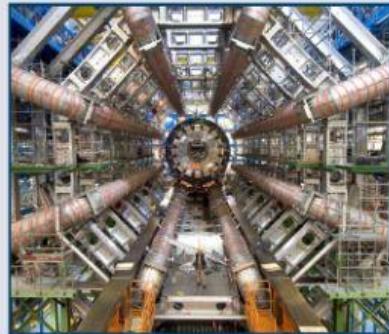


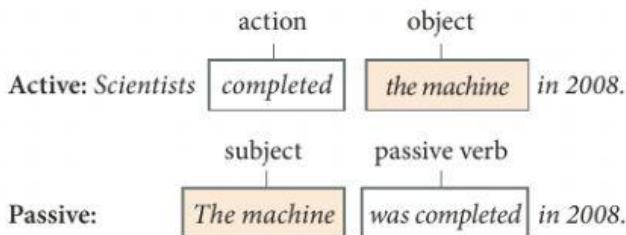
## The Hadron Collider

► 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:



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

\*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

- 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.

 The International Space Station (ISS) <sup>1</sup> is currently .....  
 ..... being run (currently / run) as a joint project  
 between five space agencies. The main structure  
<sup>2</sup> ..... (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 <sup>3</sup> .....  
 (not / reach) until 1992, and final plans for a new  
 space station <sup>4</sup> ..... (announce) a  
 year later. Unlike previous spaceships and satellites,  
 the ISS <sup>5</sup> ..... (build) in space while  
 in orbit. In fact, components <sup>6</sup> .....  
 (still / add) today.

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

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

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

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

5 We might have sold all those dresses.

2 The class had answered every question.

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

3 I'm afraid they've already gone.

4 The doctor should prescribe some medicine.