

COOPERATION

Week 8

Cooperation

Working well together.

Objectives

Cooperation Systems of the Body Week 8

General Objectives

- To practice being cooperative
- To learn about lymphatic and immune systems and their parts
- To learn about bacteria, viruses, and diseases
- To observe God's design of the human body

Specific Objectives

- To make agar and grow bacteria
- To study microbes, bacteria, and viruses
- To research lymphatic system and its parts
- To practice ways to prevent spreading diseases
- To experiment to see how germs travel through wounds
- To understand the difference between contagious and non-contagious disease
- To close with a grand finale

8 Weeks Focus

Cooperation Systems of the Body Week 1

- **Activities**
- **Body Roll Out**
- **Book**
- **Research**
- **Cooperation→Design**

Weekly Supplies

Cooperation Systems of the Body Week 8

- Beef bouillon, plain gelatin, and Petri dish 23 and 24 (p.60)
- Microscope, slides, and methylene blue or India ink 25 (p.60)
- Pipe cleaners 27 (p.43)
- Pipe cleaners 28 (p.61)
- Two good apples, one rotten apple, two needles, and candle or alcohol 34 (p.61)

Bible Verse

Cooperation Systems of the Body Week 8

Jesus was going through all the cities and villages, teaching in their synagogues and proclaiming the gospel of the kingdom, and healing every kind of disease and every kind of sickness.

Matthew 9:35

Focus Books

Cooperation Systems of the Body Week 8

- A *Blood and Guts: A Working Guide to Your Own Insides* by Linda Allison (A must!)
- * *The Human Body* by Bruun and Bruun (excellent!)
- * *Inspector Bodyguard Patrols the Land of U* by Vicki Cobb
- * *The Pied Piper of Hamelin* by Robert Browning
- * *The Velveteen Rabbit* by Margery Williams
- More About My Magnificent Machine* by William L. Coleman
- Louis Pasteur: The Germ Killer* by John Mann
- O * *The Doctor Who Conquered Yellow Fever* by Ralph N. Hill
- The Disease Fighters* by Nathan Aaseng
- M *Understanding Your Body* by Rebecca Treays and Christyan Fox
- The Incredible Body Machine* by Paula S. Brown
- The Black Plague* by Walter Oleksy
- Vaccinations and You* by Daniel Cohen
- Y *No Measles, No Mumps For Me* by Paul Showers

Websites

Cooperation Systems of the Body Week 8

- http://www.amnh.org/nationalcenter/infection/01_mic/01_mic.html (Meet the microbes)
- http://www.youtube.com/watch?v=Ys_V6FcYD5I&feature=related (Antibodies)
- http://www.niaid.nih.gov/Publications/immune/the_immune_system.pdf (great info; BEST pics)
- <http://www.youtube.com/watch?v=O-OwdGlgpK8&feature=related> (Cute animation on immune system response)
- <http://www.youtube.com/watch?v=tjlCoY7B9WM&feature=related> (Wash your hands)

Writing Assignment

Cooperation Systems of the Body Week 8

Y-M-O 23 (p.9) Write and illustrate a book about traveling through the body.

- This week finish writing your adventure.
- Illustrate what you have written.

Music/Videos

Cooperation Systems of the Body Week 8

A Pied Piper of Hamelin, Fairy Tale
Theater

Ring Around the Rosy

Hickory Dickory Dock

<http://www.indianchild.com/nursery%20rhymes.htm>

Three Blind Mice

Timeline Characters

Cooperation Systems of the Body Week 8

Immune System

Anton van Leeuwenhoek [16] (1683) - worked with microscopes; saw "beaties" (bacteria)

Edward Jenner [17] (1796) - vaccinated against smallpox

Louis Pasteur [18] (1866) - described "germ theory" of disease and he produced weakened anthrax for vaccine

