

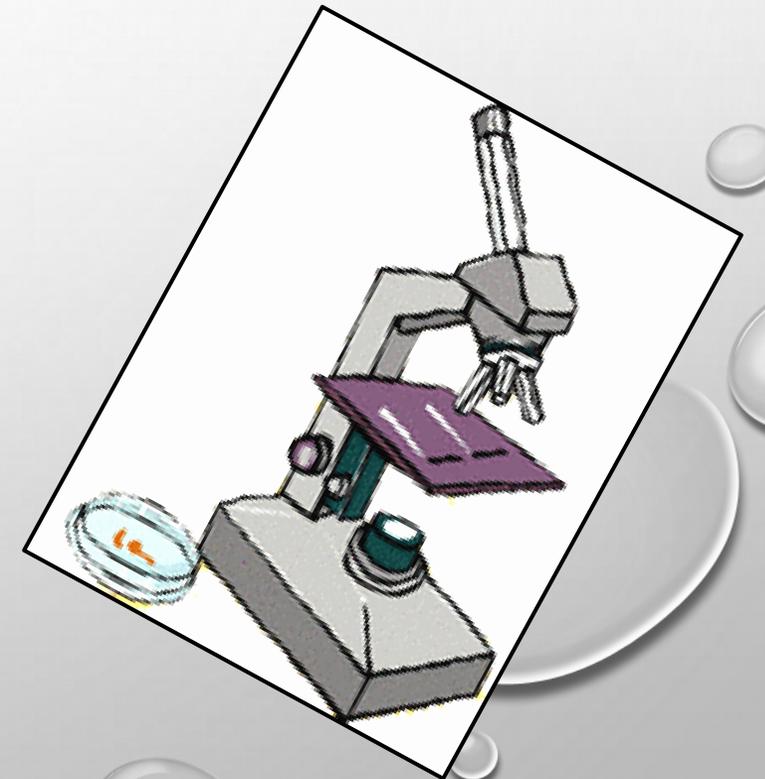
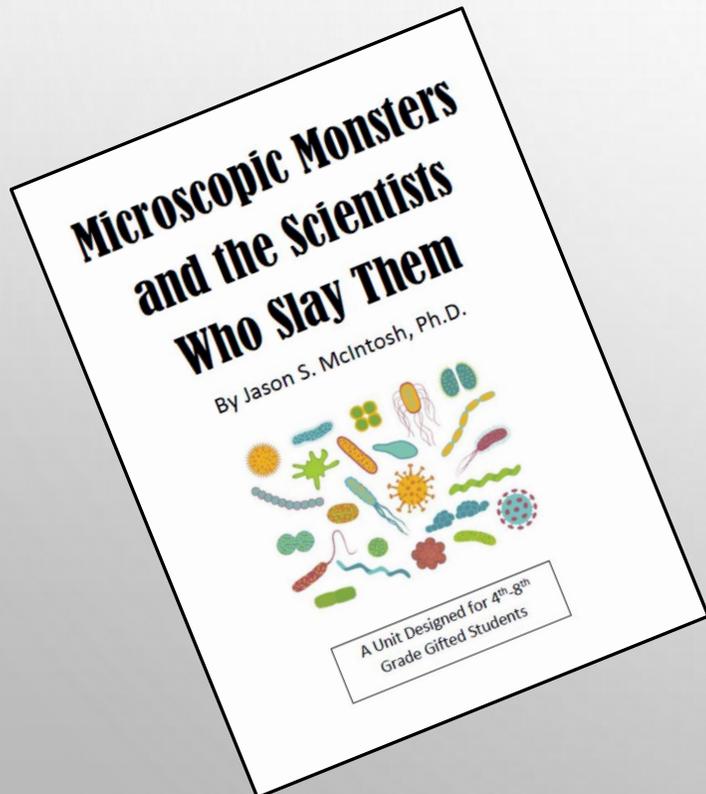
MICROSCOPIC MONSTERS AND THE SCIENTISTS WHO SLAY THEM

