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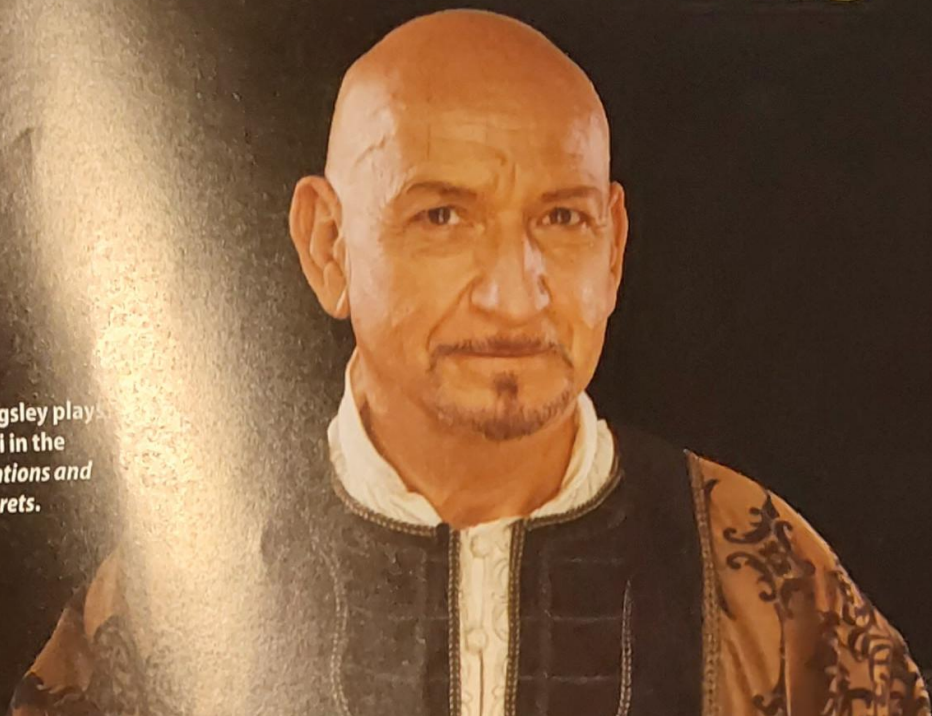
Unit 7: GREAT INVENTORS

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GREAT INVENTORS 7

Ben Kingsley play...
al-Jazari in the
...01 Inventions and
...ry of Secrets.

Think and Discuss

1. Car, Computer, Cellphone, Internet, Clock
2. The cellphone was invented by Martin Cooper and the car was invented by Karl Benz, Etienne Lenoir and Alexander Winton.

...DEMIC SKILLS

READING Understanding pronoun reference
...GRAMMAR Using simple past tense of *be*
Using simple past tense of other verbs
...L THINKING Analyzing an argument

A Look at the information on these pages and answer the questions.
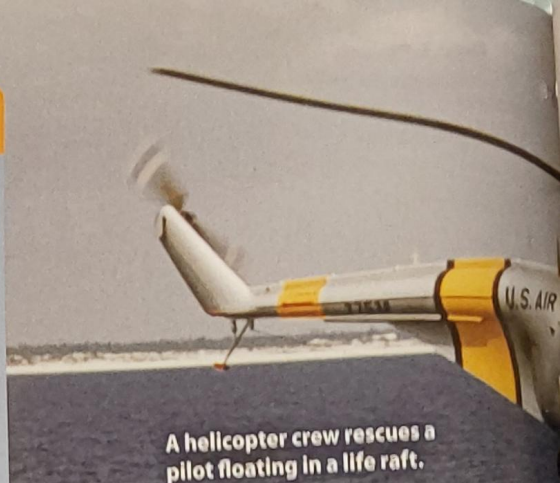
   1. Who developed the first helicopter that flew with a pilot? When?
   2. Who completed the first signal flare? When?
   3. Who invented the first life raft? When?
   4. Which invention do you think was most important? Why?

B Use the correct form of the words in yellow to complete the definitions.

   If you __described__ something, you give details about it.
   If you __invented__ something, you are the first person to make it.
   A __machine__ is an object that uses power to move.

A helicopter crew rescues a pilot floating in a life raft.

U.S. AIR

A. Look at the information on these pages and answer the questions

1. It was invented by Frenchman Paul Cornu in 1907.
2. In the early 19th century by Benjamin Franklin Coston and his wife Martha Coston.
3. Maria Beasley and Horace Carley. Beasley created hers in 1882 and Carley completed his in 1903.
4. The helicopter since it is used to rescue people and transport people or objects to other places.

