math

NTI Day #18

Name _____ Date _____ Class _____

LESSON 6-7

Reteach

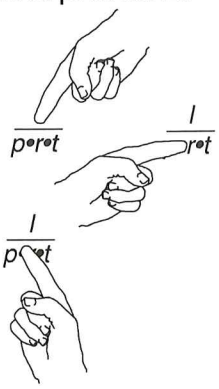
Simple Interest

When you put money into a bank account, you may receive simple interest for loaning the bank your money.

$$\text{Interest} = \text{Principal} \cdot \text{Rate} \cdot \text{Time}$$
$$I = p \cdot r \cdot t$$

You can use the expression $\frac{I}{p \cdot r \cdot t}$ to solve interest problems.

- To find interest (I), put your finger over I. Perform the operations for letters you see.
- To find principal (p), put your finger over p. Perform the operations for letters you see.
- To find interest rate (r), put your finger over r. Perform the operations for letters you see.



Find each missing value.

1. $p = \$400$, $r = 5\%$, $t = 3$ years

$I = p \cdot r \cdot t$

$I =$ _____ • _____ • _____

$I =$ _____

2. $p = \$15{,}000$, $r = 6\%$, $t = 2$ years

$I = p \cdot r \cdot t$

$I =$ _____ • _____ • _____

$I =$ _____

3. $I = \$350$, $r = 7\%$, $t = 2$ years

$p = \frac{I}{r \cdot t}$

$p = \frac{\quad}{\quad \cdot \quad}$

$p =$ _____

4. $I = \$168$, $p = \$1{,}400$, $t = 4$ years

$r = \frac{I}{p \cdot t}$

$r = \frac{\quad}{\quad \cdot \quad}$

$r =$ _____ = _____

5. $I = \$57$, $p = \$380$, $t = 5$ years

$r =$ _____

6. $p = \$4{,}800$, $r = 6\%$, $t = 2$ years

$I =$ _____

7. $I = \$1{,}200$, $r = 4\%$, $t = 4$ years

$p =$ _____

8. $p = \$750$, $r = 7\%$, $t = 3$ years

$I =$ _____

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Name _____ Date _____ Class _____

LESSON 6-7

Puzzles, Twisters & Teasers

Simply Interesting!

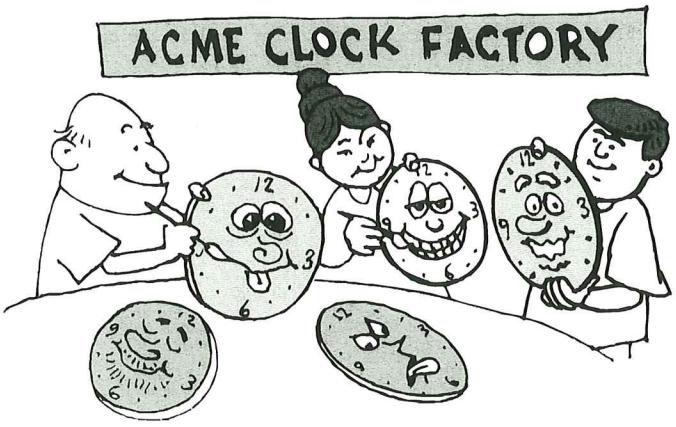
Use what you know about simple interest to complete the chart. Then use your answers and the answer key to solve the riddle.

Principal	Interest Rate	Time	Simple Interest
$3,455	4%	S	$691
F	5.25%	2 years	$630
$16,500	E	24 months	$2,310
A	6%	3 years	$135
$625	3.5%	10 years	C

What do people in clock factories do all day?

They make _____ _____ _____ _____ _____.

