



WHAT ARE THE ODDS?

PRESENTATION #2

Are We Special?

On February 14th 1990 Voyager 1 approached the edge of the solar system and turned back toward the sun. Where it took some pictures of the planets. One planet appeared as a pale small dot view from nearly 4 billion miles away. It was earth.

Carl Sagan said "Our posturing, our imagined self-importance, the delusion that we have some privileged position in the Universe, are challenged by this point of pale blue light. Our planet is a lonely speck in the great enveloping cosmic dark. In our obscurity, in all this vastness, there is no hint that help will come from elsewhere to save us from ourselves." (Carl Sagan, Pale Blue Dot. pg.7)

Copernican Principle - The idea that the earth occupies a typical or unexceptional position in the universe.

This came from the paradigm switch from geocentric solar system to heliocentric solar system

Mediocrity Principle - The mediocrity principle is the notion in philosophy of science that there is nothing special about humans or the Earth. It is a Copernican principle, used either as a heuristic about Earth's position or as a philosophical statement about the place of humanity.

Life on Earth depends on just a few basic molecules

The elements that make up these molecules are (to a greater or lesser extent) common to all stars

The laws of science we know apply to the entire universe

Then – given sufficient time – life must have originated elsewhere in the cosmos.

What are the Odds?

Amount of stars approximately - 10^{22} to 10^{24}

That is a 1 with 22 to 24 zeroes behind it

Anthropic Principle - The cosmological principle that theories of the universe are constrained by the necessity to allow human existence

Any of several similar explanations for the nature of the universe, and for the values of its fundamental constants, that states either that the universe is as it is because otherwise we wouldn't be here to observe it, or that the very presence of intelligent life constrains the universe to be as it is.

Fine-tuned Universe - A universe whose parameters (fundamental constants) are within a very narrow range enabling chemically based life to exist.

- Terrestrial Class Planet with Water
- Habitable Zone
- Orbit Main Sequence G2 Dwarf Star
- Protected by Gas Giant Planets
- Nearly Circular Orbit
- Oxygen-rich Atmosphere
- Orbited by Large Moon
- Magnetic Field - movement of liquid iron
- Plate Tectonics
- Ratio of Liquid Water and Continents
- Moderate Rotation
- Correct location in Galaxy

Let's just take a conservative figure and say 1/10 for each parameter

There is actually about a list of 22 to 24 parameters for life to exist on earth
Then life has a 10^{-22} or 10^{-24}
That is a 1/1 with 22 to 24 zeros behind it.

Which about how many stars there are

Making the chances for life to be very very very slim indeed

Not Just for Living on

A. Eclipse

1. Sun
2. Moon
3. Earth
4. All Same line and straight line
5. All apparent size , 400 times bigger but 400 times farther away
 - a. Gravitation Pull by Moon - tides
 - b. Right distance from Sun - oxygen and water
6. Allows observation of part of the sun otherwise not able to study
 - a. Measure upper layers of sun's atmosphere
 - b. Flash spectrum appears during eclipse - Gases in sun figured out
 - c. Helped figure out distant stars

- d. Needed perfect fit
- 7. Helped confirm Einstein's Theory of General Relativity (bent light) in 1919
 - a. angle predicted during eclipse
- 8. Earth is the only place where total eclipses occur

B. Atmosphere

- 1. Earth is one of seven with atmosphere to contain life
- 2. Also only one that is transparent
- 3. This sliver of radiation is useful
- 4. Also is only part that is allowed in $1/10^{24}$
- 5. Also type of light sun produces in abundance
- 6. Also allows us to observe the universe

C. Location in Milky way galaxy

- 1. Spiral Galaxy, Half way from center
- 2. Center most dangerous
- 3. Outer Edge abundance of elements lacking
- 4. Galactic Habitable Zone
- 5. Within Zone
 - a. Spiral Arms also are dangerous
 - b. Need to be in right region and outside of arms
 - c. Not in uncrowded arms
- 6. Best setting for astronomical research
 - a. Hard to tell what is in and not in galaxy
 - b. Too much dust
 - c. Too much gas

D. The Forces / Fundamental principles/ Constants

- 1. Relative strength are perfect / finely tuned
 - a. Gravity
 - b. Strong
 - c. Electro-magnetic
 - d. etc.
- 2. Change one of the forces by a little bit would make it impossible for life
- 3. They are also discoverable/ simple
 - a. All of them written on simple sheet of paper
 - b. order and intelligible
- 4. Evolutionist Reason - Why would we be able to figure out black holes, gravity etc., how would that help us hunt better

Put in best place to Live and Discover

Conspiracy not just Chance

Craftsman was the assumption of early scientist Copernicus Galileo and Newton

Expelled - Modern Science flips what happened to C and G

Gonzalez was not able to get Tenure because of ID ideas