UNIT 8

Innovations

Warm-Up

Look at four historical innovations. Which are inventions? Which are discoveries? What's the difference?

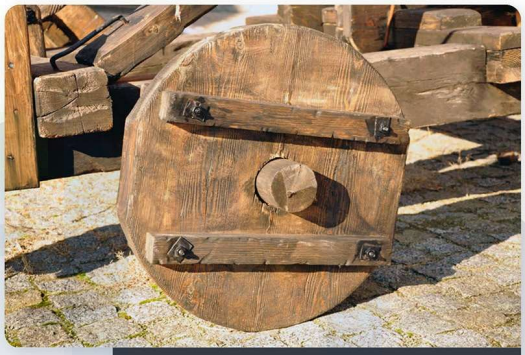
PRONUNCIATION | Listen and repeat.



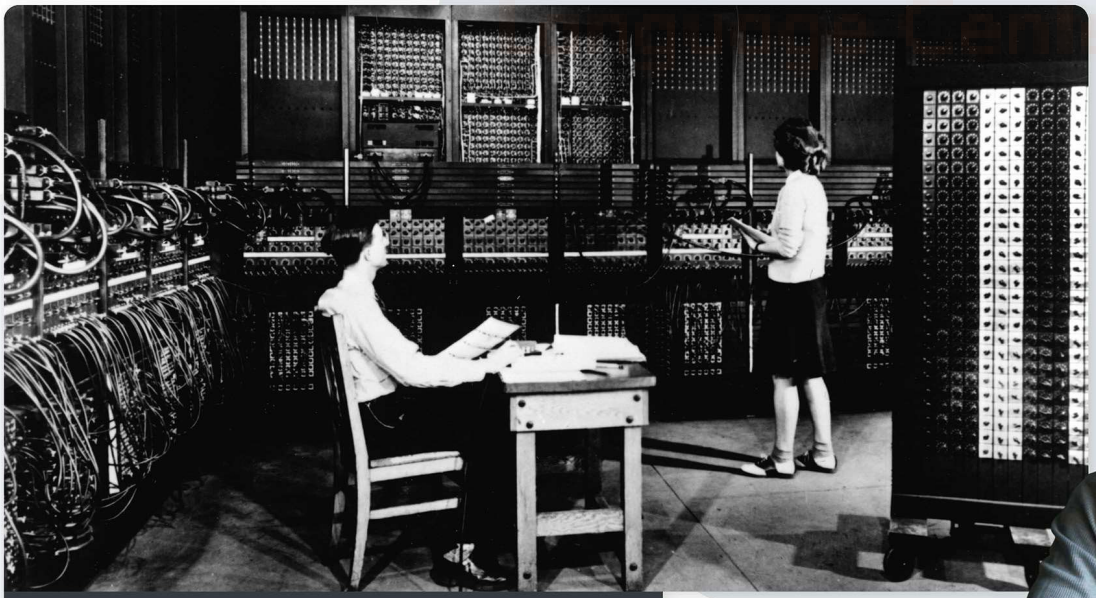
THE PRINTING PRESS, 1440

PENICILLIN, 1928





THE WHEEL, 3500 BCE



THE DIGITAL COMPUTER, 1946



UNIT 8 COMMUNICATION GOALS

Lesson 1
Describe new kinds of products

Lesson 2
Imagine a different past outcome

Lesson 3
Describe inventors and their inventions

Lesson 4
Consider the impact of historical inventions

Afaq-lc.com

Topic Warm-Up

A INVENTIONS | Take the survey.



NEW INVENTIONS?

Check the activities for which you'd like to see some new inventions.

- ☐ making cars safer
- ☐ improving home safety
- ☐ organizing things at home
- ☐ cooking and preparing food
- ☐ eating or snacking
- ☐ getting into shape
- ☐ raising children
- ☐ caring for pets
- ☐ relaxing at home
- ☐ learning or reading faster
- ☐ learning a new language
- ☐ preparing for a natural disaster
- ☐ preparing for tests
- ☐ planning and scheduling
- ☐ other activities:



B PAIR WORK | Choose one of the activities you checked and describe an invention you'd like to see.

