The background of the image is a microscopic view of numerous spherical organisms, likely algae or bacteria, in various shades of green and yellow. The organisms are scattered across the frame, with some appearing more prominent than others. The overall color palette is a mix of bright green, yellow, and light blue, creating a vibrant and naturalistic feel.

# Characteristics of LIFE

# What is Biology?

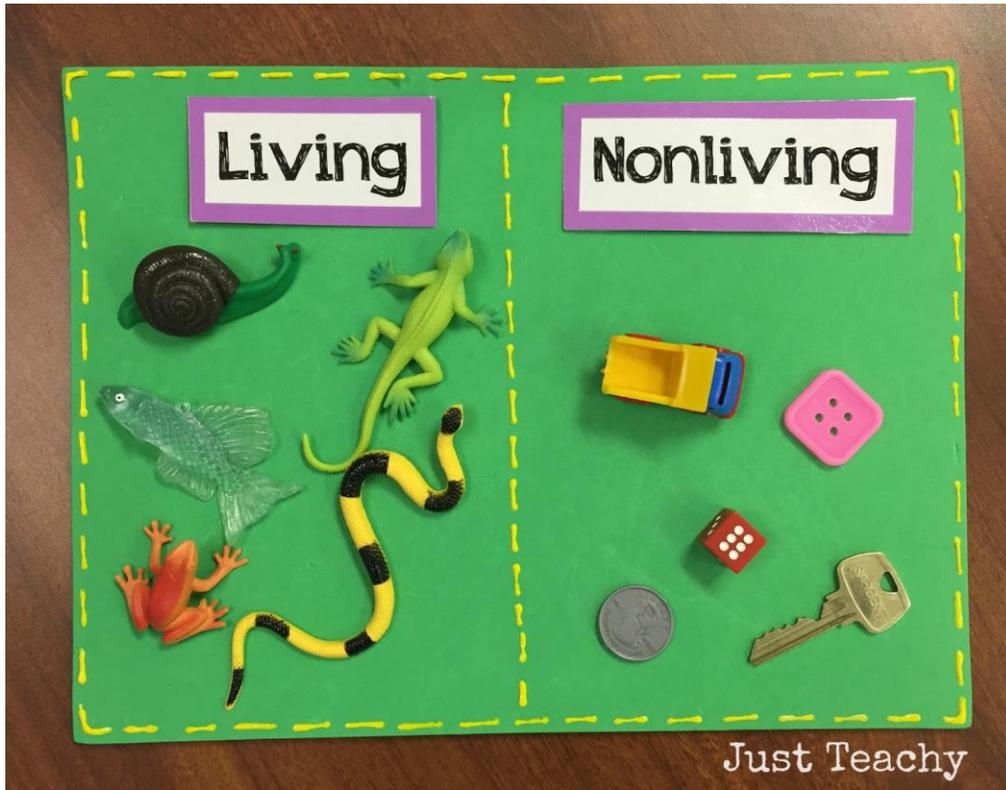
Bio = Life

-ology = study of

Biology = The Study of Life



# Why Might it be Important for Scientists to Agree on a Definition of Life?



# #1: All Living Things are Made of Cells

- Cells are the smallest things considered alive.
- Living organisms can be made of 1 or more cells.

