Introduction

When you think about all the things that can take your life, ones that come to mind might be: car accidents; gang violence; cancer; heart attacks; wars; drug abuse; homicide; smoking; malnutrition; and many others.

And even though these can certainly be lethal, they do not add up in raw statistics to the biggest killer of them all. Indeed, the number one cause of human death throughout history has actually been infectious disease. Now in developed countries like the United States, heart disease has surpassed infections as the number one cause, but in developing countries, you can still catch the main threat that will kill you.

Read the story from a Peace Corps volunteer in Africa before proceeding. Only then will you be prepared to tackle the rest of this assignment.
There has been a widespread epidemic racing through town! It is your job to create a presentation that will inform the public and help them understand what is going on and more importantly, how to fight, control and prevent it from spreading!

You will pick an infectious disease - maybe a deadly awful one (like malaria or Ebola), or maybe just an annoying one (like a common cold, or chicken pox). Research all about it, finding out where it came from, how it works in the human body, how to combat it, and what efforts around the world are being done to control and prevent it.

You will create a PowerPoint presentation illustrating an infectious disease. It must include the details included on the Process tab:

**Tasks**

- The History Of The Disease
  - When did it first appear? (not just in town - in history)
  - What has it been called throughout history?
- Its Symptoms
- How It Is Spread
- What Its Cause Is
  - Bacteria?
  - Virus?
  - Protozoan?
  - Fungus?
Include its scientific name!
Illustrations (try to include each)

- Illustrations of the cause
- Historical pictures
- How It Is Fought And Prevented

Treatment
Prevention
Control

This is to be a factual presentation - not a commentary from you. Have no more than 20 words per slide. You should NOT read your presentation - use the presentation as a visual aide to your explanations.

You will present your slides to the class. You will need to act the part of the reporter/expert giving the presentation to a worried crowd of townsfolk.

You will be graded by the quality of the presentation (neatness, informative, covers all the material above, pleasing to the eye, etc.) AND by the quality of your presentation (including the acting like you are a real expert).

<table>
<thead>
<tr>
<th>Category and Score</th>
<th>Beginning</th>
<th>Developing</th>
<th>Good</th>
<th>Outstanding</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of the slide show</td>
<td>You created a PowerPoint presentation, but few slides and little effort put into it.</td>
<td>Good number of slides, but text is copied from another site instead of your own words. Pictures are sparse or missing. Organization and explanation of topic needs work.</td>
<td>Presentation is well organized, but just leaves the audience expecting something else, something more. The appearance is solid, the pictures are appropriate, but more could be done to really explain the topic.</td>
<td>Presentation leaves the audience impressed with your thorough knowledge of the subject and your ability to communicate with a quality presentation. Organization is logical and complete, pictures are just right, text is your own, references are sited.</td>
<td>25</td>
</tr>
<tr>
<td>Thoroughness</td>
<td>Not very complete - either slides are missing, or copy/pasted materials, or large blank areas.</td>
<td>Most of the basic points are present, but not all, or they are incomplete.</td>
<td>All points are presented, but there are some gaps in the presentation that a thorough investigation should have filled.</td>
<td>All points are covered in a complete manner, details are plentiful and student has put them in their own words.</td>
<td>25</td>
</tr>
</tbody>
</table>
Even though we have looked at diseases caused by germs (viruses, bacteria, etc.), the great majority of microscopic critters are harmless and many are even beneficial. REMEMBER - ALL microbes are NOT Germs!

We could not digest our food without microbes. Garbage would not decay without microbes. Plants would not grow without microbes. The gas we pass is caused by bacteria in our intestines. Without microbes there would be no life on earth.

**Conclusion**

This assignment is for the students of Biology II at Eads High School in SE Colorado.

As we together explore the complexities of infectious disease, we will then delve into the fascinating world of viruses and bacteria - the world of the microbiologist. At times it is deadly, most times a bit smelly, but usually these guys coexist with us in mind-blowing numbers and yet we're still around to wonder and study about them.

Let's hear it for the MICROBES!

**Teacher Page**

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Let's hear it for the MICROBES!

**INTRODUCTION**

This was developed as part of the Infectious Disease unit by Bruce Hallman (Eads High School). It covers the topic of communicable diseases and helps to introduce the students to the many microbes that can disrupt our lives, sometimes fatally. It serves as an ice-breaker for the future units of Virology and Bacteriology, and these reports will be referred back to as the weeks go on.

**LEARNERS**

This lesson is specifically for students studying Infectious agents such as viruses and bacteria. Students will not have any specific background prior to this assignment - it is inherently introductory.
This WebQuest satisfies several of the Colorado standards, including but not limited to:

**Life Science - Colorado State Science Standards:**

2.1 Matter tends to be cycled within an ecosystem, while energy is transformed and eventually exits an ecosystem

2.2 The size and persistence of populations depend on their interactions with each other and on the abiotic factors in an ecosystem

2.3 Cellular metabolic activities are carried out by biomolecules produced by organisms

2.6 Cells, tissues, organs, and organ systems maintain relatively stable internal environments, even in the face of changing external environments

Students learn about - Microbes

- how particular viruses and bacteria cause disease
- how others in the world have to live with horrible mortality from infectious diseases
- how to organize and synthesize a real world product for the community's good (and for a grade!)

Students learn to:
- produce a creative report and presentation based on a real-life situation

**PROCESS**

The WebQuest is designed to last 4-5 periods (based on the fact a period runs for about 50 minutes - adjust accordingly). Students are required to create these presentations on their own, not in groups.