Reading 1

PREPARING TO READ

A The words in **blue** below are used in the reading passage on pages 115–116. Match the sentence parts to make definitions. Use a dictionary to help you.

1. An **engine** _b_
2. A **drawing** _e_
3. **History** _d_
4. A **model** _c_
5. An **engineer** _a_

a. works to build or fix things like machines, roads, or bridges.
b. is the part of a machine that gives it power.
c. is an object that is a copy of something else.
d. refers to events that happened in the past.
e. is a picture of something made with a pen or pencil.

B Circle the correct word to complete the definitions.

1. If something **floats** in water, it (will) / won't stay on the top of the water.
2. If something **sinks** in water, it will / (won't) stay on the top of the water.

C List three ideas for each category below. Then share your ideas with a partner.

1. three things that **float** in water

   ship   _leaves_   _plastic bottles_

2. three things that **sink** in water

   keys   _coins_   _stones_

3. three things that have an **engine**

   vehicles   _boats_   _airplanes_

4. three famous people from **history**

   William Shakespeare   _Abraham Lincoln_   _Albert Einstein_

D Read the first paragraph of the reading passage on pages 115–116. What invention does it describe? Why does the author describe the invention as "amazing"? Note your ideas below. Then discuss with a partner.

The invention is a clock. The author describe the invention
amazing because every half hour the clock came alive.
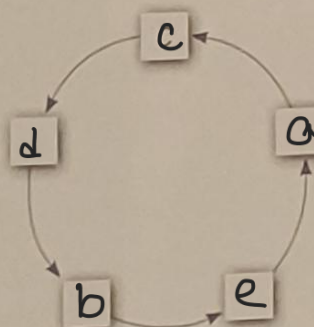
UNDERSTANDING THE READING

A Complete the summary. Use no more than three words for each blank.

Al-Jazari was a(n) ¹ **man** who lived in ² **Turkey** around ³ **eight hundred** ago. His most famous invention was the ⁴ **clock**. We know about al-Jazari and his ideas because he ⁵ **invented**. Many modern-day items or machines use al-Jazari's ideas, such as a car ⁶ **engine**.

B How does al-Jazari's elephant clock work? Write the steps (a–e) in the correct sequence in the diagram.

a. The dragon's tail pulls the bowl back up.
b. After 30 minutes, a ball starts to fall from the top.
c. A bowl floats on the water in the tank.
d. The bowl moves down in the water and pulls on ropes.
e. The ball drops into a dragon's mouth.

(Diagram: circle with positions c (top), a (right), e (bottom right), b (bottom left), d (left))

CRITICAL THINKING **Analyzing** an argument means looking at and understanding a writer's point of view. As you read, ask yourself: *What is the writer's opinion? What evidence does the writer give to support this opinion?*

C Note answers to the questions below. Then discuss with a partner.

1. In paragraph B, what opinion does the author give of al-Jazari?
   The author considers al-Jazari to be of the one of the greatest engineers in history.

2. What evidence does the author use to support his/her opinion?
   The author cite the words of some historians that called him "the father of modern-day engineering."

◀ A full-size working model of the elephant clock in Ibn Battuta Mall, Dubai

DEVELOPING READING SKILLS

READING SKILL Understanding Pronoun Reference

A pronoun is a word that stands for, or takes the place of, a noun. **Subject pronouns** are *I, he, she, it, you, we,* and *they.* Subject pronouns refer to subjects in sentences. A pronoun usually refers to a noun that comes earlier—in the same sentence or in a previous sentence.

To understand which noun a pronoun refers to, ask yourself these questions:

- Is the pronoun singular (e.g., *he, she, it*) or plural (e.g., *they*)? The pronoun should match the earlier noun.
- Is the pronoun feminine (*she*), masculine (*he*), or gender-neutral (*it, they*)? The gender of the pronoun should match the gender of an earlier noun.

In the example below, the singular masculine pronoun **he** refers to the man **al-Jazari**. The plural gender-neutral pronoun **they** refers to the plural noun **machines**.

*A man named **al-Jazari** was one of the greatest inventors in history. **He** invented amazing **machines**. **They** were both beautiful and useful.*

UNDERSTANDING PRONOUNS

A Look at the **bold** pronouns in the paragraph below. Ask these questions about each pronoun:

- Is it singular or plural? *Singular: He, It / Plural: They*
- Is it feminine, masculine, or gender-neutral? *Masculine: He / Gender-neutral: They, It*

We know about al-Jazari mostly from a book that **he** wrote. **It** describes a number of machines of all shapes and sizes. **They** include clocks, hand-washing machines, and pumps for lifting water. The book also has drawings that show how each machine works.

