

Title: The World of the Virus Primary Subject Area: Life Science Grade Level: 7 - 8 **Overview:** Learn what is a virus and how it operates. **Approximate Duration:** Three class periods **MA Frameworks:** Life Science (Biology), Grades 6-8 : #2 – Recgonize that all living things are composed of cells. and that many organisms are single-celled (unicellular), e.g., bacteria, yeast..., #7, #8 **Interdisciplinary Connections:** Technology, Health, Lesson Objectives: Students will be able to: 1. Define what is a virus 2. Illustrate and label the structure of a virus. 3. Explain how a virus multiplies. 4. Compare and contrast the lytic and lysogenic cycles. **Lesson Materials and Resources** Handout "The World of the Virus" 1. 2. Lists of research websites (included in handout). 3. Small, disposable cups (1 per student in the class), same number of test tubes as students, 1 L distilled water, 1tsp. sodium carbonate, 5ml.phenolphthalein, eyedroppers, index cards (one per student), beaker, permanent marker, tape, test tube rack. 4. Computers to access on-line sites. 5. Classs set of paper bowls, one small piece of black construction paper for each student, water, clear nail polish. 6. **Technology Tools and Materials** Computer access for each student or in pairs. **Background Information Useful Vocabulary** New Vocabulary Word Meaning absorption Attachment of viral particle Lytic cycle Cycle of multiplication of an active virus Lysogenic cycle Cycle of hiding within a cell before beginning the lytic cycle **Essential Questions to be answered:** What is a Virus and how do Viruses Affect Living Organisms Misconceptions: Viruses are living., Viruses are a type of bacteria. It is difficult to "catch" a virus. Viruses are living or are a type of bacteria. It is difficult to contract a virus. Any virus can affect any organism. **Lesson Procedures:** Introduce Topic of Viruses with video: www.youtube.com/watch?v=Rpj0emEGSHQ or you can 1.

Lesson Plan

google "catch a virus" and the youtube video becomes one of your choices.

2. Explain to students that in the next 3 classes they will be learning what a virus is and how do viruses affect living organisms.

- 3. To do this, each student will need their own laptop (or they can work in pairs, as needed) and a copy of the WebQuest handout, "The World of the Virus".
- 4. Students can be directed to visit websites independently to complete the questions in the packet, or the teacher can visit each website as a class. The teacher can project each site on the board, have a class discussion on the material presented in each site, have students record the answers to packet questions as the class discusses the website information.
- 5. Discuss answers, explaining concepts as students need. Make sure to clarify the differences between the hidden and active virus cycles.
- 6. Assign question #10 as the final assessment in which students explain in their own words the differences between the lytic and lysogenic cycles.
- 7. Introduce the concept of how are viruses detected. Ask students if they can imagine any way that viruses can be detected. First explain how small they are by using www.cellsalive.com and complete the interactive lesson on "How Big is A" This interactive gets the message across to kids that viruses are tiny particles.
- 8. Ask students what unit of measurement was used to measure the two virus particles. (nanometers)
- 9. Hand students a copy of the "nanoruler" and ask them to use the nanoruler to measure the width of a human hair. Results should be humorus because students will realize that it is impossible to get an accurate measurement with the paper nanoruler.
- 10. Have students work in groups to brainstorm ideas on what could be used to measure in nanometers. Report ideas to the class.
- 11. Present my BU RET Poster on detecting viruses using photons.
- 12. Show the Jove video from BU Photonics lab, introducing the detection of virus particles using the NSF AIR SPI.
- 13. Assign students lab on measuring transmission of light explained in: <u>http://www.phschool.com/science/biology_place/labbench/lab4/spectro.html</u>
- 14. Have groups of students graph their results for each sample.
- 15. The teacher should use an Ipad to snapshot each graph and project on the Eno Board/Smart Board and discuss similarities and differences in the results and interpret each graph.
- 16. Discuss how light travels in wavelengths of varying size.
- 17. Nano-sized light waves can be used to measure the smallest particles like viruses.
- 18. Discuss ideas for other uses of lightwaves.

Assessment Procedures

- 1. Students will complete the packet answering questions regarding viruses and their cycle of multiplication.
- 2. Students will be assessed on their completion of the Spectrophotometer Lab through discussion and accuracy of graphs (title, labed axies, units of measurement, data).

Accommodations/Modifications

- 1. Allow students to work in pairs to encourage peer tutoring.
- 2. Instead of working independently, go through each website as a class, completing the work packet as a class.
- 3. Outline the main points for students to include in their final essay.

Reproducible Materials

- 1. Handout: The World of the Virus
- 2. Lab directions, graph paper from:
 - http://www.phschool.com/science/biology_place/labbench/lab4/spectro.html

Explorations and Extensions

1. Explore uses of light to measure viruses.

Lesson Development Resources

- 1. http://www.phschool.com/science/biology_place/labbench/lab4/spectro.html
- 2. <u>www.youtube.com/watch?v=Rpj0emEGSHQ</u>
- 3. <u>http://www.cellsalive.com</u>

4.

Reflections