Infectious Disease Learning Packet 3

Name__________________________

Infectious Disease:
Causes and Prevention

Objective #3: The students will be able to identify one or more infectious diseases and their cause(s). The students will be able to list at least 3 ways that infectious diseases can be prevented.

You get to be a Mysterious Disease Detective!

Now you can complete the “Disease Detective Series”! You can be a disease detective and solve science mysteries! HAVE FUN! PUT YOUR THINKING CAP ON!

FIRST…you will read the informational sheets so that you can get all the clues to solve the mysteries.

SECOND…you will solve some mysterious disease cases on your own using all the clues and your informational sheets.

THIRD…you will share your findings with other sleuths in the classroom and find out if your solution about the mysterious disease was correct.

FOURTH…your classmates will ALL discuss the “cases”.

THE DISEASE DETECTIVE SERIES

Solve the Case of the Mysterious Disease

Learning about the bacteria and viruses that cause infectious diseases and how to prevent them

Who are the Suspects?

What are the Cases?

Can you solve the mystery and prevent the disease?
Suspect #1

Lyme Disease

*Background:*

Lyme disease is caused by a spirochete-shaped bacteria called *Borrelia burgdorferi*. *Borrelia burgdorferi* lives in the gut of a tick and can be transmitted (passed) to a person if a tick that has *Borrelia burgdorferi* bites them. *Borrelia burgdorferi* infection in people leads to Lyme disease.

The natural host for Lyme disease is a deer. A tick is considered a vector for Lyme disease because it passes the disease from deer to people. Ticks that bite deer are called deer ticks (not all ticks are deer ticks). A deer tick is special type of tick that travels and feeds off of deer in the forest. *Borrelia burgdorferi* bacteria are found in both deer and deer ticks, but Lyme disease only occurs in people. The size of a deer tick is so small that it would fit in the period at the end of this sentence.

The infected person may get a fever, headache, or a “bulls eye” skin rash. If left untreated, the infection can spread to joints, the heart, and the nervous system. Medical tests can determine whether or not someone is infected with Lyme disease and the disease can be treated successfully with a few weeks of antibiotics. Steps to prevent Lyme disease include using insect repellent with DEET and looking for ticks after you have been in a wooded area.
Background:

**Strep throat** is caused by the cocci-shaped bacteria *Streptococcus pyogenes*. *Streptococcus pyogenes* infects the inside of the throat, making it feel very sore for several days. Not all sore throats are caused by *Streptococcus pyogenes*. Some of the **symptoms** of Strep throat are a painful, sore throat, high fever, chills, headache, and muscle aches. A quick medical test, called a throat culture, can determine whether or not a person is infected with Strep throat. The treatment for Strep throat is **antibiotics**. If left untreated, Strep throat symptoms may get worse and lead to more serious illnesses.

*Streptococcus pyogenes* bacteria are put into the air when a person with Strep throat coughs or sneezes. Strep throat is **transmitted directly** from person to person by coughing, sneezing, and close contact. Strep throat is spread through the air from person to person by them breathing in the bacteria, and becoming infected. Although anyone can become infected with Strep throat, it is most common in school-age children. Some of the common ways to prevent spreading Strep throat are covering your mouth when you cough or sneeze and washing your hands after sneezing.
Suspect #3

Tuberculosis

*Background:*

*Tuberculosis* is a disease caused by bacilli-shaped bacteria called *Mycobacterium tuberculosis*. *Mycobacterium tuberculosis* bacteria are put into the air when a person with Tuberculosis of the lungs coughs or sneezes. Tuberculosis is transmitted (spread) through the air from person to person by them breathing in the bacteria, and then becoming infected.

*Mycobacterium tuberculosis* usually causes infection in the lungs, but if left untreated, it can also infect the kidney, spine, and brain. **Symptoms** of Tuberculosis may include a bad cough (lasting 3 weeks or longer), pain in the chest, and coughing up blood. Medical tests can determine whether or not a person has Tuberculosis and infected people can be treated with antibiotics. Some common ways to prevent spreading Tuberculosis are covering your mouth when you cough or sneeze and washing your hands after sneezing.
Suspect #4

Influenza

Background:

Influenza (also called the Flu) is caused by Influenza viruses. Influenza is a contagious illness that can be spread from person to person in droplets that are coughed or sneezed out from an infected person. Influenza virus can also be spread when infected people cough or sneeze on something (like a desk) and a noninfected person touches it and touches their mouth or nose.

Symptoms of Influenza include high fever, headache, dry cough, sore throat, upset stomach, and feeling very tired. Influenza can lead to more serious illnesses, such as breathing problems and ear infections. Most people can infect others beginning 1 day BEFORE symptoms develop and up to 5 days after becoming sick. That means that you can pass on Influenza to someone else before you know you are sick, as well as while you are sick.

