

ASTR101
Unit 14 Assessment
Answer Key

1. It is believed that the existence of liquid on a planet is a requirement for the existence of life. The habitable zone is the range of distances from a particular star such that the temperature of a planet would allow for liquid water on the surface.

2. The number of stars in the Milky Way Galaxy, the fraction of stars that have planets around them, the number of planets per star that are capable of sustaining life, the fraction of these on which intelligent life evolves, the fraction of these that are capable of communication, and finally, the fraction of the planet's life during which the communicating civilization exists. The result of putting in numerical values for these factors and multiplying them is the number of communicating civilizations in the galaxy at the present time.

3. The principle argument for the nonexistence of extraterrestrial life is the Fermi paradox. If other technological civilizations exist, they would tend to spread out and colonize the galaxy. It is estimated that this would take about a million years, a negligible fraction of the age of the galaxy. Since the galaxy does not seem to be colonized, Fermi argued that other technological civilizations do not exist in our galaxy. The main argument for the existence of extraterrestrial life is the huge number of habitable planets in the galaxy. If, as most scientists suspect, life arose naturally on earth, many of these planets should have life on them. The argument further goes that evolution will eventually produce intelligence and intelligence will eventually produce technology.

4. There is no verifiable evidence for the existence of extraterrestrial life at the present time.