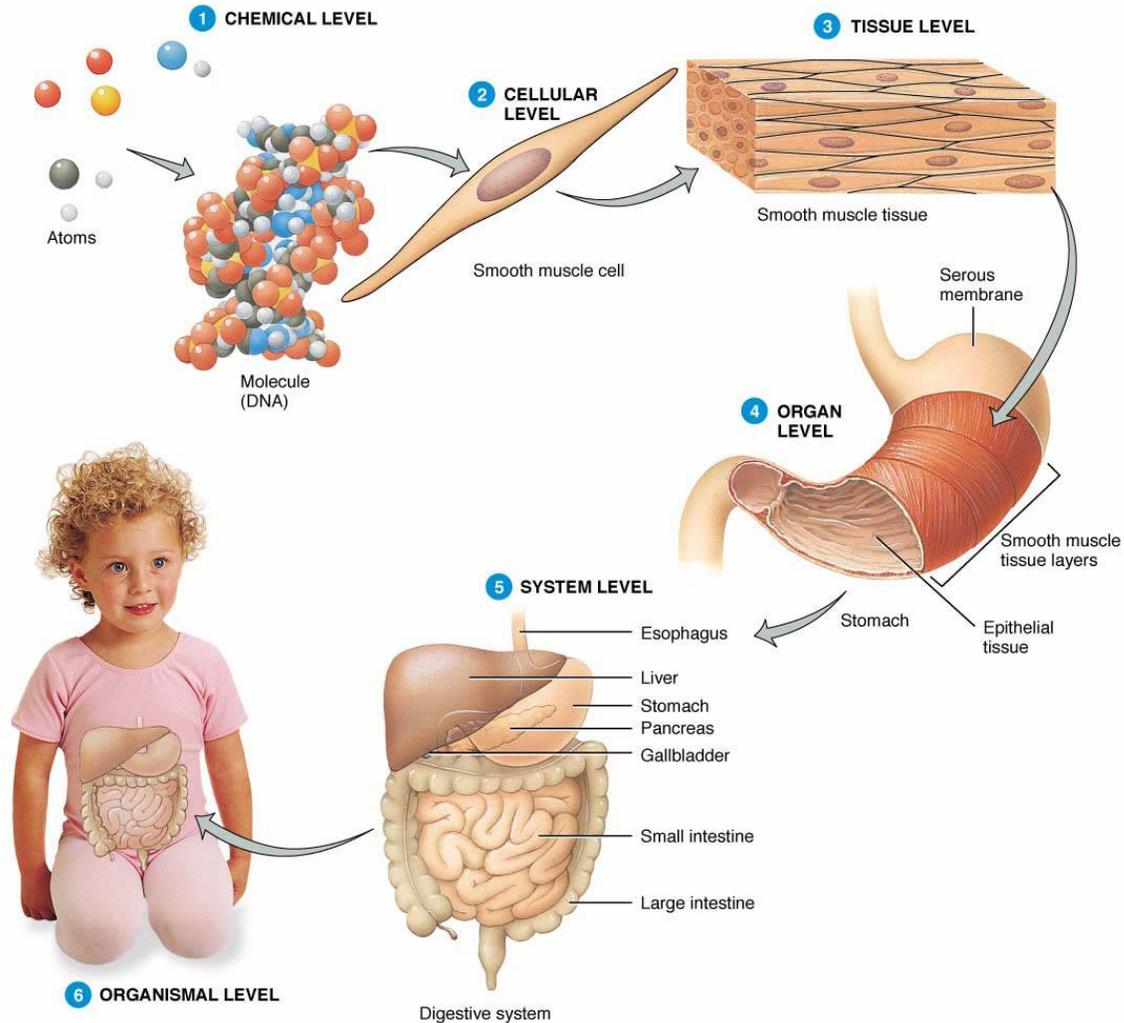


**Unicellular:**  
**Made of 1 cell.**



**Multicellular:**  
**Made of more than 1 cell.**

# #1: All Living Things are Made of Cells



Cells are **NOT** the most basic unit in an organism, just the simplest *living* thing.

Cells are still made up of atoms like all other matter in the universe.

# #2: Reproduction

All organisms can produce new organisms through a process called reproduction.

This is the ultimate goal of any living thing.

