48.1 Organisms and Living Systems

Biology

Summarize main points from each video.

Video Title / topic _____

Video Title / topic _____

Video Title / topic _____

Topic Introduction

Summarize your understanding of each paragraph.

Most of us don’t grasp the variety of species that inhabit the Earth today, and some even get surprised as they find out there are some cool life-forms they haven’t heard of before. But one thing all life forms have in common - all living things are made up of cells.

Scientists themselves keep observing new species every year and admit that modern science is not familiar with all of the strange plants, animals and other living things existing today.

The characteristics of living systems include their structure, function, growth, origin, evolution, and distribution. The study of living systems includes botany and zoology and all their subdivisions.

Living systems are in contrast to non-living systems. A non-living thing is one that lacks or has stopped displaying the characteristics of life. Thus, they lack or no longer displaying the capability for growth, reproduction, respiration, metabolism, and movement.

https://www.boredpanda.com
https://www.biology-online.org

Read/Summarize Text

1. **Read the passage.**
2. **Underline key expressions in each sentence.**
3. **Re-write each word (or expression) you underlined.**
4. **Summarize the passage.**

Living systems

1

Living systems are open self-organizing life forms that interact with their environment. These systems are maintained by flows of information, energy and matter. Some scientists have proposed in the last few decades that a general living systems theory is required to explain the nature of life. Such a general theory, arising out of the ecological and biological sciences, attempts to map general principles for how all living systems work. Instead of examining phenomena by attempting to break things down into components, a general living systems theory explores phenomena in terms of dynamic patterns of the relationships of organisms with their environment.

2

https://en.wikipedia.org/wiki/Living_systems

Re-write words you underlined

3

Using a complete sentence, summarize or rephrase the passage

4

Read Text for Comprehension

Read this article for deeper understanding. No summary is required, although you may want to circle, underline, or mark key ideas and words.

Adapted from: The Living Systems Theory of James Grier Miller

Living Systems Theory is a general theory about how all living systems "work," about how they maintain themselves and how they develop and change.

By definition, living systems are open, self-organizing systems that have the special characteristics of life and interact with their environment. This takes place by means of information and material-energy exchanges.

Living systems can be as simple as a single cell. Regardless of their complexity, they each depend upon the same essential subsystems (or processes) in order to survive and to continue the propagation of their species.

Some of these processes deal with material and energy for the metabolic processes of the system. Other subsystems process information for the coordination, guidance and control of the system. Some subsystems and their processes are concerned with both.

The essence of life is process. If the processing of material-energy and information ends, life also ends. The defining characteristic of life is the ability to maintain, for a significant period, a steady state in which the entropy (or disorder) within the system is significantly lower than its non-living surroundings.

In the conceptual system developed by James Grier Miller, living systems form eight (8) levels of organization and complexity. Miller also postulates that twenty (20) subsystems that process information or material-energy account for the survival of living systems, at any level. His full work (not included here) describes the subsystems.

Editor: Elaine Parent is a close associate and assistant to James Miller.

Adapted from: http://www.isss.org/primer/asem14ep.html

Draw Illustration

Copy and Label the Illustration in the Space Provided

Living Systems

All organisms …

1. are composed of one or more cells
2. are able to grow, reproduce and adapt
3. use energy
4. maintain homeostasis
5. respond to the environment
6. receive instructions from DNA

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Draw (Copy) the Illustration Here