Joseph Lister [19] (1867) - published a paper about antiseptics

Walter Reed [20] (1851-1902) - showed relationship of mosquito to yellow fever

Alexander Fleming [88] (1928) - discovered penicillin

Jonas Salk [89] (1955) - made polio vaccine

Vocabulary

Cooperation Systems of the Body Week 8

Microbes

Microbes

Virus

Bacteria

Protozoa

Fungi

Growing Bacteria

Petri dish

Agar

Incubation

Colony

Spreading Diseases

Quarantine

Carrier

Vector

Treatment

Antiseptic

Sterilization

Immunity

Antigen

Antibody

Vaccination

Antibiotic = drug

Vocabulary (cont'd 2)

Cooperation Systems of the Body Week 8

Diseases

Bubonic Plague/Black Death

Smallpox

Tuberculosis

Cholera

African sleeping sickness

Diphtheria

Malaria

Yellow fever

Measles

Chicken pox

Heart disease

Cold

Mumps

Scarlet fever

Whooping cough

Polio

Pneumonia

Influenza (flu)

AIDS

Gangrene

Appendicitis

Tonsillitis

Cancer

Vocabulary (cont'd 3)

Cooperation Systems of the Body Week 8

General

Disease

Symptom

Infection

Inflammation ("-itis")

Fever

Pus

Germs

Contagious

Non-contiguous

Communicable

Epidemic

Plague

Immune System Parts

Bone Marrow

Thymus

Spleen

Lymph nodes

Leukocytes = "white blood cells"

Lymphocytes = lymph cells

T-Cells

B Cells

Natural Killer Cells (NK) cells

Granulocytes

Macrophages

Activities

Cooperation Systems of the Body Week 8

Monday: Bacteria/ Viruses/ Diseases

26 (p.61) Learn the different kinds of microbes.

27 (p.61) Make a model of each type of bacteria.

Research the difference between good and bad bacteria.

23 (p.60) Make sterile agar.

24 (p.60) Find and grow bacteria from around your house.

28 (p.61) Make a model of a virus and show how it replicates.

Types of Microbes

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Microbes, or microorganisms, are organisms that are microscopic and cannot be seen with the unaided eye.

- **Discovered by Antonie van Leeuwenhoek in 1676 using his microscope.**
- **Microbes include:**
 - **Bacteria**
 - **Viruses**
 - **Protozoa**

Bacteria

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Bacteria are one-celled organisms

- **Shapes**
 - Spherical
 - Spiral
 - Rod-shaped
- Found as single cells or in chains
- Good bacteria are found in the stomach, ferment and preserve milk, are used in antibiotics, and can even help clean up oil spills.
- Bad bacteria are found in diseases, like the Black Plague, common cold, AIDS.

Bacteria Facts

Cooperation Systems of the Body Week 8

Bacteria are found everywhere

- At the bottom of the deepest ocean
- At the top of Mount Everest
- In frozen rocks in Antarctica
- In all foods we eat
- In every animal including humans

Bacteria Caused Diseases

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Bacterial Diseases

- **Sore throat**
- **Gangrene**
- **Scarlet fever**
- **Tonsillitis**
- **Sinus infection**
- **Pneumonia**

Treatment of Bacterial Diseases

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Treatment

- **Antibacterial antibiotics**
- **Antibiotics will not work on a viral infection**

Virus

Cooperation Systems of the Body Week 8

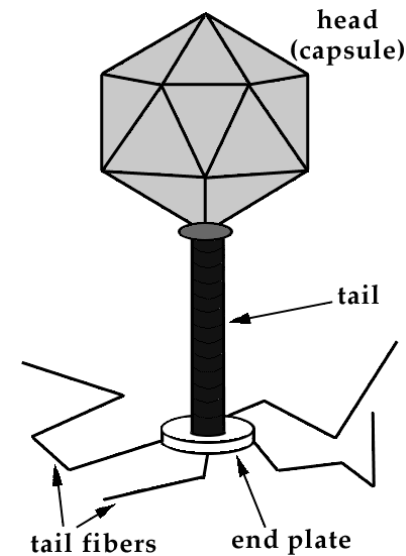
Virus - an ultramicroscopic, infectious agent that can replicate only in cells of living hosts, mainly bacteria, plants, and animals.

