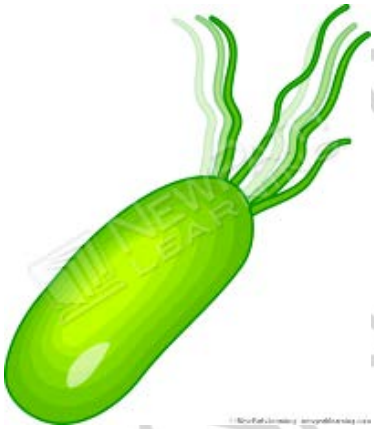
BACTERIA AND VIRUSES

Types of Bacteria

Bacteria are the most abundant organisms on the planet and they live in almost every area on our Earth.



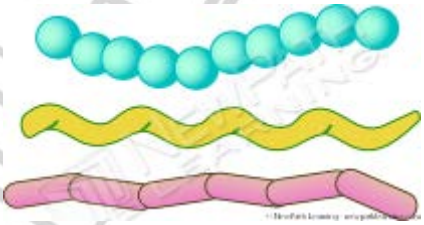
Anton van Leeuwenhoek discovered them in the late 1600's using a home-made microscope. Bacteria are single celled organisms that differ with

No Nucle

They are p lasm because th g a nucleus, b res that are found criteria for being a liv

Bacteria Structure

There are three different shapes of bacteria: spiral, rod, and spherical shaped.



The bacterium's shape is determined by the chemicals that are found in the cell wall. This cell wall is rigid and protects it from most threats.

Common structures that are found within the bacterial cell are ribosomes, cytoplasm, cell wall, cell membrane, and DNA.

Lesson Checkpoint:

What are the three possible shapes of bacteria?

Flagella

Bacteria also have flagella, which are hair-like structures that help an organism move by rotating. Flagella are fixed to the cell membrane and exit the cell wall through a pore. Bacteria can have one flagellum, more than one flagellum, or no flagella. If a bacterial cell does not have a flagellum then they cannot move unless another force, like the wind, helps them to move.

Two Kingdoms of Bacteria

There are two kingdoms of bacteria: Archaebacteria and Eubacteria. Archaebacteria thrive in extreme conditions that other organisms are not able to withstand.

Most eubacteria do not live in extreme conditions. Rather, they live in places like our bodies. As you read this, there are billions of bacteria that are moving around on your body. Don't worry; we have a mutually symbiotic relationship with them. Autotrophic eubacteria are thought to
our atmospher

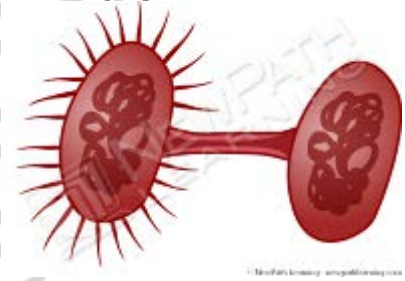
Reprodu

Bacterial c
which is when one

Binary fiss

What Is Asexual Reproduction?

Asexual reproduction is a process of cellular division that requires only one parent cell and produces two identical daughter cells. Some species of bacterial cells reproduce using a process known as sexual reproduction. **Sexual reproduction** produces a unique individual from genetic material from two parents. Bacteria sexually reproduce using a process known as conjugation.



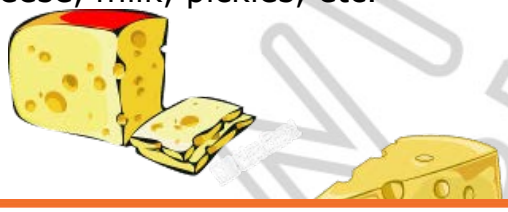
Conjugation is a process where a threadlike object joins the two prokaryotes together until the one of the bacterial cells DNA has been

transferred to the other. When the DNA has transferred completely, the two bacterial cells separate. Conjugation allows the DNA to be varied in the offspring.

