

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?

Lesson 3: Immunizations

Glossary

1. **antibodies:** proteins created by the immune system to fight against germs (the tiny living things that can make you sick, including viruses, bacteria, fungi, and parasites).
2. **antigen:** the part of the microbe (germ) the body sees and fights against
3. **Bacteria:** tiny living creatures that can only be seen with a microscope; some bacteria help the human body, and other bacteria cause illness
4. **B-cells:** B-cells create antibodies that are used to destroy germs and remember information about germ antigens so the body can respond faster the next time the same infection happens
5. **contagious:** type of disease that spreads quickly from person to person
6. **contaminated:** food or water that has had a harmful substance added to it
7. **covid-19:** a disease caused by a virus called coronavirus that causes a cold or flu like illness and pneumonia in serious cases*
8. **DTaP/Tdap/DT vaccine:** protects against diphtheria, tetanus, and pertussis. DTaP vaccines are for babies and young children, DT vaccines are for babies and children who can't get the pertussis vaccine, and Tdap vaccines are for older children, teens, and adults.
9. **germs:** the tiny living things that can make you sick, including viruses, bacteria, fungi, and parasites
10. **hepatitis A:** a virus that can cause liver failure*
11. **hepatitis B:** a virus that attacks the liver and can cause liver failure, which can lead to death*
12. **Hib vaccine:** protects against bacteria that can cause pneumonia and meningitis (inflammation of the brain), which can lead to death
13. **human papillomavirus:** a virus often known as "HPV" that can cause cancer*
14. **immune system:** protects the body against germs and includes white blood cells, antibodies, and organs like lymph nodes, the spleen, and bone marrow.
15. **immunity:** the body's ability to remember a specific germ and how to fight it off (you can become immune to some germs by receiving vaccines)
16. **infection:** occurs when viruses, bacteria, or other types of germs called microbes enter your body and begin to multiply
17. **infectious disease:** develops when the cells in your body are damaged because of infection, and signs and symptoms of an illness appear
18. **Influenza:** a severe lung infection caused by viruses that can be deadly; commonly happens every year
19. **macrophages:** a type of white blood cell that destroys germs, as well as dead or dying cells, and leave behind parts of the germs called antigens.
20. **measles:** a very contagious disease that causes rash and fever*
21. **MMR vaccine:** protects against measles, mumps, and rubella
22. **mumps:** a very contagious disease that causes fever and swollen glands*
23. **paralysis:** the loss of movement and feeling in part of your body
24. **pneumococcal vaccine:** protects against bacteria that cause pneumonia, ear infections, and severe illness
25. **polio:** a virus that causes muscle weakness and paralysis*
26. **rotavirus:** a virus that causes severe diarrhea*
27. **rubella:** a disease that causes rash and fever*
28. **T-cells:** cells that kill the germs causing infection as well as the cells already infected; they also send alerts to B-cells
29. **vaccine:** medicine that uses fake or weakened germs to make the immune system respond as if an infection has occurred, without causing illness. Also known as immunization.
30. **varicella:** a disease often known as "chickenpox" that causes an itchy rash and blisters. In rare cases, can cause

*All of these diseases can cause serious illness and sometimes death, especially in young children or people with weak immune systems

Lesson 3: Immunizations

Reading Comprehension: Part I

Background Information

What is immunization?

Immunization is a way to protect people from dangerous illnesses and diseases. It exposes you to a small, safe piece or part of the germ, usually through a shot. The contents of the shot can't hurt you, but it does help your body practice fighting the real disease. After that practice, your body can more easily fight the disease if you are exposed to it later. The body's ability to prevent you from getting sick even after being exposed to a disease is called **immunity**. Read on to learn more.

How infectious diseases make you sick¹

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 hurt 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 called an **antigen**.

Infectious disease develops when the cells in your body are infected because 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 infection. The immune system is made up of white blood cells, antibodies, and organs like lymph nodes, the spleen, and bone marrow.

Immunity is created after the body makes antibodies to fight against specific germs. If the germ comes back, your body recognizes it and is ready 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 you²

To understand how vaccines work, it is helpful to look at how your body fights infections. Remember, infection is when germs, like bacteria or viruses, enter your body, multiplying and attacking the cells in your body. This infection is what causes disease. The immune system uses several of its tools to fight infection, like white blood cells. The main types of white blood cells are macrophages, T-cells, and B-cells.

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

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

B-cells find the germ antigens left behind by the macrophages. B-cells create **antibodies**, which are proteins that destroy germs. B-cells store information about germ antigens so they can respond more quickly and make the person less sick the next time the same infection happens.

When a new germ enters the body, it can take several days or longer for the body to make and use all its germ-fighting tools to get better. 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 create antibodies to destroy the antigens immediately.

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

² <https://stacks.cdc.gov/view/cdc/44482>

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Reading Comprehension: Part II

Information about Vaccines

How vaccines work

Vaccines prevent diseases that can be dangerous or even deadly. Vaccines greatly decrease the risk of getting sick by helping the body's immune system to safely create immunity to a specific disease.

Vaccines use fake or weakened germs that cause the immune system to react like an infection has occurred. This "germ" lets your immune system recognize and fight it, but it is not strong enough to make you sick. Your immune system then reacts by making T cells and antibodies to protect you. Sometimes your body's reaction can cause mild symptoms like a fever or headache. This does not mean you are sick with the germ. It is a normal sign that your immune system is working and learning.

