

World-Changing Inventions

FOCUS QUESTION

How have inventions changed our world?

NOTICE AND WONDER

Look at the three texts you will read in this lesson. What do you notice? What do you wonder? Discuss your ideas with a partner.

TALK ABOUT INVENTIONS

Brainstorm words for the following groups with a partner:

- Words that describe inventions
- Examples of inventions
- Synonyms for the word *invention*

An example of an invention is ____.

____ said ____ is a synonym of _____. I agree/disagree because _____.



Capturing Moments
by Stephen Krensky



Speak Up!
by Scott Logan




So Cool
by Paul Davis



Capturing Moments

by Stephen Krensky

- 1** *Boom!* That's the sound a camera once made when taking a picture. It needed flash powder, like the kind used in firecrackers, to work. The loud, explosive light meant the camera had caught a single moment in time.
- 2** Capturing special moments made photographs seem incredible when they first appeared. For hundreds of years, artists had created realistic scenes and people. Artists needed a lot of talent and skill to make images look so real. Cameras, though, could capture a real scene using just light and flat metal plates coated in chemicals.
- 3** Early cameras were big and heavy, and only professional photographers operated them. Sometimes, people posing didn't smile because the camera took 15 to 30 seconds to take the picture—too long to hold a smile. People also had to stand or sit perfectly still or else the finished picture would be blurry. Moreover, cameras could take only one photo at a time. Afterward, the photographer had to **develop** the plate into a single photograph. The whole process could take months.
- 4** Luckily, cameras improved. By the 1880s, cameras were lighter, and anyone could use them. The newer cameras could record many pictures on a small roll of film. Once people had taken all their photos, they could mail their cameras to the factory, where the film was developed. Weeks later, the photographs were ready. 

develop = to turn an image on film into a printed picture

Stop & Discuss

How did the first cameras change the way people made images?

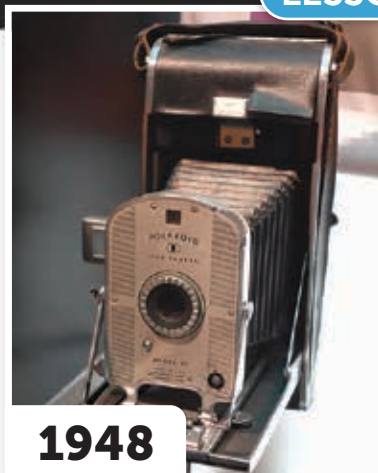
Support your response with details from paragraphs 2 and 3.

**1839**

The daguerreotype camera captured an image on a copper plate.

**1900**


The Brownie camera, which used film, was the first widely popular camera.

**1948**

The instant camera produced an image that came directly out of the camera.

5 Over the years that followed, cameras continued to be improved. They became smaller, using film that rolled up into a metal **canister** that could be removed from the camera for developing. The developing process improved too. Film was developed in a local shop, and finished photos were available in days instead of weeks. Eventually, one-hour processing became common.

6 Then, in the 1990s, digital photography arrived. Digital cameras created images electronically rather than using film. Digital photography allowed people to see their photos on a screen as soon as they were taken. This feature was a game-changer. Instead of waiting for film to be developed by someone else, people could take, view, and delete their photos with the simple touch of a button.

7 These days, photography doesn't seem so amazing. People take photos of anything and anyone whenever they want. But we do still take photographs of the people and events that matter to us. People can capture special moments with devices such as smartphones and then use the internet to share their photos in seconds with close friends and family around the world. 

canister = a container that stores something

Stop & Discuss

How did digital cameras change the experience of taking and looking at pictures?

Support your response with details from paragraphs 6 and 7.

Digital cameras allowed people to ____.



Analyze a Historical Text

- **Historical texts** tell about events and ideas that happened in the past. They explain the **sequence**, or order, of events.
- Historical texts also explain why things happen and how events are connected by causes and effects. A **cause** is the reason something happens. An **effect** is what happens as a result.

Reread/Think

Reread "Capturing Moments." How did each new type of camera change the way people made images? Fill in the chart by describing each type of camera and its effects.

Paragraphs 2 and 3:

early cameras captured "real scenes" on flat metal plates, equipment was big and heavy, only for professionals, took one picture at a time, took months to develop



Paragraph 4:



Paragraph 5:



Paragraphs 6 and 7:

Talk

In a small group, discuss the changes you listed in your chart. Describe each change and explain why it was better than what came before it.

Before ____, people
had to ____.

