Atheists repeatedly say that the universe is so big the odds indicate that there must be life on other planets. The truth is that the odds and requirements for life existing on other planets is larger than the estimated total number of planets in the universe!

An Estimate of the Probability for Attaining the Necessary Parameters for Life Support

Parameter	**Probability that feature will fall in the required range**
galaxy size	.1
galaxy type	.1
galaxy location	.1
star location relative to galactic center	.2
star distance from closest spiral arm	.1
z-axis extremes of star's orbit	.1
proximity of solar nebula to a supernova eruption	.01
timing of solar nebula formation relative to supernova eruption	.01
number of stars in system	.2
star birth date	.2
star age	.4
star metallicity	.05
star orbital eccentricity	.1
star's distance from galactic plane	.1
star mass	.001
star luminosity relative to speciation	.0001
star color	.4

Parameter	Probability that feature will fall in the required range
$^3H^+$ production	.1
supernovae rates and locations	.01
white dwarf binary types, rates, and locations	.01
planetary distance from star	.001
inclination of planetary orbit	.5
planetary axis tilt	.3
rate of change of axial tilt	.01
planetary rotation period	.1
rate of change in planetary rotation period	.05
planetary orbit eccentricity	.3
surface gravity (escape velocity)	.001
tidal force	.1
magnetic field	.01
albedo	.1
density	.1
planetary crust thickness	.01
oceans-to-continents ratio	.2
rate of change in oceans-to-continents ratio	.1
global distribution of continents	.3
frequency and extent of ice ages	.1

Parameter	Probability that feature will fall in the required range
asteroid and comet collision rate	.1
change in asteroid and comet collision rates	.1
mass of body colliding with primordial Earth	.002
timing of collision with primordial Earth	.05
rate of change in asteroid/comet collision rate	.1
proximity and mass of Jupiter	.01
major planet eccentricities	.1
major planet orbital instabilities	.1
drift rate and rate change of major planets	.1
atmospheric transparency	.01
atmospheric pressure	.1
atmospheric electric discharge rate	.1
atmospheric temperature gradient	.01
carbon dioxide level in atmosphere	.01
oxygen level in atmosphere	.01
chlorine level in atmosphere	.1
iron quantity in oceans	.1
tropospheric ozone quantity	.01
stratospheric ozone quantity	.01
mesospheric ozone quantity	.01

Parameter	**Probability that feature will fall in the required range**
water vapor level in atmosphere	.01
oxygen-to-nitrogen ratio in atmosphere	.1
quantity of greenhouse gases in atmosphere	.01
frequency and extent of forest and grass fires	.01
soil mineralization	.1
quantity of sea-salt aerosols	.1
quantity of decomposer bacteria in soil	.01
quantity of mycorrhizal fungi in soil	.01
quantity of nitrifying microbes in soil	.01
quantity of sulfur in soil	.1
quantity of sulfur in planet's core	.1
tectonic activity	.1
volcanic activity	.1
decline in volcanic activity	.1
viscosity of Earth's core at core boundaries	.01
biomass to comet-infall ratio	.01
regularity of cometary infall	.1
dependency factors (estimate)	100,000,000,000
longevity requirements (estimate)	.00001

Probability for combined occurrence of all 75 parameters = 10^{-99}

Maximum possible number of planets in universe = 10^{23}

Taken from Ross, H. 1998. *Big Bang Refined by Fire*. Reasons To Believe, Pasadena, CA.

By putting together probabilities for each of these design features occurring by chance, we can calculate the probability of the existence of a planet like Earth. This probability is 1 chance in 10^{99}. Since there are estimated to be a maximum of only 10^{23} planets in the universe (10 planets/star, see note below), by chance there shouldn't be any planets capable of supporting life in the universe (only one chance in 10^{76}). This clearly proves that God created the universe.

Note: This is most likely a huge over estimate. In a recent survey of globular cluster 47 Tucanae, scientists found zero extrasolar planets out of 37,000 stars searched (Astronomers Ponder Lack of Planets in Globular Clusterfrom the *Hubble Space Telescope*).