$6,000 $750 $218.75 7% 5 years



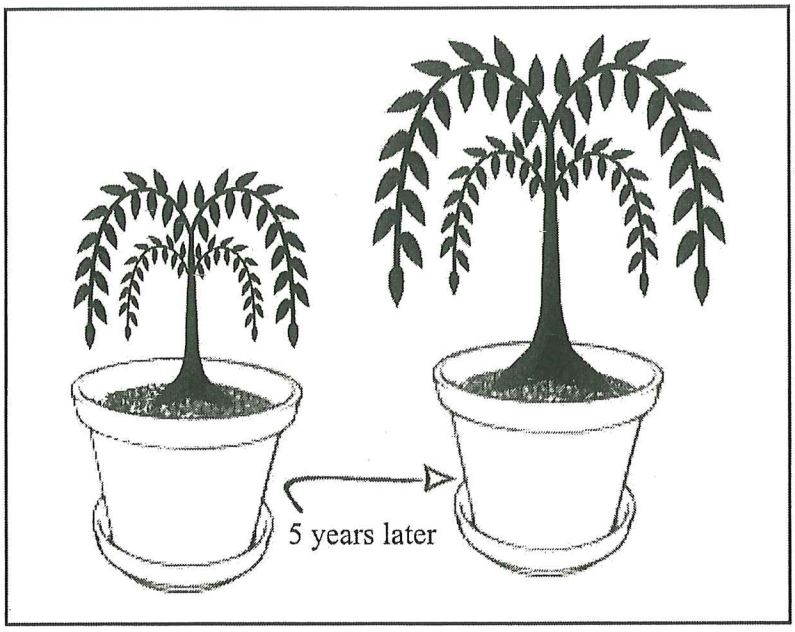
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NTI 18 (3pages)

The Flower Press

Cost: 1 photon

Unveiled: New theory casts doubts on Soil Eating Plants!

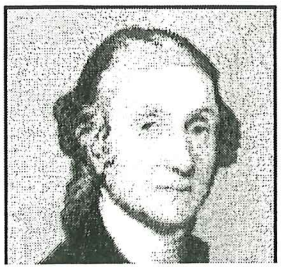


Jan Baptista van Helmont was a Belgian chemist who first coined the word gas. He carried out experiments in the 1600s on a willow tree to find out where trees got their mass from (people thought that plants ate soil). He grew the tree in a pot of soil. He measured the mass of the soil and the mass of the tree at the start of his experiment and again when it was 5 years older. He found that although there was very little difference in the mass of the soil the tree had gained 74kg.

He concluded that the increase in mass must have come from the water he had used when watering the tree.

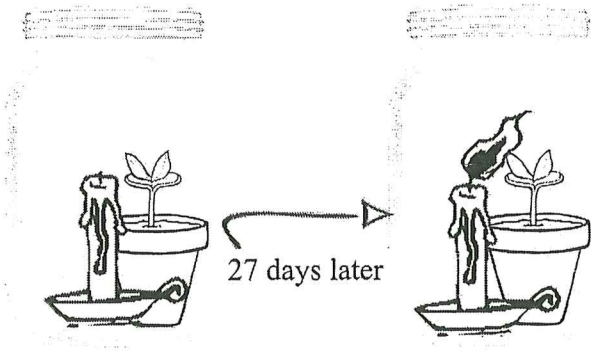
Breaking: Holes in New Helmont Theory

Another scientist John Woodward decided to test van Helmont's hypothesis. He measured the amount of water given to a plant. He found that most of the water that is drawn up through the plant escapes through pores in the leaves so water couldn't account for the increase in mass. He also discovered that plants that grew in less pure water grew better than plants growing in pure water. This was the start of hydroponics (growing plants in water with nutrients and minerals but without soil).



In the 1770s Joseph Priestly discovered that if he placed a burning candle in a sealed jar it soon burned out. He also experimented using a mouse and found that it

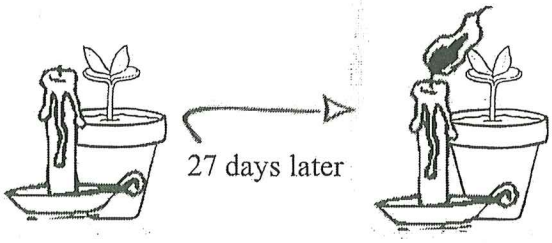
Soon lost consciousness if left in a seal jar,

