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| **TGC Fellow Unit**  |
| Prepared by: Melinda Carpenter School/Location: Nicholas County High School Summersville, WV |
| Subject: Biology Grade: 10 Unit Title: Viruses-Past, Present, Future Time Needed: 4 weeks (20 periods, each 60 minutes) |
| Unit Summary: Students will be researching what is a virus, the history of viruses that have plagued humanity, the scientific innovations that have treated these viruses, viruses that still plague us today and why, the economics of treatement, and design and defend solutions to combat the spread of viruses.  |
| **Stage 1 Desired Results** |
| **ESTABLISHED GOALS:****WVDE Biology Content Standards and Objectives**G1: SC.O.B.1.3-conduct and/or design investigations that incorporate the skills and attitudes and/or values of scientific inquiry (e.g., established research protocol, accurate record keeping, replication of results and peer review, objectivity, openness, skepticism, fairness, or creativity and logic).G2: SC.O.B.1.6-investigate, compare and design scientific and technological solutions to address personal and societal problems.G3: SC.O.B.1.7-given current science-technology-societal issues, construct and defend potential solutions.G4: SC.O.B.1.8-relate societal, cultural and economic issues to key scientific innovations.G5: SC.O.B.2.19-examine the cycle of viruses and compare disease prevention:• vaccinations, vector control, drug therapy**GLOBAL COMPETENCY:** G6. Investigating the WorldG7. Communicating IdeasG8. Taking Action**Grade 9-12 Standards for 21st Century Learning****Learning Skills**G9. 21C.O.9-12.1.LS1Student recognizes information needed forproblem solving, can efficiently browse, searchand navigate online to access relevantinformation, evaluates information based oncredibility, social, economic, political and/orethical issues, and presents findings clearly and persuasively using a range of technology tools and media.**Technology Tool Objectives**G10. 21C.O.9-12.1.TT1Student makes informed choices amongavailable advanced technology systems,resources and services (e.g., globalpositioning software, graphing calculators,personal digital assistants, web casting,online collaboration tools) for completingcurriculum assignments and projects and formanaging and communicatingpersonal/professional information.G11. 21C.O.9-12.1.TT7Student uses advanced features and utilitiesof presentation software (e.g., slidetransitions, master slides, narrations andtimings, creating web-enabled presentations,creating a non-linear presentation) to communicate ideas to multiple audiences.**WVDE 9-12 Social Studies Content Standards and Objectives**G12. SS.9.C.3 research and categorize multiple current and historical world aid organizations and assess the importance of global volunteerism as a 21st century citizen (e.g., Doctors Without Borders, International Red Cross, Peace Corps)G13. SS.9.G.1use different types of maps and geographic tools to analyze features on Earth to investigate and solve geographic questions.G14. SS.9.G6use maps, charts and graphs to analyze the world to account for consequences of human/environment interaction, and to depict the geographic implications of world events.G15. SS.9.H.CL5.3summarize the origins and contributions of the scientific revolution.G16. SS.10.G.4evaluate the impact of health and cultural considerations on the quality of life over different historical time periods (e.g., impact of epidemics).G17. SS.10.H.CL6.4investigate the impact of technological advances and innovation in the early twentieth century both in the United States and the world (e.g., medical advances). G18. SS.11.H.CL1.5make connections between relief efforts and interventions of the 1918 pandemic to modern global health concerns.G19. SS.EE.1explain and give examples showing how scarcity of goods and services forces people to make choices about needs and wants.**RESOURCES:** Educating for Global Competence: Preparing Our Youth to Engage the WorldIntroduction to the Viruses, How Viruses work, Origin of viruses1.http://www.pbs.org/wgbh/nova/body/virus-wars.html2. http://www.pbs.org/wgbh/nova/body/history-of-vaccination.html3. http://video.nationalgeographic.com/video/virus-crisis-sci4.<http://www.ucmp.berkeley.edu/alllife/virus.html>5.<http://www.nature.com/scitable/topicpage/the-origins-of-viruses-14398218>6. <http://science.howstuffworks.com/life/cellular-microscopic/virus-human.htm>Making Vaccines Interactive Lab7. http://www.pbs.org/wgbh/nova/body/making-vaccines.htmlVaccine Economics8.http://www.whatiseconomics.org/what-is-economics/cost-benefits-analysis9.<http://www.immunizationinfo.org/issues/immunization-policy/vaccine-economics>10.<http://www.cdc.gov/vaccines/acip/committee/guidance/economic-studies.html>11.<http://www.wtec.org/vaccmfg/workshop/05_Jacobson.pdf>Vaccines and Society12.<http://www.hhs.gov/asl/testify/t990803a.html>13.http://www.historyofvaccines.org/content/articles/cultural-perspectives-vaccinationThe Environmental and Social Influences on emerging infectious diseases: past, present, and future14. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1693387/What’s Next-combating viral pandemics: 15.http://www.ted.com/talks/nathan\_wolfe\_hunts\_for\_the\_next\_aidsCenter for Disease Control’s Website on the history of Ebola:16.<http://www.cdc.gov/vhf/ebola/outbreaks/history/chronology.html>Pandemic Game 17.http//www.learn4good.com/games/high-school-students-games/science-health.htm | ***Transfer***  |