Uniqueness of the Galaxy-Sun-Earth-Moon System for Life Support

1. galaxy size (9) (p = 0.1)
   if too large: infusion of gas and stars would disturb sun's orbit and ignite deadly galactic eruptions
   if too small: infusion of gas would be insufficient to sustain star formation long enough for life to form

2. galaxy type (7) (p = 0.1)
   if too elliptical: star formation would cease before sufficient heavy elements formed for life chemistry
   if too irregular: radiation exposure would be too severe (at times) and life-essential heavy elements would not form

3. galaxy location (9) (p = 0.1)
   if too close to dense galaxy cluster: galaxy would be gravitationally unstable, hence unsuitable for life
   if too close to large galaxy(ies): same result

4. supernovae eruptions (8) (p = 0.01)
   if too close: radiation would exterminate life
   if too far: too little "ash" would be available for rocky planets to form
   if too infrequent: same result
   if too frequent: radiation would exterminate life
   if too soon: too little "ash" would be available for rocky planets to form
   if too late: radiation would exterminate life

5. white dwarf binaries ([8]) (p = 0.01)
if too few: insufficient fluorine would exist for life chemistry
if too many: orbits of life-supportable planets would be disrupted; life would be exterminated
if too soon: insufficient fluorine would exist for life chemistry
if too late: fluorine would arrive too late for life chemistry

6. proximity of solar nebula to a supernova eruption ([9])
if farther: insufficient heavy elements would be attracted for life chemistry
if closer: nebula would be blown apart

7. timing of solar nebula formation relative to supernova eruption ([9])
if earlier: nebula would be blown apart
if later: nebula would not attract enough heavy elements for life chemistry

8. parent star distance from center of galaxy ([9]) (p = 0.2)
if greater: insufficient heavy elements would be available for rocky planet formation
if lesser: radiation would be too intense for life; stellar density would disturb planetary orbits, making life impossible

9. parent star distance from closest spiral arm ([9]) (p = 0.1)
if too small: radiation from other stars would be too intense and the stellar density would disturb orbits of life-supportable planets
if too great: quantity of heavy elements would be insufficient for formation of life-supportable planets

10. z-axis range of star's orbit ([9]) (p = 0.1)
if too wide: exposure to harmful radiation from galactic core would be too great

11. number of stars in the planetary system ([10]) (p = 0.2)
if more than one: tidal interactions would make the orbits of life-supportable planets too unstable for life
if fewer than one: no heat source would be available for life chemistry

12. parent star birth date ([9]) (p = 0.2)
if more recent: star burning would still be unstable; stellar system would contain too many heavy elements for life chemistry
if less recent: stellar system would contain insufficient heavy elements for life chemistry

13. parent star age ([9]) (p = 0.4)
if older: star's luminosity would be too erratic for life support
if younger: same result

14. parent star mass (10) (p = 0.001)
if greater: star's luminosity would be too erratic and star would burn up too quickly to support life
if lesser: life support zone would be too narrow; rotation period of life-supportable planet would be too long; UV radiation would be insufficient for photosynthesis

15. parent star metallicity (9) (p = 0.05)
if too little: insufficient heavy elements for life chemistry would exist
if too great: radioactivity would be too intense for life; heavy element concentrations would be poisonous to life

16. parent star color (9) (p = 0.4)
if redder: photosynthetic response would be insufficient to sustain life
if bluer: same result

17. $H3^+$ production (23) (p = 0.1)
if too little: simple molecules essential to planet formation and life chemistry would never form
if too great: planets would form at the wrong time and place for life

18. parent star luminosity (11) (p = 0.0001)
if increases too soon: runaway green house effect would develop
if increases too late: runaway glaciation would develop

19. surface gravity (governs escape velocity) (12) (p = 0.001)
if stronger: planet's atmosphere would retain too much ammonia and methane for life
if weaker: planet's atmosphere would lose too much water for life

20. distance from parent star (13) (p = 0.001)
if greater: planet would be too cool for a stable water cycle
if lesser: planet would be too warm for a stable water cycle

21. inclination of orbit (22) (p = 0.5)
if too great: temperature range on the planet's surface would be too extreme for life

22. orbital eccentricity (9) (p = 0.3)
if too great: seasonal temperature range would be too extreme for life

23. axial tilt (9) (p = 0.3)
if greater: surface temperature differences would be too great to sustain diverse life-forms
if lesser: same result

24. rate of change of axial tilt (9) (p = 0.01)
if greater: climatic and temperature changes would be too extreme for life

25. rotation period (11) (p = 0.1)
if longer: diurnal temperature differences would be too great for life
if shorter: atmospheric wind velocities would be too great for life