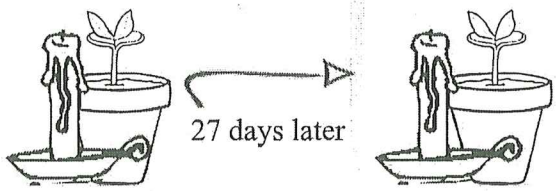


He repeated this experiment except that the second time he put a plant into the jar along with the candle. The candle burned out but it took a little longer. He left the burnt out candle for a few weeks and then he tested it again to see if it would relight. (He focused sunlight onto the candle wick to relight it). It did. He concluded that the plant must have changed the composition of the air. He experimented on the mouse as well and found that it lasted longer in the jar with the plant. What new product had the plant

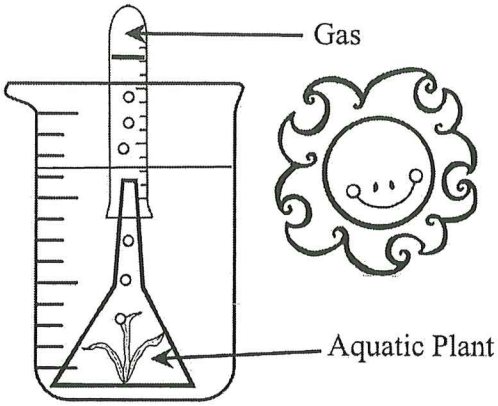
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Sunlight Suspected





A Dutch physician Jan Ingenhousz took these experiments further. He put some of the plants and jars into sunlight and some into darkness. Only candles that were in the jars exposed to the sun would relight. So now he knew that plants changed the composition of the air but only if they were exposed to sunlight. Clever! He even ruled out the heat from the sun as being responsible *"If it was the warmth of the sun, and not its light, that produced this operation, it would follow, that, by warming the water near the fire about as much as it would have been in the sun, this very air would be produced; but this is far from being the case..".*



Bubbles Produced

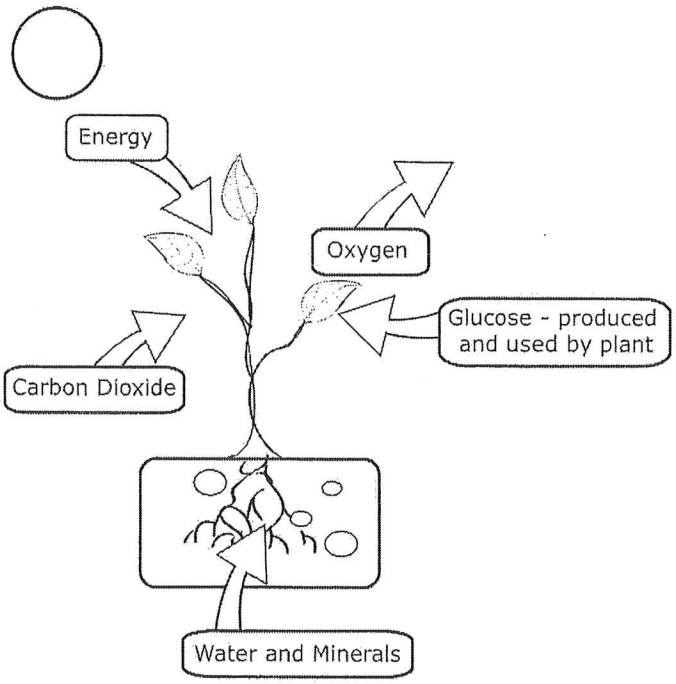
Not content to leave it at that Ingenhousz went even further. He observed that aquatic plants produced bubbles when they were placed in direct sunlight but not when they were placed in darkness. When he collected these bubbles they would relight a glowing splint. This is the classic test for oxygen.

So now we know that plants give out oxygen (which is handy because we need it). But what do they take in? A Swiss botanist Jean Senebier discovered that plants take in carbon dioxide.

Photosynthesis

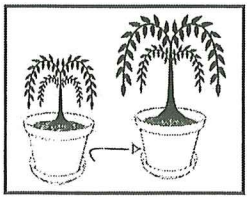
So now we know that plants absorb carbon dioxide from the air and they release oxygen when sunlight is present.

This is part of the process called photosynthesis. "Photo" means light and "synthesis" means combining together. Plants also need water which they get from their roots. Plants use the carbon dioxide and water to make food. The food is called glucose. Oxygen is a by-product of this process. If we didn't have sunlight then plants couldn't produce their own food and we wouldn't be here. All our food energy comes from the sun. Plants make their own food using energy from the sun. Animals eat plants and we eat plants and animals.



