



A PILOT DVD PROJECT

THE SMALLEST MENACE IS NOT DENNIS

Pre- and Post-Video Activities

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Activity: Pre-Video

Time Frame: One class period (50-55 minutes) or less.

Materials:

1. Student handout titled “Capsule Concepts Viruses”

Teachers Directions:

✂✂ Students will complete the Capsule Concepts activity before viewing DVD.

✂✂ See handout titled “Capsule Concepts Pre DVD Activity Teacher Instructions” for details on this and sequence mapping which will be used later.

✂✂ Give students the handout titled “Capsule Concepts Viruses” to assist them in this activity.

✂✂ Once completed discuss the activity to insure students comprehend and are comfortable with the concepts. You may collect these or allow students to refer to them during video.

Student Directions:

(See attached Black Line Master: Capsule Concepts Viruses)

Evaluation:

1. Completed pre-activity worksheet
2. Participation

Activity: During Video and Post-Video

Time Frame: One to two class periods (50-55 minutes). Lecture one and four from the DVD will be used to complete the activities. Both lectures can be shown during same period or split into two periods.

Materials:

1. Student handout titled “DVD Student Handout Lecture 1”
2. Student handout titled “DVD Student Handout Lecture 4”
3. Student Handout titled “Virus Replication Puzzle Handout”
4. Glue and construction paper for sequence maps
5. Student Handout titled “Virus Word Search” to complete if student finishes early

Teachers Directions:

- ✂✂ This lesson reinforces the concepts concerning viruses. Viruses can be complicated to understand when reading about them in a textbook. With the help of Dr. Ganem, the DVD lesson will reinforce these concepts through lecture, animation video-clips, and demonstration.
- ✂✂ For maximum benefit, students should be familiar with key viral concepts before this lesson. The pre-video activity using necessary concepts should be completed first.
- ✂✂ Give out the three handouts “DVD Student Handout Lecture 1 and Lecture 4, plus the Virus Replication Puzzle Handout”.
- ✂✂ The teacher’s copy with answers is “DVD Handout Lecture 1” and “Lecture 4”.
- ✂✂ You may want to play both lectures together or split them. That is why two handouts were provided.
- ✂✂ Some of the questions may require you to pause the video occasionally. In addition, some of the questions will need to be completed **after** the video because of time restraints.

Student Directions:

(See Attached Black Line Masters: DVD Student Handout Lecture 1, DVD Student Handout Lecture 4, Virus Replication Puzzle Handout, and Virus Word Search)

Evaluation:

1. Completed pre-activity worksheet
2. Completed during and post video activities

Extensions:

- ✂✂ Have students research a virus, write a paper on it, and create a 3D model of their virus.
- ✂✂ Information to be covered in research:
 - ✂✂ Mode of transmission
 - ✂✂ Treatment

~~///~~ Impact on society (past and present)

~~///~~ Susceptible

~~///~~ Sources for information:

~~///~~ Nih.gov

~~///~~ Cdc.gov

~~///~~ Pbs.Org/

~~///~~ Discover.com

Capsule Concepts

VIRUSES

Concepts Used:

Partners name:

Partners concept use:

Summary of viruses using concepts:

Capsule Concepts

Pre DVD Activity Teacher Instructions

Capsule Concepts is a CRISS strategy and can be found on page 152 in the CRISS manual. Capsule concepts employ four steps: talking, listening, writing, and reading. Below is an explanation of how you would use capsule vocabulary for this lesson.

1. Select from 8-10 words, which relate to a single topic or concept. Write these words on the board. Some words that would be good to use are virus, host cell, retrovirus, receptors, pathogens, mutation, recombination, provirus, NA polymerase, RNA polymerase, lytic cycle, and lysogenic cycle.
2. Begin discussing the topic with the class. In your model discussion, include these words.
3. Divide students into pairs. Partners hold conversation using as many words as they can. Each student keeps track of the words his or her partner uses.
4. Each student writes a summary or brief paper on the topic using the concepts. In this case the topic would be viruses and they will write a summary.

