Lesson 3: Immunizations

K-W-L Graphic Organizer

K (Know) What do you know about immunizations?	W (Want) What do you want to know about immunizations?	L (Learned) What did you learn about immunizations?

1. antibodies: proteins created by the immune system to fight against germs
2. antigen: the part of the microbe (germ) the body sees and fights against
3. B-cells: develop antibodies that are used to destroy germs and store information about germ antigens so the body can respond faster the next time the same infection occurs
4. contaminated: contaminated food or water has had a harmful substance added to it
5. DTap/DT vaccine: protects against diphtheria, tetanus and pertussis
6. hepatitis A: a virus that can cause liver failure
7. hepatitis B: a virus that attacks the liver and can cause liver failure, which can lead to death
8. Hib vaccine: protects against bacteria that can cause pneumonia and meningitis (inflammation of the brain), which can lead to death
9. human papillomavirus: a virus that can cause cancer
10. immune system: your body's immune system protects it against germs. The immune system includes white blood cells, antibodies, and organs such as lymph nodes, the spleen and bone marrow
11. immunity: created after the body learns how to fight against specific germs. If the germ comes back, your body recognizes it and is prepared to fight it quickly. You can become immune to some germs by receiving vaccines.
12. infection: occurs when viruses, bacteria, or other types of germs called microbes enter your body and begin to multiply
13. infectious disease: develops when the cells in your body are damaged as a result of infection, and signs and symptoms of an illness appear
14. Influenza: a severe lung infection caused by viruses. Influenza can be deadly and comes around every year
15. macrophages: a type of white blood cell that eats germs, as well as dead or dying cells. Macrophages leave behind parts of the germs called antigens
16. measles: a very contagious disease that causes rash, fever, and sometimes death
17. MMR vaccine: protects against measles, mumps and rubella
18. mumps: a very contagious disease that causes fever and swollen glands
19. paralysis: the loss of movement and feeling in part of your body
20. pneumococcal vaccine: protects against bacteria that cause pneumonia, ear infections, and severe illness
21. polio: a virus that causes paralysis and possible death
22. rotavirus: a virus that causes severe diarrhea
23. rubella: a disease that causes rash and fever
24. T-cells: rush to kill the germs causing the infection and the cells already infected. T-cells also send alerts to the B-cells
25. vaccine: uses fake or weakened germs to make the immune system respond as if an infection has occurred, without causing illness. Getting vaccinated is also called immunization.
26. varicella: chickenpox, a disease that causes an itchy rash and blisters. In rare cases, chickenpox can cause severe illness or even death.

Lesson 3: Immunizations

Reading Comprehension: Part I

Background Information

What is immunization?

Immunization is a way to protect people from dangerous illnesses. It exposes you to a tiny bit of a disease, usually through an injection (a shot). The amount of disease in the injection is so small that it can't hurt you, but it is enough to help your body practice fighting the disease. After that practice, your body can more easily fight the disease if you are exposed to it later. The body's ability to fight a disease is called immunity. Read on to learn more.

How infectious diseases make you sick[1]

Infection happens when viruses, bacteria, or other types of germs, also called microbes, enter your body and begin to multiply (increase in number). Germs enter your body when you injure yourself, when someone sneezes or coughs and you breathe in the germ, or when you eat contaminated food or drink contaminated water. The part of the germ your body sees and fights against is call an antigen.

Infectious disease develops when the cells in your body are damaged as a result of infection, and signs and symptoms of an illness appear. Not everyone who is infected with a germ gets sick.

Your body uses its immune system to fight an infection. The immune system includes white blood cells, antibodies, and organs such as lymph nodes, the spleen and bone marrow.

Immunity is created after the body learns how to fight against specific germs. If the germ comes back, your body recognizes it and is prepared to fight it quickly. You are much less likely to become sick from a germ when you have immunity to it.

- Sometimes you can become immune to a germ after you have had an illness caused by that germ
- You can become immune to some germs by receiving a vaccine (also called immunization)

How your immune system protects you[2]

To understand how vaccines work, it is helpful to look at how your body fights infections. When germs, such as bacteria or viruses, enter your body, they multiply and attack the cells in your body. This invasion of germs is called an infection, and the infection is what causes disease. The immune system uses several tools to fight infection, such as white blood cells. The main types of white blood cells are macrophages, T-cells and B-cells:

Macrophages eat germs, as well as dead or dying cells. Macrophages leave behind parts of the germs called antigens. The body identifies antigens as dangerous and attacks them.

T-cells rush to kill the germs causing the infection and the cells already infected. T-cells also send alerts to the B-cells.

B-cells find the germ antigens left behind by the macrophages. B-cells produce antibodies, which are proteins that destroy germs. B-cells store information about germ antigens so they can respond faster the next time the same infection occurs.

The first time the body encounters a germ, it can take several days or even longer to make and use all the germ-fighting tools needed to get over the infection. Disease can damage the body or cause death, if the immune system cannot work quickly and effectively enough.

If a person survives an infection, the immune system remembers what it learned about how to protect the body against that disease. The body keeps a few B-cells and T-cells, called memory cells, which act quickly if the body encounters the same germ again. When memory cells recognize familiar antigens, they produce antibodies to destroy the antigens right away.