The new _____
could _____.

This made a difference because _____.

Write

How has the way people capture images changed over time? Use details from your chart and think about why each change would have been better than what came before it.

WRITING CHECKLIST

- ☐ I described how the way people capture images has changed over time.
- ☐ I included details from my chart and from the text.
- ☐ I used complete sentences.
- ☐ I used correct spelling, punctuation, and capitalization.



Carrier pigeons were an early method of long-distance communication.

SPEAK UP!

by Scott
Logan

- 1 You hear a buzz and a few seconds of your favorite song. Your phone is ringing. It's your cousin, and even though you live hundreds of miles away from each other, you're connected in seconds.
- 2 Thousands of years ago, it was almost impossible to communicate with someone who was far away. The Romans, French, and Germans used carrier pigeons, birds that could carry and deliver messages from one place to another. One problem with this method, however, was that pigeons can fly only so far.
- 3 A huge improvement in long-distance communication came in the 1830s, when the telegraph was invented. Messages called telegrams traveled over electric wires for hundreds of miles in an instant.
- 4 Communicating this way was complicated, because in order to send a telegram, a telegraph operator had to translate all the letters into Morse code. This "language" used dots and dashes instead of letters. Once the telegram was received, another operator had to translate the dots and dashes back into words.

A ·—	N —·
B —···	O ———
C —·—·	P —···
D —··	Q ———·
E ·	R —··
F —···	S ...
G —··	T —
H	U —··
I ..	V —··

Stop & Discuss

How did the telegraph change the speed at which people communicated?

Underline a sentence in paragraph 3 that supports your response.






Telephone operators used switchboards to connect callers.



Can you figure out how to use this early telephone?

- 5 Then, in 1876, a **device** was invented that could actually send a person's voice from one room to another. It was called the *telephone*, a word with Greek roots that means "far sound."
- 6 At first, making a telephone call involved many steps. A telephone user had to call an operator first. The operator managed a switchboard, a machine that used electrical cords, or "switches," to connect callers. Next, the operator would ask the caller for the number of the person to receive the call. Then, the operator moved cords on the switchboard to connect the two callers.
- 7 These calls may not have been easy to make, but at least there were no dots or dashes! People just talked. They could share news and stories with someone across town or across the country. Firefighters and police officers could be quickly alerted when needed. 

device = a mechanical or electronic object that has a special purpose

Stop & Discuss

What made the telephone unlike earlier forms of communication?

Discuss your response with a partner.

The telephone allowed people to ____.



Callers using a wall telephone talked through a handset connected to the phone by a cord.

introduced = used for the first time


immensely = in a very big way

Stop & Discuss

What did smartphones allow people to do that they could not do before?

Underline details in paragraph 10 that support your response.



- 8 The telephone system changed over the years. By the 1920s, telephones that could be dialed allowed people to make local calls without the help of an operator. Telephones themselves became smaller and easier to use. Up until 1970, all telephones plugged into the wall, and people talked through a handset attached to the phone by a cord. Later, the invention of the cordless telephone allowed people to walk freely as they chatted, but the phone still relied on wires to send the sound.
- 9 Then, in the 1980s, cell phones were **introduced**. Cell phones had no cords or wires at all—voices were sent by electrical signals through the air. People were free to talk inside or outside. But the world was changing fast, with computers popping up in offices and homes everywhere. Inventors wondered why phones couldn't do more than just send voices back and forth.
- 10 The first smartphone, a phone with a built-in computer, was invented in 1992 and became more affordable in the 2000s. Now people could do much more than talk. They could also look up information, listen to music, send messages, take photos, and play games.
- 11 The way we communicate over long distances has changed **immensely** over hundreds of years. Who knows what the next hundred might bring! Will people be signing up for a planet-to-planet phone plan? 



Analyze a Historical Text

- Historical texts describe important events and ideas and explain how they affected people's lives.
- To better understand a historical text, think about the effects of events and how one event leads to another.

Reread/Think

Reread "Speak Up!" How did each method of communication affect people's lives and improve communication? Fill in the chart with the effects.

Communication Method	Effects on People's Lives
Carrier pigeons	
Telegraph	
First telephone	
Telephones that could be dialed	
Smartphones	



Talk

Talk with a partner about how communicating over long distances has changed over time. Discuss why these changes have affected people's lives.

When ___ was invented,
people could ___.

This was better
than ___ because ___.

Write

Which form of communication do you think had the greatest impact on people during its time? Why? Refer to details in the text to support your response.