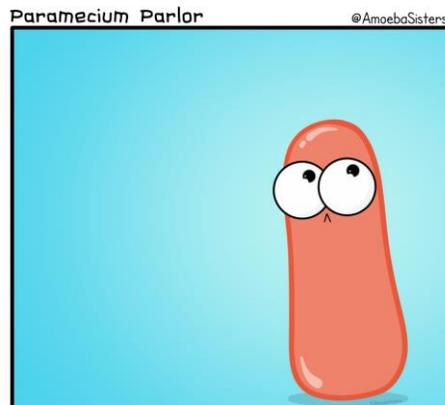


# #2: Reproduction

There are two basic kinds of reproduction:

## Asexual:

**Involves only one parent. The parent produces an identical copy of itself as offspring**



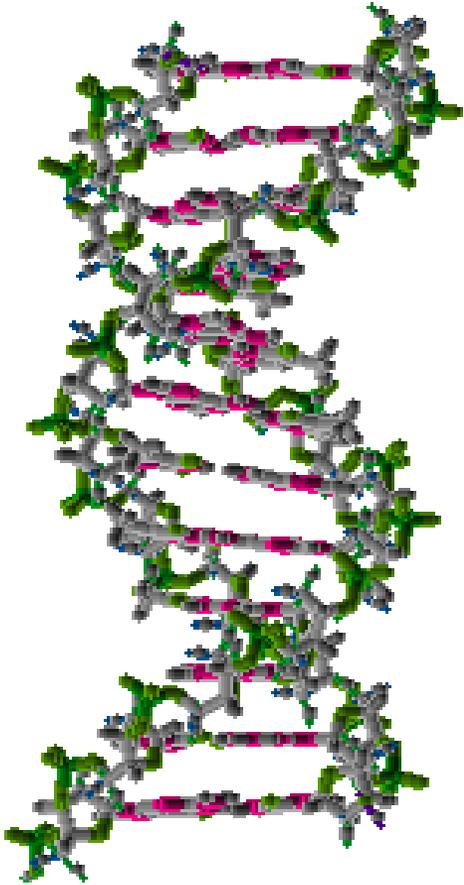
Asexual Reproduction:  
Clone yourself more friends!

## Sexual:

**Involves two parents. The offspring has genetic material from both parents.**



# #3: Uses DNA as Genetic Material



Offspring always resemble their parents.

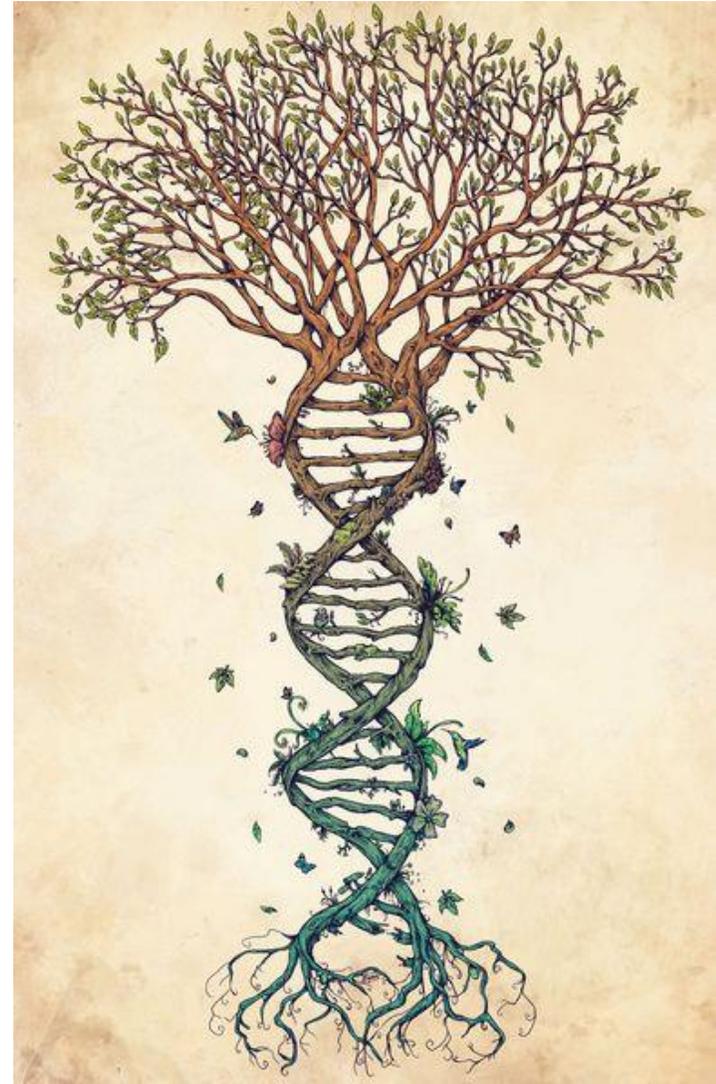
This resemblance is due to genes that are inherited or passed on.

