

Voice

The Active and Passive Voice

Why use them?

Structure

Subject	Verb	Object	Adverbial
People	speak	English	in London

- 1) People speak English in London. (active)
- 2) English is spoken in London. (passive)

Forming a passive sentence

Select the correct form of *be*

Change the action verb into its past participle (*spoke – spoken*)

Tense: Simple Present (a) <i>to speak – speak</i> (b) <i>to be – is/are + spoken</i>	Number: Singular (c) Passive subject (active object) – <i>English</i> (d) <i>to be – is</i>
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Passives in the 5 most common verb tenses

1. Simple Present
Active: People speak English in London
Passive: _____
2. Simple Past
Active: People _____ English in London
Passive: _____
3. Simple Future
Active: People _____ English in London
Passive: _____
4. Present Perfect
Active: People _____ English in London
Passive: _____
5. Present Continuous
Active: People _____ English in London
Passive: _____

Choosing the active or the passive

- An active subject: *The astronauts sent a message.*
- A receptive subject: *A message was sent by the astronauts.*

Practice

Choose the correct active or passive form of the verb in parentheses. Be sure the verb is in the correct tense.

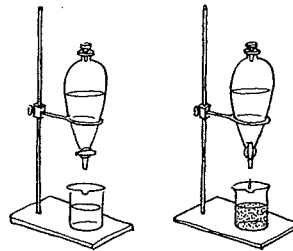
Example: In the Stone Age, tools (make) of stone.

Answer: In the Stone Age, tools were made of stone.

1. Friction (reduce) by the application of oil.
2. The earthquake (occur) on April 18, 1906.
3. Fluorescent lighting (link) to melanoma, a vicious form of skin cancer, in the last few years.
4. X-rays (discover) by Roentgen in 1895.
5. The light that you see here shows that the laser beam (reflect) from the moon back to the earth at this moment.
6. Physicists (recently find) traces of the subatomic particle known as "W".
7. The ejection of volcanic dust into the atmosphere (slightly lower) global temperatures for the next few years.
8. A microscope (usually compose) of an objective, a specimen stage, and a light source.
9. Electronic engineers (currently investigate) the feasibility of three dimensional television.
10. Thanks to satellite photographs, the earth's aurora (show) to be nearly round.

Inanimate subjects with active verbs

Figure 2.1 Changing Color of Ammonium Dichromate Solution



- a. The color of the solution is changed by adding acid.
- b. With acid, the color of the solution changes.
- c. We change the color of the solution by means of acid.
- d. If we add acid, the color of the solution changes.
- e. Because acid is present, the color of the solution is changed.

These are all correct sentences in English, but they are considered to be wordy and indirect. A better way to write the above sentences is:

Acid changes the color of the solution.

Notice that the subject of the sentence (*acid*) is not a person but an agent. In many languages, it is impossible to use an inanimate subject in this way. However, scientific English prefers the use of inanimate subjects and active verbs for clarity and conciseness. Inanimate subjects show or imply a cause and effect relationship. Look at the examples in the box below:

Inanimate Subject + Active Verb	Cause	Effect
Gravity keeps the moon in its orbit.	gravity	moon in orbit
The carbon ¹⁴ dating method determined the age of the sample.	C ¹⁴ method	age of the sample determined
The clouds are moving to the east.	(wind, earth rotation)	clouds move
Floods have ruined the crops.	floods	ruined crops

The role of blood clots in heart attacks has not yet been determined. But since a clot blocks blood flow to a part of the heart muscle, thereby killing it, researchers hope that removing a clot within the first hour will resupply the area with blood.

Not only numbers but all characters are coded in binary when they are transmitted to the computer. The machine gives a list of equivalent expressions to represent these symbols. The central processing unit is designed to recognize these binary numbers. The programmer, however, must organize and separate the information the computer needs and the instructions it must execute in order to obtain accurate results for the program.

Exercise 2.13

Directions: Fill the blanks with an inanimate subject and an active verb derived from the information in the first sentence.

Example: In orange juice, vitamin C is contained.

Answer: Orange juice contains vitamin C.

