Solve the Outbreak

The worksheets on the following pages were designed for use with the CDC Solve the Outbreak web app available at https://www.cdc.gov/mobile/applications/sto/web-app.html.

I have also created a PPT for use to introduce the activity. It also includes slides with the discussion questions and challenge sections from the back of the worksheet. The PPT is temporarily located at https://www.mrstomm.com/uploads/1/9/4/5/19456431/cdcsolvetheoutbreak_directions.pptx.   Updates will be made as I use the lesson with more classes.

Preparation:

1) I divided the cases in Level 1 into 4 groups - A, B, C - and printed the worksheets as shown on the next pages. Each worksheet had the same discussion questions listed on the back, but different cases on the front.

NOTE: Since I use interactive science notebooks, the pages are set up to be "fold-a-flap" left sideways. I always trim the top inch off the page prior to passing out the worksheets so they fit without any extra cutting on the student's part.

2) Each student was assigned 4 cases depending on which worksheet he/she received.

3) After reviewing the basics of the site related to how to use the icons and "Learn" button, I allowed one class period for students to solve the four assigned cases.

4) At the start of the next class period, I allowed 10 minutes for the students to discuss the questions in Part B on the back of the worksheet with other students in their group (A, B, or C).

5) After the time was up, we discussed the responses in Part B to help student compare the 12 different cases.

6) The final assignment challenged the students to work as small groups to find the latest information about four of the twelve diseases we investigated.

Extension Activities:
- The CDC Solve the Outbreak app has Level 2 missions available. However, students will need a certain number of points to access those missions.
- I also created a Quizlet set at https://quizlet.com/488550908/epidemiology-challenge-flash-cards/ that has many terms from the missions along with others we discussed during our MedMyst unit.

Additional Resources:
- Click the **LEARN** link and then choose **TEACHER RESOURCES** for documents related to core curriculum along with lesson plans for middle and high school.

Feedback:
- Please let me know how you used this worksheet with your students and your ideas for improvements/additions. E-mail me at ttomm@sciencespot.net.
- I have also created a PPT for use to introduce the activity. Updates will be made as I use the lesson with more classes. The link is located on the Biology page of the Science Classroom at sciencespot.net.

CDC: Solve the Outbreak - Group A   **Name** _____

Level 1 Missions
1 - Fill in the chart as you complete each mission listed below.
2 - Be sure to record details about each case along with other helpful notes.
3 - Use the ICONS to see data and notes or click the LEARN button to learn more.
4 - The more questions you answer correctly, the higher your score will be!

Mission	Symptoms	Clues & Observations	Cause of Outbreak & Source	Treatments &/or Precautions
A 1 Breathless in the Midwest _____ **points earned**				
A 2 Conference Blues _____ **points earned**				
A 3 Deadlier than War _____ **points earned**				
A 4 Birthday Party Gone Bad _____ **points earned**				

Part B: Discussion Questions - Answer these questions based on the information from your chart.

1) Which symptoms did your four cases have in common?   List the top 3.

_____ _____ _____

2) How many of the 12 outbreaks were caused by each of the following pathogens/toxins?

   Bacteria = _____ Virus = _____ Parasite = _____   Other = ____

3) How many of the 12 outbreaks were treated with the following treatments?

   Antibiotics = _____   Antiviral = _____   Vaccines = _____   Other = _____   None = _____

4) How many of the 12 outbreaks involved animals - animal bites, contact with animals, etc.?   _____

5) What four things can we learn from an epi-curve? Hint: Click the LEARN button if you do not remember.

1 - _____

2 - _____

3 - _____

4 - _____

Challenge: Use the search tools on the CDC website to learn more about any four of the twelve diseases we have discussed in class. You are not limited to the four you studied.

	Name of Pathogen/Disease	Most Recent Case(s) Where & when?	How many people were affected? Explain how.
1			
2			
3			
4			

CDC: Solve the Outbreak - Group B   Name _____

Level 1 Missions

1 - Fill in the chart as you complete each mission listed below.

2 - Be sure to record details about each case along with other helpful notes.

