Principles of Biomedical Science

Virtual Learning

9-12 / PLTW® PBS

May 5, 2020

Principles of Biomedical Science

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Lesson: May 5, 2020

Objective/Learning Target:

Students will be able to: identify and evaluate different ways to transmit infectious disease. *(Reference: PLTW® 5.1.1 Contagious)*

Let’s Get Started (Bell Ringer):

Watch the following Videos:

Infectious Disease Transmission

Center for Infectious Disease Dynamics Week 1 Video 4: Transmission Types

Lesson/Activity:

Let's start by reading the following Section from the Center of Disease Control and Prevention about the Chain of Infection and answering the following questions over the section.

1. What are the two major modes of transmission in an infectious agent?
2. Describe the two kinds of direct transmissions.
3. Describe the three types of indirect transmission.

Answers:

1. What are the two major modes of transmission in an infectious agent?
   a. Direct and Indirect

2. Describe the two kinds of direct transmissions.
   a. **Direct contact:** occurs through skin-to-skin contact, kissing, and sexual intercourse. Direct contact also refers to contact with soil or vegetation harboring infectious organisms.
   b. **Droplet spread** refers to spray with relatively large, short-range aerosols produced by sneezing, coughing, or even talking. Droplet spread is classified as direct because transmission is by direct spray over a few feet, before the droplets fall to the ground.

3. Describe the three types of indirect transmission.
   a. Airborne transmission occurs when infectious agents are carried by dust or droplet nuclei suspended in air. Airborne dust includes material that has settled on surfaces and become resuspended by air currents as well as infectious particles blown from the soil by the wind.
   b. Vehicles that may indirectly transmit an infectious agent include food, water, biologic products (blood), and fomites (inanimate objects such as handkerchiefs, bedding, or surgical scalpels).
   c. Vectors such as mosquitoes, fleas, and ticks may carry an infectious agent through purely mechanical means or may support growth or changes in the agent.

Lesson/Activity continued:

Diseases spread through two basic ways direct and indirect contact, however there are many different subsets and categories that diseases spread in as well. Find your own resources to explain these types of spreading examples along with the names of some pathogens that take advantage of this form of transmission. Write your new found information in your notebook or on a separate piece of paper. Your examples are on the next slide.

Lesson/Activity continued:

Transmission Examples:

- Air droplets
- Aerosol
- Faecal-Oral
- Skin or Mucous Membrane Contact
- Blood or other Body Fluids
- Sexual Contact
- Food and Water (to eat)
- Animal Contact
- Insect Contact
- Soil or Water (in nature)

Answers:

There are many websites but her is a good one that will explain them all, along with examples of diseases the correspond with them as well.

Healthline *How Are Diseases Transmitted?*

Practice:

Your have looked at the concepts covered in this activity at the beginning of the lesson let's see what you remember. Click on the following web site and read over the *Dengue Fact Sheet* (you will have to scroll down toward the bottom of the web page) information. Outline the chain of infection by identifying the reservoir(s), portal(s) of exit, mode(s) of transmission, portal(s) of entry, and factors in host susceptibility. Write down your answers in your notebook or seperate piece of paper.

Answers:

Reservoirs: humans and possibly monkeys

Portals of exit: skin (via mosquito bite)

Modes of transmission: indirect transmission to humans by mosquito vector

Portals of entry: through skin to blood (via mosquito bite)

Factors in host susceptibility: except for survivors of dengue infection who are immune to subsequent infection from the same serotype, susceptibility is universal

Additional Practice:

Additional Resources to Explore:

TED-ED How Pandemics Spread

How OSHA handels Infectious Diseases in the workplace