1. Because of the El Niño current, many fish were killed.
_____ many fish.
2. In chlorophyll, magnesium is contained.
_____ magnesium.
3. With the "big bang" theory, the origin of the universe is described.
_____ the origin of the universe.
4. The patient's heartbeat was monitored by the machine.
_____ the patient's heart beat.
5. A gas pipeline connection is made between the oil fields and the seaport.
_____ the oil fields and
the seaport.
6. With nucleophilic addition, aldehydes can be reduced to primary alcohols.
_____ aldehydes to primary
alcohols.
7. Electrical engineers measure the voltage in a system with a volt meter.
_____ the voltage in a system.

Passive structures with *by*-agents

*English is spoken in London by people.

*The bridge was built in 1934 by somebody to reduce traffic on other roads.

By whom? By what?

The report was requested by the Lightman Chemical Co.

The moon is held in orbit by the earth's gravity.

Food is digested by enzymes in the stomach.

Exercise 2.16

Directions: Complete the following sentences with the *by-agent* in parentheses if necessary.

Example: Poisons are removed from the blood. (the liver)

Answer: Poisons are removed from the blood by the liver.

1. Silk is produced. (silk worms)
2. Gunpowder is used in making weapons. (the weapons industry)
3. The Golden Gate Bridge was built in 1937. (workers)
4. Some animals use trees to build dams. (beavers)
5. The space shuttle was first launched in 1981. (NASA)
6. Honey is made to feed their young. (bees)
7. In plants, water is absorbed. (the roots)
8. The doctor requested that an x-ray of the patient be taken. (nurse)
9. The structure of the DNA molecule was discovered in 1953.
(scientists)
10. The structure of the DNA molecule was discovered in 1953. (Watson
and Crick).

How-Agents

The man was killed by a stone (by-agent)
The man was killed with a stone (how-agent)

- **By** used as a how-agent must be used with zero article + singular noun

The equipment was delivered by truck./The equipment came by truck.
A wind generator is powered by wind./A wind generator operates by wind.

- **With** is commonly used with tools, devices, and materials. It can NEVER be used with zero article + singular noun.

Food is digested with enzymes./The stomach digests food with enzymes.
Teeth are removed with forceps./Dentists remove teeth with forceps.
Pressure can be measured with a Venturi meter./We measured the pressure with a Venturi meter.

- **By means of** emphasizes the process that a tool, device, or material performs.

Teeth are removed by means of forceps./Dentists remove teeth by means of forceps.
Food is digested by means of enzymes./The stomach digests food by means of enzymes.

Exercise 2.18

Directions: Indicate whether the final noun phrase is a *by-agent* (*by*) or a *how-agent* (*how*). Then fill the blanks with *by*, *with*, or *by means of*. Sometimes more than one answer is possible.

Example: ___ She opened the box _____ a knife.

Answer: how She opened the box with a knife.

1. ___ The lumber was transported _____ train.
2. ___ Current can be varied in a circuit _____ a rheostat.
3. ___ Earthquakes are usually caused _____ the movement of the continental plates.
4. ___ The age of the sample was determined _____ the carbon 14 dating method.
5. ___ Steel surfaces can be protected _____ a thin coating of machine oil.
6. ___ The colors of the aurora borealis are generated _____ the effect of solar particles on the various atmospheric gases.
7. ___ The primitive cooling earth was darkened for centuries _____ hot, dense clouds.
8. ___ The direction of growth of a plant is controlled _____ light (phototropism).
9. ___ The orbit was calculated _____ the formula for centripetal force, $mr\omega^2$, where m = mass, r = radius, and ω = angular velocity.
10. ___ The body temperature of a higher mammal is regulated _____ the hypothalamus.

Compare processes with multiple steps

Water is purified by heating water to the boiling point, condensing it, and collecting the product in a container.

Heating water to the boiling point, condensing it, and collecting the product in a container purifies water.

Exercise

Directions: The following sentences have methods, mechanisms, or principles as subjects. Replace the subject with a more detailed description using the passive voice and a *by*-agent with VERB_{ing} forms.

Example: Distillation purifies water.

Answer: Water is purified by heating it to a boiling point, condensing it, and collecting the water in a container.

1. Nuclear power generates electricity.
2. Hemodialysis cleans the blood.
3. Flood control projects protect valley residents.
4. Photographic methods reproduce photographs.
5. Spectroscopy indicates the elements in a star.

Resources

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