3 - Use the ICONS to see data and notes or click the LEARN button to learn more.

4 - The more questions you answer correctly, the higher your score will be!

Mission	Symptoms	Clues & Observations	Cause of Outbreak & Source	Treatments &/or Precautions
B1 Village of Gold _____ **points earned**				
B2 Sugar Plantation Blues _____ **points earned**				
B3 Connect the Spots _____ **points earned**				
B4 Up Sick Creek _____ **points earned**				

Part B: Discussion Questions - Answer these questions based on the information from your chart.

1) Which symptoms did your four cases have in common?   List the top 3.

_____   _____   _____

2) How many of the 12 outbreaks were caused by each of the following pathogens/toxins?

   Bacteria = _____ Virus = _____ Parasite = _____   Other = ____

3) How many of the 12 outbreaks were treated with the following treatments?

   Antibiotics = _____   Antiviral = _____   Vaccines = _____   Other = _____   None = _____

4) How many of the 12 outbreaks involved animals - animal bites, contact with animals, etc.?   _____

5) What four things can we learn from an epi-curve? Hint: Click the LEARN button if you do not remember.

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2 - _____

3 - _____

4 - _____

Challenge: Use the search tools on the CDC website to learn more about any four of the twelve diseases we have discussed in class. You are not limited to the four you studied.

	Name of Pathogen/Disease	Most Recent Case(s) Where & when?	How many people were affected? Explain how.
1			
2			
3			
4			

Level 1 Missions
1 - Fill in the chart as you complete each mission listed below.
2 - Be sure to record details about each case along with other helpful notes.
3 - Use the ICONS to see data and notes or click the LEARN button to learn more.
4 - The more questions you answer correctly, the higher your score will be!

Mission	Symptoms	Clues & Observations	Cause of Outbreak & Source	Treatments &/or Precautions
C1 Queens Killer _____ **points earned**				
C2 Hiding in Plain Sight _____ **points earned**				
C3 Laid Low in the Desert _____ **points earned**				
C4 Midterm Revenge _____ **points earned**				

Part B: Discussion Questions - Answer these questions based on the information from your chart.

1) Which symptoms did your four cases have in common?   List the top 3.

_____   _____   _____

2) How many of the 12 outbreaks were caused by each of the following pathogens/toxins?

   Bacteria = _____   Virus = _____   Parasite = _____   Other = ____

3) How many of the 12 outbreaks were treated with the following treatments?

   Antibiotics = _____   Antiviral = _____   Vaccines = _____   Other = _____   None = _____

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5) What four things can we learn from an epi-curve? Hint: Click the LEARN button if you do not remember.

   1 - _____
   2 - _____
   3 - _____
   4 - _____

Challenge: Use the search tools on the CDC website to learn more about any four of the twelve diseases we have discussed in class. You are not limited to the four you studied.

	Name of Pathogen/Disease	Most Recent Case(s) Where & when?	How many people were affected? Explain how.
1			
2			
3			
4			

CDC: Solve the Outbreak

Level 1 Missions   (Letters refer to groups A, B, or C)