Sequence Mapping

This is another CRISS strategy found on page 65 in the manual. Here is a brief explanation of it.

Students decide upon the main event(s) of a story, chapter, or an entire novel and place them in correct order. Students can use pictures, words, or a combination of both. In this case Virus Replication would be the main event. Sequence mapping makes an excellent cooperative team project. You may want students to work together on this or separately.

DVD Teacher Handout
LECTURE 1

Complete the following questions or activities while viewing the film on Viruses.

Hint: Some of the activities may require you to record important information during film and completing the activity after it.

1. What is the root cause of 33 million people dying since 1981-1982?
(Chapter 7)

The AIDS Pandemic

2. What are viruses? In your own words briefly describe, draw, and include an example of each type of virus mentioned. (Chapter 10)

Students may have mentioned that viruses are macro molecular aggregates that contain a DNA or RNA genome and that viruses contain a protein coat encoded by their own genes. These are called nonenvelope viruses with the example given as polio. In addition some viruses, called envelope viruses, have an additional coat made up of lipid and protein for example HIV.

3. Watch the size analogy demonstration that Dr. Ganem does for viruses. What was the smallest object he used to illustrate this analogy and what did it represent? (Chapter 11)

He used an aspirin and it illustrated a virus.

4. Can you come up with a size analogy that would also work for a virus?

Answers will vary.

5. Pay close attention to the animation of virus replication. Complete a sequence map of this action. Hint: you may want to take notes and complete this after the video. (Chapter 12 & 13)

1. Attachment: The virus's receptors attach to the cell surface receptors 2. The internal contents including the genome enter the host cell. 3. Disassembly of incoming virus particle 4. Genome replication 5. Assembly: Viral progeny wrap genome with proteins to give rise to viral daughter particles 6. Budding off of new virus particles

6. What are CD4 and Chemokyn? (Chapter 36)

HIV co-receptors

7. Does HIV integrate with human DNA? How does this occur? (Chapter 37)

Yes, the HIV virus attaches to human chromosomes

Lecture 4

Complete the following questions or activities while viewing the film on Viruses.

Hint: Some of the activities may require you to record important information during film and completing the activity after it.

- Describe two ways that new diseases arise. (chapter 5)
 - Genetic change in the virus itself**
 - Changes in the virus' ecological niche- natural changes like rainfall, volcanoes, drought, man-made changes, urbanization, and travel.**
- What example does Dr. Ganem give of a retrovirus? (chapter 7)
HIV
- How many mutations might occur in a retrovirus containing 20,000 bases? 40,000 bases? 60,000 bases? (chapter 7)
One might expect 2, 4, and 6 mutations respectively or 1 every 10,000 bases.
- Compare the proofreading abilities of a RNA-based genome to that of a DNA-based genome by stating how they are similar and how they are different. (chapter 9 & 10)
DNA-based genomes contain the "proofreading" protein called DNA Polymerase, which checks that newly incorporated bases are correctly paired and if any are not paired correctly it removes them. RNA Polymerases lack this "proofreading" ability, which results in the incorrectly paired bases being incorporated in the genome. Because of the lack of "proofreading" RNA-based genomes have a higher rate of mutations.
- What can you conclude about the consequences if a virus has an elevated mutation rate? (chapter 11)
This variance may cause the virus to become resistant to antiviral drugs.
- What type of virus is the influenza virus? How is it different from a retrovirus? (chapter 12)
It is an envelope RNA virus
- What makes the genome of the influenza virus different from others? (chapter 12)
Its genome is not made up of a single RNA molecule but of 8 RNA segments. Each one encodes for a single viral protein.
- Watch the animation showing a host cell becoming infected by two strains of the flu virus. This is called recombination. Create a sequence map for this animation and then by using a Venn Diagram compare (how are they similar and different) your sequence map from lecture one with this map. (chapter 20)
The difference is that during assembly the two different strains assemble together instead of separate giving rise to a new virus that may be resistant to antibodies.
- How does recombination occur in nature with the influenza virus? (chapter 21)
In nature birds carry many different strains of the virus, but it is uncommon for these viruses to infect humans. Pigs on the other hand, which have their own type of virus, can contract the viruses from birds. Pigs then become the mixing vessels because recombination can occur between these viruses. Since humans can contract the flu virus from pigs this newly formed virus that now has a different antigenic surface, maybe resistant to previous antibodies, which may cause a pandemic or a worldwide spread of the virus.