UNDERSTANDING PRONOUNS

B In the paragraph above, draw an arrow to the noun that each pronoun refers to.

▶ Pages from al-Jazari's *Book of Knowledge* show one of his water-raising machines.

Sir Ben Kingsley as
al-Jazari in the movie
*1001 Inventions and the
Library of Secrets*

THE GOLDEN AGE

BEFORE VIEWING

A Look at the title of the video. The phrase *Golden Age* is used to talk about times in history when people achieved great things. What period in your country's history could be described as a Golden Age? Discuss with a partner.

DISCUSSION

B The words below are used in the video. Match each word with the correct definition.

VOCABULARY IN CONTEXT

The elephant clock was an **ingenious** invention.
Al-Jazari's ideas helped lay the **foundations** of modern engineering.
Al-Jazari's work has had a big **impact** on today's technology.
Ancient Egypt is an example of a very old **civilization**.

1. _impact_ (n) a strong effect

2. _foundations_ (n) the ideas that other things are based on

3. _ingenious_ (adj) new and very clever

4. _civilization_ (n) a group of people with their own society and culture

C Read the information about the Dark Ages. Then answer the questions.

As the Roman Empire spread through Europe, it brought with it many improvements in art and culture. However, after the Roman Empire fell in around A.D. 500, many of these improvements were lost. This period, which lasted hundreds of years, became known as the Dark Ages. Modern historians, however, prefer not to use the term Dark Ages anymore. Research has shown that many great achievements were made in this period, both in Europe and in other parts of the world.

1. Why is the period after A.D. 500 known as the Dark Ages?

   Because around those hundreds of years many
   improvements and advancements were lost because the fall of roman empire.

2. Why do some historians think that the name is not suitable?

   Because despite the Roman empire made many technological
   advancements, the rest of the world did too and it is important to
   consider other parts of the globe.

WHILE VIEWING

A ▶ Watch the video. What are two reasons why the librarian believes the Dark Ages should be known as "the Golden Ages"?

■ a. There were many great discoveries made during this time.

☐ b. Many great artists and writers were born during the period.

☐ c. Ideas from many different cultures around the world came together.

B ▶ Watch the video a second time. Match the sentence parts to make true sentences.

1. Ibn al-Haytham _C_   a. made discoveries about engineering.

2. Abbas ibn Firnas _b_   b. had early ideas about flying.

3. Al-Jazari _a_   c. explained how our eyes work.

AFTER VIEWING

A What modern technology may have benefited from the work of the inventors below? Use information from the video and the reading passage on pages 115–116.

1. Ibn al-Haytham: _The discovery of the Camara Obscura allowed the invention of photographic cameras, projectors_
   and even art

2. Abbas ibn Firnas: _Thanks to his discoveries we have flying vehicles like airplanes and helicopters_

3. Al-Jazari: _Invented the foundation of machines like water pumps clocks, and even robots_

B Which of the people in activity A do you think made the most useful discoveries? Why? Discuss with a partner.

I think that Abbas ibn Firnas because
airplanes are used to travel to other
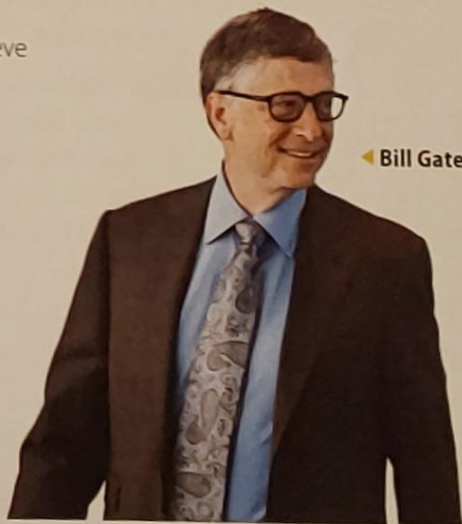_places more easily and quickly than ships._

Reading 2

PREPARING TO READ

A The words in **blue** below are from the reading passage on pages 122–123. Match the correct form of each word to its definition.

