

GEO STAC Teaching Guide

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Subject Area: Science, Health, and Geography

Grade Level: Senior high

Lesson Description: Students will look at world health data using GIS. The students will be compare malaria and cholera death data from different years and predict if there exist the conditions for an epidemic. Students will take on the role of an epidemiologist and identify the region of the world where deaths are the highest and recommend to the World Health Organization where they should concentrate their relief efforts

National Standards:

Technology:

- 1) NT.K-12.3 Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works.
- 2) NT.K-12.3 Students use technology tools to enhance learning, increase productivity, and promote creativity
- 3) NT.K-12.4 Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences.
- 4) NT.K-12.6 Students employ technology in the development of strategies for solving problems in the real world.

Health:

- 1) NPH-H.9-12.3 Develop strategies to improve or maintain personal, family and community health.
- 2) NPH-H.9-12.7 Express information and opinions about health issues.
- 3) NPH-H.9-12.1 Analyze how the prevention and control of health problems are influenced by research and medical advances.

Science:

- 1) NS.9-12.6 Personal and community health
- 2) NS.9-12.6 Science and technology in local, national, and global challenges.

Source for Standards:

<http://www.educationworld.com/standards/national/index.shtml>

Epidemic Sources on-line:

http://www.bam.gov/sub_diseases/diseases_wnv.html

Center for Disease Control and Prevention Website on Epidemiology and West Nile Virus

Learning Objectives:

Students will explore the data to see if there is a connection between population size of a country and the incidence of disease. The final part of the lesson would be a presentation that the students will have to make using PowerPoint. They will need to explain the health problems using data from the World Health GIS map, identify the countries with the greatest raise in deaths, research methods to prevent deaths from malaria and cholera, and then create a plan of action. The presentation can be created and presented to the class with a partner.

Geospatial Concepts:

- 1) Students will make the connection between regions with high incidents of certain diseases and their proximity to each other.
- 2) Students will compare the populations of countries with high death rates with those with low death rates and look for patterns.
- 3) Students will identify the conditions of countries with high death rates and make connections to possible causes.

Other Discipline: Health

Career Connection: Epidemiologist, GIS Data Analyst, Cartographer, and Health Care Provider

Web-based GIS Tools: The tools students will be using for this activity are: Toggle, Find, Query, and Identify

Materials: Computer Lab and Student Worksheet.

Prerequisites: Students should be able to identify biotic and abiotic factors, have background information on the diseases of cholera and malaria, symptoms, how it's spread, prevented, and treatments.

Beginning the Lesson

Have students read through information on West Nile Virus from CDC web site. Then, as a class discussion, have student's list abiotic and biotic factors that facilitate the spread of the disease. Based on what they just read have student come up with their own definition of an epidemiologist.

Developing the Lesson

Give students 5 minutes to do a web search on cholera and malaria. Discuss what causes diseases like cholera and malaria. Call on each student to give one fact about each disease that has not yet been shared. Compile class list. Distribute student handout on Epidemiology. Have students work through hand out answering questions as they go. Students are to use the Map of World Health

Concluding the Lesson

At the end of the student handout is a list of expectations for the PowerPoint Assignment. With their partner they have 2 days to make a Power Point. If time allows, have students present to the class their findings. If time is limited have students print out their presentations and hand them in.

Career Connections: Discuss the aspect of making STEM career connections and assessment

Assessment/Evaluation: How will you assess the stated learning objectives? Develop a specific assessment for the activity.

Student assessment will have several pieces:

1-Pre-Activity research on Cholera and Malaria (Graded on Participation)

2-Participation in CDC West Nile Virus Disease Game (Graded on Participation)

3-GIS World Health Student worksheet (Grades for Correctness)

4-PowerPoint Project and Presentation (Points for each part of assignment on student handout)