The best way to prevent Influenza infection is to get an Influenza vaccination every year in the fall. Vaccination allows the body to get a vaccine against the Influenza virus. This vaccine contains inactivated (killed) virus that is given with a needle. This vaccine helps the body to know what Influenza looks like, so that the body will be able to attack the Influenza virus if you become infected. This type of vaccine is only helpful to your body for one year because there is a new type of Influenza each year. It is important that you get the vaccine in the fall of EVERY year.
Suspect #5

AIDS

Background:

AIDS (Acquired Immunodeficiency Syndrome) is a disease that is caused by infection of HIV (Human Immunodeficiency Virus). HIV disrupts the body’s ability to fight off infection and keep the body healthy. Instead, people infected with HIV can become very sick or die from many diseases that a healthy person would not ever get sick from.

AIDS can only be spread directly by infected blood, by sharing needles and syringes with an infected person or by infected bodily fluids. AIDS is NOT spread by indirect contact, such as sneezing, shaking hands, hugging, or being in the same classroom with someone who is infected.

Early symptoms for AIDS include high fever, headache, dry cough, sore throat, upset stomach, and feeling very tired. AIDS symptoms may not occur until several years after infection. That means that you can pass on AIDS to someone else before you know you are sick, as well as while you are sick. Medical tests can determine whether or not you have AIDS. Some medicines can slow the course of AIDS, but there is NOT a vaccine or cure for AIDS. To prevent getting AIDS, do not touch used needles, do not touch other people’s blood, and keep band-aids on your cuts and scrapes.
Suspect #6

Chickenpox

**Varicella-zoster virus**

**Blister-like rash caused by Chickenpox**

**Background:**

*Chickenpox* is disease caused by infection with the *Varicella-zoster virus*. Chickenpox is highly contagious and spreads from person to person by direct contact or through the air from an infected person’s coughing or sneezing. A person with Chickenpox is contagious 1-2 days before the rash appears and until all blisters are gone. It takes from 10-21 days after contact with an infected person for someone to develop Chickenpox. Once a person has been sick with Chickenpox, they are immune to it for the rest of their lives. Being immune means that you can no longer become infected.

**Symptoms** of Chickenpox include a **blister-like rash**, itching, tiredness, and fever. First the rash appears on the chest, back, and face, but it can spread over the entire body causing between 250 to 500 itchy blisters. It is important to stay home from school when you have Chickenpox until the blisters are gone, so that you do not spread it to other people. Most cases of Chickenpox occur in people less than 15 years old. The best way to prevent Chickenpox is to get a Chickenpox **vaccination**. Vaccination allows the body to get a **vaccine** against the Varicella-
zoster virus. One vaccination will prevent you from getting sick from Chickenpox for your entire life.

**The Case of the Mysterious Disease**

Now it is time for you to be the Disease Detective! A Detective uses clues to determine which Suspect has caused a crime and presents evidence to solve the Case. Use the clues in each case to figure out which one of the Disease Suspects is the criminal. Then, give evidence to support why you think that Disease Suspect is guilty of causing illness and answer the questions below.

**Case #1**
Mark has a high fever and an upset stomach. Mark always eats lunch with his friend Steve, who was coughing a few days ago and is now staying home sick from school. Mark’s teacher asked him if he had a vaccination this year, but Mark does not remember getting any shots in the last few years.

Which disease does Mark have?_____________________________________________________  
How is this disease spread?_______________________________________________________  
What evidence do you have for your conclusion?_______________________________________  

_____________________________________________________________________________  
Is this disease caused by bacteria or a virus?_________________________________________  
What is the name of the bacteria or virus?___________________________________________  
How could this disease have been prevented?_________________________________________  

_____________________________________________________________________________  

**Case #2**
Soma has just returned from a family camping vacation in the woods and she has been having headaches for the past few days. Soma has a circular rash near her ankle. She has been vaccinated against the varicella-zoster virus.

Which disease does Soma have?_____________________________________________________  
How is this disease spread?_______________________________________________________  
What evidence do you have for your conclusion?_______________________________________  

_____________________________________________________________________________  
Is this disease caused by bacteria or a virus?_________________________________________  
What is the name of the bacteria or virus?___________________________________________  
How could this disease have been prevented?_________________________________________  

_____________________________________________________________________________
Case #3
Tyron has a sore throat and chills. Many of Tyron’s friends from school are home sick and are taking antibiotics. Tyron’s school nurse suggests that he get a throat culture, but Tyron insists that he already got an Influenza vaccine.