WRITTEN BY DR. JASON MCINTOSH

TARGETING GRADES 3-8

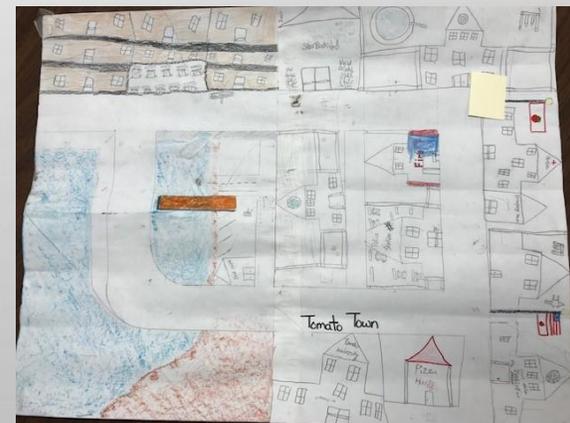
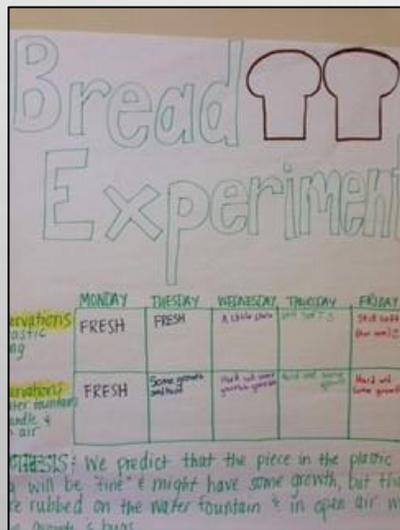
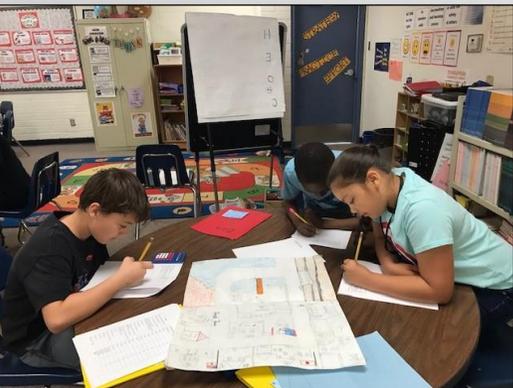
30 LESSONS

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UNIT HIGHLIGHTS

- THE MICROSCOPIC MONSTERS UNIT WAS DESIGNED USING VANTASSEL-BASKA'S INTEGRATED CURRICULUM MODEL (ICM):
 - ✓ OVERARCHING CONCEPT: **PERSEVERANCE**
 - ✓ ADVANCED INTERDISCIPLINARY CONTENT: **MICROBIOLOGY / ENGINEERING DESIGN / MASS COMMUNICATION PRINCIPALS / THE ROLE OF GOVERNMENT / BUDGETING, SCALE, & ESTIMATION**
 - ✓ PROBLEM BASED LEARNING TASKS FORCING STUDENTS TO **THINK LIKE EPIDEMIOLOGISTS**



THE PBL TASK

OPENING SCRIPT:

YOU ARE AN ELECTED OFFICIAL FOR A MEDIUM-SIZED TOWN IN THE WESTERN PORTION OF THE UNITED STATES. WHILE ENJOYING YOUR MORNING CUP OF COFFEE AND READING THE LATEST HEADLINES ON YOUR SMART PHONE, A POP-UP ALERT SUDDENLY APPEARS. BREAKING NEWS IT DECLARES. NATURALLY CURIOUS, YOU CLICK ON THE ALERT AND READ ON. “NUMEROUS CITIES AND TOWNS ACROSS THE COUNTRY HAVE REPORTED CASES OF AN UNKNOWN ILLNESS RAPIDLY SPREADING WITHIN THEIR BORDERS. THE CDC HAS DISPATCHED PERSONNEL TO AFFECTED AREAS (SEE THE FULL LIST BELOW) AND IS MONITORING THE SITUATION CLOSELY. LITTLE IS KNOWN AT THIS TIME, BUT A NEWS CONFERENCE IS SCHEDULED FOR TOMORROW AFTERNOON”. WHILE A LITTLE DISCONCERTING, YOU DO NOT BEGIN TO PANIC UNTIL YOU READ DOWN THE LIST OF AFFECTED AREAS AND DISCOVER A NEIGHBORING TOWN.



