

**Intro to Viruses
Group Worksheet**

Name: _____ Per: ____ #

Purpose: To describe the characteristics of viruses and how they infect a host cell.

Directions: Discuss the following questions as a group and use the resources provided to answer the questions.

Resource #1: Characteristics of Viruses

1. What macromolecule(s) are viruses made up of?
2. Are viruses living things? How do you know?
3. How are viruses able to reproduce if they cannot reproduce on their own?

Resource #2: General Pathway of Viral Infection

4. What is a capsid?
5. What does a virus inject into a bacterial cell?
6. What must be assembled inside of the host cell to make a new virus?
7. Viruses use the enzymes of the host cell to complete protein synthesis and DNA replication. Why do they need to complete protein synthesis and DNA replication?
8. Does the virus shown in Resource #2 follow the Central Dogma of molecular biology? Explain by describing what the central dogma is (DNA>RNA>Protein).
9. Using the words *virus*, *DNA*, *host cell*, *proteins*, *replication*, *transcription*, and *translation*, describe how a virus infects a host cell.

Resource #3: Lytic v. Lysogenic Cycle

10. What are the names for the two ways that a virus can behave once it enters a host cell?

11. What type of cell has been infected in the diagram shown in Resource #3?

12. What is a prophage?

13. Compare the two cycles by completing the chart below:

	Lytic Cycle	Lysogenic Cycle
What happens to the DNA that has been injected into the host cell?		
Is the host cell destroyed?		
How is the host cell "used" by the virus? (<i>What is it used to do?</i>)		
What is the end result of this cycle?		

14. Using words like *bacterial chromosome*, *phage*, and *lysis*, describe how a virus might infect a cell and use it to produce new viruses.

15. Using words like *phage*, *prophage*, *bacterial chromosome*, and *host cell*, describe how a virus might infect a cell and remain inside the cell without killing it.

16. **Think Critically:** HIV and the Herpes Simplex 1 virus both can remain within the host for many years without any symptoms. Referring to the diagram in Resource #3, why do you think this might occur?

Resource #4: Retroviruses

17. Describe the structure of a HIV virus.

18. What enzyme is present in the HIV virus?

19. Does the HIV virus follow the Central Dogma of molecule biology? Explain by referring to evidence in the diagram.

20. HIV belongs to a class of viruses called “retroviruses.” Knowing how HIV functions, and the root of the word “retro-“ means “in reverse” or “backward,” what do you think a retrovirus is/does?

21. Imagine you have been asked to develop a cure for HIV. Knowing how the virus infects a cell, explain **two** parts of the virus’s replication cycle that you might be able to inhibit (stop from working) in order to stop the virus’ ability to reproduce.

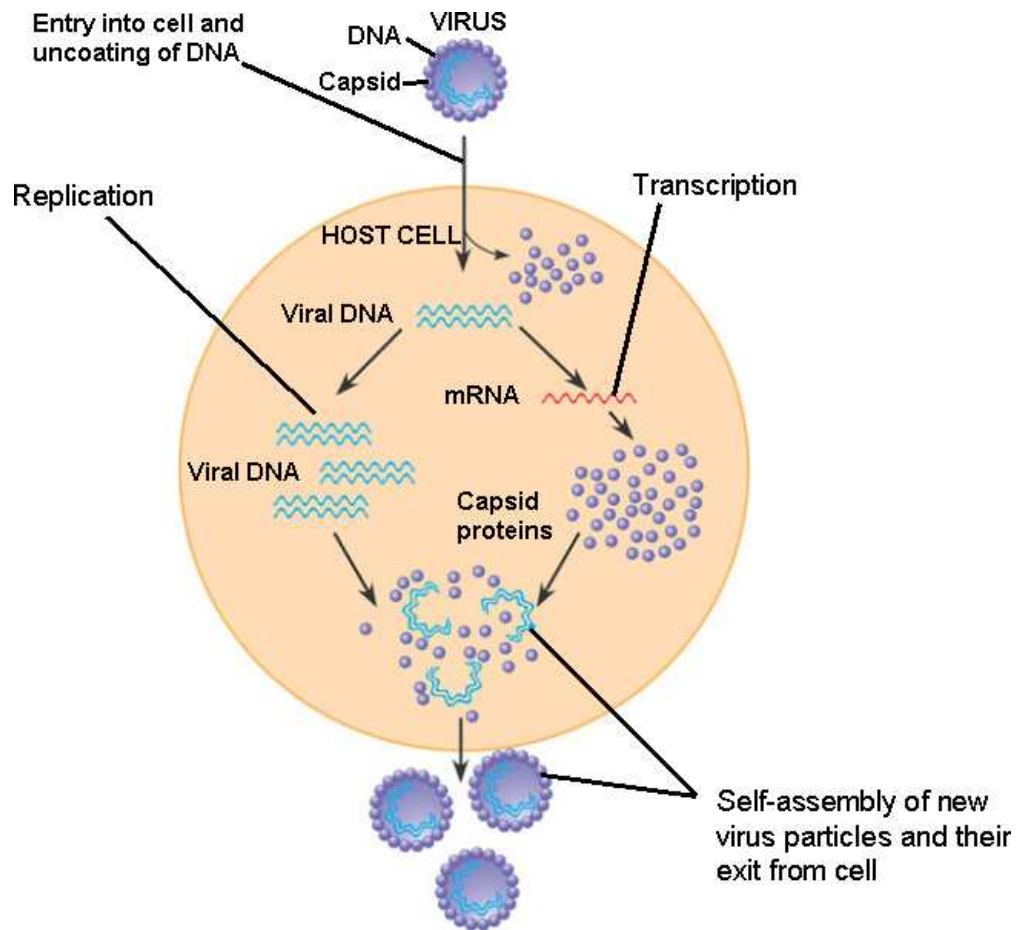
RESOURCE #1: Characteristics of Viruses

Have you ever gotten the flu? How about a nasty cold? If so, you've had an encounter with a viral infection. But how much do we know about these pathogens? Answer: quite a lot!