[1] http://needtoknow.nas.edu/id/infection/how-pathogens-make-us-sick/

[2] http://www.cdc.gov/vaccines/hcp/patient-ed/conversations/downloads/vacsafe-understand-color-office.pdf

Information about Vaccines

How vaccines work

Diseases that vaccines prevent can be dangerous, even deadly. Vaccines greatly reduce the risk of getting sick by working with the body's natural defenses to safely develop immunity to disease.

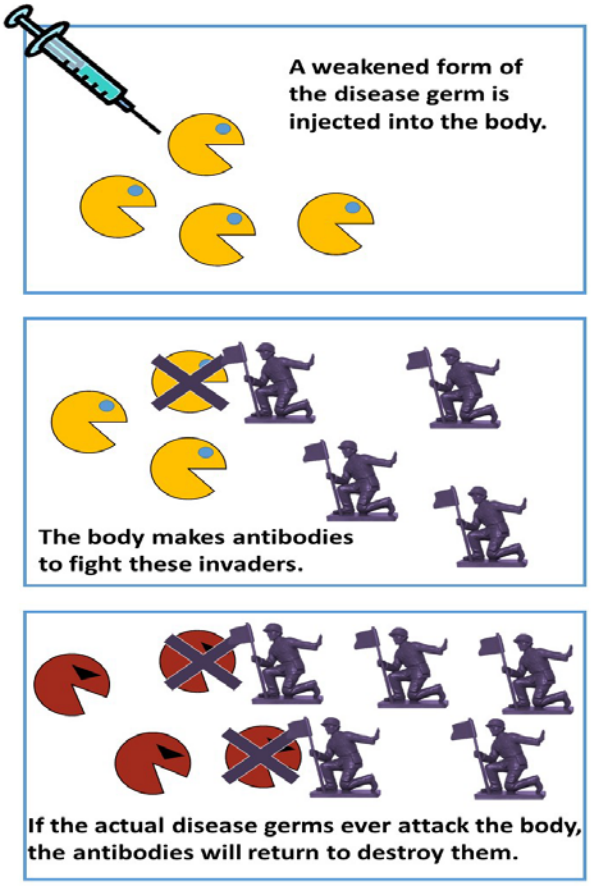
Vaccines use fake or weakened germs to get the immune system to respond as if an infection has occurred. The immune system usually reacts as it would to a real infection, but vaccination does not cause illness. It does cause the immune system to produce T-cells and antibodies. Sometimes, the immune response after vaccination can cause minor symptoms, such as fever. Minor symptoms are normal and should be expected as the body builds immunity.

After vaccination, the body has a supply of "memory" B-cells and T-cells that will remember how to fight that disease in the future. However, it takes a few weeks for the body to produce T-cells and B-cells after vaccination. It is possible that a person who was infected with a germ just before or just after vaccination could develop the disease, because the vaccine has not had enough time to provide protection.

The impact of immunization on our community

Vaccines have helped people live longer, healthier lives. For example, polio is a disease that may cause partial or full paralysis, or death. In 1952, there were 57,628 polio cases reported in the U.S.[1] Thanks to vaccination, there is no polio in the U.S. today.

Vaccination protects not only individual people but also communities. A lot of diseases are contagious and can easily spread throughout a community. It is important to immunize as many people as possible, so disease will not be able to spread.



Because babies have new immune systems, they need several vaccines. They should get their vaccines at the right times. Talk to your health care provider about vaccines for babies and children.

Vaccines are not just for babies. People need vaccines throughout their life. Each time you visit the doctor, ask if you need any vaccines.

Many schools and jobs require up-to-date vaccinations. For example, most public schools require children to complete a series of vaccinations and health tests before they can enroll. This protects the health of each student and the health of the school community.

[1] http://www.historyofvaccines.org/content/timelines/diseases-and-vaccines

Which vaccines do children and adults need?

Vaccines for children and teens

Children need many vaccines because there are lots of diseases that their immune systems have not been exposed to yet.

- Hepatitis B vaccine protects against a virus that attacks the liver and can cause liver failure, which can lead to death
- DTaP/DT vaccine protects against diphtheria, tetanus and pertussis
    - Diphtheria can damage organs, including the heart, which can lead to death
    - Tetanus causes painful muscle spasms and may cause a person's jaws to lock together, which makes it hard to breathe and swallow and can lead to death
    - Pertussis, also known as whooping cough, causes such severe coughing that a person cannot catch their breath. It is very dangerous in babies
- Hib vaccine protects against bacteria that can cause pneumonia and meningitis (inflammation of the brain), which can lead to death
- Polio vaccine protects against a virus that causes paralysis and possible death
- Pneumococcal vaccine protects against bacteria that cause pneumonia, ear infections, and severe illness. Both babies and older persons need this vaccine
- Rotavirus vaccine protects against a virus that causes severe diarrhea
- MMR vaccine protects against measles, mumps and rubella
    - Measles is a very contagious disease that causes rash, fever, and sometimes death
    - Mumps is also very contagious and causes fever and swollen glands
    - Rubella causes rash and fever
- Varicella vaccine protects against chickenpox, a disease that causes an itchy rash and blisters. In rare cases, chickenpox can cause severe illness or even death
- Hepatitis A vaccine protects against a virus that can cause liver failure
- Human papillomavirus (HPV) vaccine protects against a virus that can cause cancer
- Influenza vaccine protects against viruses that cause a severe lung infection, which can be deadly. Influenza comes around every year. Make sure you and your child get an influenza vaccine every fall

Vaccines adults need

Adults need a repeat dose (also called a "booster shot") of some vaccines to make sure they are still protected.

