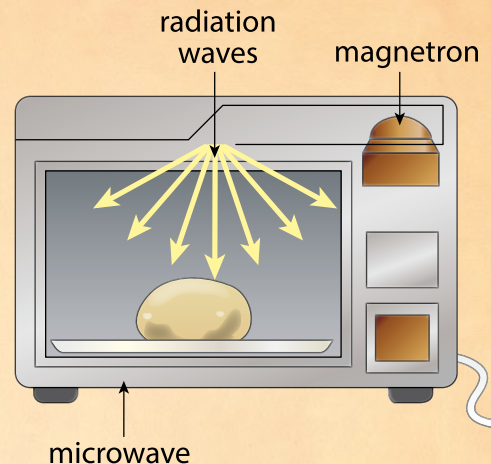


Grammar start

He noticed that the chocolate **had melted**.1  Read and number the sentences in the order the events happened.**The invention of the microwave oven**

Dr. Percy Spencer invented the microwave oven. The invention happened by accident. Dr. Spencer was an engineer. In 1946 he was doing radar research with magnetrons. Magnetrons produce microwave radiation. One day at work he noticed that the chocolate bar in his pocket had melted. He realized that the microwaves from a magnetron had melted the chocolate.



Dr. Spencer wanted to do more experiments. He immediately bought a bag of popcorn. He put it in front of a magnetron. When he checked it two minutes later, all the popcorn had popped! Dr. Spencer had created the first microwave popcorn snack! He was very excited because he had discovered that microwaves cook things more quickly than normal ovens. Other scientists had noticed the same phenomenon before Dr. Spencer, but they hadn't understood the potential of the discovery. So it was thanks to Dr. Spencer that microwave ovens were soon available to the public in stores.

- a Other scientists saw the effect of magnetrons.
- b The chocolate bar melted.
- c Dr. Spencer put a chocolate bar in his pocket.
- d He put popcorn in front of a magnetron.
- e He checked the popcorn.
- f The popcorn popped.
- g Dr. Spencer was excited about his discovery.
- h He saw the melted chocolate.

1
2

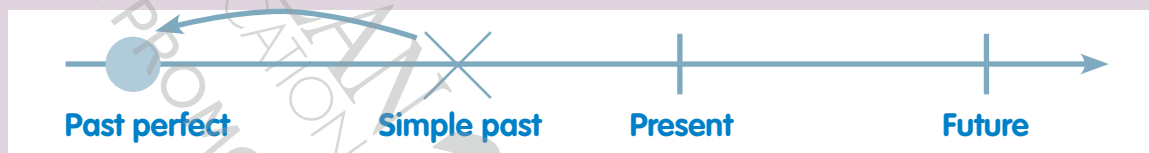
2 Read and complete the grammar box.

We use the **past perfect** to say that something happened **before** another action or event in the past. To form the past perfect we use **had (not)** + the past participle:

2nd event = simple past

1st event = past perfect

He **noticed** that the chocolate bar in his pocket **had melted**.



Affirmative

He **realized** that the microwaves **had melted** the chocolate.

When he **checked** it, all the popcorn _____ **popped**.

Dr. Spencer **had** _____ the first microwave snack.

Negative

Other scientists **hadn't understood** the potential.

3 Read and number the events '1' and '2' in the order they happened.

- a Dr. Spencer **realized** the microwaves **had melted** the chocolate.
- b He **put** popcorn in front of the magnetron because he **had seen** the chocolate melt.
- c The popcorn **had popped** when he **checked** it.
- d When he **got** his first job in a factory, Spencer **had** just **finished** 5th grade at school.
- e He **had been** an electrical engineer for many years when he **made** his discovery.
- f Before Dr. Spencer **made** his discovery, people **hadn't used** microwaves for cooking.

11

Listen and complete the sentences.

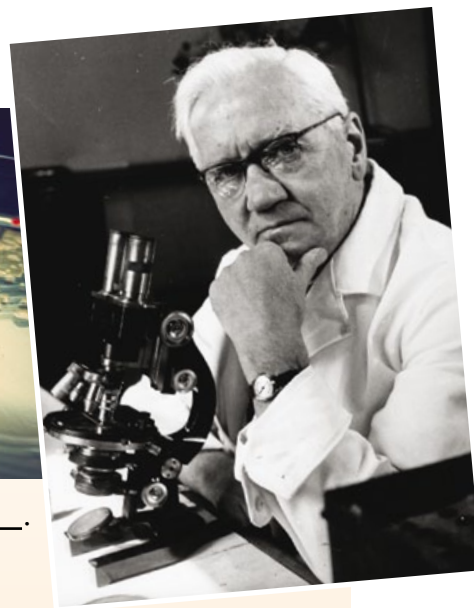
penicillin



mold



bacteria culture



- a Dr. Alexander Fleming discovered penicillin in 1928.
- b At the time he was a _____ researcher.
- c Dr. Fleming's laboratory was often _____.
- d During his vacation, he had left the bacteria cultures on a _____ in the laboratory.
- e He saw that _____ had developed on one of the dishes.
- f He noticed that the mold had stopped the _____ from growing.
- g Fleming had seen _____ die of dangerous bacteria during World War I.
- h Fleming knew he had discovered something really _____.

