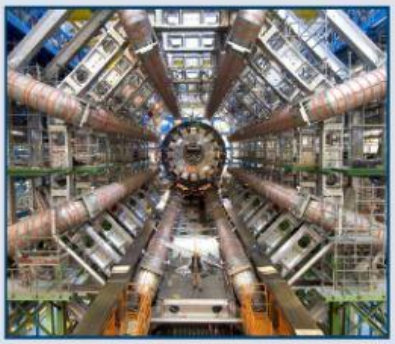
The Hadron Collider

The Hadron Collider is the largest machine in the world. It was planned by over 10,000 scientists in 100 different countries. The science of the Hadron Collider is so complex that its purpose still isn't fully understood by most of the general public. The machine's purpose is to fire sub-atomic particles at each other. Scientists think that by doing this, the origins of the universe might be discovered. However, since it was completed in 2008, it has suffered a number of technical setbacks. One theory for these has been that the problems are being caused by future time – that's one theory that even most of the scientists don't understand!



Presentation

Use the passive form when you want to focus on the person or thing affected by the action of the verb. The subject of the passive verb is the object of the active verb:

	action	object	
Active: *Scientists*	*completed*	*the machine*	*in 2008.*

	subject	passive verb	
Passive:	*The machine*	*was completed*	*in 2008.*

The passive is often used when *the agent* (who or what did the action) …

- is unknown: *It was built in 1990 ~~by someone~~.*
- is obvious or has already been mentioned: *Scientists fire atoms so that the origins of the universe might be discovered ~~by scientists~~.*
- is not important: *The machine has been fixed ~~by someone~~.*
- refers to people in general: *More information about the Hadron Collider can be found ~~by you~~ at www.lhc.ac.uk.*
- doesn't want to be known, in order to avoid criticism or embarrassment: *I'm afraid the machine has been broken ~~by me~~.* (= The speaker either did this or is protecting the person responsible.)

See also Unit 77 for when to include the agent after the passive.

Tenses and modal verbs

To form the passive, use *to be + past participle*:

present / past simple	*Scientists **test/tested** the machine. → The machine **is/was** tested.*
present / past continuous	*Scientists **are/were developing** a new machine. → A new machine **is/was being developed**.*
present / past perfect	*Scientists **have/had made** a new discovery. → A new discovery **has/had been made**.*
present, future and past modals	*Scientists **may discover** the origins of the universe. → The origins of the universe **may be discovered**.* *Scientists **will be testing** the theory. → The theory **will be being** tested.* *Scientists **might have discovered** the origins of the universe. → The origins of the universe **might have been discovered**.*

*Note that perfect continuous forms in the passive are rarely used.

You cannot use the passive form with intransitive verbs (e.g. *arrive, die, go, sit*) because they have no direct object: *The tests went well.* (not ~~*The tests are gone well.*~~)

See page 236: Summary of active to passive verb forms

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1 **Complete the first half of an article by writing the verb in brackets in the correct tense and passive form. Then listen and check.**

SCIENCE NEWS

The International Space Station (ISS) [1] is currently being run (currently / run) as a joint project between five space agencies. The main structure [2]..... (complete) in 1998, but the idea for cooperation in space began at the end of the Cold War. An agreement for a joint space programme between the USA and Russia [3]..... (not / reach) until 1992, and final plans for a new space station [4]..... (announce) a year later. Unlike previous spaceships and satellites, the ISS [5]..... (build) in space while in orbit. In fact, components [6]..... (still / add) today.



2 **Complete the second half of the article by underlining the active or passive form. Then listen and check.**

SCIENCE NEWS

The ISS [7]*has become / has been become* the biggest space station ever. It [8]*can even see / can even be seen* from earth with the naked eye. The space agencies [9]*carry out / are carried out* daily experiments on the ISS. For example, new spacecraft systems [10]*regularly test / are regularly tested* here. It [11]*has continuously staffed / has been continuously staffed* since 2000, so it [12]*is using / is being used* as a research centre to assess the long-term effects of zero gravity on the human body. The results [13]*will affect / will be affected* the preparations for long-term space colonisation.

3 **Rewrite the sentences in the passive where possible. Mark the sentence that cannot be written in the passive with an ✗.**

1 We are currently discussing your situation.
Your situation is currently being discussed.

2 The class had answered every question.
.....

3 I'm afraid they've already gone.
.....

4 The doctor should prescribe some medicine.
.....

5 We might have sold all those dresses.
.....

6 The council is going to make the final decision at the next council meeting.
.....
.....

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