Lesson Questions

• What steps are involved in viral infection and replication?

• Why are some kinds of influenza virus more deadly than others?

• How do flu viruses and HIV overcome immune system defenses?
Lesson Objectives

• Create a model of viral infection and replication.

• Explain why some kinds of influenza virus are more deadly than others.

• Describe how flu viruses and HIV overcome immune system defenses.
Unique Lesson Features

• Antigenic drift activity

Simulates cycle of infection, transcription and translation in the Antigenic Drift activity.
Lesson FAQs

• What’s in the lesson?
  • Students examine the concepts of antigenic variation and resistance using influenza and HIV as models and conduct an activity to model antigenic shift and drift.
  • Students research the influenza pandemic of 1918 to investigate how antigenic variation can defeat the immune system.
  • Students investigate HIV infection, exploring a model of HIV’s infection process and analyze why HIV degrades the human immune system.

• What interactives are there?
  • Students watch the animation *Antigenic Drift: How the Influenza Virus Adapts* and a NOVA video.
Lesson FAQs (cont.)

• What other activities are there?
  • Students draw on their own experiences to describe symptoms of influenza and vaccinations to prevent infection.
  • Students complete a hands-on activity to model the genetic processes underlying antigenic drift.
  • Students develop a hypothesis for why people need annual vaccinations against influenza.
  • The class discusses hypotheses, including how well the activity modeled antigenic drift and antigenic shift.
  • Students groups research the influenza pandemic of 1918.
Lesson FAQs (cont.)

• What other activities are there? (cont.)
  • The groups create a concept map to illustrate various facts about the 1918 influenza pandemic.
  • Students complete worksheet questions on a NOVA video about the pandemic.
  • The class discusses the role of antigenic drift and antigenic shift in the development of the pandemic.
  • Students write a brief report on their investigation.
  • Students investigate the life cycle of HIV and identify key steps allowing cell infection, replication and reinfection.
  • Students complete worksheet questions on the life cycle of HIV.

• How long is the lesson?
  • Four to five 45-minute sessions
Lesson FAQs (cont.)

• What are the lesson pre-requisites?
  • Students should have:
    • Passed high school biology and chemistry
    • Completed all lessons in Unit 1 and Lesson 1 of Unit 2.

• Who is the lesson designed for?
  • College prep students
  • Honors students
  • Advanced placement students
  • GED students (lesson may need adapting)
Lesson Content and Timing

**Engage (15 mins)**
- Describe flu symptoms
- Share descriptions

**Explore 1 (60 mins)**
- Explore interactive glossary
- Watch animation
- Complete antigenic drift activity

**Explain 1 (30 mins)**
- Complete activity questions
- Hypothesize about influenza vaccinations
- Discuss hypotheses

**Explore 2 (45 mins)**
- Research the 1918 influenza pandemic
- Create concept map about pandemic
- Watch NOVA video

**Evaluate (10 mins)**
- Assess students

**Elaborate (35 mins)**
- Investigate HIV life cycle
- Complete worksheet questions
- Create HIV poster

**Explain 2 (30 mins)**
- Complete worksheet questions
- Discuss antigenic drift and antigenic shift