

Most likely number of contactable alien civilizations is 36

Level 3 • Advanced

1 Warmer

Test your general knowledge in this space quiz.

- How many planets are there in our solar system?
 - 7 (+ 8 dwarf planets)
 - 8 (+ 5 dwarf planets)
 - 7 (+ 3 giant planets)
- A light year is ...
 - the distance that light travels in one year.
 - the light that travels around the Earth in one year.
 - the distance from the Earth to the Sun.
- A light year measures ...
 - just under a million kilometres.
 - just under five billion kilometres.
 - just under ten trillion kilometres.
- The distance from the Earth to our moon is ...
 - 40,384 km.
 - 384,400 km.
 - 500,843 km.
- Man first walked on the moon in ...
 - 1959.
 - 1962.
 - 1969.

2 Key words

Match the key words with the definitions. Then find them in the article to read them in context.

speculative equation	evolved random	conservative quest	upbeat assumption	detectable unpicked
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- a calculation that must take several factors into account _____
- If something is _____, you can prove it is present using scientific methods.
- something that you consider likely to be true even though you have no proof _____
- happening without any particular method, pattern or purpose _____
- based on guesses or on a little information, not on facts _____
- used to describe a guess that is usually less than the actual amount _____
- separated or taken apart and considered individually _____
- positive and confident _____
- came into existence gradually over a long period of time _____
- a long difficult search _____

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Scientists say most likely number of contactable alien civilizations is 36

New calculations come up with estimate for worlds capable of communicating with others

Nicola Davis

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- 1 They may not be little green men. They may not arrive in a vast spaceship. But according to new calculations, there could be more than 30 intelligent civilizations in our galaxy today capable of communicating with others.
- 2 Experts say the work not only offers insights into the chances of life beyond Earth but could shed light on our own future and place in the cosmos.
- 3 “I think it is extremely important and exciting because, for the first time, we really have an estimate for this number of active intelligent, communicating civilizations that we potentially could contact. This is something that has been a question for thousands of years and is still not answered,” said Christopher Conselice, a professor of astrophysics at the University of Nottingham and a co-author of the research.
- 4 In 1961, the astronomer Frank Drake proposed what became known as the Drake equation, setting out seven factors that would need to be known to come up with an estimate for the number of intelligent civilizations out there. These factors ranged from the average number of stars that form each year in the galaxy through to the timespan over which a civilization would be expected to be sending out detectable signals.
- 5 But few of the factors are measurable. “Drake-equation estimates have ranged from zero to a few billion civilizations – it is more like a tool for thinking about questions rather than something that has actually been solved,” said Conselice.
- 6 Now Conselice and colleagues report in the *Astrophysical Journal* how they refined the equation with new data and assumptions to come up with their estimates.
- 7 “Basically, we made the assumption that intelligent life would form on other Earth-like planets like it has on Earth, so within a few billion years, life would automatically form as a natural part of evolution,” said Conselice.
- 8 The assumption, known as the Astrobiological Copernican Principle, is fair, as everything from chemical reactions to star formation is known to occur if the conditions are right, he said. “If intelligent life forms in a scientific way, not just a random way or a very unique way, then you would expect at least this many civilizations within our galaxy,” he said.
- 9 He added that, while it is a speculative theory, he believes alien life would have similarities in appearance to life on Earth. “We wouldn’t be super shocked by seeing them,” he said.
- 10 Under the strictest set of assumptions – where, as on Earth, life forms between 4.5bn and 5.5bn years after star formation – there are likely today between four and 211 civilizations in the Milky Way capable of communicating with others, with 36 the most likely figure. But Conselice noted that this figure is conservative, not least as it is based on how long our own civilization has been sending out signals into space – a period of just 100 years so far.
- 11 The team add that our civilization would need to survive at least another 6,120 years for two-way communication. “They would be quite far away – 17,000 light years is our calculation for the closest one,” said Conselice. “If we do find things closer, then that would be a good indication that the lifespan of communicating civilizations is much longer than a hundred or a few hundred years, and that an intelligent civilization can last for thousands or millions of years. The more we find nearby, the better it looks for the long-term survival of our own civilization.”
- 12 Dr Oliver Shorttle, an expert in extrasolar planets at the University of Cambridge, who was not involved in the research, said several as yet poorly understood factors needed to be unpicked to make such estimates, including how life on Earth began and how many Earth-like planets considered habitable could truly support life.
- 13 Dr Patricia Sanchez-Baracaldo, an expert on how Earth became habitable, from the University of Bristol, was more upbeat, despite emphasizing that many developments were needed on Earth for conditions for complex life to exist, including photosynthesis. “But, yes, if we evolved on this planet, it is possible that intelligent life evolved in another part of the universe,” she said.
- 14 Professor Andrew Coates, of the Mullard Space Science Laboratory at University College London,

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said the assumptions made by Conselice and colleagues were reasonable, but the quest to find life was likely to take place closer to home for now.

