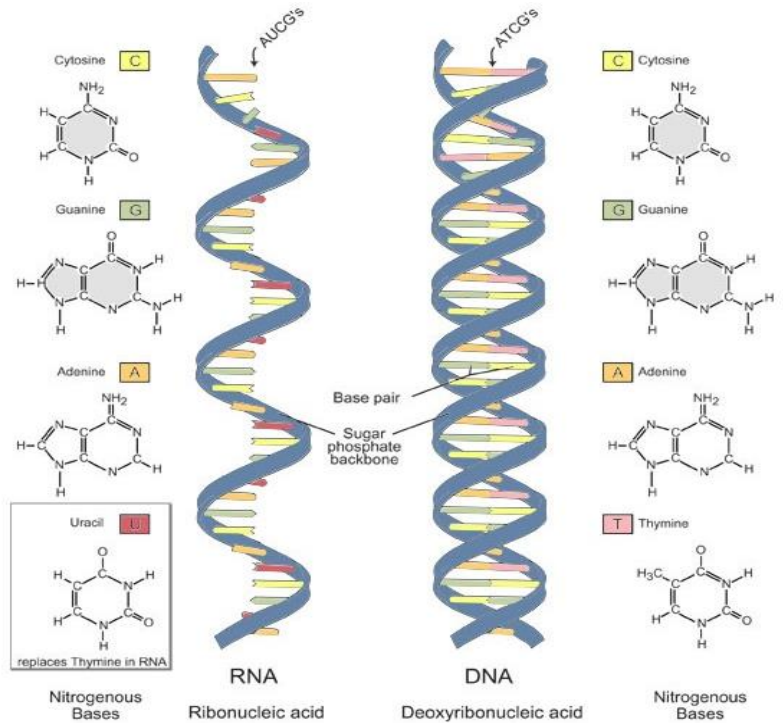
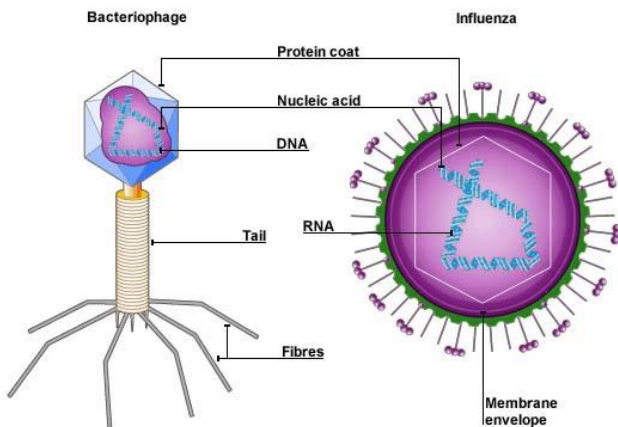


Are Viruses Alive? Writing Prompt

Background Information: For years, scientists have debated whether or not viruses should be considered alive. Viruses include disease-causing agents in humans such as influenza, rhinovirus (the cold virus), and HIV (human immunodeficiency virus). Viruses are made of two molecules commonly found in cells—protein and genetic material. Unlike other organisms, not all viruses contain DNA as their genetic material. Instead, some viruses contain a molecule similar to DNA called RNA. The structures of the DNA and RNA molecules are shown side-by-side below and to the right.

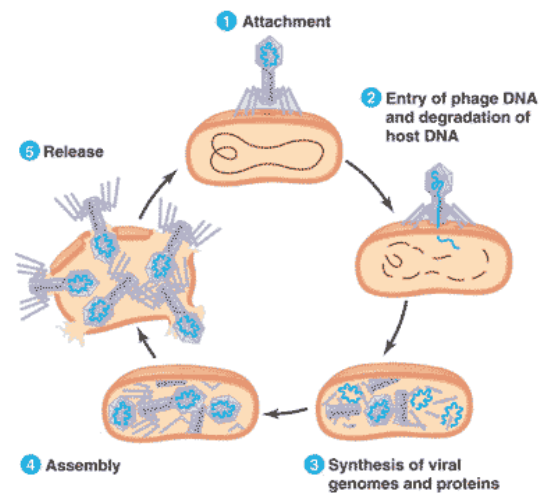
Their protein outer coating typically surrounds and protects their genetic material (molecules which determine the traits of the virus and are passed on to any baby viruses / virus offspring). Though they are made of some molecules typically found in cells, they do not contain all the essential parts of a typical cell.

Viruses can reproduce only by infecting other organisms (ex: bacteria, plants, and animals). The image below shows a bacteriophage—a type of virus that infects bacteria cells—and the influenza virus. Though they look different from each other, they have the same basic structure—a protein coat surrounding genetic material.



To infect the cells of other organisms, viruses use a needle-like structure that is

part of their protein coat to inject their genetic material (either DNA or RNA) into the host cell. They then use the host cell's tools to make baby viruses based on their genetic material. These baby viruses then burst out of the host cell, killing it in the process. The image to the right shows the infection process.



Viruses do not make or use energy molecules of their own. Instead, they use the energy molecules created by their host cell to provide energy for reproduction. Additionally, because they live inside a host cell, viruses do not need to respond to the environment or maintain stable internal conditions. The host cell does this for them.

Groups of viruses change over time. This is why you need a new flu shot every year. The population of influenza viruses changes enough every year that old vaccines will be ineffective against the traits displayed by the new viruses.