Mission	Symptoms	Clues & Observations	Cause/Source	Treatments &/or Precautions
A1 - Breathless in the Midwest	Fever, fatigue, coughing, chest pain, difficulty breathing	Chicago and Milwaukee Blood tests show inhalation anthrax	Anthrax (bacteria) Items from Africa not properly treated or cleaned	Antibiotics Thoroughly treat items brought into the country
A2 - Conference Blues	Stomach cramps, diarrhea, fever	Data shows all attended the Welcome Party (10) or stayed at the same hotel (8); Symptoms appeared after 3 days for 11 people; Attack rates highest for the spinach dip	E.coli O157:H7 (bacteria) Tracked to raw spinach contaminated by cow manure	Thoroughly wash raw vegetables; warnings & possible recall needed
A3 - Deadlier than War	Tired, sick, chest pains, fever, breathing trouble, cough, pneumonia	Many veterans who are sick attended a conference; disease affected people who were outside the building - not just inside	*Legionella pneumophila* bacteria (Legionnaires' disease) Tracked to the hotel's AC system	Clean the cooling towers to prevent the spread of the pathogen in the air conditioning systems
A4 - Birthday Party Gone Bad	Watery diarrhea along with stomach pain, vomiting, and tiredness	Not all the kids who were sick at the ice cream Easily spread through contact with feces; eating uncooked contaminated food; or swallowing water with the parasite	Cryptosporidium (Parasite) Contaminated water was the source	Drain the pool and treat the water Anti-parasitic drugs can help rid the body of the parasites
B 2- Sugar Plantation Blues	Headache, fatigue, muscle aches, fever	Contact with an infected animal (raccoons, skunks, bats, and foxes); most worked in North field & shared water bottles	Rabies (Virus) Contact with an infected animal (bat)	No cure; avoid being bitten/near infected animals; get PEP shots before symptoms appear
B1 - Village of Gold	Vomiting, abdominal pain, headache, convulsions	Do not bring mining activities to the homes/community and get rid of the contaminated dirt	Lead Poisoning (Heavy metal) Brought home by gold miners	Chelation therapy to remove the lead from the blood
B3 - Connect the Spots	Rash, swollen glands, chills, sore throat, high fever	12/14 people have had contact with prairie dogs; became sick from a scratch, which was not connected to the sickness for several days	Monkey pox Rope squirrels transferred to prairie dogs.	Need to track down all the animals from that shipment (and the source of the giant Gambian rats) Smallpox vaccine may help along with antiviral drugs
B4 - Up Sick Creek	Fever, muscle pain, weakness, and dizziness Some with blindness & seizures	Many of the sheep are also sick; 75% of the cases reported handling raw meat or milk	Rift Valley Fever Virus From mosquito bites and sick sheep	Use mosquito nets, repellents, and clothing to avoid getting mosquito bites

C1 - Queens Killer	Bad fever, headaches, neck stiffness, muscle weakness, disorientation (confusion)	Warn other communities to be on the lookout for West Nile Virus; may have come from birds	St. Louis Encephalitis Caused by the West Nile Virus with mosquito as vector	Use insecticides to kill mosquitoes and repellents to avoid getting bit
C2 - Hiding in Plain Sight	Eye damage	Higher rates of incidence in people with new contacts; Highest infections with people who "top" off the fluid with water	Amoeba or AK (*Acanthamoeba keratitis*) Source: Soil, dust, & water	Eye damage; surgery needed to fix
C3 - Laid Low in the Desert	Flu-like symptoms including fever, headache, chills, cough	Spread by brown dog ticks (vector); people became sick even though they did not recall getting a tick bite	Rocky Mountain Spotted Fever *Rickettsia rickettsil* bacteria Spread by ticks	Antibiotics Take precautions to avoid tick bites Put tick repellent collars on dogs
C4 - Midterm Revenge	Vomiting & diarrhea Dehydration	All students ate at the food court; sandwich line/cheese had highest %	Norovirus Food worker who did not wash hands (fecal matter)	Keep hydrated Wash hands often (especially people who work with food products)

Part B: Discussion Questions - Answer these questions based on the information from your chart.

1) Which symptoms did your cases have in common?   List the top 3.   *Answers will vary*

2) How many diseases were caused by each of the following pathogens/toxins?

Answers will vary depending on the cases selected/assigned

Bacteria = _____ Virus = _____ Parasite = _____ Other = ____

3) How many of the diseases involved animals - animal bites, contact with animals, etc.? *Answers will vary*

4) What four things can we learn from an epi-curve? Hint: Click the LEARN button if you do not remember.

Size of the outbreak (magnitude), Trend of the outbreak (time trend), Spread of the outbreak (patterns), & period of exposure (time between exposure and onset of symptoms)

Challenge: Use the search tools on the CDC website to learn more about any four of the twelve diseases we have discussed in class. You are not limited to the four you studied.

	Name of Pathogen/Disease	Most Recent Case(s) Where & when?	How many people were affected? Explain how.
1			
2		*Answers will vary*	
3			
4			