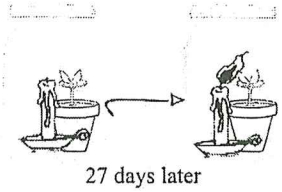
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WORKSHEET



Jan Baptista van Helmont was careful to weigh the soil at the beginning and the end of his 5 year experiment. Why did he do this?

How did John Woodward prove that water couldn't be the reason for the increase in mass in the willow tree?



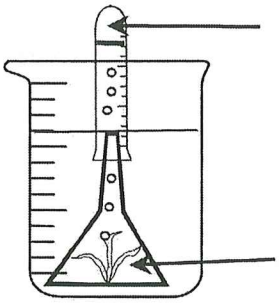
Joseph Priestly discovered that if he lit a candle in a jar with a plant it would extinguish. But if he left it for a few weeks it would relight. What is the significance of this?





Jan Ingenhousz repeated Priestly's experiments with plants kept in sunlight and plants kept in the dark. What did he find out?

How did Jan Ingenhousz know that it was the light from the sun that was responsible and not the heat?

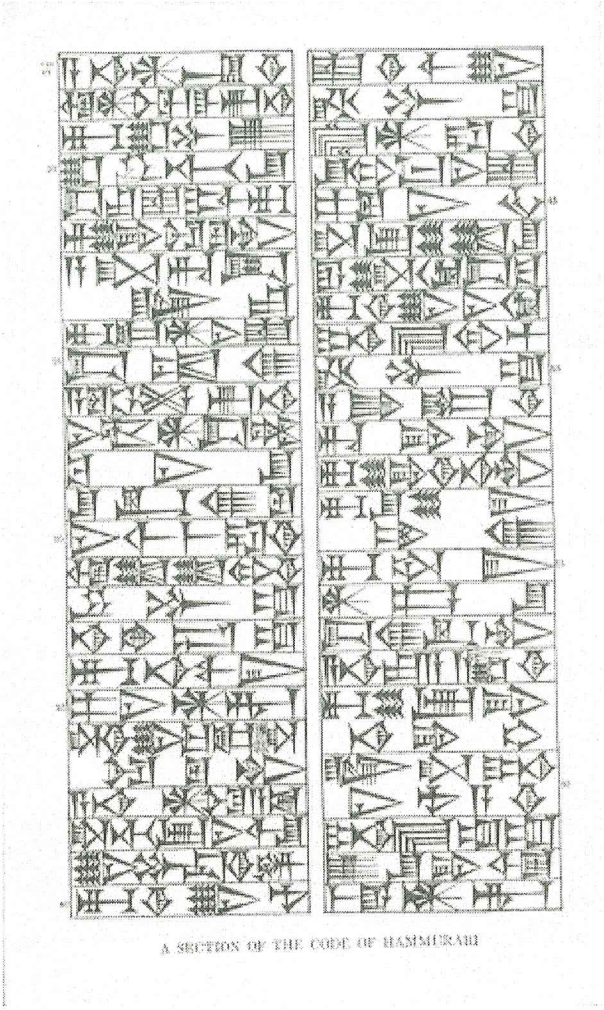


What happens a glowing splint when placed into the gas? What is the name of this gas?

What substances are need for photosynthesis?
What is the name of the food that is produced?
What is the name of the gas that is a by-product of

The Code of Hammurabi

by ReadWorks



Section of the Code of Hammurabi

We may take for granted the existence of written laws. Many people grow up with the understanding that certain laws exist. If you fail to stop at a stop sign in your car, you will likely receive a fine. Refusal to pay your taxes can result in a prison sentence. In some states, killing another human being can even result in the death penalty.

The U.S. Constitution, the supreme law of the United States of America, was written to ensure that everyone knows the laws of living in this country. Instead of allowing a single ruler to impose his or her will, people are required to follow a set of written laws. Breaking them comes with certain punishments. Based on the code of laws, a judge determines the punishment for a particular crime. Committing murder is a much larger crime than running a red light. Thus, the punishment for murder is much greater than failing to stop at a red light.