The biological molecule responsible for this inheritance is DNA.

# #3: Uses DNA as Genetic Material

All living things have DNA & use it in the same way.

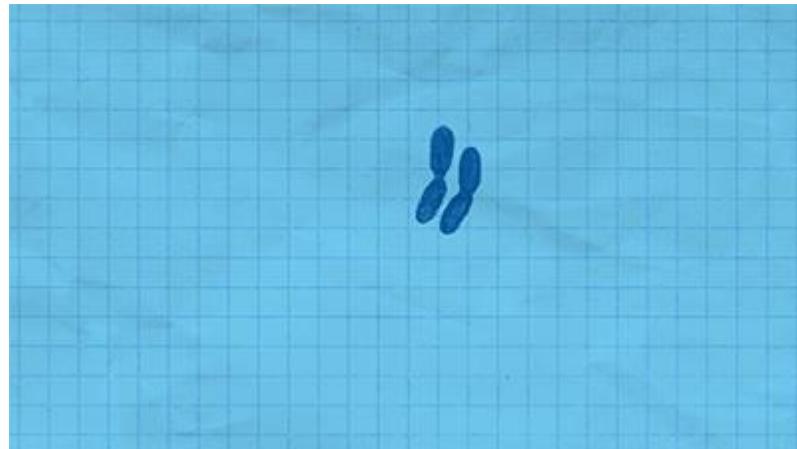
In fact we can trace the DNA of every organism on Earth back to the first living thing.



# #4: Growth and Development

All living things grow during at least part of their lives.

For unicellular creatures like bacteria, this usually means just an increase in size.



# #4: Growth and Development



Multicellular creatures grow through a process called development to produce the many cells of a mature organism.



These cells can have different forms and functions and as they divide they can change in shape and structure.

# #5: Need for Materials & Energy

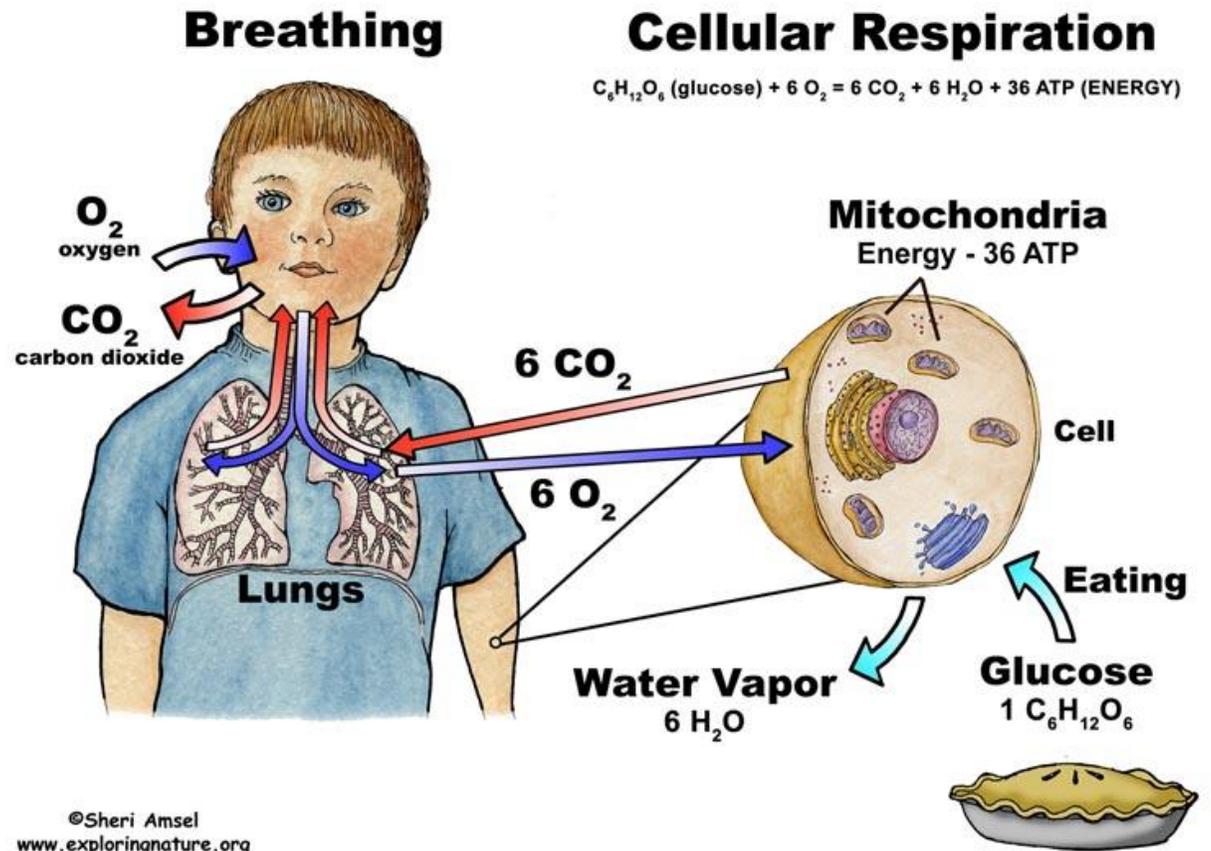
As an organism grows and develops it needs raw materials and energy to make new cells and keep existing cells alive.