The WebQuest itself requires that you as a teacher understand and know the basic disease-causing microbes and what diseases they produce. Students are asked to look at various resources themselves (Internet is the main source used by my classes) and include their sources in their presentation at the end. Students always find things they want to share with other students or the teacher, so a basic understanding will help guide them from the sensational to the more reliable and solid information.

This process requires a time to present, and in order to help everyone give their full attention, I have them grade each other (I also have the main grading share, but I will average their scores for each other in their grade), and I deduct from their grade if they are rude, not listening or not participating fully.

**RESOURCES NEEDED**

- computer for each student
- internet access for each student
- student account log ins
- student email accounts
- teacher email accounts
- sign-up list
  - I prefer a whiteboard for its visibility, and don't allow students to pick a topic that has already been chosen by someone else. Within a short time I allow for switching to a topic no one has yet chosen.
  - websites (links in the WebQuest, but students quickly find more)
  - one classroom teacher
is sufficient projector with screen or white wall.

ADAPTATION: This WebQuest could easily be adapted for a younger audience, or one with limited computer access. Using textbooks, journals, magazines, or personal interviews of medical personnel, students could gain knowledge of the various contagious pathogens that make us sick. For younger students, or those with limited computer access, poster boards would make a reasonable substitute for PowerPoint slides, where they can draw pictures, paste illustrations/graphs and list the important points by hand. Either way, they still need to present a quality "press conference" about the epidemic of their choosing.

Standards

Credits

Other

Background and Diseases to Choose From

Here is a chart to show you the deadliest of diseases and how they have changed over a 10-year period. Below the chart is a list with many of the infectious diseases that plague mankind. Pick one and really go for it with this project!

2002

2002

1993

World population

6.2 billion

5.5 billion
Total deaths from all causes

<table>
<thead>
<tr>
<th>Cause of death</th>
<th>Number (millions)</th>
<th>1993 Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communicable diseases category</td>
<td>14.9</td>
<td>1</td>
</tr>
<tr>
<td>Lower respiratory infections</td>
<td>3.9</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rank</th>
<th>Cause of death</th>
<th>Number (millions)</th>
<th>Percentage of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lower respiratory infections</td>
<td>3.9</td>
<td>6.8%</td>
</tr>
</tbody>
</table>
1

2

HIV/AIDS

2.8

4.9%

0.7

7

3

Diarrheal diseases

1.8

3.2%

3.0

2

4

Tuberculosis (TB)

1.6

2.7%

2.7

3

5

Malaria

1.3

2.2%
<table>
<thead>
<tr>
<th>Disease</th>
<th>Incidence (Cases)</th>
<th>Incidence Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measles</td>
<td>0.6</td>
<td>1.1%</td>
</tr>
<tr>
<td>Pertussis</td>
<td>0.30</td>
<td>0.5%</td>
</tr>
<tr>
<td>Tetanus</td>
<td>0.21</td>
<td>0.4%</td>
</tr>
<tr>
<td>Meningitis</td>
<td>0.17</td>
<td></td>
</tr>
</tbody>
</table>
Syphilis

Hepatitis B

Tropical diseases (6)

Viral infectious diseases
AIDS
– AIDS Related Complex – Chickenpox or Varicella – Common cold –
Cytomegalovirus Infection – Colorado tick fever – Dengue fever – Ebola
haemorrhagic fever – Epidemic parotitis – Flu – Hand, foot and mouth disease –
Hepatitis – Herpes zoster – Influenza – Lassa fever – Measles – Marburg
haemorrhagic fever – Infectious mononucleosis – Mumps – Poliomyelitis –
or variola – Viral meningitis – West Nile disease – Yellow fever

Bacterial infectious
diseases

Anthrax
– Bacterial Meningitis – Brucellosis – Bubonic plague – Campylobacteriosis –
Cat Scratch Disease – Cholera – Diphtheria – Endometriosis – Epidemic Typhus –
Glanders – Gonorrhea – Hansen's Disease – Legionellosis – Leprosy –
Leptospirosis – Listeriosis – Lyme Disease – Melioidosis – MRSA infection –
Nocardiosis – Pertussis – Pneumococcal pneumonia – Psittacosis – Q fever – Rocky
Mountain Spotted Fever or RMSF – Salmonellosis – Scarlet Fever – Shigellosis –
Typhus – Whooping Cough

Parasitic infectious diseases

African
trypanosomiasis – Amebiasis – Ascariasis – Babesiosis – Chagas Disease –
Clonorchiasis – Cryptosporidiosis – Cysticercosis – Diphyllobothriasis –
Dracunculiasis – Echinococcosis – Enterobiasis – Fascioliasis – Fasciopsiasis –
Filariasis – Free-living amebic infection – Giardiasis – Gnathostomiasis –
Hymenolepiasis – Isosporiasis – Kala-azar – Leishmaniasis – Malaria –
Metagonimiasis – Myiasis – Onchocerciasis – Pediculosis – Pinworm Infection –
Scabies – Schistosomiasis – Taeniasis – Toxocariasis – Toxoplasmosis –
Trichinelliosis – Trichinosis – Trichuriasis – Trypansomiasis

Fungal infectious diseases

Aspergillosis
– Blastomycosis – Candidiasis – Coccidioidomycosis – Cryptococcosis –
Histoplasmosis

Prion infectious diseases

Bovine spongiform
encephalopathy – Creutzfeldt-Jakob disease – Kuru

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