

## **Title: Gasp!!!.....the RETURN OF SMALLPOX???!!!!...**

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### **Abstract (150 word limit):**

- Introduce students to the structure and function of viruses and virus replication. Role of RNA in the cell via reverse transcription viruses.
- Extract DNA from plant cells and understand the importance of the genetic code stored within the nucleotide sequence in DNA molecules and how those codes differ between organisms----BRAIN (strawberry) DNA EXTRACTION-beginning steps to determine if suspected smallpox patient indeed died of smallpox
- Learn about current biotechnology research practices by reviewing PCR techniques through activity and lab----- PCR lab/simulation PCR dash??? -beginning steps to determine if suspected smallpox patient indeed died of smallpox
- Role of proteins in biotechnology (includes review of immune system response; protein function)—ELISA testing simulation-determine if others have been exposed to smallpox by looking for antibody production
- Explore various aspects of careers in biotechnology---Viral Quest Curriculum lesson 10
- Create a board game titled “OUTBREAK” that sums up the unit-----classroom supplies
  - Game Requirements
    - DNA structure and function
    - RNA structure and function
    - Virus structure and function
    - Smallpox symptoms/mechanism
    - Biotechnology lab practices and careers

### **Rational**

1. Scenario/Framework: “Is it possible that an outbreak of smallpox is upon us? A patient has been presented with the symptoms of smallpox. Through this unit students will investigate the properties of the virus and determine if a smallpox outbreak has emerged?
  
1. Students assume the role of the four stages of biotechnology
  - a. Educator-learn the basics of the subject (i.e. DNA structure, complementary base-pairing, RNA structure, amino acid/protein relationship)---professor?
  - b. Research and Design- conducts the labs that supplies the evidence to support theories
  - c. Community- research environmental behaviors, practices, knowledge that could lead to a smallpox outbreak
  - d. Government- laws/regulations to +/- knowledge that is emphasized in the policy making (eradicate smallpox)

### **Description of teaching unit or module(s), including expected outcomes**

- a. Background information of smallpox
- b. Pre-read “The Demon in the Freezer” by Richard Preston with discussion questions/quizzes

- c. Internet (webquest?) research/ article review emphasizing the impact of smallpox on society over history (interdisciplinary)
  - d. symptoms of smallpox and mortality rates
- 2. Educator Role-learn the basics of the subject matter according to the NG-SSS, teacher-led discussion, vocabulary review, UF faculty talk via Skype (Dr. McFadden)???
- 3. Researcher Role-
  - a. DNA extraction lab
  - b. PCR simulation/dash ???
  - c. ELISA simulation
  - d. Viral Quest Curriculum
- 4. Community Role-
  - a. Webquest/research human impact on environment (behaviors that lead to epidemics)
  - b. Campaign posters to help raise awareness
- 5. Government Role
  - a. Webquest/research current and past laws/regulations that were approved to address the smallpox virus, and investigate current laws/regulations regarding potential epidemic microorganisms
  - b. Students create a powerpoint presentation for classroom display
- 6. Board Game Unit project
  - a. Create board game entitled “Outbreak”-must address the major subtopics of the unit.
    - i. Game will be created by student working groups
    - ii. Game will address major subtopics of this teaching unit
    - iii. Game will be played and analyzed by classmates
    - iv. Game will be followed up by a student reflective writing

**Data collection techniques and/or student assessments**

- 1. Teacher-made assessments throughout educator, researcher, community, and government roles. For example, tests, vocabulary quizzes, bell ringer questions, wrap up questions, etc.
- 2. Students will self assess and cross assess via powerpoint presentation notes, board game analysis, etc.
- 3. Laboratory questions will follow-up laboratory components

**If applicable, use of equipment lockers and/or UF visit (either in the classroom or UF campus)**

- 1. DNA extraction lab (strawberry) or Cheek cells DNA extration
- 2. Micropipetting practice locker
- 3. PCR lab locker
- 4. PCR Dash locker
- 5. ELISA simulation locker
- 6. Website access: CPET teacher resources link
- 7. Faculty Talks via Skype (Dr. Grant McFadden—“Viruses: Friend or Foes”)

**ICORE summer institute elements specifically included (UF connections)**

- 1. Viral Quest Teacher guide
- 2. PCR lab and Dash
- 3. ELISA simulation locker
- 4. Falcutly

**Literature cited**

1.

**Budget and budget justification**

1. 26 copies of "The Demon in the Freezer" \$7.99 each x 30 = \$239.70