The **Arecibo message** is a 1974 [interstellar radio message](https://en.wikipedia.org/wiki/Interstellar_radio_message) carrying basic information about humanity and Earth sent to [globular star cluster M13](https://en.wikipedia.org/wiki/Great_Globular_Cluster_in_Hercules) in the hope that [extraterrestrial intelligence](https://en.wikipedia.org/wiki/Search_for_extraterrestrial_intelligence)might receive and decipher it. The message was [broadcast](https://en.wikipedia.org/wiki/Broadcasting) into space a single time via [frequency modulated](https://en.wikipedia.org/wiki/Frequency_modulation) [radio waves](https://en.wikipedia.org/wiki/Radio_waves) at a ceremony to mark the remodeling of the [Arecibo radio telescope](https://en.wikipedia.org/wiki/Arecibo_Observatory) in [Puerto Rico](https://en.wikipedia.org/wiki/Puerto_Rico) on 16 November 1974.[[1]](https://en.wikipedia.org/wiki/Arecibo_message#cite_note-phoneet-1)[[2]](https://en.wikipedia.org/wiki/Arecibo_message#cite_note-NYT-20170628-2) The message was aimed at the current location of M13 some 25,000 [light years](https://en.wikipedia.org/wiki/Light_year) away because M13 was a large and close collection of stars that was available in the sky at the time and place of the ceremony.[[3]](https://en.wikipedia.org/wiki/Arecibo_message#cite_note-3) The message consisted of 1,679 [binary digits](https://en.wikipedia.org/wiki/Bit), approximately 210 [bytes](https://en.wikipedia.org/wiki/Byte), transmitted at a frequency of 2,380 [MHz](https://en.wikipedia.org/wiki/Hertz) and modulated by shifting the frequency by 10 Hz, with a power of 450  [kW](https://en.wikipedia.org/wiki/Kilowatt). The "ones" and "zeros" were transmitted by frequency shifting at the rate of 10 bits per second. The total broadcast was less than three minutes.[[1]](https://en.wikipedia.org/wiki/Arecibo_message#cite_note-phoneet-1)[[4]](https://en.wikipedia.org/wiki/Arecibo_message#cite_note-4)

The number 1,679 was chosen because it is a [semiprime](https://en.wikipedia.org/wiki/Semiprime) (the product of two [prime numbers](https://en.wikipedia.org/wiki/Prime_number)), to be [arranged rectangularly](https://en.wikipedia.org/wiki/Raster_scan) as 73 rows by 23 columns. [The alternative arrangement](https://en.wikipedia.org/wiki/File:AreciboMessageShifted.svg), 23 rows by 73 columns, produces jumbled nonsense (as do all other X/Y formats). The message forms the image shown on the right, or its inverse, when translated into graphics, characters, and spaces.[[5]](https://en.wikipedia.org/wiki/Arecibo_message#cite_note-cassiday-5)

Dr. [Frank Drake](https://en.wikipedia.org/wiki/Frank_Drake), then at [Cornell University](https://en.wikipedia.org/wiki/Cornell_University) and creator of the [Drake equation](https://en.wikipedia.org/wiki/Drake_equation), wrote the message with help from [Carl Sagan](https://en.wikipedia.org/wiki/Carl_Sagan), among others.[[1]](https://en.wikipedia.org/wiki/Arecibo_message#cite_note-phoneet-1) The message consists of seven parts that encode the following (from the top down):[[5]](https://en.wikipedia.org/wiki/Arecibo_message#cite_note-cassiday-5)

1. The numbers one (1) to ten (10) (white)
2. The [atomic numbers](https://en.wikipedia.org/wiki/Atomic_numbers) of the elements [hydrogen](https://en.wikipedia.org/wiki/Hydrogen), [carbon](https://en.wikipedia.org/wiki/Carbon), [nitrogen](https://en.wikipedia.org/wiki/Nitrogen), [oxygen](https://en.wikipedia.org/wiki/Oxygen), and [phosphorus](https://en.wikipedia.org/wiki/Phosphorus), which make up [deoxyribonucleic acid](https://en.wikipedia.org/wiki/Deoxyribonucleic_acid) (DNA) (purple)
3. The [formulas](https://en.wikipedia.org/wiki/Formula) for the [sugars](https://en.wikipedia.org/wiki/Sugar) and [bases](https://en.wikipedia.org/wiki/Base_(chemistry)) in the [nucleotides](https://en.wikipedia.org/wiki/Nucleotides) of DNA (green)
4. The number of nucleotides in DNA, and a graphic of the double helix structure of DNA (white & blue)
5. A graphic figure of a human, the dimension (physical height) of an average man, and the human population of Earth (red, blue/white, & white respectively)
6. A graphic of the [Solar System](https://en.wikipedia.org/wiki/Solar_System) indicating which of the planets the message is coming from (yellow)
7. A graphic of the [Arecibo radio telescope](https://en.wikipedia.org/wiki/Arecibo_Observatory) and the dimension (the physical diameter) of the transmitting antenna dish (purple, white, & blue)

Since it will take nearly 25,000 years for the message to reach its intended destination (and an additional 25,000 years for any reply), the Arecibo message is viewed as a demonstration of human technological achievement, rather than a real attempt to enter into a conversation with extraterrestrials. In fact, the core of M13, to which the message was aimed, will no longer be in that location when the message arrives.[[1]](https://en.wikipedia.org/wiki/Arecibo_message#cite_note-phoneet-1) However, as the [proper motion](https://en.wikipedia.org/wiki/Proper_motion) of M13 is small, the message will still arrive near the center of the cluster.[[6]](https://en.wikipedia.org/wiki/Arecibo_message#cite_note-6) According to the *Cornell News* press release of November 12, 1999, the real purpose of the message was not to make contact but to demonstrate the capabilities of newly installed equipment.[[1]](https://en.wikipedia.org/wiki/Arecibo_message#cite_note-phoneet-1)

