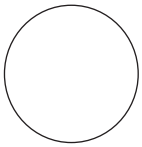
# 7(a): INSIDE A CAPSID

All viruses have a genome, which can be either DNA or RNA.
Many viruses also have one or more protein "tools"inside the capsid (tools it will need immediately after entry).

**POLIO**

RNA(+)

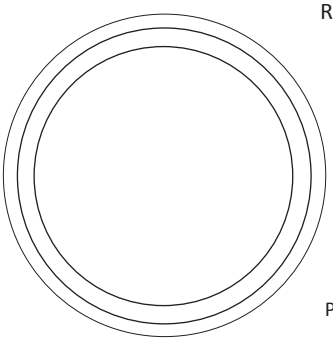


flat attachment proteins

PolyA tail

**HIV-1**

RNA(+)



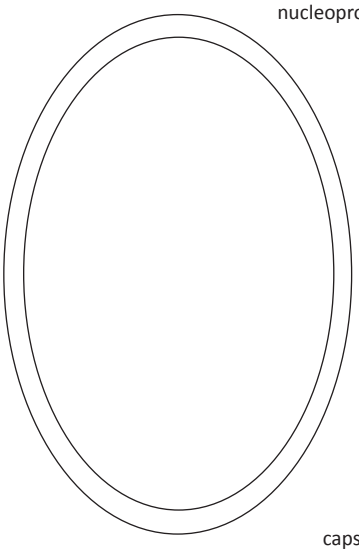
Protease

Integrase

Reverse Transcriptase
(for turning RNA into DNA)

**SMALLPOX**

DNA nucleoproteins



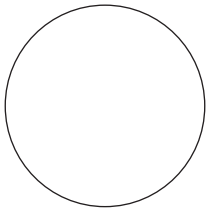
capsid

over 100 enzyme tools!

lateral bodies (function unknown)

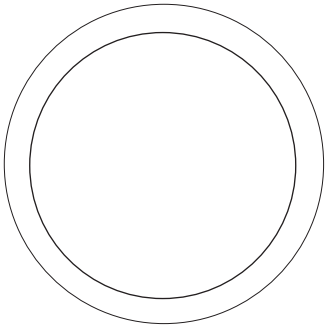
envelope with attachment "tubules"

**PAPILLOMA**



DNA wound around protein spools

**CORONA**

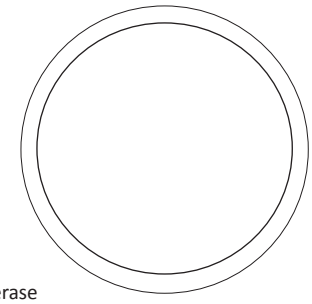


Huge genome - 30,000 bp
RNA(+) is wrapped around nucleoproteins

**INFLUENZA**

NEP

RNA polymerase



RNA(--) wrapped around nucleoproteins

**Viruses do not have:**

1) _____

2) _____

3) _____

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Virologists draw viral genomes as a straight line when they want to show where information is located.
Each segment represents the instructions for one thing, sort of like a chapter in a book.

Both RNA and DNA are directional.
One end is called 5-prime and the other is 3-prime.

As a general rule, the genome is read and used in this direction.

| |
|---|
| |

how to make viral structures

when to use tools

how to make tools

NOTE: Viruses don't have spell checkers or editors.

**UTR** = untranslated region *(not read by ribosomes)*

# 7(b): CLASSIFYING VIRUSES

**THE VIRUS'S STRATEGY WILL DEPEND ON WHAT TYPE OF GENOME IT HAS.**

KEY: ds = double-stranded (+) = "positive sense" RNA that is ready to be read by ribosomes
ss = single-stranded (-) = "negative sense" RNA that is "backwards" [So a (+) copy will need to be made.]

| | |
|---|---|
| 1) _____ | Herpes family<br>Papilloma (warts)<br>Pox family<br>Adenovirus<br>Polyoma |
| 2) _____ | <u>Animals</u><br>Parvo<br>Circo<br>Anello<br><u>Plants</u><br>Gemini<br>Nanoviruses<br>Microvisuses |
| 3) _____ | Reoviruses<br>(Ex: Rotavirus-- "the stomach flu") |
| 4) _____ | Calici<br>Corona<br>Flavi (yellow fever)<br>"Picorna" family:<br>polio, rhino<br>Coxsackie B |
| 5) _____ | Arena<br>Rabies<br>Ebola<br>Influenzas<br>Measles<br>Mumps |
| 6) _____ | HIV (AIDS)<br>cancer-causing viruses, esp. leukemias |
| 7) _____ | Hep B<br>fish viruses<br>feline leukemia |

**THIS CHART REPRESENTS THE "BALTIMORE CLASSIFICATION SYSTEM" invented by David Baltimore.**

David Baltimore won a Nobel Prize in 1975 for discovering _____.

*Recently (and quite surprisingly) RT has been found in the human genome. It allows sections of the genome to be moved to a new location, and also seems to be used in restoring the length of chromosomes as they shrink over time*