

# How to add 90 billionths of a second to your life

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- 1 IT'S taken a century, but scientists believe they have finally proved that Albert Einstein was right – time does pass more quickly if you stand on a ladder. In a bizarre experiment using the most accurate atomic clocks ever invented, researchers showed that time ran faster when the clocks were raised by 12 inches.
- 2 11, anyone hoping that a lifetime in a basement is the secret to longevity will be disappointed. The effect is so small that it would add just 90 billionths of a second to a 79-year life span.
- 3 The experiment – carried out by the National Institute of Standards and Technology in Boulder, Colorado, and published in the journal *Science* – demonstrates one of the strangest consequences of Einstein's theories of relativity.
- 4 In 1907, his General Theory of Relativity showed that time runs more quickly at higher altitudes because of a weaker gravitational force. Scientists say the fact that the atomic clock moves more quickly is not a measuring error caused by the high altitude – like a broken watch running fast – but signifies that actual time is speeded up. The phenomenon – called gravitational time dilation – has been demonstrated by putting atomic clocks on jumbo jets and flying them at high altitudes. Just as Einstein predicted, clocks flown at 30,000 ft run faster than those left on the ground.
- 5 Gravitational time dilation also means that your head ages more quickly than your feet and that people living on the top floor of a tower block age more quickly than those on the ground floor.
- 6 The U.S. researchers used atomic clocks that are so accurate they lose or gain less than one second every 3.7 billion years.

*Daily Mail, 2010*

## Tekst 4 How to add 90 billionths of a second to your life

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- 1p 11 Which of the following fits the gap in paragraph 2?
- A However
  - B Indeed
  - C Instead
  - D Moreover
  - E Therefore
- 1p 12 How does paragraph 4 relate to paragraph 3?
- A It clarifies the information given in paragraph 3.
  - B It puts the information given in paragraph 3 in a historical perspective.
  - C It repeats the information given in paragraph 3.
  - D It stresses the importance of the information given in paragraph 3.
  - E It summarizes the information given in paragraph 3.
- 2p 13 Geef van elk van de volgende beweringen aan of deze juist of onjuist is volgens de tekst.
- 1 De resultaten van het onderzoek kloppen alleen als men ervan uitgaat dat de gemiddelde levensverwachting niet meer zal stijgen.
  - 2 Op grote hoogten gaan klokken kapot.
  - 3 Mensen die in hoge flats wonen, krijgen vaker last van ouderdomskwaaltjes dan mensen die in laagbouw wonen.
  - 4 De gebruikte atoomklokken zijn heel nauwkeurig.
- Noteer het nummer van elke bewering gevolgd door “juist” of “onjuist”.

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### Bronvermelding

Een opsomming van de in dit examen gebruikte bronnen, zoals teksten en afbeeldingen, is te vinden in het bij dit examen behorende correctievoorschrift, dat na afloop van het examen wordt gepubliceerd.