**Lesson 2**

**Section 1.2: Unifying Themes of Biology**

**Main Ideas:**

- All organisms share certain characteristics  
- All levels of life have systems of related parts  
- Structure and function are related in biology  
- Organisms must maintain homeostasis to survive in diverse environments  
- Evolution explains the unity and diversity of life

- Read Pages 8-13 Complete Introduction in Canvas

**Answer all of the red italicized questions into Canvas**

**Activity 1: Rank the following Resources**

Defining "life" is a very difficult task, and scientists don't all agree on a common list of the characteristics of life. Some of the other characteristics that you may discover in your research and often listed in textbooks can vary between as few as four and as many as eleven. Many of these traits are not limited to living things. Fire, for example, uses energy, grows, and can reproduce, but it is not considered alive in part because it is not made of cells. Its traits are necessary, but not sufficient, for life.

Below you will find four resources that review the main ideas in this lesson. *Arrange the resources in order from most-relevant to least-relevant, following each with a sentence about their relative relevance and/or helpfulness to you in understanding the content.*

1. [Characteristics of Life Links to an external site.](https://www.youtube.com/watch?v=juxLuo-sH6M)
2. Class Biology textbook Pages 8-9
3. [Characteristics of LifeLinks to an external site.](http://www.ck12.org/biology/Characteristics-of-Life/lesson/Characteristics-of-Life/) (CK-12) Text Only
4. [Characteristics of Living Things](https://app.schooltube.com/video/f84f8c345eba8342e9dc/characteristics-of-life)
5. [What is Life? Links to an external site.](https://www.khanacademy.org/science/high-school-biology/hs-biology-foundations/hs-biology-and-the-scientific-method/a/what-is-life)

***For me life is a challenge, but in biology everything has life; the plants, the animals and we the people, the human beings, life is an ecosystem, because it is a plant, you are born, you grow, you reproduce and you die. Everything has life from a simple bacterium to the largest animal registered on the internet, and as life exists, there are the characteristics of this, let's start with the life of a toad, this is a simple one, the toad when it is born is like a slime, better said as tadpole while that tadpole is growing is transformed into the so-called toad, which means this, means that all evolved, another example could be a seed, when you plant a seed you have to water it until this seed grows, and pollinate According to my data said in this paragraph "The Life" we would say that it is a cycle of every living being that exists***

**Activity 2: Lab Investigation on the Characteristics of Living Things**

**Objective: To recognize and describe the characteristics of living organisms.**

**Getting Started: Review these six easily observed characteristics of living things**

1. movement (which may occur internally, or even at the cellular level)
2. growth and development
3. response to stimuli
4. reproduction
5. use of energy
6. cellular structure

**Going Further: Based on what you currently know about the “characteristics of life”**

1. *Do all sources agree on the characteristics?*

No

1. *Are there characteristics not covered in the above list?*

*No*

1. *Do all scientists agree on a common list of “characteristics”?*

*No*

1. *If all of the characteristics of life are required to classify something as “alive”, how can we account for those individuals who are definitely alive, but that do not reproduce (for example, people without children or a sterile mule)?*

“People without children” then that is caused by external factors that causes mutation in genes or diseases, so you can not classify them as not alive sincetheir species (Parents) are able to reproduce. When it comes to mules, their sterility is caused by being a hybrid of donkey and horse (not the same specie). Example, the cells in the human or mule body reproducing constantly

1. *Is a virus alive?*

*No*

1. *How do scientists answer this question about viruses?*

**What’s Going On?**

Defining “life is a very difficult task, and scientists don’t all agree on a common list of the characteristics of life. Some of the other characteristics that you might have discovered in your research and which are often listed in textbooks, might be included in the list below. Many of these traits are not limited to living things. For example, fire uses energy, grows and can reproduce, but is not considered alive in part because in part it cannot evolve; its traits are necessary, but not sufficient, for life. NASA scientist Bruce Jakosky, in his book **The Search for Life on Other Planets**, provides a generally accepted definition of something being “alive” if it 1) utilizes energy from some source to drive chemical reactions. 2) is capable of reproduction, and 3) can undergo evolution.

**List of Characteristics of Living Things found from multiple sources**

1. All organisms use energy (metabolism).
2. All organisms maintain a stable internal environment (homeostasis).
3. All organisms detect and respond to select external stimuli.
4. All organisms can engage in movement (which can occur internally, or even at the cellular level).
5. All organisms show growth and development; that is, specialization of cells or structures. (Even unicellular organisms show a tiny amount of growth, and single cells repair and use materials from the environment to replace internal structures as needed.)
6. All organisms reproduce. (Even if an individual can’t reproduce, its species can.) In addition, an individual’s cells are constantly reproducing themselves.
7. All organisms have nucleic acid as the hereditary molecule.
8. All organisms show adaptation, which occurs at the individual level and is tightly related to homeostasis.
9. All organisms are made of one or more cells.
10. All organisms exhibit complex organization, grouping molecules together to form cells; at a higher level, cells are organized into tissues, organs, and organ systems.
11. All organisms exhibit evolution over time due to mutation and natural selection (which operates at the species level).  
      
    *7. Why does the above list contain so many examples compared to other resources such as your book, videos and the initial list from this assignment (at the top)?*

*To explain what scientists think about life, and how difficult it is to describe it*

*8. Consolidate the list from multiple sources into the four basic characteristics given in your textbook?*

*9. How do characteristics of living things contribute to an organism's survival?* Species Are designed to survive and adapt to certain areas in which they live.