26. rate of change in rotation period (14) (p = 0.05)
if more rapid: change in day-to-night temperature variation would be too extreme for sustained life
if less rapid: change in day-to-night temperature variation would be too slow for the development of advanced life

27. planet's age (9) (p = 0.1)
if too young: planet would rotate too rapidly for life
if too old: planet would rotate too slowly for life

28. magnetic field (20) (p = 0.01)
if stronger: electromagnetic storms would be too severe
if weaker: planetary surface and ozone layer would be inadequately protected from hard solar and stellar radiation

29. thickness of crust (15) (p = 0.01)
if greater: crust would rob atmosphere of oxygen needed for life
if lesser: volcanic and tectonic activity would be destructive to life

30. albedo (ratio of reflected light to total amount falling on surface) (9) (p = 0.1)
if greater: runaway glaciation would develop
if less: runaway greenhouse effect would develop

31. asteroid and comet collision rates (9) (p = 0.1)
if greater: ecosystem balances would be destroyed
if less: crust would contain too little of certain life-essential elements

32. mass of body colliding with primordial earth (9) (p = 0.002)
if greater: Earth's orbit and form would be too greatly disturbed for life
if lesser: Earth's atmosphere would be too thick for life; moon would be too small to fulfill its life-sustaining role

33. timing of above collision (9) (p = 0.05)
if earlier: Earth's atmosphere would be too thick for life; moon would be too small to fulfill its life-sustaining role
if later: Earth's atmosphere would be too thin for life; sun would be too luminous for subsequent life

34. oxygen to nitrogen ratio in atmosphere (25) (p = 0.1)
if greater: advanced life functions would proceed too rapidly
if lesser: advanced life functions would proceed too slowly

35. carbon dioxide level in atmosphere (21) (p = 0.01)
if greater: runaway greenhouse effect would develop
if less: plants would be unable to maintain efficient photosynthesis

36. water vapor quantity in atmosphere (9) (p = 0.01)
if greater: runaway greenhouse effect would develop
if less: rainfall would be too meager for advanced land life

37. atmospheric electric discharge rate (9) (p = 0.1)
if greater: fires would be too frequent and widespread for life
if less: too little nitrogen would be fixed in the atmosphere

38. ozone quantity in atmosphere (9) (p = 0.01)
if greater: surface temperatures would be too low for life; insufficient UV radiation for life
if less: surface temperatures would be too high for life; UV radiation would be too intense for life

39. oxygen quantity in atmosphere (9) (p = 0.01)
if greater: plants and hydrocarbons would burn up too easily, destabilizing Earth's ecosystem
if less: advanced animals would have too little to breathe

40. seismic activity (16) (p = 0.1)
if greater: life would be destroyed; ecosystem would be damaged
if less: nutrients on ocean floors from river runoff would not be recycled to continents through tectonics; not enough carbon dioxide would be released from carbonate buildup

41. volcanic activity (26)
if lower: insufficient amounts of carbon dioxide and water vapor would be returned to the atmosphere; soil mineralization would be insufficient for life advanced life support
if higher: advanced life would be destroyed; ecosystem would be damaged

42. rate of decline in tectonic activity (26) (p = 0.1)
if slower: crust conditions would be too unstable for advanced life
if faster: crust nutrients would be inadequate for sustained land life

43. rate of decline in volcanic activity (9) (p = 0.1)
if slower: crust and surface conditions would be unsuitable for sustained land life
if faster: crust and surface nutrients would be inadequate for sustained land life

44. oceans-to-continents ratio (11) (p = 0.2)
if greater: diversity and complexity of life-forms would be limited
if smaller: same result

45. rate of change in oceans-to-continents ratio (9) (p = 0.1)
if smaller: land area would be insufficient for advanced life
if greater: change would be too radical for advanced life to survive

46. distribution of continents (10) (p = 0.3)
if too much in the Southern Hemisphere: sea-salt aerosols would be insufficient to stabilize surface temperature and water cycle; increased seasonal differences would limit the available habitats for advanced land life

47. frequency and extent of ice ages (9) (p = 0.1)
if lesser: Earth's surface would lack fertile valleys essential for advanced life; mineral concentrations would be insufficient for advanced life.
if greater: Earth would experience runaway freezing

48. soil mineralization (9) (p = 0.1)
if nutrient poorer: diversity and complexity of lifeforms would be limited
if nutrient richer: same result