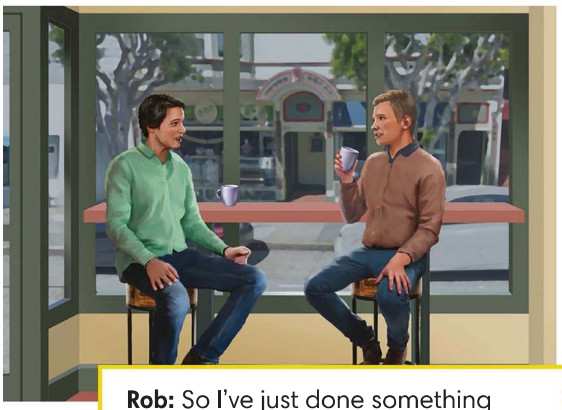


Afaq-lc.com

Language Warm-Up

A ZOOM-IN | Read and listen to a conversation about a new product. Notice the featured words and phrases.

UNDERSTAND A VARIETY OF ACCENTS
Rob = American English (regional)
Dan = American English (standard)





Rob: So I've just done something dumb. I wasted a lot of money on something I didn't need.

Dan: What was it?

Rob: This special system for making juice—the Veg-Me-Up. Have you heard of it? They advertise the heck out of it.

Dan: Actually, I saw it online, but I didn't really see the point. Can't you just throw some fruits and veggies into a blender and get juice without a system?

Rob: Well, if I'd given it two seconds' thought, I would have figured that out. But I've been promising myself I was going to start eating better, and when I saw the ad, I just fell for it. I didn't realize how ridiculous the whole thing was.

Dan: So what's the big deal? It's only money. You can afford it.

Rob: I could just kick myself for being so gullible.

Dan: Aside from all that, how's the juice?

Rob: It's actually pretty good. You order everything online and they ship you the vegetables, already cleaned and cut up in this special air-tight packet. You just stick the packet into the machine, press the button, and out comes the fresh juice in a second.

Dan: Wait, what? You can't use your own veggies?

Rob: That's the kicker. If I don't buy the veggies from them, the Veg-Me-Up won't veg me up anymore!

B UNDERSTAND FROM CONTEXT | Read the statements with a partner. Write T (true) or F (false). If a statement is false, explain what you think it really means, based on the conversation.

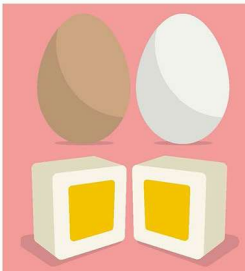
..... 1 "I wasted a lot of money on something" means "I spent a lot of money for a good purpose."
..... 2 "They advertise the heck out of it" means "They advertise it a lot."
..... 3 "I didn't really see the point" means "I didn't understand what was so good about it."
..... 4 "I just fell for it" means "I believed the Veg-Me-Up was ridiculous."
..... 5 "That's the kicker" means "That's the good thing."

SPEAKING PAIR WORK | Rate the usefulness of these gadgets from 1 (very useful) to 3 (entirely useless). Explain. Then name each gadget.



A smart hairbrush: tells you how much you've brushed and how much more brushing you need. Takes the guesswork out of brushing.

Rating .....
Name .....



Makes square eggs for neater sandwiches. A great conversation starter!

Rating .....
Name .....



Helps even the shortest pets get up on the beds and sofas they love. Kind. Humane.

Rating .....
Name .....



This smart water bottle keeps you hydrated. Doesn't let you forget to drink water and records your consumption all day, all week, or all month.

Rating .....
Name .....



Afaq-lc.com

1 COMMUNICATION GOAL Describe new kinds of products

A GRAMMAR | The unreal conditional (review and expansion)

Remember: Unreal conditional sentences describe unreal conditions or actions—ones that don't exist—and their results. Use the simple past tense or were in the if clause. Use would in the result clause if the result is certain.

if clause (unreal action or condition)	result clause
If you **took** the high-speed train,	you**'d arrive** there in an hour.
If this **were** the best fitness tracker,	**I'd buy** it for my husband.

Use could or might in the result clause if the result is not certain.
If they **wanted** to use less fuel, they **could buy** a plug-in vehicle.
If a water bottle **were** truly "smart," I **might get** it.

The if clause can occur first or last. When the if clause comes first, end it with a comma.
If the car were less expensive, they might buy it. OR They might buy the car if it were less expensive.

Questions
If the car rental company **had** self-driving cars, **would** you **rent** one? (Yes, I would. / No, I wouldn't.)
Where **would** they **go** if someone **offered** them a free air ticket?
Who **would** you **call** if you **had** an accident?

Contractions
would → **'d**

Be careful!
Never use would in an if clause.
Don't say: If she ~~would be~~ here, . . .