There are a variety of ways that organisms obtain energy.



# #5: Need for Materials & Energy

All living organisms perform a variety of chemical reactions to keep themselves alive known as metabolism.



# #6: Response to the Environment

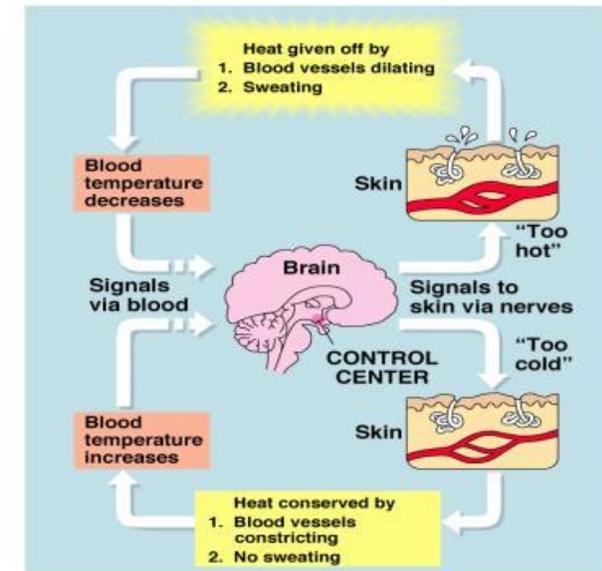
All organisms can detect and respond to stimuli (signals) both internally and externally.



# #7: Maintaining an Internal Balance

Even though external conditions may vary widely, most organisms must keep their internal conditions (body temperature, water content) fairly constant.

Think about when it gets hot outside... How does your body respond to keep your core body temperature constant?



# #7: Maintaining an Internal Balance

Maintaining constant internal conditions is known as homeostasis.



How might homeostasis help you maintain a stable, internal water balance if you were to eat something really salty?