Which disease does Tyron have?____________________________________________________

How is this disease spread?__________________________________________________________

What evidence do you have for your conclusion?__________________________________________

________________________________________________________

Is this disease caused by bacteria or a virus?______________________________________________

What is the name of the bacteria or virus?______________________________________________

How could this disease have been prevented?______________________________________________

________________________________________________________

Case #4
Jing is a new student in school—she has only been there for 30 days. She used to be home-schooled, so she hasn’t been around very many other students her age before. Jing has had a high fever and has been feeling very tired for days. Her mom tells her to stay home from school. The next day, Jing sees very small, red blisters on her face. Jing has never been vaccinated for anything.

Which disease does Jing have?________________________________________________________

How is this disease spread?____________________________________________________________

What evidence do you have for your conclusion?__________________________________________

________________________________________________________

Is this disease caused by bacteria or a virus?______________________________________________

What is the name of the bacteria or virus?______________________________________________

How could this disease have been prevented?______________________________________________

________________________________________________________
EXTRA CREDIT

1) What is a vector?
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

2) What does inactivated mean?
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

3) How does a vaccine help your body?
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

4) What does HIV stand for?
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

5) What does transmitted mean?
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

6) What are symptoms?
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
List of Bold Terms

Lyme disease
*Borrelia burgdorferi*
Transmitted
Host
Vector
Deer tick
Bulls eye skin rash
Antibiotics

Strep Throat
*Streptococcus pyogenes*
Symptoms
Antibiotics
Transmitted directly

Tuberculosis
*Mycobacterium tuberculosis*
Transmitted
Symptoms

Influenza
Influenza virus
Contagious
Noninfected
Symptoms
Vaccination
Vaccine

AIDS
HIV
Symptoms
Vaccine

Chickenpox
Varicella-zoster virus
Immune
Symptoms
Blister-like rash
Vaccination
vaccine
You have completed the experiment on “The Spreading of Colds and Flu”. Keeping this experiment in mind, answer the following questions.

A. How can a person with a cold or flu avoid spreading viruses? List at LEAST three ways and describe them thoroughly.

_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

B. How can a healthy person keep from getting cold or flu viruses? List at LEAST three ways and describe them thoroughly.

_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

C. Describe how cold or flu viruses are spread differently from HIV.
2. You have completed the experiment on how HIV spreads through blood, so now you can answer these questions successfully.

A. How can a person infected with HIV avoid passing the virus to others?

_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_____________________________________________________________________________

B. How can a healthy person avoid getting HIV?

_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

Hint: When IV drug users share needles, blood-containing viruses (food coloring), from a person with HIV is left in the needle (medicine dropper) and is injected into the blood of the next IV drug user. Then that person is infected with HIV. Just as the green coloring cannot be removed from the oil, HIV cannot be removed from the infected person’s body.
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3. You have completed the “Wet-Wipe Clean Up” experiment. Hopefully, now you will think about the countless, unseen microscopic organisms that live in, on, and around us. Though many are beneficial, some can cause infectious diseases. Answer the following questions using good, complete, and scientific answers.

A. Describe what your wet wipe looks like. Did you realize your working area was this dirty? Explain.
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

B. Not all dirt contains harmful pathogens, but what can you do to reduce the possibility of transferring some of the harmful ones?
Explain.
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

C. Do the pathogens we found stay here on your desk all day, or do they travel with you? If so, where do they go? Explain.
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
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4. After doing the “Not So Life Saving” experiment, we learned that we come in contact with numerous pathogens daily, but they do not always cause disease. Transmission of disease is easy, but we can protect ourselves. Answer the following questions using good, complete sentences.

A. How easy is it to come into contact with a pathogen and not know it?

_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

B. Do we always acquire the illness when we come in contact with the pathogen that causes it?

_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

C. What are some ways we can protect ourselves? Be specific and explain thoroughly.

_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
Elementary school students can do a lot of things to help prevent the spread of infectious disease. One of the most important things that everyone can do is to keep themselves healthy so that your body is able to fight off infection better. Make sure that you have proper nutrition, drink lots of water, get adequate amounts of sleep, and exercise regularly.

You can help to prevent the spread of disease by using a tissue when you have a cold, cough, or you sneeze. It is very important that you throw the tissue away right after you use it, to prevent others from touching it and also becoming sick. Make sure to carefully and thoroughly wash your hands with soap and water (it should take you longer than singing the “Happy Birthday” song). Remember that if you are ill, you should stay home from school, drink lots of water, and get lots of sleep, so that your body can fight off the disease.