GRAMMAR EXPANDER p. 138
- Real and unreal conditionals (review)
- Unless in conditional sentences

B UNDERSTAND THE GRAMMAR | Check the statements that describe unreal conditions.

- ☐ 1 If they have high performance tires at the tire store, I'll buy them.
- ☐ 2 If they gave you penicillin for that infection, it would cure it.
- ☐ 3 If you get a wireless keyboard, you won't have to sit at your desk to work.
- ☐ 4 She would buy those new earring speakers if they didn't cost an arm and a leg.

C GRAMMAR PRACTICE | Circle the correct words.

1 If we (had / would have) a self-driving car, we (can / could) take a nap on the way to work.
2 If someone (invented / would invent) an improved app to take a picture of food and tell you the calorie count, a lot of people (will / would) buy it.
3 If there (would be / were) a portable gadget to freeze water, I (might / would) definitely get it for my camping trip.
4 (Will / Would) you buy one of those heavy blankets if they (wouldn't be / weren't) so expensive?

D PAIR WORK | Complete the statements. Then share your statements with the class.

1 If I were an inventor, . . . 2 People would get robots if . . . 3 I wouldn't buy a self-driving car if . . .

E VOCABULARY | Adjectives for describing products, processes, or ideas | Read and listen. Then listen again and repeat.

high-tech	using advanced technology *A smart refrigerator is a high-tech appliance that is connected to your smart phone.*
low-tech	using simple traditional or mechanical technology *A solar bottle light bulb is a low-tech light made with a plastic water bottle and a solar panel.*
cutting-edge	using the very newest stage in the development of a product or process *3D printing is a cutting-edge process that allows you to create objects using a digital design.*
innovative	using a new method or idea *A hamburger made with "meat" created from plants instead of animals is an innovative way to satisfy people's love of meat without killing animals.*
revolutionary	bringing about a major change *The Internet was a revolutionary invention that forever changed the way we get information.*
novel	new and unlike other products, processes, or ideas *A jacket with built-in reflectors is a novel way to keep pedestrians safe at night.*

Afaq-lc.com

F **ACTIVATE VOCABULARY** | **With a partner, identify one product, process, or idea that can be described by each adjective.**

> "I have an innovative wallet that protects my credit cards with RFID-blocking technology."

COMMUNICATION ACTIVATOR

Now let's describe new kinds of products.



A **CONVERSATION MODEL** | **Read and listen.**

A: Now here's a novel idea. Look at this pressure-sensitive alarm clock.

B: The Get-U-Up? That's so cool. If I had one of those, I'd never oversleep.

A: Would you actually buy one?

B: Well, now that I think about it, I guess not. It's kind of silly. I could just set the alarm on my phone and put it on the other side of the room.

A: So what about this? The portable water purifier. It would be great on a camping trip, wouldn't it?

B: And you know what I like about it? It's low-tech. There's nothing to break.

Social language
To change an opinion after giving it more thought, say:
Now that I think about it . . .

B **PRONUNCIATION PRACTICE** | **Listen again and repeat. Then practice the Conversation Model with a partner.**

C **CONVERSATION PAIR WORK** | **Change the conversation, using one of the products, or other ones you've seen. Then change roles.**

A: Now here's ..... idea. Look at this ..... .

B: The ..... ? That's ..... . If I had one of those, I ..... .

A: Would you actually buy one?

B: Well, now that I think about it, I guess not. ..... .

A: So what about this? The ....

B: ..... .

Reasons not to buy something
- I don't really need that.
- I'll bet it's pretty expensive.
- I already have something like it.
- It sounds like [a waste of money / a scam].

KEEP TALKING!
- **Express a fuller opinion of the products in the pictures.**
- **Talk about products you have or would like to have.**
- **Explain what they're good for.**

Watch the video for ideas!











D **CHANGE PARTNERS** | **Change the conversation again, using other products and ideas.**

Afaq-lc.com

2 COMMUNICATION GOAL Imagine a different past outcome



A GRAMMAR | The past unreal conditional

The past unreal conditional describes unreal conditions or actions—ones that didn't exist—and their results. Use the past perfect in the if clause. Use would have in the result clause for a result that was certain.

If she'd seen the weather forecast, she wouldn't have gone to the beach.
(But she didn't see the forecast.)
If there hadn't been a late flight, he would have had to wait until the next day.
(But there was a late flight.)