Written laws existed long before the U.S. Constitution. Historians trace the creation of written laws to around 1772 B.C. At that time, what we now consider Iraq was known as Mesopotamia. And the ruler of Mesopotamia was a man named King Hammurabi. Hammurabi was a member of the Babylonian

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people. He was also a talented military leader and a smart governor. It was he who is credited with creating the first written laws.

Hammurabi's Code often required the criminal to receive the same injury that he or she had inflicted on a victim in an effort to make the punishment fit the crime. Such laws may seem harsh today, but they were intended to prevent society from descending into chaos and disorder. They helped to advance the rule of law in Mesopotamia.

Hammurabi created 282 laws, which dealt with aspects of everyday life. Crimes came with specific penalties, and many of them were punishable by death. The laws were inscribed on a stone pillar, and became known as Hammurabi's Code. To ensure that everyone knew all 282 laws, they were also probably read aloud in public on a regular basis. That way, no one could be excused for committing a crime because of not knowing the law. Laws in the United States function in a similar way. The United States government usually allows people full access to its laws, so the fact that you don't know that running a red light is illegal in the U.S. does not excuse you from paying a fine for doing so.

One of many differences between Hammurabi's Code and the U.S. Constitution is that the laws in Hammurabi's Code often depended on social standing. Soldiers and noblemen had certain rights that ordinary citizens and poor people did not. Still, the existence of laws prevented a future single ruler from imposing his will on the populace.

Hammurabi's Code also dealt with similar issues that we confront in our own justice system today. The laws covered issues related to trade, marriage, taxes, theft, and murder, among other things. To create the code, the king collected laws from different regions of Mesopotamia and compiled them into a single rulebook. If a person was accused of a crime, that person would face a judge. This judge would determine whether the accused person was innocent or guilty of the crime. If the person was found guilty, then the judge would prescribe the appropriate punishment as written in Hammurabi's Code.

Here's an example of how Hammurabi's Code might have been used in Mesopotamia. Imagine a shepherd is accused of stealing a sheep that was taken from a nobleman's flock. The shepherd and the nobleman are both brought before a judge. The nobleman introduces a witness. The witness claims to have seen the shepherd in the nobleman's field the night before the nobleman realized one of his sheep was missing. Then, the witness says, "The shepherd picked a sheep up and ran off with it in the direction of his own property." The witness is certain it was the same man because she got a good look at the shepherd's face and he was wearing the same hat that he now has on during this "trial." Later, the nobleman points out that the sheep found at the shepherd's place was marked with the nobleman's brand.

In an attempt to defend himself, the shepherd claims he purchased the sheep from a man in town. The shepherd names the man in town, and that man is also brought before the judge. The man says that he has never seen the shepherd and also that he was not selling sheep in the market on the day that the shepherd says he bought the sheep. The man continues to say that he was visiting his daughters. The man's daughters and their husbands act as witnesses and confirm that he was not in the market on said day.

Since the shepherd's story of purchasing a sheep from the marketplace has been cast into doubt by witnesses, the judge determines that he is guilty of stealing the sheep. The judge consults

erved.

Hammurabi's Code.

Law number eight states: "If any one steals cattle or sheep, or an ass, or a pig or a goat, if it belongs to a god or to the court, the thief shall pay thirtyfold therefor." This means that if a man steals a sheep that's owned by the ruling class in Mesopotamia, he would be required to pay 30 times the amount of the sheep's worth. The law continues: "If they belonged to a freed man of the king he shall pay tenfold; if the thief has nothing with which to pay he shall be put to death." Because the shepherd is found guilty of stealing the sheep from a nobleman and noblemen are considered to be members of the court, the shepherd is required to pay 30 times the cost of the sheep based on the law. According to Hammurabi's Code, if the shepherd does not have enough money to cover his payment, he will be put to death.

Fortunately for the shepherd, he has many other sheep in his flock. He sells 30 of his sheep and pays the nobleman. As a result, the shepherd now has only three sheep left in his flock.

