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| **TGC Fellow Unit** | | |
| Prepared by: Wally Blankenship School/Location: Rock Hill High School, Rock Hill, SC | | |
| Subject: **Biology** Grade: **9th** Unit Title: **Ebola** Time needed: 7-8 class days over 4 weeks | | |
| Unit Summary: Students will study the anatomy and habit of the Ebola virus, research the demographics of the victims, analyze the treatment of victims, and propose ways in which care and prevention might be improved. | | |
| **Stage 1 Desired Results** | | |
| **ESTABLISHED GOALS:**  **H.B.1A.4** Analyze and interpret data from informational texts and data collected from investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to (1) reveal patterns and construct meaning, (2) support or refute hypotheses, explanations, claims, or designs, or (3) evaluate the strength of conclusions.  **H.B.1A.5** Use mathematical and computational thinking to (1) use and manipulate appropriate metric units, (2) express relationships between variables for models and investigations, and (3) use grade-level appropriate statistics to analyze data.  **H.B.1A.7** Construct and analyze scientific arguments to support claims, explanations, or designs using evidence and valid reasoning from observations, data, or informational texts  **H.B.1A.8** Obtain and evaluate scientific information to (1) answer questions, (2) explain or describe phenomena, (3) develop models, (4) evaluate hypotheses, explanations, claims, or designs or (5) identify and/or fill gaps in knowledge. Communicate using the conventions and expectations of scientific writing or oral presentations by (1) evaluating grade-appropriate primary or secondary scientific literature, or (2) reporting the results of student experimental investigations.  **H.B.2B.3** Obtain information to contrast the structure of viruses with that of cells and to explain, in general, why viruses must use living cells to reproduce.  (Source: SC Dept. of Ed.)  **GLOBAL COMPETENCY:**  **G1:** Oxfam Knowledge: Skills: Students will critically analyze information and make ethical judgments.  **G2:** Oxfam Knowledge: Skills: Students will argue rationally and persuasively from an informed position.  **G3:** Oxfam Values and Attitudes: Students will have a sense of common humanity and common needs  **G4:** Students are able to investigate the world in the following ways:  • Identify an issue, generate a question, and explain the significance of locally, regionally, and globally focused researchable questions.  • Use domestic and international sources to identify and weigh relevant evidence in addressing a globally significant researchable question.  • Analyze, integrate, and synthesize evidence to construct coherent responses to globally significant researchable questions.  • Develop an argument based on compelling evidence that considers multiple perspectives and draws defensible conclusions.  G1 – G3 Source: *Education for Global Citizenship:  A Guide for Schools;* (OXFAM 2006)  G4: *Educating for Global Competence: Preparing Our Youth to Engage the World;* Mansilla and Jackson, 2011  RESOURCES: World Health Organization  <http://www.who.int/mediacentre/factsheets/fs103/en/>  <http://www.who.int/csr/disease/ebola/maps/en/>  Center for Disease Control <http://www.cdc.gov/vhf/ebola/resources/posters.html>  <http://www.cdc.gov/vhf/ebola/outbreaks/2014-west-africa/qa.html>   [http://www.apic.org/Resource\_/ TinyMceFileManager/epublications/EbolaPS1403-FALL-FINAL.pdf](http://www.apic.org/Resource_/TinyMceFileManager/epublications/EbolaPS1403-FALL-FINAL.pdf) | ***Transfer*** | |
| ***Students will be able to independently use their learning to…(real world purpose)***  **T1:** Investigate to establish relevant evidence in answering a researchable question with a coherent response. **T2:** Exercise the use of various valid/reliable sources of research. **T3:** Analyze the patterns of behaviors to establish predictions. **T4:** Collaborate/Communicate ideas with peers and stakeholders using technology tools effectively. | |
| ***Meaning*** | |
| **UNDERSTANDINGS**  ***Students will understand that…***  **U1:** Viruses are not cells and must use a host cell to replicate its DNA  **U2:** An antidote for a virus is much more difficult to discover and produce  **U3:** Viruses spread through different vectors, have different environmental requirements to stay viable, and typically have a high mutation rate.  **U4:** Many factors affect the rate of disease proliferation: Different cultural practices, hygiene habits, poverty, poor health care system, malnourishment, weak infrastructure, legacy of war, etc.  **U5:** Control of such environmental pathogens requires a multifaceted approach, addressing: altering human habits, cleanliness, education, nutrition, public policy, pharmaceuticals, etc. | **ESSENTIAL QUESTIONS**    **E1:** What does the Ebola virus do with the host cells that is so detrimental to the host organism?  **E2:** How does the Ebola virus spread?  **E3:** How are people trying to stop the spread of the disease?  - Viruside development?  - Cultural practices addressed/altered?  - Policy changes (politics)?  - Information dissemination   – Accuracy? Effectiveness?  **E4:** How effective/ineffective are current efforts globally? Locally? What are better alternatives? |
