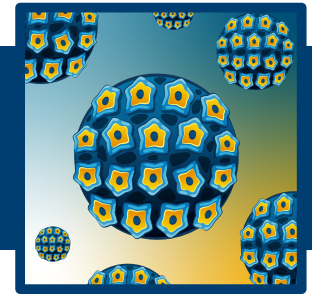


Teacher Directions

UNIT: GOING VIRAL!

LESSON 2: PUBLIC HEALTH: IT'S A PROCESS!

Activity 2A: Viral Invasion! Time to Ink, Think, & Link!



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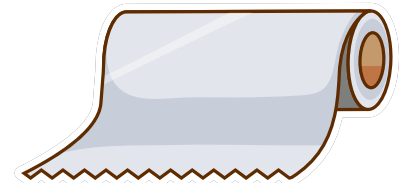
Suggested time: ~15-20 min

Instructional Objectives: Students will be able to...

- › Identify the sequence of the HPV16 viral replication cycle.
- › Correlate the cell cycle to viral replication and cancer formation.

Student Materials

- › Paper table covers for desks (butcher paper)
- › Markers
- › Prompts
- › Article Sections



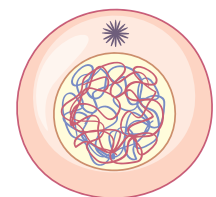
Round 1: Ink (cell cycle section including mitosis figure)

Organize students into their public health committees of 3-4.

Place butcher paper over desks to create table covers for students to draft their ideas.

Provide students with the following prompt:

- › **In your groups, sketch the cell cycle.**
 - Students start to discuss the cell cycle and its steps.
 - Students draw on the butcher paper covering their table.
- › Circulate between groups, giving minimal feedback, but keeping groups on track.



MIDDLE & HIGH SCHOOL LEVEL

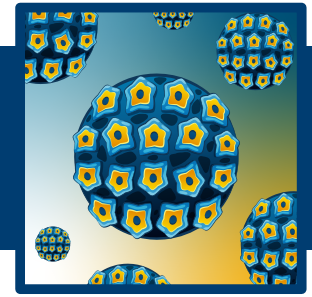
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Teacher Directions

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LESSON 2: PUBLIC HEALTH: IT'S A PROCESS!

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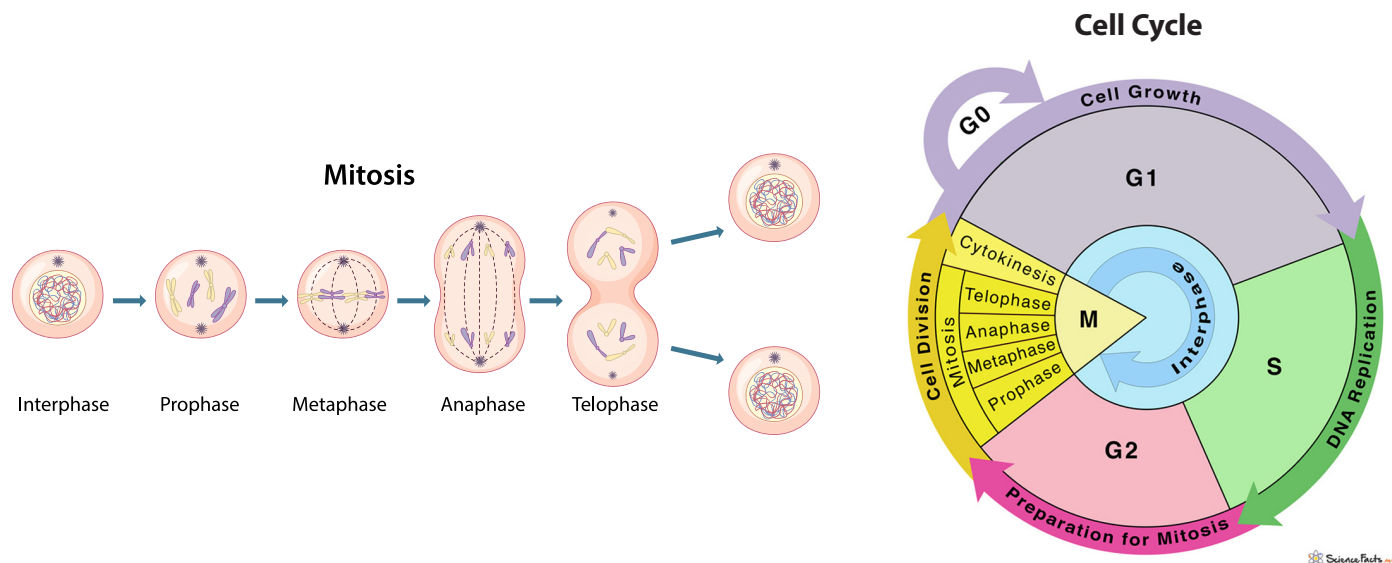


Activity 2A: Ink, Think, Link

Cell Cycle

Viruses contain genetic material, sometimes a single strand of RNA or even double-stranded DNA. Although viruses contain genetic material, they lack the mechanisms required for the genetic material to replicate. Because they cannot replicate by themselves viruses are classified as non-living. HPV is an **icosahedral** (eye-coh-sah-HEE-drill) virus containing a double-stranded DNA molecule consisting of the same base-pair system found in human DNA. Viruses replicate by invading a living cell and hijacking the mechanisms of the **cell cycle** to make copies of its own genetic material. The cell cycle is a series of events in which each cell grows, replicates its DNA, and divides into two daughter cells. The longest part of the cell cycle is **interphase** during which the cell grows and prepares for the next phase: **mitosis** (my-TOH-sis).

