

Title: Undead and Loving Life

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Abstract (150 words)

This action proposal is designed to introduce middle school students to various aspects of the nature of science over the first quarter using a hands-on approach. The subject of zombies, while relegated to the realms of fiction and pseudoscience, will be used to get students excited and hooked into the class as early as possible. The length of exposure to our first two big ideas allows for a wide swath of material to be introduced with the nature of science and scientific method without cutting into or disrupting the pacing guide.

Undead will generate interest in the sciences, promote development of laboratory safety skills, exposure to complex labs, as well as giving the students a hands on roll in the scientific process making it their own. Through simulation and modeling students will begin to understand pathogens, how they spread, and how researchers try to track and contain disease.

Rationale

Undead and Loving Life is focused on bringing the nature of science to 7th grade advanced and gifted students, although it should work equally as well with students in any ability range. The Science II Advanced course addresses a wide range of Next Generation Sunshine State Standards (NGSSS) at both the middle and high school levels. A full quarter is devoted to learning about the nature of science which at my past school has contained a number of labs specifically dealing with measurement, but no overarching theme that really brings it all together. As students delve into what science is and start experiencing a full on science class, often for the first time, it becomes more important to snare student interest and get them doing real science with their own hands.

I believe that working with Undead will weave an area of common interest to students with science as a whole. This is especially important as it's the first real science course that most of these students are exposed to. With such a wide variety of exposure to experimentation and the scientific process I hope to help students develop their thinking process and hook them into the class for the rest of the year. The theme will give the students an opportunity to delve into the nature of science and come to the conclusion that they are also part of that process and investigations they undertake can and do matter.

Description of teaching units and modules, including expected outcomes

The teaching unit will span approximately 8 weeks (1 quarter) and will focus on the following NGSSS:

- SC.7.N.1.1 Carrying out a scientific investigation

- SC.7.N.3.2 There are benefits and limitations to scientific models
- SC.7.N.1.3 Scientific investigations can be carried out in various ways
- SC.7.N.1.6 Science is based on evidence
- SC.7.N.1.7 Scientific knowledge is based on debate and peer-review
- SC.7.N.2.1 New Scientific evidence can lead to a better understanding of the natural world

Outcomes

- Students will be able to identify the differences between science and pseudoscience
- Students will be able to distinguish between an experiment and other forms of scientific investigation and explain that not all scientific knowledge is derived from experimentation.
- Students will be able to define a problem from the curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, identify variables, collect and organize data, interpret data, analyze information, make predictions, and defend conclusions.

Student outcomes will be achieved through the following activities

- Introduction to science
- Role of science in society
- Science vs pseudoscience introduction to why
- Panic in Level 4 guided reading
- The scientific method
- Plant virus simulation with immunostrip assays
- The importance of field work
- Coliform conundrum water lab
- PSA's
- The roles of models in science
- ELISA simulation zombie outbreak
- Modeling the outbreak with ArcGIS
- Research/summarization project

Data collection techniques and/or student assessments

- Unit Pre-Test
- Lab write-ups
- Scenario reflection and report
- Post test

Use of lockers and or equipment for labs, or UF Visit

- Build your own ELISA kit
- Detecting water borne pathogens through colorimetric methods?
- immunostrip simulation kit?

ICORE Summer institute parts actually included

- ELISA
 - build your own ELISA
- ArcGIS Online
- Coliform/Cholera Conundrum
 - modified

How proposal differs from what you normally teach

I introduced the concept of zombies and humans as predator/prey relationships this past year as a wrap up to our interdependence unit. I feel the nature of science aspect was somewhat more lacking given the huge amount of time devoted to it in the beginning of the year. I feel that this will enable me to get out of a heavy lecture and demonstration laden first quarter by giving the students an opportunity to get more hands on and involved than they've previously been able to at this point. Sure we get heavy hands on in measurement, but this will give them an opportunity to have a practical reason for doing the stuff we're doing. The overarching idea of zombies will also make it easier to present the material as part of a unified theme that will not only hook their interest but get them thinking about the different things we'll be studying over the course of the year and how they might be related to each other.

Literature cited

From ICORE:

Mapping Water Quality Field Samples

Coliform Conundrum

Cholera Conundrum

Plant virus detection through nimmunostrip assays

Okeechobee County. *Okeechobee County Zombie Apocalypse Annex*. 2010. Accessed 20 June 2013. < <http://www.okeechobeeec.com/Annex%20Z.pdf>>

Schneider, Howard. "Are You Fat Enough to Survive the Zombie Apocalypse." *The Washington Post*. 20 June 2013. Accessed 20 June 2013. < http://www.washingtonpost.com/opinions/are-you-fat-enough-to-survive-the-zombie-apocalypse/2013/06/20/4a872f44-d8ee-11e2-a9f2-42ee3912ae0e_story.html>

Budget and budget justification

I can't really think of anything specific in terms of what I actually need for conducting my lab. I think I need to use the water borne pathogens kit, and I'm not sure if there's a cost to that for chemicals or whatnot. An extra laptop or something similar would be useful so that students wouldn't have to rely on getting access to a computer lab in order to upload data into ArcGIS online, but I think that's probably beyond the scope of the grant. Likewise, there is stuff that I would consider doing if I was working with Science Research next year, but things are uncertain for me and I have a hard time trying to plan for things that may not be able to happen. If I did have Research I would want to do a gel electrophoresis lab with them, or even a more in depth version. As for the biohazard neck tie, I figured it would be a way to draw the students in.