Name: _____ **Date:** _____

1. What is Hammurabi's Code?

A. a collection of 282 laws believed to be the first written laws

B. a group of soldiers and noblemen who lived in ancient Mesopotamia

C. the ancient idea that a punishment should fit the crime

D. the punishment for stealing sheep from a nobleman in ancient Mesopotamia

2. What does this passage describe?

A. the origin and meaning of the word "judge"

B. what Mesopotamian society was like before written law

C. the life and death of the Mesopotamian King Hammurabi

D. the function and influence of the first written laws

3. Read these sentences from the text.

In an effort to make the punishment fit the crime, Hammurabi's Code often required the criminal to receive the same injury that he or she had inflicted on a victim. Such laws may seem harsh today, but they were intended to prevent society from descending into chaos and disorder.

Based on this evidence, what might King Hammurabi have wanted to promote in society?

A. chaos and confusion

B. justice and order

C. anger and violence

D. wealth and fortune

4. How might Hammurabi's Code have prevented a single ruler from imposing, or forcing, his or her will on people?

A. by convincing the public that a ruler always wants what is best for the people

B. by punishing a ruler for trying to change the Code

C. by forcing a ruler to get people to agree on a new law before adding it to the Code

D. by preventing the ruler from making up new laws that were not mentioned in the Code

5. What is the main idea of this text?

A. In the time of Hammurabi's Code, it was illegal for a shepherd to steal a sheep from the flock of a nobleman.

B. The U.S. Constitution is mostly based on the ideas and laws mentioned in Hammurabi's Code.

C. Hammurabi's code and the U.S. Constitution differ in that the laws in Hammurabi's Code often depended on social standing.

D. Hammurabi's Code was the first collection of written law and advanced the rule of law in Mesopotamia.

6. Why might the author have described the imaginary trial of the shepherd who stole the nobleman's sheep?

A. to show that the shepherd did not commit the crime of which he was accused

B. to show that a single ruler could impose his or her will on other people

C. to show how Hammurabi's Code might apply to a specific situation

D. to convince the reader that Hammurabi's Code was unfair in its punishments

7. Choose the answer that best completes the sentence.

All 282 laws of Hammurabi's Code were also probably read aloud in public on a regular basis _____ no one could be excused for committing a crime because of not knowing the law.

A. although

B. however

C. above all

D. so that

8. What does law number eight of Hammurabi's Code describe the punishment for?

9. In the example of the trial of the shepherd, how did the judge determine the shepherd's punishment for stealing the nobleman's sheep?

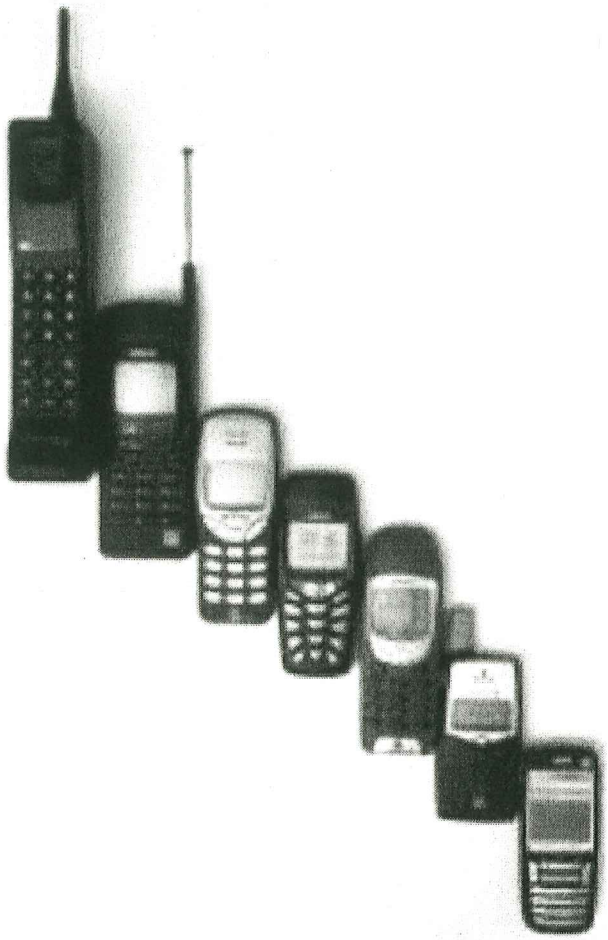
10. Why is it important for laws to be written down? Support your answer with at least two pieces of evidence from the text.

Day 18

7th Grade Eng.

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.