Role of Bacteria in Nature

Overall, bacteria are more helpful than they are harmful. They help us to break down food within our bodies and they help to clean up the environment. Of course, there are some species of bacteria that are harmful and will give an organism some type of disease or cause other harmful effects.

Bacteria produce many common foods that we eat on a regular basis, including yogurt, cheese, milk, pickles, etc.



On the oth ad. This is done by poiled foods norn eat those foods.

Bacteria th ping to decompose dead organisms. Decomposers break down the large molecules of a dead organism into smaller molecules, which allows living organisms to use the molecules again. These bacteria are known as the recyclers because of their ability to change unusable molecules into usable molecules. Some species of bacteria feed on oil and gas. These bacteria are used by scientists to clean up an oil spill or a gas leak. They change the harmful chemicals of the oil and gas into harmless substances.

Bacteria are also capable of causing infectious disease. An **infectious disease** is an illness that can be passed from one organism to another either directly of indirectly. An infectious disease can be spread directly by hugging, kissing, or touching a person that is infected. An infectious disease can be spread indirectly by sharing food or a drink or even inhaling particles of an infected person's sneeze. In the year 1928, scientists developed a medicine that cured diseases caused by bacteria called antibiotics.

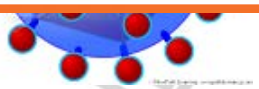
An **antibiotic** is a compound that kills bacterial cells without damaging an organism's own cells. Antibiotics have saved countless lives since their discovery.

Types of Viruses

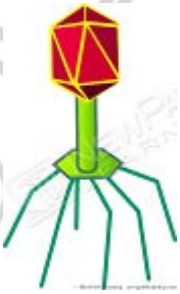
A **virus** is very small particle that is nonliving and that invades and reproduces within a living cell. A virus is considered to be nonliving because it is not a cell. They also don't use energy, grow, or respond to their environment.

The only similarity that a virus has with a living cell is that it is able to reproduce. A virus needs a living cell in order to reproduce. The organism which a virus invades is called a host. As we learned in Topic 8, the host is an organism that is harmed by a parasite. Remember that this is a symbiotic relationship. Viruses act like a **parasite**; nearly all of them will destroy the cell that they invade. Every living organism could potentially be infected by a virus.

A virus car
<image sir
http://ww



A type of virus called a bacteriophage, meaning "bacteria eater," infects bacterial cells.

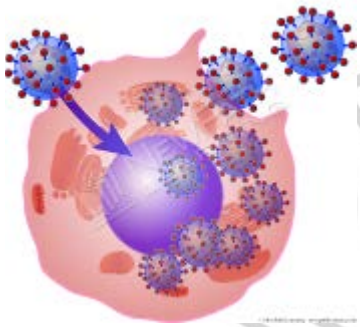


All viruses contain an outer coat with the genetic material inside of that coat. The DNA of a virus contains the information necessary to make new viruses.

Lesson Checkpoint:
What type of symbiotic relationship exists between a virus and the cell it invades?

Bacteria, Viruses, and Disease

Soon after a virus attaches to a cell, it quickly enters the cell. The virus' DNA takes the cell over, directing all the cell functions.



There are two different types of virus: active and hidden. The **active virus** takes charge of the cell immediately, telling the cell's DNA to make new virus proteins and replicate the virus' DNA. The DNA and proteins become new viruses. This process will continue until the cell has produc r hold anymore a The **hidde** th the cell's DNA. rn on and take over t

If you hav have had a viral infe include influenza, measles, rabies, and polio. With advances in medicine, these viral infectious diseases are generally mild. There are other viral infectious diseases that can cause death, such as acquired immunodeficiency syndrome (AIDS).

There are no cures for viral infections, but there are medicines that relieve some of there symptoms. A vaccine is a molecule that causes the body to produce chemicals that will wipe out the virus or bacterial cells.

Vaccines help to prevent the spread of infectious diseases by putting a dead or a changed version of the virus or bacterial cell into the body. This will put the body on alert to target and kill the invading virus or bacterial cell.