**Characteristics of Living Things**

Scientists have a very particular definition of what is living and what isn’t. There are five characteristics that all living things must have.

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**Bacteria and Viruses**

Bacteria are some of the smallest cells. There are many different varieties and they all have smaller parts within them to perform necessary functions. Bacteria split in half to make more bacteria and will seek for ideal locations to begin reproducing.

Do Bacteria

* Respond to their environment?
* Need Energy?
* Grow?
* Reproduce?
* Get rid of waste?

Viruses only carry DNA information; they do no tasks on their own. They infect a host cell and trick the cell into making more of the virus. The host cell will eventually burst, spreading the viruses further. The virus uses its host cell to provide it with anything it needs.

Do Viruses

* Respond to their environment?
* Need Energy?
* Grow?
* Reproduce?
* Get rid of waste?

Are Bacteria living?

Are Viruses living?

**Cell Theory**

What tasks and jobs would a self-contained community to survive?

Cells of any living thing are individual, self-sustaining parts.

**Anton Van Leeuwenhoek**

The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ was invented by Anton Van Leeuwenhoek, a Dutch biologist in the early 1600’s. Leeuwenhoek’s invention allowed him to see tiny living organisms in droplets of water.

**Robert Hooke**

In the late 1665 Robert Hooke observed that the cork plant he looked at contained \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. He called them \_\_\_\_\_\_\_\_\_.

**Matthias Schleiden and Theodor Schwann**

Two hundred years later Matthias Schleiden and Theodor Schwann suggested that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are composed of cells.

The idea that all life is made of smaller, living parts was very different from what was normally thought at the time:

* Early scientists thought that some living things could arise from nonliving things  
   - eg. frogs could come from \_\_\_\_\_\_\_\_, flies from \_\_\_\_\_\_\_\_\_\_\_\_
* It wasn’t until 1864 that it was proven that \_\_\_\_\_\_\_\_ were not produced by sweaty underwear and husks of wheat in a jar.

The research started by Hooke, Schleiden and Schwann began the start of what is known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Cell Theory**

Cell theory has three main ideas



**Experimental evidence of cell theory**

* Cells removed from tissues can \_\_\_\_\_\_\_\_\_\_ alone for short periods of time
* Nothing \_\_\_\_\_\_\_\_\_\_\_\_ than a cell has been found to be able to live
* Experiments by Francesco Redi and Louis Pasteur have demonstrated that cells cannot grow in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ conditions