

Name _____

Movie Notes: The Search for ET (The Universe)

Part 1: Review on Distance and Urey-Miller Experiment

1. If the sun were the size of a marble placed on a sidewalk in Manhattan, New York, where would the next closer star (Alpha Centari) be place?

The next star would be in Washington D.C.

2. With the Urey-Miller Experiment, describe what the material looked like that formed on the inside of the spark chamber, and what did it contain.

A brown sludge material containing amino acids.

3. Why does life need carbon? What is carbon great at doing?

Life needs carbon because it can form long bonds. It is great at storing information, like DNA.

4. What would a hypothetical life form look like on Jupiter? Describe it and how it collects food? Is it an animal or plant?

It would be a floating balloon like creature like a hot air balloon, it would be more plant like drifting around in the atmosphere collecting nutrients out of the clouds.

Part 2: Europa

5. What are some features of Europa? (Size, surface, amount of water, and distance)

Ice cover ball, size of our moon, 1/4 size of Earth

Water layer, 100 miles thick. Has twice all the oceans on earth

Its 5x away from sun as Earth

6. What are two ways that Europa can generate heat? (2nd comes later)

Orbits on an ellipse, the body is continuous worked, generates friction "tidal heating"

7. Why are the cracks on the surface important, how are they created, and what does this indicate about potential of life.

Stretching causes cracks. Appear to open and close frequently. When it closes takes down material like oxygen separated by charged particles from Jupiter's magnetic field. Also takes down organic compounds from comets/etc.

8. What is the best way to find life on Europa? Where should we look and how?

Life couldn't live on surface because of radiation.

Day is 3.5x as long as Earth day.

Possible for residual heat in the core, could have hot vents for life to use.

Send a probe to Europa, how do you melt through? Instead land by crack-active crack the best if lucky. But could contaminate it by Earth microbes.

Part 3: Saturn's largest Moon-Titan

9. What are some features of Titan? (size, geology, surface, distance, chemistry)

2nd largest moon, 50% bigger than ours

Possible for life in the future- wind, erosion, geology, very rich in geology.

Its 9x further from the sun than Earth. So cold ice behaves like rock.

So cold hydrocarbon- methane and ethane. Like lakes on the surface.

Huge lakes-Great Lakes- and small seas.

10. What is meant that life could be "exotic"?

Life could be exotic. Life in hydrocarbons instead of water?

11. Describe how life could have formed the same time as it did here on Earth.

Life could have formed when there was more heat from formation in early history.

Has same chemistry of early Earth.

12. Where could life be on Titan currently? What is the heat source?

If core is still warm, then micro organism could be near core deep below surface. Like 50-100s of Km below surface. Could be liquid water below surface.

13. Dropping a probe on the surface is a good idea, but what is better for spotting life on Titan?

Have landed on it, but only in one spot. Like landing on Earth's Sahara Dessert. Better for a balloon to float and take pictures.

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Part 4: SETI and Searching for life

1. What is happening to our TV/Radio waves when they leave Earth?
All our TV and radio waves are going out and will go out for infinity
2. Why is contact through a signal more possibly/easier than traveling with a rocket ship?
Light travels faster than rockets. Gets there soon.
3. How sensitive are our radio telescopes?
So sensitive they can detect a flea hopping.
4. What is SETI looking for a signal to have (natural vs. intelligence)?
Using radio waves to study the universe.
SETI in California, looking for signals being made by ET.
Looking for a narrow band signal-not natural. 100 million channels at a time.
5. What stars are SETI looking at and why?
SETI goes through list of stars that are nearby. Don't know that planets there.
If they get an interesting signal, get another radio telescope to confirm.
6. Why would life that comes to visit us be a machine rather than biological? List the reason why.
ET could be non-human. Maybe a thinking machine. Every two years processing doubles. By 2030 get the processing power by \$1, 1000 buck in 2020.
Capture a human thoughts/personality into a computer. Possibly live forever. Smart enough machine, that could replicate like a virus. Machines could withstand radiation and live "forever" and would most likely get here first. Its what we would probably do first.
7. What would it mean to humans if there was or wasn't life in the Universe?
 - a. Is life?
Could have a positive effect on humans. We are one species among many. Might not cause panic.
 - b. No Life?
Or we could never meet anyone. Means that intelligence life is precious and should be treasured.