Interpret a Graph

Write the title of the graph _____

Circle the type of chart this represents

Bar Chart *Line Chart* *Pie Chart* *Other*

If applicable,

What does the X-axis represent _____

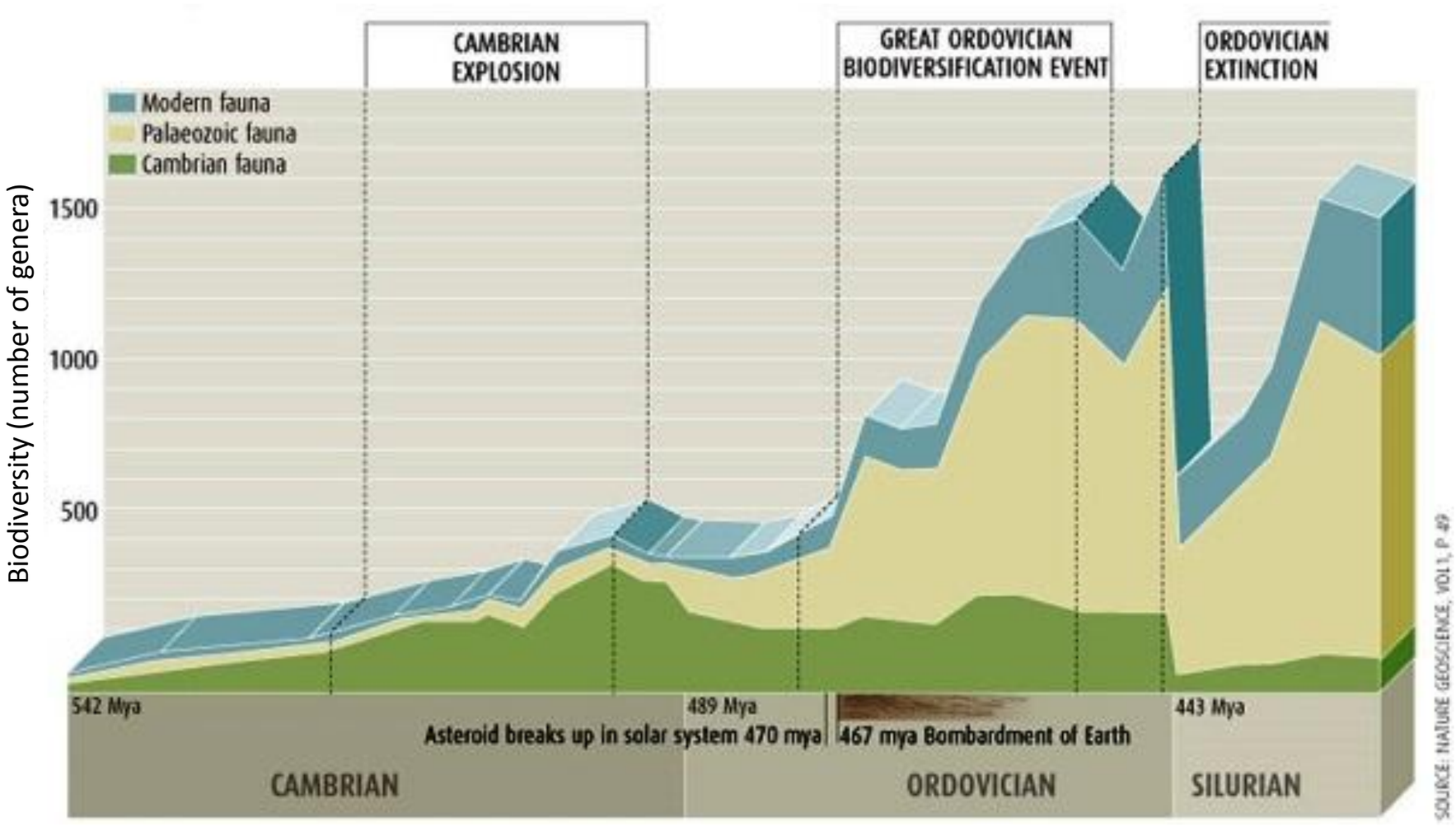
What does the Y-axis imply _____

Summarize what this graph represents or conveys

_____

https://www.patheos.com/blogs/crossexamined/2017/06/7272/

Is the Cambrian explosion that remarkable?



Summarize these …

(on the next page)

Honeycutt Science Topics: 14, 16, 25, 44

1. Cell Theory

- All living things are made up of cells.
- Cells are the smallest working units of all living things.
- All cells come from preexisting cells through cell division.

All organisms … are composed of one or more cells.

Honeycutt Science Topics: 21, 23, 24, 26, 32, 43

4. Homeostasis

- Steady state of being regardless of external surroundings.
- Maintaining a stable internal environment
  - Shiver when cold.
  - Sweat when hot.

All organisms … maintain homeostasis.

Honeycutt Science Topics: 24, 26, 27

2. Adaptation

- Any structure, behavior, process that promotes survival of a species.
  - Cactus – have thorns
  - Camels – have humps of FAT on their backs
  - Camels foot – webbed to trek terrain

All organisms … are able to grow, reproduce and adapt.

Honeycutt Science Topics: 23, 26, 27, 35, 43, 46

5. Environment

- Biotic factors – all things alive or that once lived.
- Abiotic factors – all things that never lived but affect life.

All organisms … respond to the environment.

Honeycutt Science Topics: 15, 16, 23, 43, 46

3. Organisms Use Energy

All Life Needs Energy

Autotrophs

- *Photosynthesizers* - use solar energy
- *Chemosynthesizers* - use chemical energy

Heterotrophs

an organism deriving its nutritional requirements from complex organic substances. These use energy stored as the bodies of other organisms.

All organisms … use energy.

Honeycutt Science Topics: 14, 17, 18, 19, 45

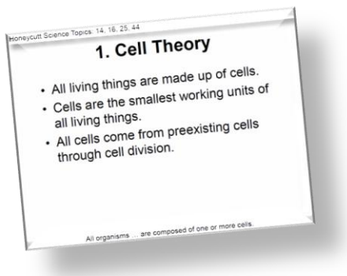
6. Instructions from DNA

Every living thing has **DNA**. This means you have something in common with a zebra, a tree, a mushroom and a beetle!

All organisms … receive instructions from DNA.

Use Your Own Words

Use the previous page as a reference. Summarize these six major points regarding living systems.



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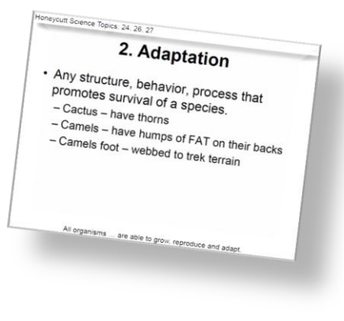

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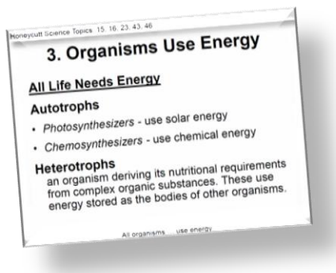

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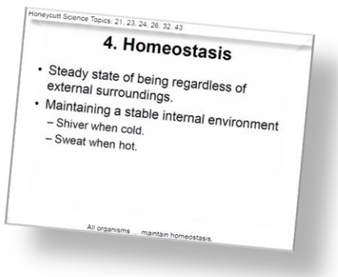
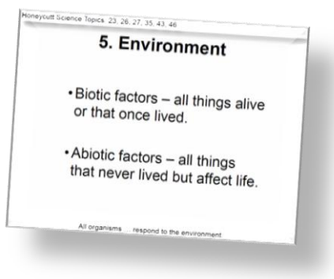


All organisms … maintain homeostasis.



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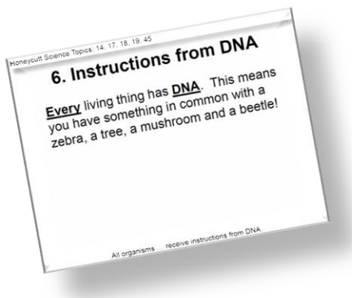

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