

Name: _____ Period: _____ Date: _____

Ms. Randall LE

Living vs. Nonliving

Background:

What are the differences, if any, between living and non-living things? Physically many similarities exist between the two. Both living and non-living objects are comprised of many of the same materials. However, living organisms do have characteristics that make them unique from the non-living. In order for an organism to be considered alive it must exhibit organization, utilize energy, and also undergo reproduction, growth and development, response, and adaptation. Some of these characteristics are found in non-living things as well, but in order to be considered alive organisms must have all of the above attributes.

All living creatures are highly organized. They exhibit specialized structures that are designed to perform specific functions. The basic unit of organization of life is a *cell*. All organisms are made of cells. Organisms such as protists and bacteria are *unicellular*, that is, they consist of only one cell. Multicellular organisms such as humans and plants are made up of trillions of cells.

Energy exists in many forms such as thermal, sound, radiant, and chemical. Living things utilize many different forms of energy. All forms of life are capable of taking energy from their environment and converting it to a form that is needed to sustain life. For example, plants are able to use light energy to make food from carbon dioxide and water.

Growth and development are also essential for life. *Growth* is defined as an increase in size. Development is a change in form or shape over time. The amount of growth varies greatly between species. A paramecium does not grow very much from its original size. A giraffe grows from a fertilized egg to a several-thousand-pound adult. Development also varies between organisms. A caterpillar undergoes a significant change in development to become a butterfly.

All living things originate from other living things. Reproduction is the process by which living things are formed. *Reproduction*, which involves the formation of new cells, is necessary for survival of a species. It can vary from creation of an exact duplicate of the parental organism to a duplicate that deviates from the original.

Living organisms must also be able to respond and adapt to stimuli in their environment. Scratching an itch is an example of a learned response to a stimulus.

Responses are generally referred to as individual changes or reactions to conditions. Adaptations occur when a population of organisms responds to changes in their environment. Adaptations are passed on to future generations within a species. Many species, such as polar bears and armadillos for example, have developed adaptations that allow them to thrive in adverse environments—in cold arctic water and the desert, respectively.

Pre-Lab: QuickTime Video- “Is It Alive?” Available at Teacher Domain
<http://www.teachersdomain.org/resource/tdc02.sci.life.colt.alive/>

Scientists classify things as alive if they can carry out these 8 LIFE FUNCTIONS.

R- Respiration

R- Regulation

R- Reproduction

E- Excretion

G- Growth

N- Nutrition

T- Transport

S- Synthesis

R R R E G N T S

=biology

Part 1

Define the life functions in the chart below. Use your notes, textbook and knowledge of Biology to help you!

Life Function	Definition
<i>Respiration</i>	
<i>Regulation</i>	
<i>Reproduction</i>	

<i>Excretion</i>	
<i>Growth</i>	
<i>Nutrition</i>	
<i>Transport</i>	

<i>Synthesis</i>	
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Part 2:

Problem: Is the unknown sample living or nonliving?

Materials:

Jumping beans

Scissors

Scotch tape

Microscope

Slides/coverslip

Pipettes

Procedure:

1. Hold the jumping bean in your hand for several minutes. Record your observations below.
2. Use a hand lens to look closely at the outside of the jumping bean's shell. Record your observations below.

3. Do you think the jumping bean is alive? Explain your reasoning.

4. After making your observations, what are some additional questions you have about Mexican jumping beans?

5. Hold the bean between the index finger and thumb of one hand so that one of the flat sides of the bean is facing out. Use the scissors to carefully shave off this flat section. Do not shave more off the jumping bean than can be covered with the piece of scotch tape. Cover the opening with tape. Put the shaving to the side. Later you will view it under a microscope.
6. Look closely at the interior of the bean. Record your observations below.
7. Notice the paper-thin layer that was the inside layer of the jumping bean. Place the shaving on a microscope slide with the paper-thin layer facing up. Use a transfer pipette to place one drop of water on the shaving. Cover the shaving with a cover slip. This type of slide is called a wet mount.
8. Place the slide on the microscope stage and view it with the high-power objective in place. In the space below, sketch what you see.

Analysis and Conclusions

1. Based on your observations, what kind of organism do you conclude that a Mexican jumping bean is? Explain.
2. Are all things that move living? Explain