Viruses are so small that special size scales have been developed to measure them. 950,000 viruses end-to-end would fit across a penny and 9,500,000 viruses end-to-end would fit along the length of a new pencil. Think about this: if all the people in the US were shrunk to the size of viruses, they would fit on the eraser ends of two pencils with plenty of room left over for future generations.

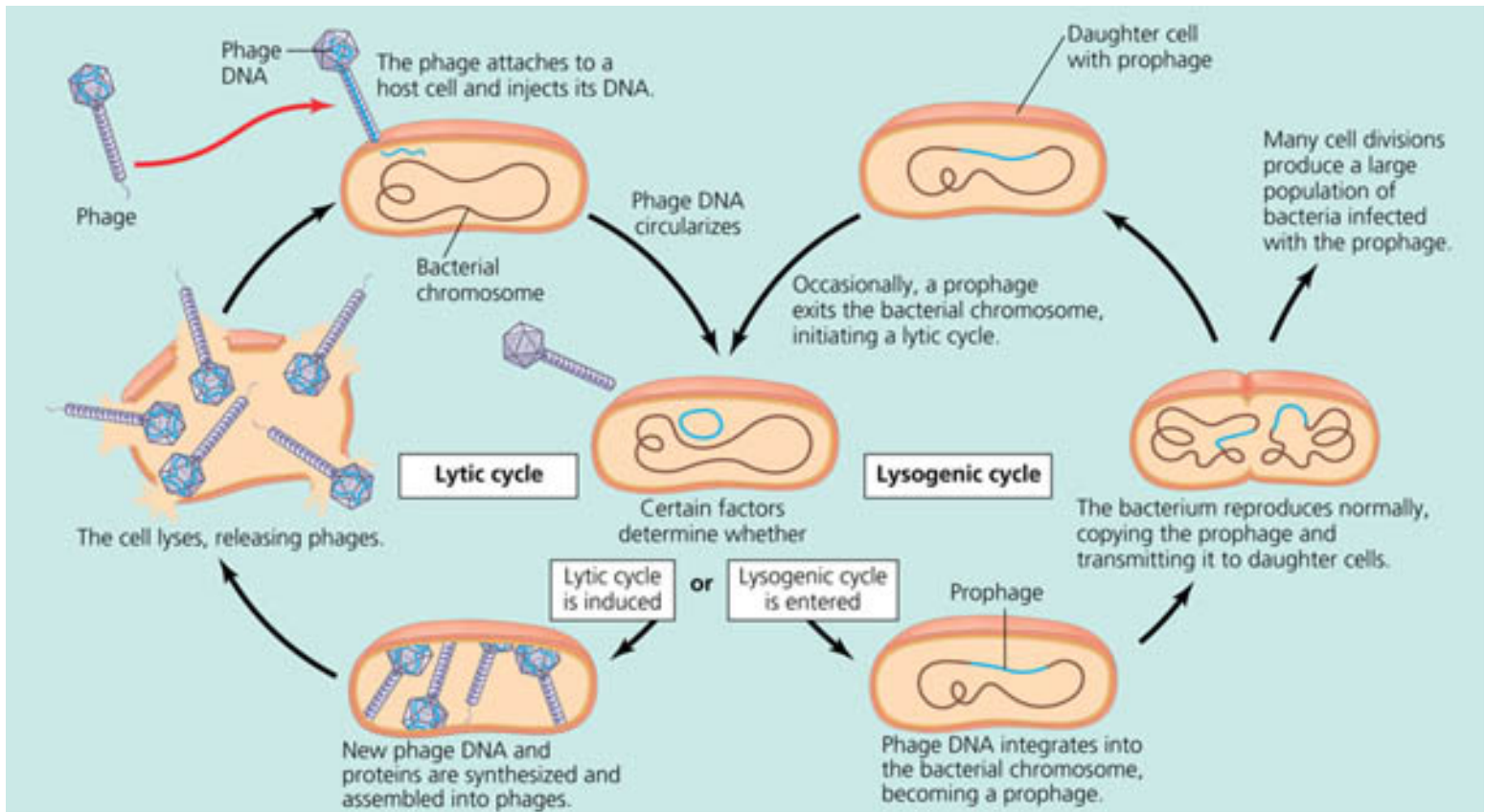
Viruses come in a variety of shapes, but the most complex are **bacteriophages**, which, as their name suggests, attack bacteria. They look like little lunar spacecraft and have a hollow modular head and spindly legs for grasping the surface of bacteria. Regardless of their shape, however, all viruses have a protein coat that surrounds tiny strands of viral genes, which can be either in the form of DNA or RNA. Viruses may have genes, but they contain no cell parts and are not made up of cells. They do not require energy and they do not take in food or give off waste products. Because they require another cell in order to reproduce, they are called "obligate parasites." Usually, specific viruses will only infect specific organisms. For example, a plant virus cannot infect an animal.

RESOURCE #2: General Pathway of Viral Infection



RESOURCE #3: Lytic v. Lysogenic Cycle

The diagram below shows two ways that a virus can behave once it has entered a host cell.



Helpful Hints:

- ✓ A **phage** in this diagram is the same as a “bacteriophage” because this phage is attacking a bacterial cell.
- ✓ “**Lysis**” refers to the rupturing of a cell.

RESOURCE #4: HIV and Retroviruses