Bill Gates is sometimes called "the father of home computing." Born in 1955, Gates **grew up** in the United States. When he was 13, his school bought one of the earliest computers, and Gates showed **huge** interest in it. After **discussing** it with his teachers, he was allowed to miss math class and instead spend time on the computer. His **aim** was to be able to write his own computer **programs**. Gates became not just a **brilliant** computer programmer but also a smart businessman. In 1975, before he finished university, Gates co-founded Microsoft. As the company became successful, Gates had no **reason** to finish his university studies. In 2015, the company **celebrated** its 40th birthday and is now the world's largest computer software company.

1. _aim_ (n) a goal; something you want to achieve

2. _reason_ (n) a statement that explains "why"

3. _brilliant_ (adj) very smart

4. _celebrated_ (v) to do something special for an important event

5. _grew up_ (v) to become an adult

6. _huge_ (adj) very big

7. _programs_ (n) a set of instructions that tell a computer what to do

8. _discussing_ (v) to talk about something

◀ **Bill Gates**

B List three ideas for each category below. Then share your ideas with a partner.

1. three things you **celebrate** every year

   Birthdays _Saint Valentines_ _Christmas_

2. three **reasons** to study English

   learning _talking_ _communicate_

3. three **brilliant** scientists

   Isaac Newton _Galileo Galilei_ _Charles Darwin_

C Skim the reading on pages 122–123. Who is the reading about? What was her great achievement? Check your ideas as you read the passage.

The reading is about Ada Lovelace, who invented the foundations used for the creation of modern computers.

UNDERSTANDING THE READING

UNDERSTANDING THE MAIN IDEA

A Why has Ada Lovelace become a role model?

a. She is an example of someone who never gave up during difficult times.

b. She came from a poor family but became a brilliant mathematician.

c. ~~She is a woman who made a great achievement in science and mathematics.~~

COMPLETING A SUMMARY

B Complete the summary with information from the reading on pages 122–123.

Ada Lovelace lived during the ¹ _19 th_ century. Her mother was a ² _mathematician_. When Lovelace was ³ _17_ years old, she met a man named ⁴ _Charles Babbage_. He was designing a machine that could do ⁵ _math_ problems. Lovelace was very interested. In 1843, Lovelace helped to write an article about the machine. She added her own ideas and notes. The machine is considered one of the first designs of a ⁶ _computer_, and Lovelace's notes are thought to be the first ever ⁷ _computer program_. People who want the world to remember Lovelace created a day to celebrate her. Ada Lovelace Day is on ⁸ _October 16_ every year.

CRITICAL THINKING: ANALYZING AN ARGUMENT

C Note answers to the questions below. Then discuss with a partner.

1. In paragraph C, what adjective does the author use to describe Lovelace's math and science ability?

   – Brilliant

2. In the final sentence of the reading passage, what phrase does the author use to describe his/her opinion of Ada Lovelace?

   "Ada Lovelace continues to be a role model for young women around the world."

3. In paragraph E, what evidence does the author give to support his/her opinion?

   The author used one note of Ada Lovelace.

CRITICAL THINKING: SYNTHESIZING

D What are three things that al-Jazari and Ada Lovelace have in common? Write your ideas below. Then discuss with a partner.

The two invented things that have become indispensable today.

Both left their mark on engineering.

Both are know for the influence of their inventions on engineering.

Writing

EXPLORING WRITTEN ENGLISH

A Read the information in the box.

LANGUAGE FOR WRITING Simple Past Tense

Use the simple past to talk about completed actions in the past.

*Ada Lovelace **lived** in London, England.*

Add *-ed* to the base form of a regular verb to form the simple past.

invent—invent**ed**

Add *-d* if the verb already ends in *-e.*

live—live**d**   translate—translate**d**

Make spelling changes for some verbs.

For verbs that end in consonant + *-y,* drop the *-y* and add *-ied:*

try—tr**ied**   study—stud**ied**   carry—carr**ied**

For most verbs that end in consonant + vowel + consonant, double the final consonant and add *-ed.*

stop—stop**ped**   excel—excel**led**   rob—rob**bed**

Some verbs have irregular past forms.

become—became   build—built   come—came   eat—ate

find—found   go—went   grow—grew   have—had

make—made   meet—met   put—put   say—said

For negative statements, use *did not (didn't)* + the base form of a verb.

*She **didn't invent** the Analytical Engine.*

Now write the simple past form of each verb below.

Base Form	Simple Past Form
create	created
try	tried
say	said
have	had
desing	designed
save	saved

Base Form	Simple Past Form
begin	began
invent	invented
build	built
grow up	grew up
go	went
discover	discovered

B Complete the paragraphs with the simple past form of each verb in parentheses.