| *Students will be able to independently use their learning to…(real world purpose)*T1. Investigate the world; research and formulate ideas and opinions based on current informationT2. Review data and weigh different perspectives of possible outcomesT3. Understand opportunities to make a difference locally and globally |
| ***Meaning*** |
| UNDERSTANDINGS *Students will understand that…*U1. Viruses have played a major part in human historyU2. Human innovation has fought against the spread of viruses.U3. The battle against viruses still ragesU4. Human Life can be and is measured in dollars and cents.  | ESSENTIAL QUESTIONS E1. How have viruses shaped history?E2. Who were the scientists responsible for the steps toward virus eradication?E3. With all of our technological advances, why are we still bothered by something as simple as a virus?  |
| ***Acquisition*** |
| *Students will know… (Content)*K1. What viruses are, how they reproduce, how they are transmittedK2. What are vaccinations, vector control, and drug therapyK3. How viruses have shaped human historyK4. About the viruses that plague the world todayK5. About the impact of health and cultural considerations on the quality of life over different historical time periods (e.g. impact of epidemics).K6. About economic basics and how they relate to vaccine production and distribution | *Students will be able to… (Skills)* S1. Conduct investigations that incorporate scientific inquiryS2. Investigate solutions to address societal problemsS3. Given science-technology-societal issues and defend potential solutionsS4. Relate societal issues to key scientific innovationsS5. Summarize the origins and contributions of the scientific revolution.S6. Research the economics of vaccine production and distribution |
| **Stage 2 - Evidence** |
| **Assessment** | **Evaluation Criteria (Learning Target or Student Will Be Able To)** |
| Assessments **FOR** Learning: (ex: kwl chart, exit ticket, observation, draft, rehearsal)\_ KWL Chart: Economics\_ KWL Chart: Viruses\_ Observation of Group Work\_Daily Exit Ticket on Class Parking Lot (I got it, I have a few questions, I’m Lost) \_Observation of participation during Skype session with Scientist and Economics Expert | L1. Growth of knowledge on KWL charts.L2. Thorough research methods gathering evidence.L3. Collaborative Research with class peersL4. Demonstrated knowledge of cost benefit analysis, viruses, and vaccines, social and environmental influences.L5. Detailed and informative editing following outlined criteria for presentation using presentation software of students’ choice (PowerPoint, Prezi. Glogster, etc) |
| Assessment **OF** Learning: (ex: performance task, project, final paper)\_Pre and Post Test\_Presentation of Research to class, scientist and economics expert via Skype\_Self-Evaluation for Competency of Established Goals | 1. Evidence of thorough research and preparation 2. Organized presentation format with correct spelling and spoken grammar.3. Field questions from class and experts with poise |
| **Stage 3 – Learning Plan** |
| *Summary of Key Learning Events and Instruction ( Make this a useful outline or summary of your unit, your daily lesson plans will be separate)***Week One- Virus Research Phase:** Students will complete the KW of the KWL chart for viruses and take a pre test. Week one will be dedicated to student research on resource sites 1-7 on the introduction to viruses, how viruses work, and one virus that has shaped history. Each of the six groups will be assigned its own virus to research. The sites will consist of readings, video clips, and an online interactive lab. Each student will have access to a laptop, headphones, and printer. Students will have a total of three hours of research time in order to review materials, take notes, and gather any facts or figures that they will want to use in their presentations from the first seven resource sites. Students can also use their own sources to research their assigned virus. There will be a fundamental question posted on the board each day that the students will need to answer about viruses as their ticket out of class. Students will also have an hour skype session with a representative of the WVDHHR, to discuss any questions the students may have about viruses. A Volunteer Red Cross worker will spend an hour with the students, in class, sharing first hand stories and pictures about what it is like treating outbreaks. The volunteer will also bring a kit of tools that would be used in the field: mask, gloves, full contamination suit, etc. At the end of week one, students will fill out the L of the KWL chart.**Week Two-Economics Research Phase:** Complete the KW of the KWL chart for economics. Week two will be dedicated to student research on resource sites 8-11 on what is economics, and vaccine economics. The sites will consist of readings. Each student will have access to a laptop, headphones, and printer. Students will have a total of three hours of research time in order to review materials, take notes, and gather any facts or figures that they will want to use in their presentations from the four resource sites. There will be a fundamental question posted on the board each day that the students will need to answer about virus economics as their ticket out of class. Students will also have a two hour skype session with a professor of economics to discuss the “Guidelines for estimating costs of introducing new vaccines into the national immunization system” from the Department of Vaccines and Biologicals, World Health Organization, Published June 2002.