PART II:

THE NEWS CONFERENCE HOSTED BY THE CDC WILL BEGIN IN ONE MINUTE. (IF STUDENTS DID NOT LIST WHAT IS THE CDC? ON THEIR NEED TO KNOW BOARDS DURING THE LAST CLASS PERIOD, ASK THEM TO DO IT NOW!)

YOU TURN ON THE TELEVISION AND THIS IS WHAT YOU HEAR. “AS REPORTED WIDELY IN NEWS OUTLETS AROUND THE COUNTRY, A NEW MENACE HAS BEEN SPREADING ACROSS THE COUNTRY. THIS NEW INFECTIOUS DISEASE, DUBBED _____ (ASK EACH GROUP TO SHARE THE NAME OF THEIR AGREED UPON MICROBE), HAS REACHED DANGEROUS LEVELS. AS OF TODAY, THE CDC IS PREPARED TO DECLARE THE DISEASE AN OFFICIAL EPIDEMIC. (PAUSE TO ASK STUDENTS WHAT AN EPIDEMIC IS).

SYMPTOMS INCLUDE _____ (ASK EACH GROUP TO SHARE THE SYMPTOMS OF THEIR AGREED UPON MICROBE). PLEASE REFRAIN FROM CONTACT WITH ANYONE EXHIBITING THESE SYMPTOMS AND CONTACT YOUR DOCTOR AT THE FIRST SIGN OF INFECTION. AT THIS POINT, THE CDC HAS NOT DETERMINED ANY KNOWN VECTORS, BUT WILL KEEP THE PUBLIC INFORMED OVER THE COMING DAYS. (ASK STUDENTS TO LIST THE WORD VECTOR ON THEIR NEED TO KNOW BOARDS).

PART III:

THE CDC HAS CREATED AND DISSEMINATED A MAP OF THE UNITED STATES DISPLAYING ALL INFECTION ZONES ACROSS THE COUNTRY. OUT OF AN ABUNDANCE OF CAUTION, OFFICIALS ARE RECOMMENDING ALL CITIES AND TOWNS 50 MILES OR LESS FROM ANY INFECTION ZONE TO IMPLEMENT A QUARANTINE UNTIL FURTHER NOTICE. ACCORDING TO THIS MAP, YOUR TOWN IS ONLY 3.5 MILES FROM THE CLOSEST ZONE. AS MEMBERS OF THE TOWN'S LEADERSHIP COUNCIL, YOU HAVE 24 HOURS TO PURCHASE SUPPLIES, PREPARE A PLAN, AND COMMUNICATE IT TO YOUR 20,000 CITIZENS.

PART IV:

THE NEXT PHASE OF THE PBL IS TO CREATE AN **EMERGENCY BROADCAST** THAT WILL EDUCATE THE CITIZENRY OF EACH TOWN ABOUT WHAT IS TAKING PLACE AND WHAT THEY SHOULD DO TO AVOID INFECTION. LATER IN THE UNIT, STUDENTS MUST REEVALUATE THEIR PLANS IN LIGHT OF NEW DEVELOPMENTS.

PART V:

DURING THE LAST PHASE OF THE PBL, STUDENTS MUST WORK WITH THEIR CLASSMATES' TOWNS TO **DIAGNOSE POSSIBLE CASES** OF THE DISEASE, **DEVELOP A VACCINE**, AND DECIDE HOW TO FUND AND **DISTRIBUTE THE VACCINE IN AN EQUITABLE MANNER** AROUND THE GLOBE.

