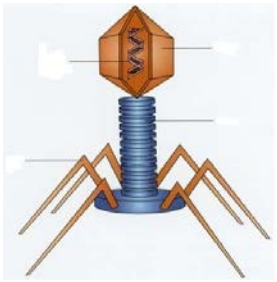
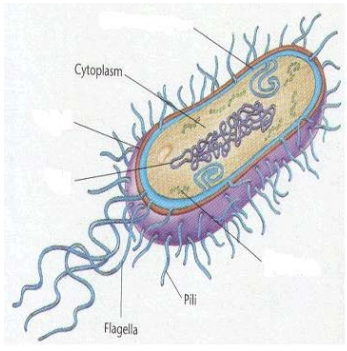
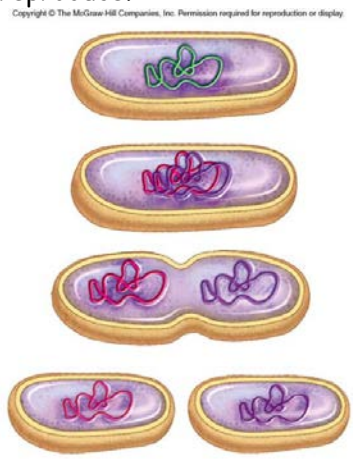
Class Notes *Viruses & Bacteria* **Main Idea:**	Name: _____ Period:_____ Date: _____ **Notes:**

Why are **viruses** NOT considered living things?
 	
 
	• Viruses differ from living things in several ways:
	  • They need to be inside a living organism to reproduce themselves.
	  • They have no metabolism outside the cell.
	  • They do not have cell parts (e.g., nucleus, mitochondria)
	  • They comprise only a nucleic acid (DNA or RNA) inside a protein capsule

How do viruses reproduce?	• In order to reproduce:
	  o A virus attaches to a host cell
	  o The virus injects the cell with its nucleic acid
	  o The viral nucleic acid commands the cell to make more viral protein and nucleic acid
	  o The cell then ruptures, releasing hundreds of new viruses

What are **retroviruses?**	• These are viruses that store their genetic information as RNA instead of DNA. o Example: HIV
How can you tell the difference between Archaea and Bacteria?	▪ Bacteria have peptidoglycan and certain specialized lipids in their cells walls that are not present in Archaea ▪ Bacteria live in the same environment as humans, some are anaerobic) ▪ Archaea live in EXTREME conditions (high pressure/ temperature, deep sea vents) ▪ Most are anaerobic!

What are **bacteria?**
 	
 
	• Bacteria are living, unicellular prokaryotes.
	• In their own kingdom Bacteria
	• Heterotroph or autotroph (most use chemosynthesis).
	• Bacteria are classified based on their shape, type of cell wall, and movement
	  o Bacteria have three basic shapes:
	  ▪ Bacilli – rod-shaped
	  ▪ Cocci – spherical
	  ▪ Spirilla – spiral

How do bacteria grow and reproduce? 	Bacteria reproduce asexually: • **Binary fission** – a bacteria doubles in size; copies its DNA and divides, producing two identical cells. • **Spore formation** – in unfavorable conditions (lack of food, water) bacteria form a capsule that encloses its DNA and part of its cytoplasm • When conditions are better, the spore germinates and grows.
What do bacteria do?	• Bacteria are most widely known for causing diseases such as strep throat, tetanus, meningitis, and tuberculosis. • However, most bacteria are very useful: o *E. coli* helps us digest our food. o Many are important decomposers in our ecosystem. o *Rhizobium* provides plants with nitrogen. o Oil dissolving bacteria are used to clean up small oil spills.
What are **vaccines?** 	• A weakened form of the pathogen (virus/bacteria) is used to stimulate the production of antibodies. • However, bacteria and viruses have very high reproductive rates, which result in many mutations. • Thus, bacteria and viruses evolve quickly, often requiring a different vaccine every year. • There are two types of vaccines (immunities): • **Active immunity** – person is injected with the actual pathogen, and immune cells make their own antibodies against the disease, immunity is permanent. • **Passive immunity** – person is injected with antibodies that fight the disease, but immunity is temporary.
Summary:	