2 Complete the sentences with the verbs in the past perfect.

- a Green mold had developed (develop) when Fleming returned from vacation.
- b When he found the mold, he _____ (be) away for more than two weeks.
- c He realized the mold _____ (kill) the bacteria in the dish.
- d He made the discovery because he _____ (not clean) the laboratory equipment.
- e He _____ (leave) the dish on a table when he went on vacation.
- f Fleming _____ (work) in his London laboratory for several years when he made the discovery.
- g Fleming was well known before his discovery, because he _____ (be) a successful medical researcher.
- h Other scientists _____ (notice) the same phenomenon before Fleming, but they _____ (not realize) its significance.

3 Complete the text with the correct form of the verbs in the box.

freeze leave fall invent send want invent make

More accidental discoveries and inventions

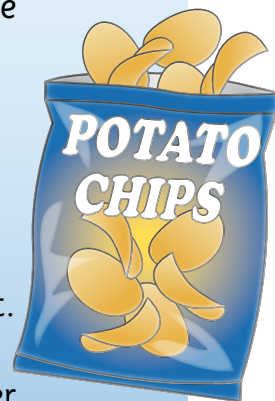
The popsicle (1905)

When 11-year-old Frank Epperson woke up one morning he remembered he (a) had left his favorite drink in the yard the night before. It had a stirring stick in it. That night, temperatures (b) _____ well below freezing. When Frank went outside he discovered that the drink (c) _____. He (d) _____ the first fruit-flavored popsicle!



Potato chips (1853)

Chef George Crum created potato chips because he was angry! He (e) _____ French fries for a customer, but the customer (f) _____ them back. He said they were too thick and soft. So Crum cut very thin slices of potato and cooked them until they were crisp. He (g) _____ to take revenge, but the customer loved them! Crum (h) _____ potato chips!



Adverbs like *just* and *already* go after *had*:
He had **just** woken up.

4 Use the prompts to write sentences.

- a Before we read the article we / not hear / of Frank Epperson
Before we read the article we hadn't heard of Frank Epperson.
- b Frank / just / wake up / when he remembered his drink

- c George Crum was angry because a customer / complain / about his fries

- d People / not try / potato chips until Crum invented them

- e He was surprised because he / not expect / the customer to like them

Grammar goal

He **was working** in Egypt.

He **found** a tomb. No one **had entered** for years.

Read the article. What did Howard Carter discover?

In 1922, the archeologist Howard Carter was working in the Valley of the Kings in Egypt. He hoped to find a pharaoh's tomb. Important archeologists had said there was nothing more to find, but Carter continued to look. While they were digging, they made an incredible discovery. They found the tomb of an unknown ancient Egyptian ruler called Tutankhamen. No one had entered the tomb for over 3,000 years!

When Carter first looked through the door, he saw a room full of gold objects. When he died 17 years later, he had recovered more than 3,500 priceless objects from the tomb, and he had become as famous as Tutankhamen himself.



We use different **narrative tenses** in stories to describe past events.

Simple past

(Main action)

They **found** the tomb of an Egyptian ruler.

Past perfect

(Previous event)

No one **had entered** the tomb for over 3,000 years!

Past progressive

(In progress at a specific time)

In 1922, he **was working** in Egypt.

2 Circle the correct words.

- When Howard Carter found the tomb, he **worked** / **had worked** in Egypt for 31 years.
- While he **dug** / **was digging**, he saw a step that someone **had cut** / **was cutting** into the rock.
- Carter sent a telegraph to announce that he **discovered** / **had discovered** something important.
- Carter found evidence that robbers **tried** / **had tried** to enter the tomb, but they **had not been** / **weren't being** successful.

3

12

Write the verbs in the correct narrative tense. Listen and check.

In 2012, a treasure hunter (a) discovered (discover) 30,000 silver and gold coins, and some jewelry while he (b) _____ (search) a field in the United Kingdom. Ronald Gray (c) _____ (have) a cheap metal detector which he (d) _____ (buy) three months earlier. The treasure he found was one of the largest collections of Celtic coins and jewelry anyone (e) _____ ever _____ (find). Experts in Celtic history (f) _____ (say) the coins were at least 2,050 years old.

Mr. Gray chose that particular field because he (g) _____ (hear) stories about other people finding old coins there. While he (h) _____ (use) his metal detector it (i) _____ (start) making a lot of noise. He dug for 30 minutes. When he stopped, he (j) _____ (find) 60 coins. He (k) _____ (hurry) back to the store that (l) _____ (sell) him the metal detector and he (m) _____ (buy) a better, more powerful model. When the day ended, he (n) _____ (uncover) at least 120 coins.



4 Expand the prompts to write an article in your notebook. Use narrative tenses.

In 2013, a treasure hunter discovered...

- In 2013 / treasure hunter / **discover** / gold plate / while she / **dive** / off the Florida coast
- Mary Fisher / **look** for / the wreck of a Spanish ship when she / **find** / the plate
- She / **be** / in the water for 30 minutes / when she / **see** / something bright in the sand
- She / **be** / excited because she / **not find** / anything like it before
- She / **take** / it to a Florida museum the next day
- While they / **clean** / it they / **announce** / that it was worth \$1 million dollars