When a cell is not infected with a virus, the cell cycle proceeds as normal. The DNA replicates during interphase in the cell cycle, creating duplicate strands of DNA, known as **chromosomes** (CROW-mah-sohms). During mitosis, the duplicated chromosomes separate and migrate to opposite areas of the cell. The cell then splits in two resulting in two daughter cells with the same number of DNA strands as the original cell. After separation, each daughter cell undergoes **differentiation**. During the differentiation process, each daughter cell becomes specialized. For example, a heart tissue cell that undergoes mitosis will produce two daughter cells. During differentiation, each daughter cell will acquire the unique characteristics and functions of a heart cell. But when infected by a virus, the virus sends signals that misdirect the cell's replication process to facilitate viral replication.



MIDDLE & HIGH SCHOOL LEVEL

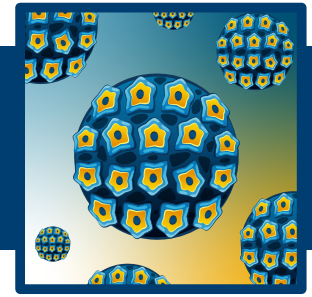
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Teacher Directions

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Round 2: Think

Students travel with their committee to a new table.

Students look at the sketch that was done and give feedback.

Suggestions:

- › Did the group label all the steps?
- › Are they missing any important steps?
- › Do you need to change anything about the sketch?
- › What could be improved?

Provide a new prompt:

› How could a viral infection disrupt the cell cycle?

- Students brainstorm ideas with their committees.
- Using their understanding of the cell cycle and viral replication, students will draft and write a response on the same butcher paper.



Round 3: Link

Students rotate with their group to the next table.

Students critique the sketch and the answer provided by the previous group.

- › Do you think they answered the prompt correctly?
- › How would you improve their response?

Provide final prompt:

› How could a virus lead to cancer?

- Using the notes on the butcher paper, students will link the sketch and written responses for discussion with their committee. Together, the committee will generate a response to the final prompt and generate any new questions the committee needs to consider.

Actively monitor responses and clarify any misunderstandings.

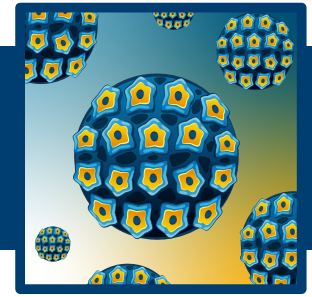


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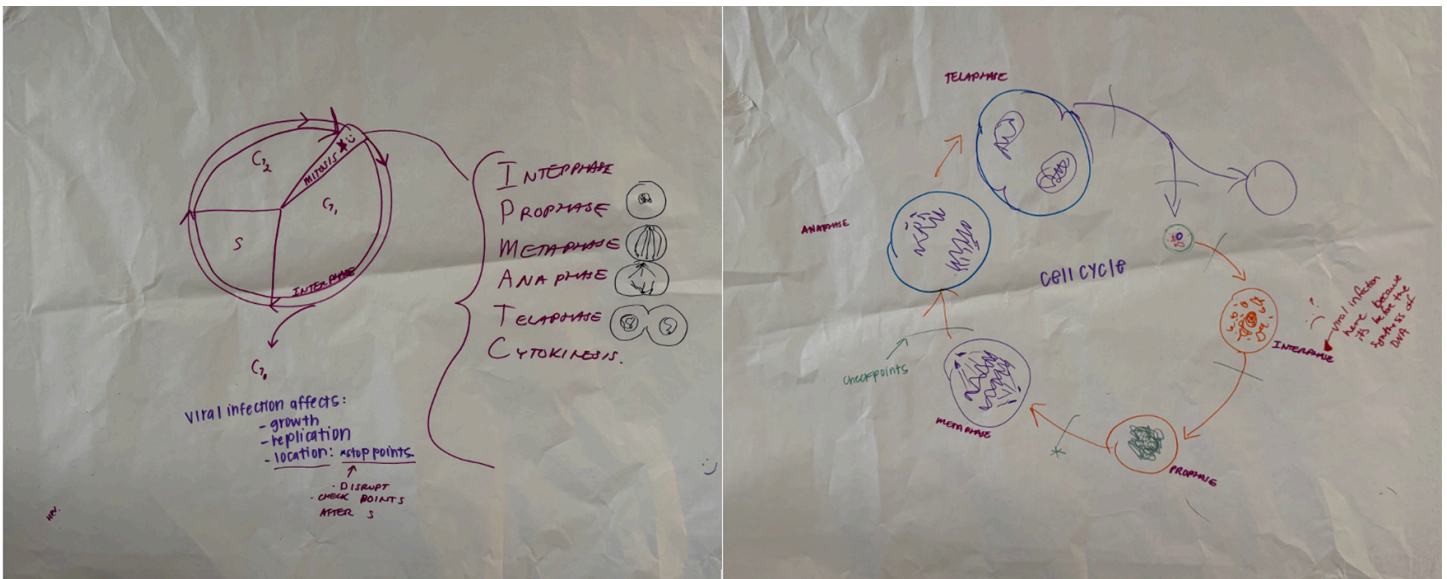


Possible Extension: Gallery Walk

To assess prior knowledge or as an extension:

- › Draw how a virus enters the cell.
- › Draw and label a virus with the parts necessary to cause an infection.
- › Viruses are known for making people sick—but could they also play a role in diseases like cancer? What might that look like?
- › How might a virus change the way a cell behaves—and what could happen if those changes aren't controlled?

Exemplar:



MIDDLE & HIGH SCHOOL LEVEL

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