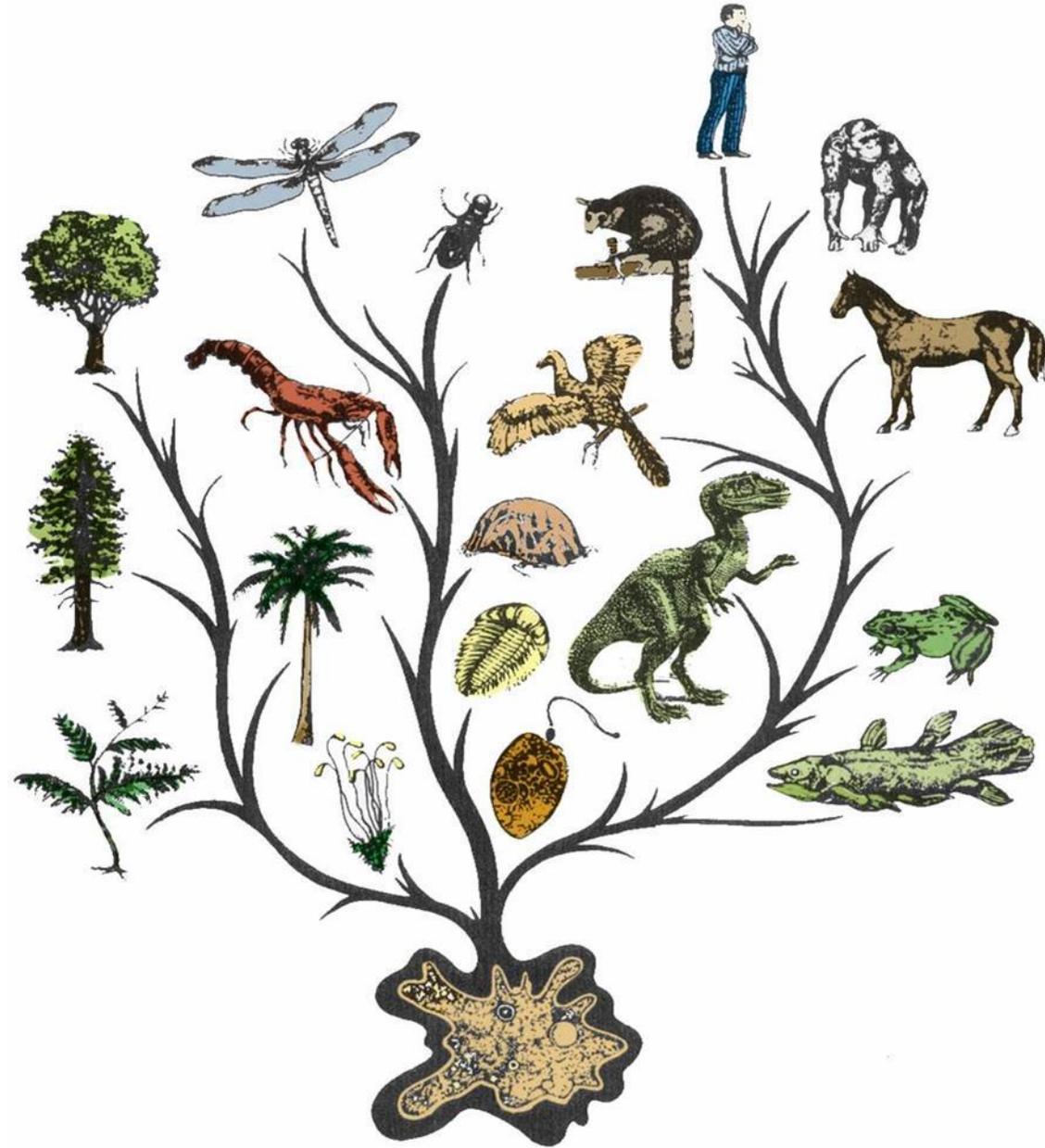
What if you drank way too much water?