Use could have or might have in the result clause for a result that wasn't certain.

If they'd wanted a high-tech car, they could have bought the Z900.
If I hadn't decided to be a veterinarian, I might have chosen to be an inventor.

Questions

Could they have avoided catching the virus if they'd worn respirator masks?
(Yes, they could have. / No, they couldn't have.)
What would you have done if you'd lost your wallet?

GRAMMAR EXPANDER p. 139
• The unreal conditional: variety of forms

Be careful!
In short answers, use have after would, could, or might.
Yes, I would have.
NOT: Yes, I ~~would~~.

B PRONOUNCE THE GRAMMAR | Listen and repeat the grammar examples.

C UNDERSTAND THE GRAMMAR | Circle the correct meaning of each past unreal conditional sentence.

1 They would have taken the high-speed train if a ticket had been available.
a They took the train. b They didn't take the train.

2 They might have had enough room for their friends if they'd rented the SUV.
a They rented the SUV. b They didn't rent the SUV.

3 If she hadn't gotten an X-ray, she wouldn't have realized that her wrist was broken.
a She got an X-ray. b She didn't get an X-ray.

4 If the authorities had known there would be a flood, they could have evacuated the city.
a They evacuated the city. b They didn't evacuate the city.

D GRAMMAR PRACTICE | Complete the sentences with the past unreal conditional. Use would.

1 If we ..... (have) an opportunity to fly on a supersonic helicopter, we ..... (take) it.
2 If Ben ..... (not / tell) Dr. Bell that his brother had the flu, she ..... (not / give) Ben a flu shot.
3 Who ..... (call) you ..... (get) if you ..... a flat tire?
4 If you ..... (buy) the Wi-Fi-enabled pressure cooker, you ..... (love) it.
5 Mark ..... (not / have) that interview at QuickStart if he ..... (not / take) a course in 3D printing.

E PRONUNCIATION | Contractions with 'd in spoken English | Notice the pronunciation of the spoken contractions of did, would, and had. Read and listen. Then listen again and repeat.

1 "Where'd /wɛrd/ you go?"
2 "Who'd /hud/ you see?"
3 "It'd /ɪt̬əd/ be OK."
4 "If we'd /wid/ known it'd /ɪt̬əd/ be so late, we'd /wid/ have called."

Note: Where'd, When'd, Who'd, Why'd and It'd are contracted in speech, but not in writing.

Afaq-lc.com

F LISTENING AND PRONUNCIATION PRACTICE | Listen and repeat the sentences you hear. Then listen again and write the full, not contracted, forms.

1 .....
2 .....
3 .....
4 .....
5 .....

COMMUNICATION ACTIVATOR

Now let's imagine a different past outcome.



A CONVERSATION MODEL | Read and listen.

A: You're not going to believe what happened.
B: What?
A: Jack showed up at his boss's house for dinner on the wrong day.
B: Are you kidding? How did that happen?
A: Apparently, he thought the invitation said Tuesday.
B: That's so embarrassing!
A: Right. I told him if he'd put it in the calendar on his phone, this wouldn't have happened.
B: Good point.

Social language
To introduce a probable cause, say:
Apparently, . . .

B PRONUNCIATION PRACTICE | Listen again and repeat. Then practice the Conversation Model with a partner.

C TALKING POINTS | Read each situation. On a separate sheet of paper, complete the sentence about how the situation could have been avoided. Use the past unreal conditional.

My brother got a speeding ticket. If he'd seen the speed limit sign, he would have slowed down.

1 Your sister lost her job. If she ....., ...
2 Someone stole your mother's phone on the bus. If ....., ...
3 You closed an important file without saving. If I ....., ...
4 Your father got the flu. If he ....., ...
5 Your friend's brakes failed and he rear-ended another car. If he ....., ...

D CONVERSATION PAIR WORK | Use your Talking Points to role-play the conversation. Then change roles.

A: You're not going to believe what happened.
B: What?
A: ..... .
B: Are you kidding? How did that happen?
A: Apparently, ...
B: That's ..... !
A: Right. I told ..... if ....., ...
B: Good point. . . .

KEEP TALKING!

Ask more questions about what happened.
Could [he] have ___ ?
What happened next?
Provide an excuse for the person who made the mistake.
Maybe [he] ___ .

Watch the video for ideas!

