

Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

**Topic 1: Living vs. Non-living Material**

*You will be given a plate of materials. In your group, classify which objects are living and which are non-living. Explain why you have classified each. Next, complete the vocabulary chart.*

<b>Object</b>	<b>Living (L) vs Non (NL)</b>	<b>Explain</b>
1. Paper clip	_____	_____
2. Leaf	_____	_____
3. Water cup	_____	_____
4. Rock	_____	_____
5. Chip	_____	_____
6. Carrot	_____	_____
7. Egg	_____	_____
8. Teeth	_____	_____

It is not always an easy thing to tell the difference between living, dead, and non-living things. Prior to the 1600's many people believed that non-living things could spontaneously turn into living things. For example, it was believed that piles of straw could turn into mice. That is obviously not the case. There are some very general rules to follow when trying to decide if

something is living, dead, or non-living. The world is made up of both living and non-living things. The term living things refer to things that are now *or one were alive*. A non-living thing is anything that was never alive.

Listed here are the six rules used by scientists:

- *Living things are made of cells.*
- *Living things obtain and use energy.*
- *Living things grow and develop.*
- *Living things reproduce.*
- *Living things respond to their environment.*
- *Living things adapt to their environment.*

If something follows one or just a few of the rules listed above, it does not necessarily mean that it is living. To be considered alive, an object must exhibit **all** of the characteristics of living things. Sugar crystals growing on the bottom of a syrup container is a good example of a nonliving object that displays at least one criterion for living organisms.

### Questions

1. Why is a rock not considered a *living thing*?

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2. Is a tree considered living? Explain your answer.

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### Living vs. Non-living Material

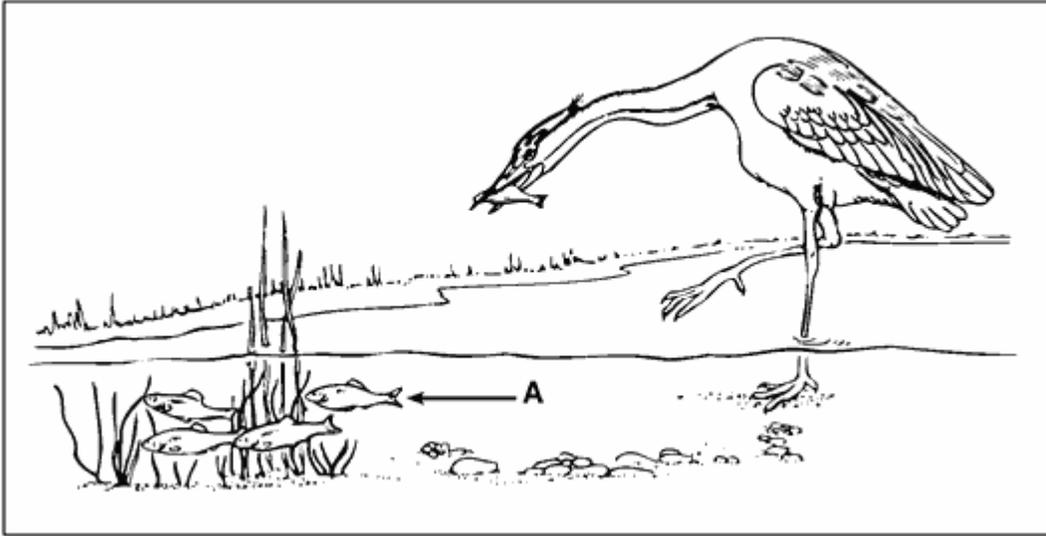
*Living = Biotic*

- Living things are made of cells.
  - Cell- basic unit of life
  - Cell- building blocks of life
  
- Living things obtain and use energy.
  - Autotrophs = Make their own sugars, like plants/ self-feeder / Producer
  - Heterotrophs = Consume sugars from outside sources, like humans/ Other-feeder/ consumer
  
- Living things grow and develop.
  - Every **living** organism begins life as a single cell.
  - Unicellular organisms may stay as one cell but they **grow** too.
  - Multicellular organisms add more and more cells to form more tissues and organs as they **grow**.
  
- Living things reproduce.
  - Asexual
  - Sexual
  
- Living things respond to their environment.
  - Respond to stimuli
  - **Stimuli** = Anything that causes a living organism to react is called a **stimulus** (plural is stimuli) Stimuli can be external or internal.
  
- Living things adapt to their environment.
  - This means that the way they look, the way they behave, how they are built, or their way of life makes them suited to survive and reproduce in their habitats.

Make it Stick:

1.

Identify *one* abiotic factor that would directly affect the survival of organism *A* shown in the diagram below.



2. Which characteristic does the object in the cup hold of a living thing?

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3. Why is it not considered living?

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### Can living things arise from non-living things?

People four hundred years ago believed that life could suddenly appear from non-living material or objects, which was identified as **spontaneous generation**. They *observed* after it

rained worms would arise, therefore they *inferred* that worms came from the mud. Today we have *background knowledge* from previous scientific studies to know that worms do not come from the mud but from *reproduction*.

Francesco Redi, in the mid-1600s, designed an experiment to disprove the spontaneous generation theory. He designed a *controlled* experiment to show that flies do not spontaneously arise from decaying meat, non-living matter. He carried out two tests that are identical in all ways besides one factor. The one factor Redi changes is the *variable*. Redi concludes that any differences in the results of the two tests must be due to the *variable*.

### Redi's Experiment

	Redi Placed meat in two identical jars. He left one jar covered and the other jar with a cloth that lets air in.
	After a few days, Redi observed maggots (young flies) ONLY on the decaying meat in the open jar.

What is the dependent *variable*?

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What is the *independent variable*?

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What is *control variable*?

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### Scientific Method, Living Cells vs Non Living and Spontaneous Generation

Francesco Redi's experiment on disproving the idea of *spontaneous generation* was very controversial at the time. People were not open to new ideas in science especially after they had

believed that living things could arise from non-living material. Let's help review Redi's experiment and see how he used the *scientific method* to design his experiment to help support his study.

Problem (*What question was he trying to answer?*):

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Hypothesis (*Variable, Result and Rational*) :

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Results (*Hypothesis supported/rejected due to the data*):

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Conclusion (*how are the results useful?*):

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Improvements for future studies:

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