# #8: Evolution

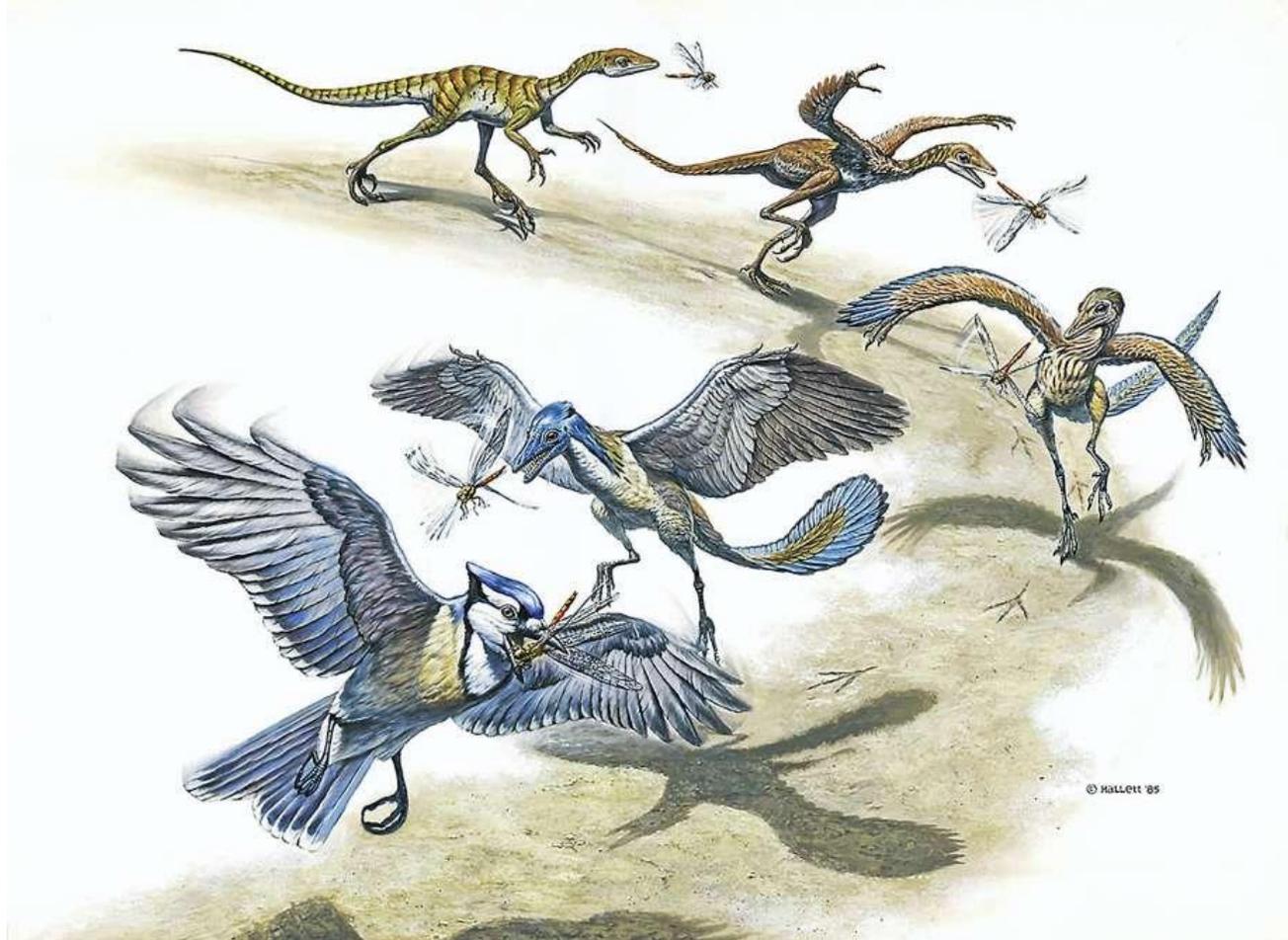
Evolution is just change over time.

In the case of biological evolution, this explains how populations of species change over time to become new species.

Though individuals cannot evolve, groups of individuals of the same species can.



# #8: Evolution



Species are therefore able to evolve and adapt to changing environments.

If they cannot, these species go extinct.