Influenza vaccine: Adults should get one every fall

Tdap vaccine: This is the adult version of the DTaP. You need this shot once, and then a Td shot every 10 years. Pregnant women should get a Tdap vaccine in every pregnancy to protect themselves and their baby

Zoster vaccine: This vaccine prevents the chickenpox virus from becoming active again in your body and causing shingles, a painful skin rash. Adults 60 and older need this vaccine

Pneumococcal vaccine: Older adults need pneumococcal vaccine, as they are at a higher risk for life-threatening pneumonia and pneumococcal blood disease

Your health care provider may also recommend other vaccines, especially if you did not receive them as a child.

Travel vaccines

If you travel to other countries, it is important to get vaccinated. Some diseases that are not common in the U.S. still exist in other parts of the world. Also, in an airport or airplane, other people can expose you to disease[1]. Before you travel, review your vaccination history. Check with your doctor or nurse to make sure you have had all of the recommended vaccines. You may need a "booster shot," even if you had vaccines when you were younger.

Talking to your doctor about vaccines

If you have questions or concerns about vaccines, talk to your doctor or health care provider.
To find out more about vaccines, visit the following websites:
http://www.health.state.mn.us/divs/idepc/immunize/index.html

http://www.niaid.nih.gov/topics/vaccines/Pages/howWork.aspx

http://www.cdc.gov/vaccines/schedules/index.html

http://www.who.int/topics/vaccines/en/

[1] http://www.cdc.gov/Features/TravelProtection/

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Vocabulary Match and Complete the Sentence

Diseases and the importance of vaccination

Read each item. Write the letter from the column on the right that gives the correct definition of the term on the left. Use the three-part reading and the glossary to help you.

1. _____ hepatitis A and B
2. _____ rotavirus
3. _____ varicella
4. _____ polio
5. _____ influenza
6. _____ vaccine
7. _____ DTap/DT
8. _____ paralysis

a. virus that causes paralysis and possible death

b. chickenpox, a disease that causes an itchy rash and blisters

c. a severe lung infection caused by viruses, which can be deadly and comes around every year

d. diphtheria, tetanus and pertussis

e. viruses that can cause liver failure

f. the loss of movement and feeling in part of your body

g. uses fake or weakened germs to make the immune system respond as if an infection has occurred, without causing illness

h. a virus that causes severe diarrhea

Use the words in the box to complete each sentence in the following passage.

contagious	immunize	vaccination	prevent	immune	diseases

_____ protects not only individual people but communities. A lot of _____ are _____ and can easily spread throughout a community. It is important to _____ people, so the disease cannot spread. Because babies have new _____ systems, they need several vaccines and should get them at the right times. The infectious diseases that vaccines _____ can be deadly. Each time you visit the doctor, ask if you need any vaccines.

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Group Discussion Questions

1. What is an infection?	2. How does your body fight an infection?	3. How do vaccines help?	4. What does being immune to a disease mean?
5. Why do babies need immunizations?	6. Why do adults need immunizations?	7. Where do you go to get vaccines?	8. Where can you get more information about vaccines?
1. What is an infection?	2. How does your body fight an infection?	3. How do vaccines help?	4. What does being immune to a disease mean?
5. Why do babies need immunizations?	6. Why do adults need immunizations?	7. Where do you go to get vaccines?	8. Where can you get more information about vaccines?

Write answers to the questions after discussion.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

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Quiz

Read the questions. Then circle A, B, C or D.

1. What is immunity?

   A. your ability to fight disease
   B. your digestive system
   C. the nervous system
   D. both A and B

2. What does vaccination do?
   A. protects people from disease
   B. helps stop disease from spreading through a community
   C. prevents disease
   D. all of the above

3. Does a vaccination give you a disease?

   A. yes
   B. no
   C. sometimes
   D. I don't know

4. What is measles?

   A. inflammation of the leg
   B. a virus that can cause severe diarrhea
   C. a contagious disease that causes rash, fever and sometimes death
   D. a severe lung infection caused by bacteria

5. How often should you get an influenza vaccination?

   A. every ten years
   B. twice a year
   C. once as a child
   D. every year

6. Why is it important for babies to get all their vaccines at the right times?

   A. because they have too much immunity
   B. because they have new immune systems and diseases can be deadly
   C. both A and B
   D. none of the above

7. Which disease do we NOT have a vaccine for yet?
   A. Human papillomavirus
   B. Measles
   C. HIV
   D. polio

8. How can you learn more about immunizations?

   _____

   _____