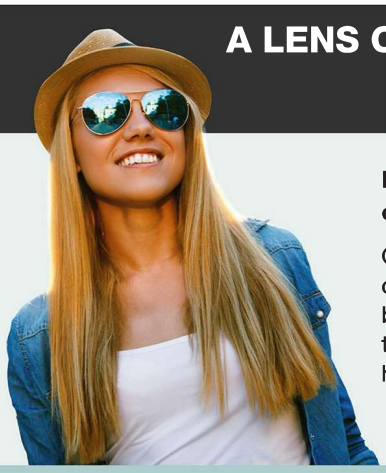
RECYCLE THIS LANGUAGE
That could happen to anyone.
It's not the end of the world.
No harm done.
These things happen.
Don't be so hard on [yourself].
Better safe than sorry.
Believe it or not, ...

E CHANGE PARTNERS | Role-play the conversation again.

Afaq-lc.com

3 COMMUNICATION GOAL Describe inventors and their inventions

A READING | Read about a famous inventor. How did his invention lead to the sunglasses we wear today?



A LENS ON Edwin Land

Do you wear polarized sunglasses—glasses that make it possible to see even through the glare of the brightest sunlight? Did you know polarized sunglasses came from a teenager's invention?

One dark summer night in 1922, 13-year-old Edwin Land was riding in a car that almost hit a team of horses because the car's headlights weren't bright enough. Headlights were dim in those days because of the concern that their glare would shine in other drivers' eyes, blinding them. Edwin thought that if the car he was in had had brighter headlights, the driver would have seen the horses while they were still far away.



Edwin Land, 1909–1991
Seen here with Polaroid camera photo samples.

At about the same time, at summer camp, a counselor showed Edwin and his friends a kind of trick. He told them to look at the blinding glare of the sun on a shiny tabletop, and he then put a special crystal in front of the boys' eyes. The crystal, known as Iceland spar, magically eliminated the glare, and the boys could see the tabletop clearly through the crystal. The Iceland spar was able to "polarize" the bright light by changing the direction of the light waves that caused the glare. Edwin immediately remembered the incident with the horses, wondering if there was a material such as this crystal that could polarize light coming from bright headlights.



Tenth-century Viking sailors used Iceland spar to help them navigate by the sun, even when it was hidden behind thick clouds.

Edwin would spend the next six years of his life experimenting with polarization, hoping to invent a practical material that could be used to polarize light. If he were successful, he thought, his first goal would be to convince automobile manufacturers to use his invention to make brighter headlights that didn't cause glare. He believed such an invention would make him rich and famous.

At the age of 19, Edwin's invention—a plastic sheet polarizer—was finally ready. He presented it to the automobile industry and tried for many years to convince them of its value. But that goal was never achieved. Other newer technologies permitted drivers to lower the direction of headlights so they wouldn't shine into other drivers' eyes. And the growth of highways with two lanes of traffic in each direction made the glare problem less serious.

But Edwin's work took him in other directions. He knew his plastic sheet polarizer had other uses as well. One was to revolutionize sunglasses, which at that time were made from ordinary dark glass that could reduce bright light but couldn't screen out glare. Edwin took his invention to American Optical, an eyeglass manufacturer, and the company began making polarized sunglasses with Edwin Land's polarized sheet.

In the end, Land achieved many successes with his inventions and did become rich and famous. He is best known for the Polaroid camera, which made and instantly printed paper photographs long before there were digital cameras and the Internet. Land's plastic polarizer is used in camera lenses today and is found in everything from car windshields to LCD screens.

B UNDERSTAND FROM CONTEXT | Write T (true) or F (false), based on the article.

..... 1 A dim light is very bright.
..... 2 Glare can make it hard to see both during the daytime and at night.
..... 3 Something that blinds you makes it easier to see.
..... 4 Headlights are the lights inside a car.
..... 5 Land didn't believe the sheet polarizer would have other uses.
..... 6 A goal is something you hope to achieve.

Afaq-lc.com

C **FIND SUPPORTING DETAILS** | **Answer the questions in your own words. Compare answers with a partner, explaining each answer with information from the Reading.**

1 How and when did Edwin Land understand that glare could be eliminated?
2 Why did the car Land was in almost hit a team of horses?
3 What would have prevented the near collision with the horses?
4 Why did Land connect polarization with making better headlights?
5 Why did Land think polarization would improve sunglasses?
6 What are some of the applications of Land 's plastic polarizer?