WRITING CHECKLIST

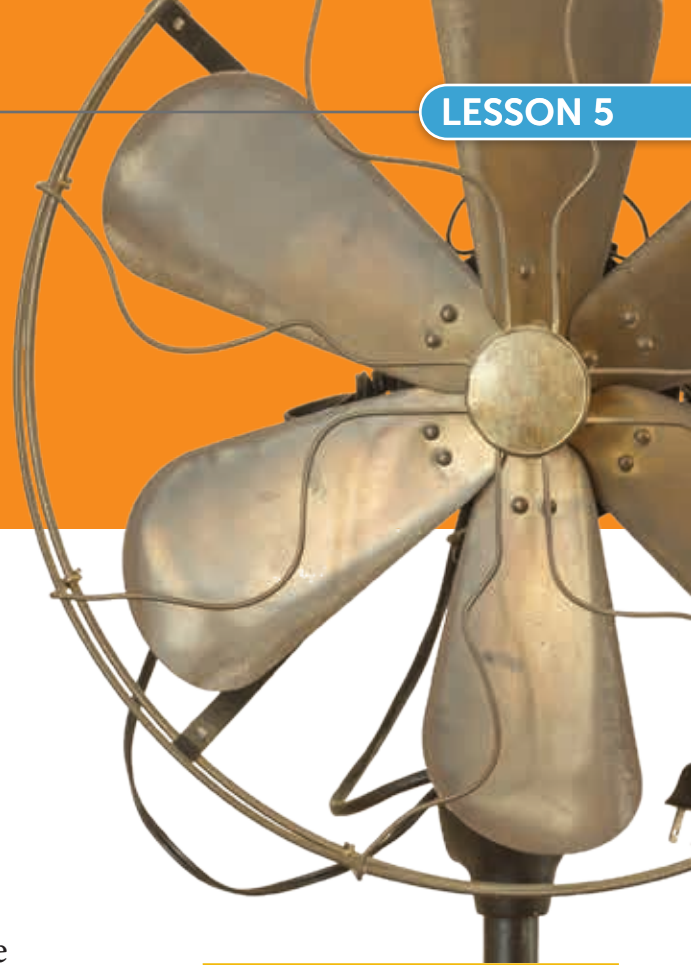
- ☐ I described a form of communication and explained how it impacted people's lives.
- ☐ I included details from the text to support my ideas.
- ☐ I used complete sentences.
- ☐ I used correct spelling, punctuation, and capitalization.