49. gravitational interaction with a moon (17) (p = 0.1)
if greater: tidal effects on the oceans, atmosphere, and rotational period would be too severe for life
if lesser: orbital obliquity changes would cause climatic instabilities; movement of nutrients and life from the oceans to the continents and vice versa would be insufficient for life; magnetic field would be too weak to protect life from dangerous radiation

50. Jupiter distance (18) (p = 0.1)
if greater: Jupiter would be unable to protect Earth from frequent asteroid and comet collisions
if lesser: Jupiterï¿½s gravity would destabilize Earth's orbit

51. Jupiter mass (19) (p = 0.1)
if greater: Jupiterï¿½s gravity would destabilize Earth's orbit 9
if lesser: Jupiter would be unable to protect Earth from asteroid and comet collisions

52. drift in (major) planet distances (9) (p = 0.1)
if greater: Earth's orbit would be destabilized
if less: asteroid and comet collisions would be too frequent for life

53. major planet orbital eccentricities (18) (p = 0.05)
if greater: Earth's orbit would be pulled out of life support zone

54. major planet orbital instabilities (9) (p = 0.1)
if greater: Earth's orbit would be pulled out of life support zone

55. atmospheric pressure (9) (p = 0.1)
if smaller: liquid water would evaporate too easily and condense too infrequently to support life
if greater: inadequate liquid water evaporation to support life; insufficient sunlight would reach Earth's surface; insufficient UV radiation would reach Earth's surface

56. atmospheric transparency (9) (p = 0.01)
if greater: too broad a range of solar radiation wavelengths would reach Earth's surface for life support
if lesser: too narrow a range of solar radiation wavelengths would reach Earth's surface for life support

57. chlorine quantity in atmosphere (9) (p = 0.1)
if greater: erosion rate and river, lake, and soil acidity would be too high for most life forms; metabolic rates would be too high for most life forms
if lesser: erosion rate and river, lake, and soil acidity would be too low for most life forms; metabolic rates would be too low for most life forms

58. iron quantity in oceans and soils (9) (p = 0.1)
if greater: iron poisoning would destroy advanced life
if lesser: food to support advanced life would be insufficient
if very small: no life would be possible

59. tropospheric ozone quantity (9) (p = 0.01)
if greater: advanced animals would experience respiratory failure; crop yields would be inadequate for advanced life; ozone-sensitive species would be unable to survive
if smaller: biochemical smog would hinder or destroy most life

60. stratospheric ozone quantity (9) (p = 0.01)
if greater: not enough LTV radiation would reach Earth's surface to produce food and life-essential vitamins
if lesser: too much LTV radiation would reach Earth's surface, causing skin cancers and reducing plant growth

61. mesospheric ozone quantity (9) (p = 0.01)
if greater: circulation and chemistry of mesospheric gases would disturb relative abundance of life-essential gases in lower atmosphere
if lesser: same result

62. frequency and extent of forest and grass fires (24) (p = 0.01)
    if greater: advanced life would be impossible
    if lesser: accumulation of growth inhibitors, combined with insufficient nitrification, would make soil unsuitable for food production

63. quantity of soil sulfur (9) (p = 0.1)
    if greater: plants would be destroyed by sulfur toxins, soil acidity, and disturbance of the nitrogen cycle
    if lesser: plants would die from An organic compound made of amino acids arranged in a linear chain, joined together by peptide bonds between the carboxyl and amino groups of the adjacent amino acid residues.protein deficiency

64. biomass to comet-infall ratio (9) (p = 0.01)
    if greater: greenhouse gases would decline, triggering runaway freezing
    if lesser: greenhouse gases would accumulate, triggering runaway greenhouse effect

65. quantity of sulfur in planet's core (9) (p = 0.1)
    if greater: solid inner core would never form, disrupting magnetic field
    if smaller: solid inner core formation would begin too soon, causing it to grow too rapidly and extensively, disrupting magnetic field

66. quantity of sea-salt aerosols (9) (p = 0.1)
    if greater: too much and too rapid cloud formation over the oceans would disrupt the climate and atmospheric temperature balances
    if smaller: insufficient cloud formation; hence, inadequate water cycle; disrupts atmospheric temperature balances and hence the climate

67. dependency factors (estimate 100,000,000,000)

68. longevity requirements (estimate .00001)

Total Probability = 1:10^{99}

Taken from *Big Bang Refined by Fire* by Dr. Hugh Ross, 1998. Reasons To Believe, Pasadena, CA.

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