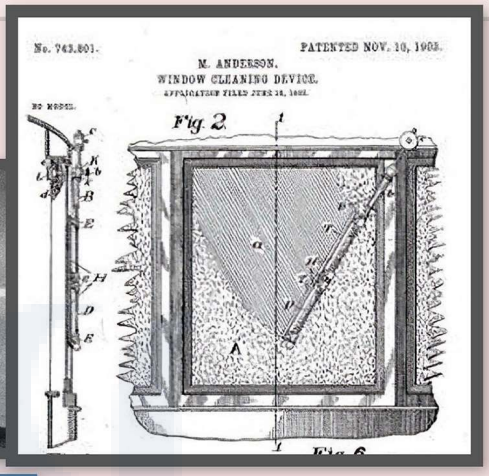
COMMUNICATION ACTIVATOR

Now let's describe inventors and their inventions.

A **TALKING POINTS** | **Choose one or more of the inventors. Find information on the Internet. Then write about the inventor and the invention in 50 words or less.**

Inventor / Birth date: Mary Anderson / *1866*
Nationality:
Her invention:







Inventor / Birth date: Alfredo Moser /
Nationality:
His invention:

Inventor / Birth date: Deepika Kurup /
Nationality:
Her invention:





Inventor / Birth date: Momofuku Ando /
Nationality:
His invention:

B **PRESENTATION** | **Sit with classmates who chose the same inventor. Put together your information from Talking Points and present your inventor, his or her life, and his or her invention to the class.**

OPTIONAL Underline new words or phrases in the Reading you can use in your Presentation. Example: "In the end, . . . "

RECYCLE THIS LANGUAGE

high-tech	innovative
low-tech	revolutionary
cutting-edge	novel

Afaq-lc.com

4 COMMUNICATION GOAL Consider the impact of historical inventions

A VOCABULARY | Archaeology | Read and listen. Then listen again and repeat.

1 **an archaeologist** a person who studies human history and pre-history from what was left behind



Archaeologists dig in the ground to search for tools from long ago.

2 **a fossil** the preserved remains of something that lived long ago



This is a fossil of an animal that lived millions of years ago.

3 **a cave** a natural space, either underground or in rocks, where animals and people can find shelter

4 **a campfire** a fire built by humans for cooking, warmth, or light



Early humans lived in caves and stayed warm by the heat of the campfire.

B LISTEN FOR MAIN IDEA | Listen to a conversation with an archaeologist. Which statement expresses her main point?

a Neanderthals are an earlier human species than Homo sapiens.
b Neanderthals were able to capture fire from natural sources.
c Fire enabled modern humans to develop physically and culturally.

C LISTEN FOR DETAILS | Listen again. Answer the questions.

1 What are two kinds of "natural" fires?
   a ones caused by lightning and volcanoes
   b ones Neanderthals used for cooking and warmth
2 What is the earliest date Homo sapiens appeared in the "fossil record"?
   a about 45,000 years ago b millions of years ago
3 What does it mean to "control" fire?
   a prevent fire from burning caves
   b capture fire from a natural source and use it
4 How did archaeologists determine that Neanderthals could control fire?
   a They found evidence of fire inside Neanderthal caves.
   b They found tools Neanderthals used to make fires.
5 Which group is also known as "modern humans"?
   a Homo sapiens b Neanderthals

D SUMMARIZE | With a partner, summarize three ways that fire helped create the life modern humans developed. Listen again if necessary.

Afaq-lc.com

COMMUNICATION ACTIVATOR

Now let's consider the impact of historical inventions.

A TALKING POINTS | Look at some key discoveries and inventions in three categories. With a partner, choose one from each category. Write notes about: (1) what life was like before it or them and (2) what changes it or they caused.

Navigation





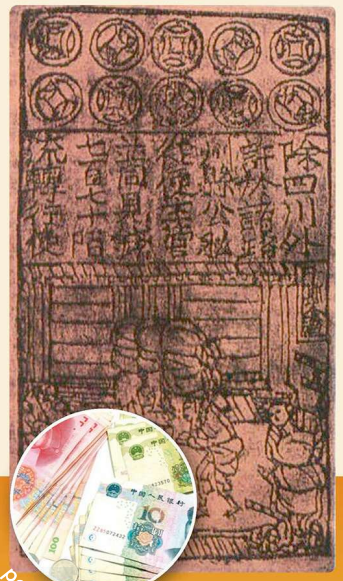


the 206 BCE: **magnetic compass**

17th century: first commercially sold **road maps**

1973: first satellite-based **Global Positioning System** (or GPS)