MULTIPLE LEARNING PREFERENCES AND OPPORTUNITIES FOR CHOICE

Choice Board

Topic: Microscopic Monsters

Directions: Complete one or more of the activities below!

Find an epidemiologist you think might make a good addition to our "Pillars of Perseverance". What about this person makes them special? How will you introduce them to the class?	Create a user's manual demonstrating how to correctly use a microscope.	Research online the qualifications someone interested in becoming an epidemiologist would need to fulfill. Which universities offer such training programs?
Visit the website www.microbeworld.org/ . Click the "Video" tab at the top and watch one of the videos. Write a summary of the information in the form of a newscast as if it were happening now.	PROPOSE YOUR OWN IDEA TO THE TEACHER	Bacteria can divide very rapidly. What would happen if you started with two E. coli bacteria? How many bacteria do you think you would have at the end of four hours? Watch this video to find out: www.cellsalive.com/ecoli.htm
Create a game that pits germs against antibodies after researching more about the body's immune system.	Choose an epidemic of the past and evaluate the effectiveness of the efforts used to try and stop it.	There are three types of bacteria: eubacteria, cyanobacteria, and archaeobacteria. Compare and contrast each type after conducting research on the internet. Present your findings in a creative way.

Visual/Spatial

p.10, Map map
 p.19, Giant Microbes
 p.24, Drawing what they see under a microscope
 p.28, My Microbe graphic organizer
 p.75, Designing a wanted poster for a germ
 p.81, Scientific method graphic organizer
 p.89, Tangram puzzle task

Bodily / Kinesthetic

p.9, Tangled Web game
 p.22, Build-a-Microscope activity
 p.35, Classroom epidemic simulation
 p.61, Build a prototype of invented tool
 p.75, Trashcan object lesson
 p.79, Pickle making experiment

Logical / Mathematical

p.30, Map creation of town to scale (1"=1 mile)
 p.35, Multiplying by zero in classroom epidemic simulation
 p.38, Exponential growth calculations using a penny
 p.43 and 65, Budgeting funds to purchase emergency supplies
 p.66, Estimating the number of bacteria after four hours

Interpersonal

p.27, Breaking the Epidemiologic Triangle in small groups,
 p.29, 33, 40, & beyond, Problem-based learning tasks in small groups
 p.52, 67, & beyond, Connecting with real epidemiologists
 p.72, Discussing the importance of the World Health Organization

Intrapersonal

p. 10, 14, 19, & beyond, Almost daily embedded journal prompts
 p.10, Personal goal setting
 p.16, Connecting with famous quotes
 p.46, Individual mini-research project
 p.66, Choice menu activities

Naturalist

p.19, Mold experiment (disproving spontaneous generation)
 p.20, Scientific name vs. common name
 p.44, Bacteria vs. virus characteristics
 p.78, Scientific method and experiment design
 p.83, Symbiotic vs. parasitic relationships in nature

Musical

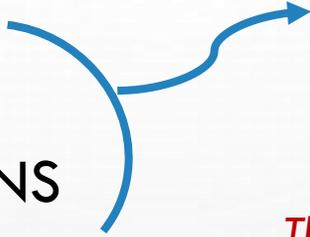
p.51, Attention getting opening to newscast
 p.55, Rap video bus drill
 p.65, Propose your own task on choice menu

Verbal / Linguistic

p.13, 21, & beyond, Word origins
 p.51, Writing, producing, and performing a newscast
 p.93, Debating the cost of prescriptions

FOCUS ON DIVERSITY

- 'EPIC EPIDEMIOLOGIST' LESSON
- PILLARS OF PERSEVERANCE LESSONS
- WORLD HEALTH ORGANIZATION COMBATING PANDEMICS



Theresa Greene Reed



Mary Guinan



Katherine Marshall



- DEBATE: *SHOULD WEALTHY COUNTRIES DO MORE TO HELP POORER COUNTRIES?*





CONTACT JASON MCINTOSH TO ORDER

COST- \$45