**Week Three-Society Research and Building Presentation Phase:** Week three will be dedicated to student research on resource sites 12-16 on Society, Viruses, and Ebola. The sites will consist of readings and video clips. Each student will have access to a laptop, headphones, and printer. Students will have a total of two hours of research time in order to review materials, take notes, and gather any facts or figures that they will want to use in their presentations from the last five resource sites. There will be a fundamental question posted on the board each day that the students will need to answer about viruses and society as their ticket out of class. Students will also have three hours to finish their presentations with their groups. This time will be used most efficiently if students divide up the sections.**Week Four-Presenting Research Phase:** A total of three hours will be available for presentations. This will leave each of my 6 groups a total of 30 minutes for presentation and a question and answer session with the students and experts via Skype. One hour will be devoted to the post test and self evaluation and one hour will be devoted to playing the online Pandemic Game.**Key Concepts to Cover in Presentation:**-What is your Virus? -How does your virus reproduce?-How is your virus spread?-How is your virus fought/controlled? What scientists/doctors/organizations contributed to the fight?-How has your virus shaped history?-Where is your virus still prevalent?-What is the economy, geography, ecosystem, society, quality of life, and culture like where your virus is prevalent? -Has that area maintained control over the virus, or is it still a problem? -Find an area close by that does not share the virus problem. What could account for this discrepancy?-How are vaccines and economics related? Relate viruses to cost benefit analysis.-How have viruses in different regions affected migration patterns of human society?-When designing a vaccine to combat a virus, describe all of the aspects one must think about. Debate/Defend on the aspects that you feel is the most important.-Design and defend a plan to combat the spread of your virus. Take politics, economics, society, culture, geography, and the ecosystem into account.*\*adapted from Understanding by Design Model* |

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| **TGC FELLOWS UBD Lesson**  |
| Lesson Title: Virus Research Subject: Biology 10th Grade Prepared by: Melinda CarpenterMaterials Needed: List of sites 1-7, paper, pencil, group and virus assignments, presentation outline, projector, headphones, and printer.Global Competency: Investigating the World, Communicating Ideas, Taking Action |
| **W**here is the lesson going?(Learning Target or SWBAT) | L1. Growth of knowledge on KWL charts.L2. Thorough research methods gathering evidence.L3. Collaborative Research with class peersL4. Demonstrated knowledge of the reproduction, spread, control, and global effects of viruses.  |
| **H**ook: | **T**ailored Differentiation: |
| As students come into the room, a sideshow of the physical effects of different viruses will be playing on the overhead projector. On their desks will be the KWL chart and pretest. Students will watch the slideshow, fill out the KL part of the chart, and take the short pre-test in silence. This will give each student time to reflect on what they know and formulate questions that they want to ask. | -students will be grouped by like abilities and extra help funneled where needed by regular education and resource teacher.-a list of sites that will be useful for group virus will be provided in advance.-a list of difficult vocabulary, defined will be provided in advance.-the assignment will be given to read over in advance.-They will be shown how to use PowerPoint, Prezi, or Glogster in advance by their resource teacher. |
| **E**quip: |
| Students will be divided into research groups and assigned a virus. They will do research on resource sites 1-7 on the introduction to viruses, how viruses work, and one virus that has shaped history. The sites will consist of readings, video clips, and an online interactive lab. Students will have a total of three hours of research time in order to review materials, take notes, and gather any facts or figures that they will want to use in their presentations from the first seven resource sites. Students can also use and site their own sources to research their assigned virus. |
| **Rethink and revise:** |
| Students will have an hour skype session with a representative of the WVDHHR, to discuss any questions the students may have about viruses. A Volunteer Red Cross worker will spend an hour with the students, in class, sharing first hand stories and pictures about what it is like treating outbreaks, and fielding questions. |
| **Evaluate:**  |
| There will be a fundamental question posted on the board each day that the students will need to answer about viruses as their ticket out of class. There also will be a post test at the end of the unit and observations during all points of lesson. |
| Notes:  |
| **O**rganization:  |
| Sites pre-bookmarked on laptops, group and virus assignments premadeKWL Charts and Pre-test already on desks, Presentation outline ready, exit question on board. |