



# Life Based on Reproduction

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# Reproduction

Definition: The process where one or more individuals create another through a specified process, such as arranging their subunits (e.g. bio monomers, cells, etc.).

Problems: “Individual” only really works in this definition due to its connotations (associated w/ sense of “alive”). How to define implicit difference in “another”?



# Theory of Life

- All life was created by reproduction
  - In order for life to continue on, there must be some process in which it produces more of itself or a process in which it was produced.
- All life will reproduce in future
  - The process in which the life is produced should be able to be replicated and performed in the future to create more life.
- The theory mostly focuses on the life-aspect rather than alive-aspect
  - Life-aspect: process that an organism does
  - Alive-aspect: what makes the organism alive



# Definition and Examples

- We say a genus of individuals is *living* if
  - instances of the genus are being created by reproduction (Genesis)
    - This condition excludes e.g. static stuff e.g. rocks
  - no more individuals of this species could be created should the genus be removed (Extinction)
    - This condition excludes self replicating robots, as humans could just create more
- Living genus examples:
  - Humans, horses, monkeys, cats, ...
  - Fungi (in some cases with cells as individuals).
  - Mules and other crossbreeds are not genera as they do not satisfy the extinction condition; however, the union of horses, donkeys and mules form a genus.



# Debatable examples

- Genetically Modified Organisms and animals cloned by humans are in the same genus as their unmodified counterparts.
- Species that alternate from one generation to the next (e.g., porophyte and gametophyte) together form a single genus.
- The union of humans and robots a living genus by our definition.
  - If all humans were to disappear but some robot-building robots remained, these robots would by themselves form a genus.



# Finding Life Through Reproduction

Requires up-close observations of the life-form and it's nature of reproduction

Extrapolations about life can be made

- Reactions
- Low Entropy
- Death
- Genetic Material (not necessarily nucleic material)
- Reaction to Stimuli
- Evolution



# Method(s) for Analysis?

Very hard to assay for reproduction except through close observations and studies of the organism in question.

Can use extrapolation and observations to form Methods of Analysis overtime

Expect life to have...

- (some) Large Populations
- Abnormalities in Composition (due to metabolites)

Spectral differences/abnormalities

May be better methods for analysis (from extrapolations)



# Outliers/Exceptions/Room for Improvement

Life on a spectrum?

Viruses alive?

Placement on spectrum?

Life simulations?





Questions/Comments?