# Exceptions

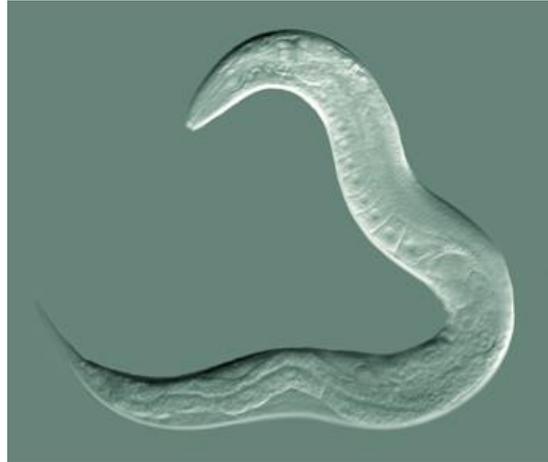
Life is too complicated and diverse to be black and white.

Here are some exceptions to the 8 characteristics:



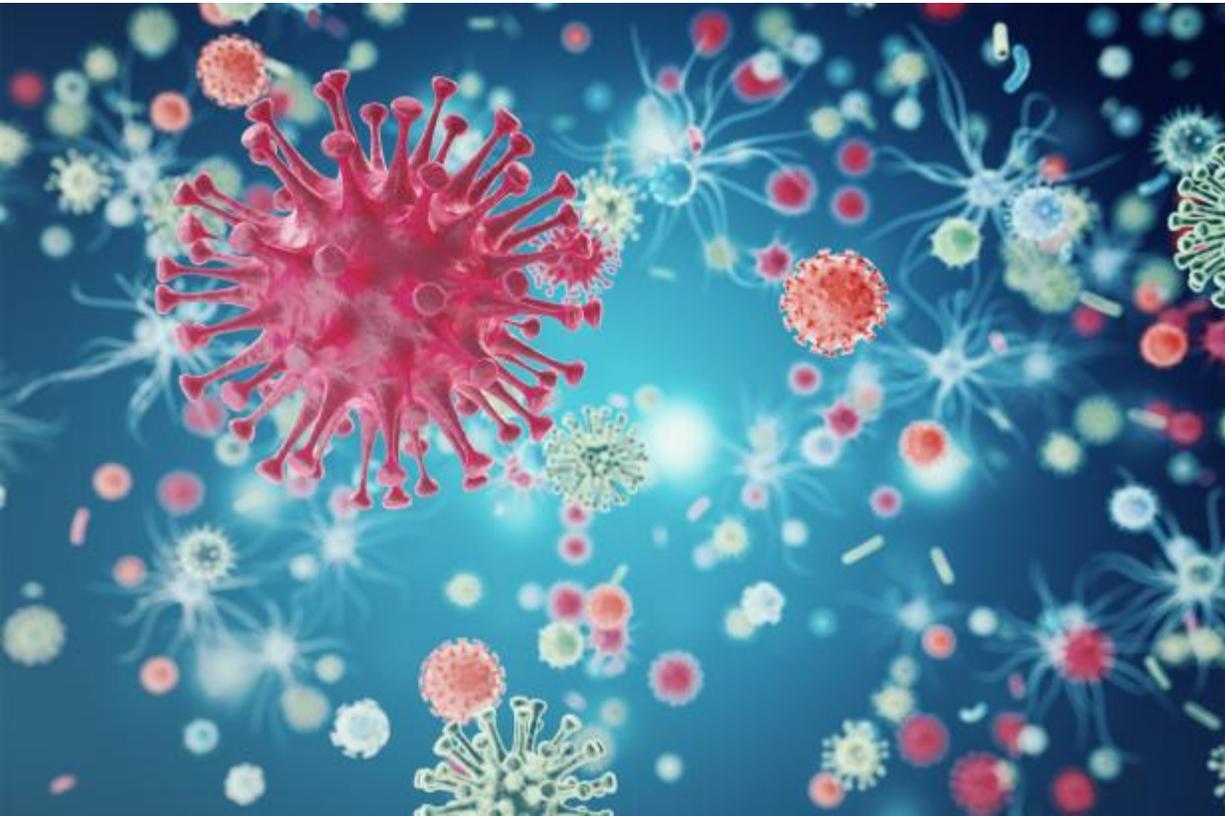
# Exceptions

If Something  
is Alive, must  
it also Die?



[Immortal Jellyfish](#)

# Exceptions



What About  
Viruses?