Currency



paper money

11th century: **Paper money** enabled people to pay for goods and services with paper instead of large quantities of coins.



coins

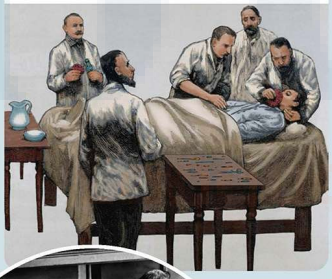
Medicine and Science

General anesthesia makes surgery and dentistry painless.

before there was anesthesia



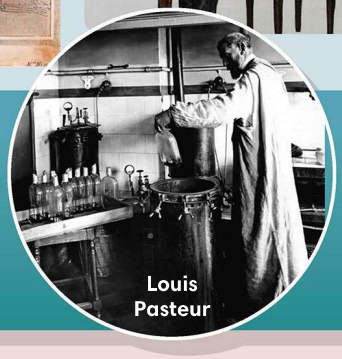
1840s: anesthetizing a surgical patient



modern anesthesia



1862: Louis Pasteur discovers that **pasteurization** with heat prevents growth of bacteria, making foods safe to eat.



Louis Pasteur



bacteria in raw, unpasteurized milk

products that can be pasteurized

Foods		Liquids
butter	nuts	milk
cheese	sauerkraut	honey
cream cheese	eggs	vinegar
sour cream	crabmeat	fruit juices
yogurt	ice cream	lemon juice

B DISCUSSION | Choose inventions and discoveries from Talking Points, or from any other part of Unit 8. Discuss their impact on history and people's lives. Be sure to make at least one statement with the past unreal conditional in your discussion.

> "After anesthesia was invented, patients could have surgery without pain. If anesthesia hadn't been invented, many people would have chosen to die instead of having an operation."

SOFT SKILLS BOOSTER p. 160

WRITING Choose one of the inventions or discoveries from Unit 8, or another invention or discovery. Describe its advantages, disadvantages, and historical impact.

WRITING HANDBOOK p. 150
- Summary statements
- Guidance for this writing exercise

Afaq-lc.com

7 OOPS!

Form teams of two players. Play against another team.

With your partner, read about seven imaginary situations that had bad outcomes. Together, write a past unreal conditional statement of how you could have avoided each mistake. Check each one off as you go. When you have a statement for all seven, say "7 OOPS!" The first pair to say "7 OOPS!" wins. NOTE: Only grammatically correct answers count!

When all teams are finished, winners read their statements to the class.

"If I hadn't ..."

"If I had ..."

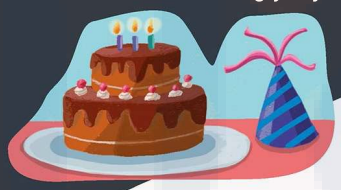
☐ **OOPS!**

You were making strawberry jam, but you weren't paying attention. Instead of sugar, you put in salt, because, hey, sugar and salt look almost the same. You had to throw away the jam.



☐ **OOPS!**

You were invited to a party for your friend, but you didn't know it was a surprise party and you said, "See you tomorrow at your party." The surprise was ruined and your friends were angry at you.



☐ **OOPS!**

You wanted to play a game on your dad's smartphone, but your brother grabbed it from you and accidentally dropped it into a swimming pool. Your dad said you have to pay to replace the phone.



☐ **OOPS!**

You bought a VEG-ME-UP juicer as a present for your sister. You didn't know she would have to buy all her vegetables from the VEG-ME-UP company. Your sister didn't like that idea.



☐ **OOPS!**

You had tickets to a concert, but you left them in the desk at your office. You couldn't go back to get them because the office was locked and you didn't have the key. You couldn't go to the concert.



☐ **OOPS!**

You bought a lot of groceries and left them in the trunk of the car for two hours. The weather was really hot, and when you opened the trunk, a few things didn't smell very good.



☐ **OOPS!**

Your boss asked you to drive her to the airport, and you felt good that she had asked you and not someone else. But you forgot to check how much gas you had, and on the way to the airport you ran out of gas.



PROGRESS SELF-CHECK

NOW I CAN

- ☐ Describe new kinds of products.
- ☐ Imagine a different past outcome.
- ☐ Describe inventors and their inventions.
- ☐ Consider the impact of historical inventions.

For more practice . . . Unit Review / *Connect TV* ★ Test-Taking Skills Booster