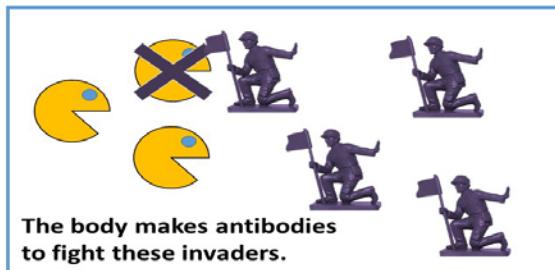
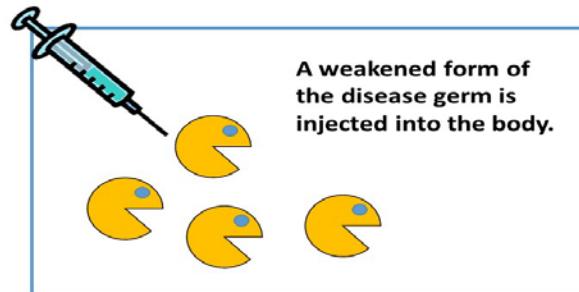
After vaccination, the body keeps "memory" B-cells and T-cells that will remember how to fight that disease in the future. However, the body needs a few weeks to create these T-cells and B-cells after vaccination. It is possible that a person who was infected with a germ immediately before or after vaccination could get sick with the disease, because the vaccine has not had enough time to create protection.

Getting vaccines

Babies have new immune systems that do not have immunity to common diseases, so they need several vaccines. They should get their vaccines at the right times. It can be uncomfortable to get many vaccines at once, and some vaccines need to be given more than once. The healthcare team will tell you what vaccines should be given and when. Talk to your doctor about vaccines for babies and children.

Vaccines are not just for babies. People need vaccines at many different times in their life. Vaccines are given to everyone, from babies to healthy adults to the elderly. Every time you visit your doctor, ask if you need any vaccines.

Many schools and jobs require vaccinations. For example, most public schools require children to complete several vaccinations and health tests before they can start. These vaccines protect the health of the school and workplace.



The impact of immunization on our community

Vaccines help people live longer, healthier lives. For example, polio is a disease that can cause some or full paralysis, or death. In 1952, there were 57,628 polio cases reported in the U.S. After years of vaccinating people to give them immunity to the polio virus, polio is extremely rare in the U.S. today.

Vaccination protects both individuals and communities. Many diseases are contagious and can spread easily through a community. It is important to immunize as many people as possible so disease cannot spread.

¹ <http://www.historyofvaccines.org/content/timelines/diseases-and-vaccines>

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Reading Comprehension: Part III

Which vaccines do children and adults need?

Vaccines for children and teens

Children need many vaccines because there are many diseases that their immune systems have not been exposed to yet. All of these vaccines prevent diseases that can cause serious illness and sometimes death.

- **Hepatitis B vaccine** protects against a virus that attacks the liver and can cause liver failure
- **DTaP/DT vaccine** protects against diphtheria, tetanus, and pertussis
 - **Diphtheria** can damage organs, including the heart
 - **Tetanus** causes painful muscle spasms and may cause a person's jaws to lock together, which makes it hard to breathe and swallow
 - **Pertussis**, also known as whooping cough, causes severe coughing that can make it hard for a person to catch their breath. It can also lead to pneumonia, or an infection in the lungs. It is very dangerous in babies.
- **Hib vaccine** protects against bacteria that can cause pneumonia and meningitis (inflammation in the brain)
- **Polio vaccine** protects against a virus that causes muscle weakness and sometimes paralysis
- **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 and fever
 - **Mumps** is also very contagious and causes fever and swollen areas in the neck
 - **Rubella** causes rash and fever
- **Varicella vaccine** protects against chickenpox, a disease that causes an itchy rash and blisters
- **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 influenza viruses that cause a severe lung infection. Influenza is common every year. Make sure you and your child get an influenza vaccine every fall.
- **Covid-19 vaccine** protects against the virus that causes an illness with symptoms similar to flu and pneumonia

Vaccines adults need

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

COVID-19 vaccine: Adults should get one every fall.

Influenza vaccine: Adults should get one every fall.

Tdap vaccine: This is the adult version of the DTaP vaccine. You need this shot once, and then a Tdap shot every 10 years. You will need a booster shot sooner if you are exposed to the disease and your last vaccine was over 5 years ago. Pregnant women should get a Tdap vaccine during every pregnancy to protect themselves and their baby.

Zoster vaccine: This vaccine prevents the varicella (or "chickenpox") virus from becoming active again in your body and causing shingles, a painful skin rash. Adults 60 and older need this vaccine even if they have already had chickenpox or the varicella vaccine.

Pneumococcal vaccine: Older adults, as well as smokers and people with certain health problems such as asthma, need this 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 get them as a child.

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Reading Comprehension: Part III

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, other people can expose you to disease when you are in an airport or airplane¹. Before you travel, review the vaccinations you have had. 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 learn more about vaccines, visit the following websites:

- Minnesota Department of Health (MDH) Immunization Page:
<https://www.health.mn.gov/people/immunize/index.html>
- US Department of Health and Human Services (HHS) Vaccine Basics:
<https://www.hhs.gov/immunization/basics/index.html>
- World Health Organization (WHO) Vaccines and Immunization Page:
<http://www.who.int/topics/vaccines/en/>

¹<https://wwwnc.cdc.gov/travel>

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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	a. virus that causes paralysis and possible death
2. _____ rotavirus	b. chickenpox, a disease that causes an itchy rash and blisters
3. _____ varicella	c. a severe lung infection caused by viruses, which can be deadly and is common every year
4. _____ polio	d. diphtheria, tetanus, and pertussis
5. _____ influenza	e. viruses that can cause liver failure
6. _____ vaccine	f. the loss of movement and feeling in part of your body
7. _____ DTaP/DT	g. uses fake or weakened germs that cause the immune system to react like an infection has occurred
8. _____ paralysis	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
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_____ protects not only individual people but communities. Many of _____ are _____ and can easily spread through 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?

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Group Discussion Questions

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. swelling in 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?