DVD Student Handout
LECTURE 1

Complete the following questions or activities while viewing the film on Viruses.

Hint: Some of the activities may require you to record important information during film and completing the activity after it.

1. What is the root cause of 33 million people dying since 1981-1982?
2. What are viruses? In your own words briefly describe, draw, and include an example of each type of virus mentioned.
3. Watch the size analogy demonstration that Dr. Ganem does for viruses. What was the smallest object he used to illustrate this analogy and what did it represent?
4. Can you come up with a size analogy that would work for a virus?
5. Pay close attention to the animation of virus replication. Complete a sequence map of this action using the virus replication puzzle handout. Hint: you may want to take notes and complete this after the video.
6. What are CD4 and Chemokyn?
7. Does HIV integrate with human DNA? How does this occur?

DVD Student Handout
Lecture 4

Complete the following questions or activities while viewing the film on Viruses.

Hint: Some of the activities may require you to record important information during film and completing the activity after it.

1. Describe two ways that new diseases arise.
2. What example does Dr. Ganem give as a retrovirus?
3. How many mutations might occur in a retrovirus containing 20,000 bases? 40, 000 bases? 60, 000 bases?
4. Compare the proofreading abilities of a RNA-based genome to that of a DNA-based genome by stating how they are similar and how they are different.
5. What can you conclude the consequence will be if a virus has an elevated mutation rate?
6. What type of virus is the influenza virus?
7. What makes the genome of the influenza virus different from others?
8. Watch the animation showing a host cell getting infected by two strains of the flu virus. This is called recombination. Create your own sequence map for this animation and then by using a Venn Diagram compare and contrast (how they are similar and different) your sequence map from lecture one with this map.
9. How does this occur in nature with the influenza virus?

Virus Replication Puzzle Handout

GENOME REPLICATION

DISASSEMBLY OF VIRUS PARTICLE

ATTACHMENT: VIRAL PROGENY WRAP GENOME WITH
PROTEINS TO GIVE RISE TO VIRAL DAUGHTER
PARTICLES

THE INTERNAL CONTENTS INCLUDING THE GENOME
ENTER THE HOST CELL

BUDDING OFF OF NEW VIRUS PARTICLES

Virus Word Search

H H X M A O T I E Z Q X C E D U M K K Z
U C R I M A A B S X A L T N O I Y L C W
D R G F R Y A G A M M J A J T I L S H X
E L S F E U X P R X X P J B F X T E S O
E L C Y C C I N E G O S Y L S O T Z C S
P R J A O P B L M L L O X Y C N L G M R
K I O P M J M K Y R C M G X W I C T M Z
P V R P B P O M L P V Y C T H R X O S M
Q O Q H I L E L O S Y Q C Z E T B T U R
U W R A N R E O P G Q X W C V Q W T G B
E Z W M A C E A A H S Q E L I V A E Q W
W M Q S T G T T N Q O P F C M T D S M A
S R E S I H V T R H T L R Z I Y Y Z E R
I V O Y O W R E Y O V D C O L Z D L A J
L H F G N R S K R L V N N S V E Y V Q B
N R E P V U V S S C J I W L N I M T K L
S N I A N X Q V G N S W R P G I R E L M
S N X N S R G H L R X P Y U H V T U Y A
X B O W I C T S V T Q R I G S J W W S N
D H V P L Z C S O S Z C I K W Q H H O D

DNA POLYMERASE
HOST-CELL
LYSOGENIC-CYCLE
LYTIC-CYCLE
MUTATION
PATHOGENS
PROVIRUS
RECEPTORS
RECOMBINATION
RETROVIRUS
RNA POLYMERASE
VIRUS