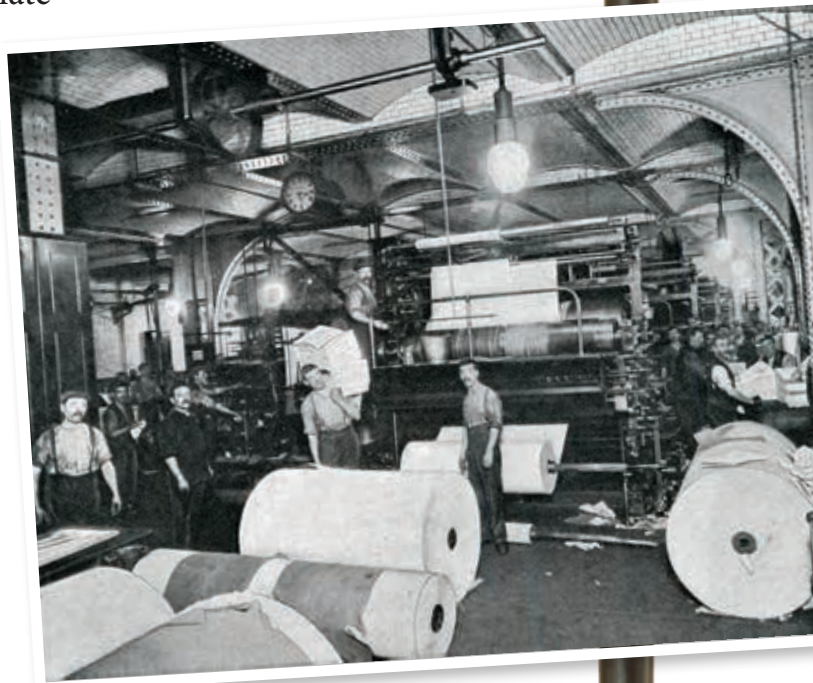
SO COOL

by Paul Davis

- 1 When you think of important inventions in the world, what comes to mind? Maybe the automobile, the camera, or the telephone? How about air conditioning? Even if we live in a cool climate, it's still a major invention that has changed our way of life.
- 2 Before air conditioning was invented, some people relied on handheld fans made of silk or lace to keep themselves cool on hot, sticky days. Later, when the electric fan was invented in the late 1800s, people could feel some breezy comfort in the heat. But none of these fans could make the air any colder, and they could **relieve** only a few people at a time.
- 3 That's where air conditioning comes in.
- 4 In 1902, the first advanced air-cooling system was created. However, the purpose of this invention was not to cool people off. Instead, it was built to help a printing plant do business. Cooling and drying out the air during hot, damp days helped the ink in the printing machines stick better to the paper running through them.



relieve = to remove an unpleasant feeling



The first air-cooling systems were used in 1902 in printing plants like this one.



architects = people who design buildings



Movie theaters proudly advertised their air conditioning to bring in more customers.

- 5 Then, in the 1920s, movie-theater owners had a great idea. Their theaters were very hot in the summer. Could a cooling system like that used at printing plants benefit their business too? In other words, would a colder theater bring in more customers?
- 6 The answer was yes. Definitely, yes.
- 7 After that, air conditioning quickly became important for homes, offices, libraries, and laboratories. Sometimes air conditioning was more than just a luxury. In hospitals, patients had a better chance to recover if their bodies didn't have to fight the heat.
- 8 By the 1950s, more buildings were designed with air conditioning in mind. **Architects** no longer worried about the sunlight making rooms too warm. They put in large windows and sliding glass doors. Skyscrapers, which were usually made with stone, now glittered in the sun with floor-to-ceiling glass.
- 9 When the first air-conditioned mall opened in Houston, Texas, in 1956, shoppers had a new reason to visit their favorite stores. They could shop in air-conditioned spaces in perfect comfort.
- 10 Once soaring temperatures no longer mattered, moving to the South became much more appealing. The population of Florida, for example, grew from 5 million in 1960 to more than 21 million today.
- 11 So, when you think about it, air conditioning really is a “cool” invention.



Respond to Text

Reread/Think

Reread "So Cool." Choose the best response to each question.

1. PART A

What is the meaning of the word *climate* as it is used in paragraph 1?

- A. the newest invention
- B. a home in a warm area
- C. an interesting place to visit
- D. the normal weather in a place

PART B

What word from paragraph 1 is the **best** clue to the meaning of *climate*?

- A. "important"
- B. "conditioning"
- C. "live"
- D. "cool"

2. Why was there a need for a better way to cool the air? Use the word bank to fill in the blanks with words that **best** complete the paragraph.

a few

breeze

fans

colder

Previous ways of cooling air, such as handheld and electric

_____, provided a _____,

but they didn't make the air _____, and they

could relieve only _____ people at a time.



Reread/Think

- 3.** Why was air conditioning important for hospital patients?

 - A.** It gave patients a better chance of healing.
 - B.** It allowed patients to visit their favorite stores.
 - C.** It made patients want to move to warm places.
 - D.** It kept patients from getting too much sunlight.
- 4.** Why did air conditioning let architects use more glass in skyscraper windows?

 - A.** Air conditioning caused glass to glitter in the sun.
 - B.** Air conditioning made windows more affordable.
 - C.** Air conditioning kept buildings cool on sunny days.
 - D.** Air conditioning worked best in buildings made of glass.

Write

How did air conditioning improve movie theaters and shopping malls? Use details from the text to support your response.

[illegible]

WRITING CHECKLIST

- ☐ I explained how air conditioning affected movie theaters and shopping malls.
- ☐ I included an introduction and a concluding sentence.
- ☐ I included details from the text.
- ☐ I used complete sentences.
- ☐ I used correct spelling, punctuation, and capitalization.



Respond to the Focus Question

How have inventions changed our world?

Reread/Think

Choose one text from this lesson to reread. From that text, choose the invention or improvement that you find most interesting.

TEXT and INVENTION: _____

What did you learn from your passage about the invention and how it affected people's lives?

Talk

In a small group, first share your responses from Reread/Think. Take notes about what your group members share.

Next, as a group, discuss how you would respond to this question:

How have the inventions described in this lesson changed the world?

The camera has changed the world because ____.

The telephone has changed how people ____.

Air conditioning has affected people because ____.

Write

Which of the inventions in this lesson do you think is the most important? Use information from at least one of the texts to support your response.