1. Hungarian László Bíró _invented_ (invent) the first ballpoint pen in the early 20th century. Bíró's brother _helped_ (help) him with the invention. Bíró and his brother were born in Hungary, but they _went_ (go) to Argentina in 1943. Bíró _died_ (die) in 1985.

2. In 1903, inventor Mary Anderson _had_ (have) an idea. She noticed that car drivers _needed_ (need) to open their windows when it rained so that they _could_ (can) see. Anderson _created_ (create) a swinging rubber arm that drivers could control by using a lever inside a car. The invention was very popular and _became_ (become) known as the windshield wiper.

3. Archaeologists _found_ (find) the world's first bars of soap in Babylon, in modern-day Iraq. Babylonians _mixed_ (mix) animal fat with wood ashes and water to make the soap.

C Look at the reading on pages 122–123 to answer the questions. Write complete sentences. Use the simple past.

1. When did Ada Lovelace live?
    Ada Lovelace lived on 1815

2. Where did she grow up?
    She grew up in London, England

3. What did her mother do?
    She was a mathematician.

4. What did she create when she was 13?
    She created a desing for a flying machine

5. Who did she meet when she was 17?
    She met a mathematician named
    Charles Babbage.

6. When did she write the first ever computer program?
    In 1843 she writed the first ever
    computer program.

A portrait of Ada Lovelace, by Alfred Edward Chalon

D Read the information below. Then complete each sentence (1–8) with the correct simple past form of *be*.

> **LANGUAGE FOR WRITING** Simple Past of *Be*
>
> Use the simple past of *be* to describe people, things, and situations in the past. The verb *be* is usually followed by a noun, an adjective, or a prepositional phrase.
>
> Ada Lovelace **was** a mathematician.
>
> She **was** talented.
>
> Lovelace and Babbage **were** in London when they met.
>
> The past forms of *be* are *was/was not* and *were/were not*. You can use contractions for the negative forms: *wasn't* and *weren't*. We usually use contractions when we speak. We do not often use contractions in academic writing.
>
> Ada Lovelace **was not** a university professor.
>
> There **were not** many female mathematicians in Lovelace's time.

1. Ada Lovelace __was__ good at math.
2. She and Charles Babbage __were__ friends.
3. Charles Babbage __was__ a mathematician.
4. There __were not__ many female scientists in Lovelace's time.
5. Lovelace's mother __was__ a computer programmer.
6. Al-Jazari __was__ an engineer.
7. Al-Jazari and Ada Lovelace __were not__ doctors.
8. Al-Jazari's elephant clock __was not__ small.

E Write true sentences (1–4) about famous people in the past. Use the past tense of *be*. Write two affirmative sentences and two negative sentences.

1. __Marie Curie was the only person to win Novel prize in two different science fields__
2. __Isaac Newtown was the one who discovered the Law of Gravity.__
3. __Isaac Newtown was not publish many of his works for fear of criticism__
4. __Albert Einstein was not pass his first college entrance exam.__

WRITING TASK

Leonardo da Vinci

    Leonardo da Vinci (1452-1519) was an Italian artist, architect, engineer and scientist of the Renaissance. He is famous for his ability to capture nature, scientific phenomena and human emotions in any material. Leonardo's innovative masterpieces show his mastery of light, perspective and overall effect. His most appreciated works are the portrait of Mona Lisa and the mural painting The Last Supper.

    Leonardo was a universal genius. Not content with being a Renaissance artist and a visionary scientist, he stands out as one of the most brilliant engineers in history. Long before they were technically feasible, he invented the helicopter and the battle tank. He excelled in his designs for power looms and hydraulic saws. He also drew plans for submarines and robots. The list of his contributions to the engineering world is virtually endless. However, many of his inventions were unusable for his time, but today they have been improved and put into practice.

UNIT REVIEW

Answer the following questions.

1. What are the simple past forms of these verbs?

live _lived_   try _tried_   stop _stopped_

go _went_   meet _met_   build _built_

2. What are some examples of modern day technology that use al-Jazari's ideas?

Toys, car engines

3. Do you remember the meanings of these words? Check (✓) the ones you know. Look back at the unit and review the ones you don't know.

Reading 1:

- [✓] describe
- [✓] engineer
- [✓] invent
- [✓] sink
- [✓] drawing
- [✓] float
- [✓] machine
- [✓] engine
- [✓] history
- [✓] model

Reading 2:

- [✓] aim
- [✓] discuss
- [✓] program
- [✓] brilliant
- [✓] grow up
- [✓] reason
- [✓] celebrate
- [✓] huge

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