Many people work to help make the population healthier. Scientists study and experiment to find the causes and vaccines for infectious diseases. Doctors and nurses help us to recover from infectious diseases by giving us medicine and helpful advice. Public health workers watch over the entire population of people, solving mysteries of disease.

1. List at least three things that you can do to keep yourself healthy?

1.  
2.  
3.  

2. List at least three things that you can do to prevent yourself from getting infectious disease?

1.  
2.  
3.  

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3. What are at least three things that you should do when you have a cold?
   1. 
   2. 
   3. 

4. List three people who help us to prevent infectious diseases?
   1. 
   2. 
   3. 
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Incredible Infectious Disease Activities

Your teacher will tell you which of the following activities are required and which ones are extra credit. Have fun!

1. Do the Infectious Disease Word Find #2 and/or #3.

2. Do the Infectious Disease Crossword Puzzle #2 and/or #3.

3. Design/build/create 3-D bacteria, fungi, and/or virus from materials that you have at home. Use some of the realistic photos that you have in your packet or use some of the colored photos that your teacher has displayed in your classroom.

4. Make an informational poster to show how you can keep healthy. Be neat, creative, and color carefully! Perhaps you will be able to display your poster in your school.

5. Make an informational poster to show why it is SO important to wash your hands. Be sure to give some “tips on hand washing” that you have learned in this unit.

6. Write a play, song, poem or an acrostic about hand washing and its importance in preventing infectious disease.

7. Make a poster to show some ways that each student can help to prevent the spread of infectious diseases in the home, school, and community. Be creative, neat, and be sure to give good information to those that read your poster.
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Infectious Disease Word Find #2

Y X S N E G O H T A P S S B I
G C J P X S N L D R N O N A L
F U N G I S A K U O L M O C L
B C V R A R F E I Y E Y I T I
J C C F R R O T S C V C T E C
F J C Q O Q A C R I G O A R A
S M V T H N L M H E D C L I B
J W C I I B I K R E W C U A J
A E Q C R C D M V Y T I C C L
V K C A R U S M O M V E O M N
U A L O D I S F Y M A I N E I
V D B M Q N C C Q J F C I W D
Q E U B B U V V L V K B Z Q X
S G P Q P F B M O A J H E J A
I N F E C T I O U S Q L T Q S

BACILLI  BACTERIA  COCCI
DISEASE  FUNGI  GERMS
INFECTIOUS  INOCULATIONS  MICROBES
PATHOGEN  SPIROCHETE  VACCINATIONS
VECTOR  VIRUS
Infectious Disease Word Find #3

AIDS  ANTIBIOTICS  BULLSEYERASH
CHICKENPOX  CONTAGIOUS  DEERTICK
HIV  HOST  IMMUNE
INFLUENZA  LYMEDISEASE  STREPTOTHROAT
SYMPTOMS  TRANSMIT  TUBERCULOSIS
VACCINE
Infectious Disease Crossword Puzzle #2

Across
3. a disease caused by the Varicella-zoster virus
6. a substance that is able to kill or inactivate bacteria
8. a disease caused by the Influenza Virus
9. a tick that carries and transmits the bacterium causing Lyme disease
12. Human Immunodeficiency Virus
13. signs or indications of the presence of something (a disease)
14. a target-shaped Lyme disease rash
15. protected from infection or disease
16. a disease caused by Borrelia burgdorferi

Down
1. a disease caused by Streptococcus pyogenes
2. to pass or spread something
4. an organism in which a pathogenic microorganism is commonly found
5. inject or introduce a weakened or dead form of a disease-producing pathogen into somebody's body in order to create immunity to the disease
7. a disease caused by Mycobacterium tuberculosis
10. easily and quickly spread (a disease from person to person)
11. Acquired Immunodeficiency Syndrome
Infectious Disease Crossword Puzzle #3

Across
4. a single-celled microorganism without distinct nuclei or organize cell structures
5. something that transmits disease-causing microorganisms from an infected organisms to another organism
7. a spherically-shaped bacterium
8. harmful conditions that impair normal body function by infections that can be spread
9. injection or introduction a weakened or dead form of a disease-producing pathogen into somebody's body in order to create immunity to the disease
11. a microscopic organism especially one that transits a disease
12. a single-celled or multi-cellular organism without chlorophyll that reproduces by spores and lives by absorbing nutrients from organic matter
14. a coil-shaped bacterium

Down
1. a harmful condition that impairs (damages) normal functioning
2. an infection particle that lives like a parasite and consists of a nucleic acid core within a protein sheath
3. something that causes disease
5. inoculation with a vaccine to produce immunity
6. a rod-shaped bacterium
10. a microorganism that may or may not cause disease
13. capability of causing and spreading infection