| ***Acquisition*** | |
| ***Students will know… (Content)***  **K1:** The anatomy of this virus.  **K2:** Where outbreaks have occurred in the past and where they are presently.  **K3:** What behaviors cause the virus to travel from one host to the other.  **K4:** How patients are being treated who have contracted the disease.  **K5:** How policies are determined (in different parts of the world) that mitigate the spread of diseases.  **K6:** How alterations in policies/practices affect established cultural/religious practices positively or negatively. | ***Students will be able to… (Skills)***  **S1:** Create a model of this virus and articulate its habit inside its host cell.  **S2:** Research/analyze statistical data to determine outbreak occurrences, death rates,  movement of new infections globally **S3:** More clearly discern valid sources of information online; identify established researched scientific data vs. consensus vs. anecdotal information.  **S4:** Research and evaluate the current and proposed policies of the USA and other countries to control the spread of the virus.  **S5:** Propose alternative practices for our community, state, and nation regarding controlling the spread of this or other dangerous diseases.  **S6:** Propose alternative practices to one affected region outside the US, with respectful regard to current traditions, cultural/religious practices, education levels, and other mitigating factors.  **S7:** Publish a video lab report presenting their findings and proposals. |
| **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: Virus behavior * Rough draft of model of virus * Preliminary source list developed for disease statistics and foreign/domestic policies * Synopsis of group discussions shared with class * Drafts of video product | 1. Demonstrate increased knowledge on KWL. 2. Planning/design skills strengthened in construction of virus model/drawing/chart 3. Research skills organized, defining issues and pertinent questions 4. Editing of information/ adherence to pertinent data/ making product concise 5. Listening skills (to fellow students, those whom they interview) | |
| Assessment **OF** Learning: (ex: performance task, project, final paper)   * Model of Ebola Virus * Report of current virus spread and examples of foreign/domestic health practices and policy modifications. * Overlay map of past/current outbreak zones * Video report of project | 1. Address the structure and habit of the virus 2. Demonstration of research of viral status worldwide and practices aimed at stopping new infection. 3. Creation of interactive maps depicting zones of outbreaks worldwide. 4. Assimilation of collaborative ideas into one product suitable for a wide range of audiences (high school students, community members, local governmental personnel, You Tube submission), suggesting solutions based on evidence. Product reflects opinions/attitudes/needs of stakeholders, suggested solutions based on scientific evidences and cultural sensitivities. | |
| **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)***  ***Lesson 1: The Virus*** *(2 days) Students will work in lab groups. First, they will construct KWL charts about viruses and disease. With school-provided devices and student devices (students’ choice), lab groups research the morphology, activity, and cycles of the Ebola virus from online resources. Credible sources will be provided them, but students are encouraged to seek other valid sources of information, including interviewing of health professionals, biologists. Rough draft of model virus done. Collaboration between lab groups to share information will be scheduled for 15 minutes at the end of class. By the end of the second day, creation of a model of the virus (students’ choice of medium/media) with written facts about the virus structure and behavior (alternative: video or audio podcast) will assess understanding*. (H.B.1A.5, H.B.1A.8, H.B.2B.3, T1, T2, T4, U1, U3, E1, E2, K1, S1, S3)  ***Lesson 2: The Devastation*** *(2 days)  Students maintain lab groups to study current and past outbreaks of Ebola; index person, known reasons for the spreading, death toll, death rate, duration. Maps will be created showing past/current outbreak zones (overlays illustrating different outbreaks and/or progression of one outbreak (students’ choice of media/medium). Collaboration with groups on data.*  (H.B.1A.4, H.B.1A.8, G3, G4, T1, T2, T3, T4, U3, U4, E2, K2, K3, S2, S3)  ***Lesson 3: The Domestic Struggle***  *Students will assess social factors and control measures associated with the spreading of past diseases in the US (e.g., 1918 Spanish flu, 1952 polio, 1957 Asian flu); past and current control measures aimed at preventing the spread of the Ebola virus and other deadly diseases in the US; impact of changes on cultural factors; policies in the US – in select states and the nation as a whole. A brief report including images, data charts, and info about control measures of past outbreaks and current Ebola concerns (with social ramifications) will be generated (students’ choice of media/medium).