- 15 “The new estimate is an interesting result but one which it will be impossible to test using current techniques,” he said. “In the meantime, research on whether we are alone in the universe will include visiting likely objects within our own solar

system, for example with our Rosalind Franklin Exomars 2022 rover to Mars, and future missions to Europa, Enceladus and Titan (moons of Jupiter and Saturn). It’s a fascinating time in the search for life elsewhere.”

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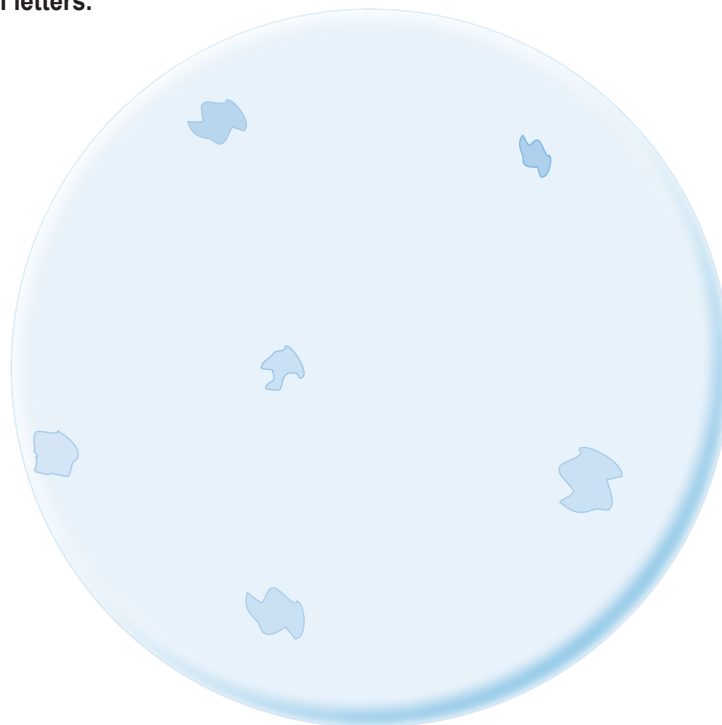
3 Comprehension check

Are the statements true (T) or false (F) according to the article? Correct any that are false.

1. The Drake equation has proven that there are more than 30 other intelligent civilizations in our galaxy.
2. The new assumption has been made using an improved version of an equation that is more than 50 years old.
3. It’s likely that the number of planets that could support life is lower than 36.
4. For us to hold a conversation with another intelligent life form, we would need to live for around another 600 years.
5. A professor of astrophysics says that aliens are likely to have a completely different appearance to us humans.
6. Finding intelligent life on other planets would give hope for the long-term survival of life on Earth.

4 Out-of-this-world vocabulary

- a. Find all the space-related words and phrases in the article. Write them into the planet. Note which of them need capital letters.



- b. With a partner, take it in turns to use one of the words in a sentence. Continue until you have used all the words.

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5 Discussion

- Do you think there is intelligent life on other planets?
- Is it worth spending money on searching for alien civilizations?
- Does the future of humankind depend on us finding other planets that could support life?
- What questions would you want to ask an alien?

6 Space quotes

a. Use the words in the box to complete the well-known space quotes.

beyond
frontier

Control

forty-two
mankind

Earth
star

1. 'One small step for man, one giant leap for _____.' – Neil Armstrong, the first man to walk on the moon
2. 'Space: the final _____.' – Captain James T Kirk, in *Star Trek*
3. 'Ground _____ to Major Tom.' – David Bowie, the first line from his song 'Space Oddity'
4. 'Returning to _____, that was the challenging part.' – Buzz Aldrin, one of the first two humans to land on the moon
5. 'Second _____ to the right and straight on 'til morning.' – J M Barrie, *Peter Pan*
6. 'To infinity and _____.' – Buzz Lightyear, from the *Toy Story* films
7. 'The Answer to the Great Question of Life, the Universe and Everything is _____.' – Douglas Adams, *The Hitchhiker's Guide to the Galaxy*

b. Which of the quotes did you already know?

c. What other space- and alien-related quotes do you know or can you find?

7 Further reading

Find out more about the Drake equation and its seven factors.

www.theguardian.com/science/across-the-universe/2013/sep/04/equation-alien-life-universe