*  **(**H.B.1A.4, H.B.1A.8, G1, G3, G4, T1, T2, T3, T4, U2, U3, U4, U5, E2, E3, E4, K2, K3, K4, K5, K6, S2, S3, S4)  ***Lesson 4: The Foreign Struggle*** *(2 days)*  *Students will assess the historical and current spreading of Ebola disease in one select hot spot country; past and current control measures aimed at preventing the spread of the virus; impact of changes on cultural factors; policies in the country (or cultural sect). Sources of information will include at least one interview with a government official or health care worker directly associated with this country’s current effort. A brief report including images, data charts, and info about control measures of past/current outbreaks and current Ebola concerns (with social ramifications) will be generated (students’ choice of media/medium).*  **(**H.B.1A.4, H.B.1A.8, G1, G3, G4, T1, T2, T3, T4, U2, U3, U4, U5, E2, E3, E4, K2, K3, K4, K5, K6, S2, S3, S4)  ***Lesson Five: A Way Out*** *(2-3 days) Students will draft reports, creating a final product, combining information from the entirety of the unit, as a concise video presentation. Along with this data will be analysis of current preventive practices/policies and suggestions for improvement and implementation of more efficacious and culturally cognizant practices aimed at the stopping of the Ebola spread, treatment of the afflicted, and prevention of future outbreaks. The video product will be suitable for a range of audiences: local officials, parents/students, other parties associated with the disease (interviewees, health workers, etc.), and YouTube. Students will critique each other’s video drafts and edit accordingly. Final products will be initially presented to other biology classes, school administration, and interested parents and members of the community.* (H.B.1A.7, H.B.1A.8, G1, G2, G3, G4, T3, T4, U4, U5, E3, E4, K4, K5, K6, S5, S6, S7) | | |

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| **TGC Lesson** | | |
| Lesson Title: **EBOLA: Lesson 4: The Foreign Struggle** (2 days)  Subject: **Biology**  Prepared by: **Wally** **Blankenship**  Materials Needed:  Devices for internet research, preferably for each student. Skype/Face Time capability. Library/computer lab access may be needed. Markers, display boards, posters (if chosen by students)  Global Competency:  Use domestic and international sources to identify and weigh relevant evidence in addressing a globally significant researchable question. | | |
| **W**here is the lesson going?  (Learning Target or SWBAT) | Students will identify control measures, cultural changes, and new policies in a source country of Ebola. | |
| **H**ook: | | **T**ailored Differentiation: |
| Based on what has been learned from lesson 3, a list of students’ findings on how the US has/is handling the control of Ebola patients and potential spreading will be posted on the board as one side of a T chart. Then, they will choose a west African country that is a source for the current Ebola outbreak and predict how that country is handling the same issues. Ideas and guesses will be listed. The lesson will be introduced that asks them to validate what they have written. | | Students self select the country they wish to research.  Guidance will be available for finding/utilizing proper research resources  Students select roles in groups for writing, research, drafting/editing drawings or digital elements, speaking for the group for presentation, etc.  Students select the type of medium they wish to use for project development/presentation. |
| **E**quip: | |
| Students will be in lab groups. They will choose different west African countries with high incidences of Ebola patients. They will research the following:   * Outbreaks of Ebola in the past: When, region affected, numbers of people affected, numbers of dead, duration, methods of control, suspected source * Current outbreak: When it began, region affected, numbers of people affected, rate of spread, numbers of dead, suspected source * Current outbreak reaction: Policy changes at local and national government levels, cultural changes employed to mitigate spread (intended and unintended), religious impact/response   Students will utilize credible resources, including those provided from the WHO and the CDC, and direct contact with a health worker or government official operating in that country (this element of the project may require this lesson’s second day to be conducted days after day one, to schedule correspondence). | |
| **Rethink and revise:** | |
| Student groups will share what they have learned at the beginning of day 2. New questions, ideas should be developed between the groups. | |
| **Evaluate:** | |
| A brief report including images, data charts, and info about control measures of past/current outbreaks and current Ebola concerns (with social ramifications) will be created and evaluated by the teacher, participating students, and an administrator. This will be accomplished through general discussion and a general rubric. | |
| Notes: | |
| **O**rganization: |
| T chart is ready, required sources ready, computer lab reserved if needed, evaluation participants scheduled for presentations. |