- **Can exist outside of a host but not make more of itself**
- **Discovered in 1898**

Virus Facts

Cooperation Systems of the Body Week 8

- Viruses invade the body and land like a space ship on a normal cell.
- They punch a hole in the cell wall with their tail.
- They insert their own DNA and take over the cell nucleus and make 1,000's of themselves.
- They kill the host cell and break out of the cell sending 1000's of themselves to take over more cells all over the body, continuing to multiply themselves.



Virus Caused Diseases

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Viruses cause a number of diseases in humans:

- Smallpox,**
- Common cold**
- Chickenpox**
- Influenza**
- Shingles**
- Herpes**
- Polio**
- Rabies**
- AIDS**
- Even a few types of cancer have been linked to viruses.**

Transmitting Diseases

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- **Contact** - another person in close proximity
- **Fluids** - sneezing, coughing, blood
- **Foods** - contaminated or poisonous
- **Vector** - mosquito, fly, tick, fleas, and rodents
- **Objects** - inanimate object like coin, doorknob, water fountain, rusty nail, drinking glass

How Microbes Spread

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Disease	Microbe Type	How it Spreads
Black Plague		
Smallpox		
Cholera		
African Sleeping Sickness		
Diphtheria		
Malaria		
Yellow Fever		
Measles		
Chicken pox		
Mumps		
Influenza (flu)		
AIDS		
Gangrene		

Contagious Diseases

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- Scarlet fever
- Chickenpox
- Measles
- Hand-foot-and-mouth disease
- Rabies
- Scabies
- Ringworm
- Pink eye
- Common cold
- Flu
- Meningitis

Non-Contagious Diseases

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- **Cancer**
- **Multiple Sclerosis**
- **Muscular Dystrophy**
- **Heart Disease**
- **Arthritis**
- **Broken bone**
- **Asthma**
- **Allergies**
- **Leukemia**
- **Pneumonia**

Activities (cont'd 2)

Cooperation Systems of the Body Week 8

Tuesday: Disease Transmission

- 25 (p.60) Observe the bacteria you grew under a microscope.
- 29 (p.61) Think of all the ways that people can get sick.
- 33 (p.61) Talk to someone who has had food poisoning.
- 34 (p.61) Experiment to see how germs travel through wounds.
- 35 (p.62) Sort different diseases into ways of spreading and kind of microbe.
- 36 (p.63) Play a matching game
- 37 (p.64) Sort diseases into contagious and non-contagious.

Activities (cont'd 3)

Cooperation Systems of the Body Week 8

Wednesday: Immune System/ Ancient Disease Treatments

Research Immune System, its parts, and how it works.

1 (p.56) Read about bubonic plague of Middle Ages.

2 (p.56) Discuss meaning of Ring Around the Rosy, sing and dance it.

3 or 4 (p.56) Read *The Pied Piper of Hamelin* or watch the video.

6-8 (p.57) Research old-fashioned cures for diseases.
(Omit the skit)

7 (p.57) Research Bible practices toward leprosy.

Draw the Immune System on your body roll-out.

First Line of Defense

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Physical Barriers

- **Skin**
- **Tears**
- **Hair**
- **Mucus**
- **Stomach acid**

Immune System Parts

Cooperation Systems of the Body Week 8

Organs of Immune System

- Bone Marrow - makes all immune cells; stem cells differentiate into either mature cells of the immune system or into baby cells that migrate out of the bone marrow mature elsewhere...like factory
- Thymus - matures T cells; immature T cells, leave the bone marrow, go to thymus where bad T cells are destroyed/ good T cells are spared and released into blood...like basic training for T cells
- Spleen - filters blood; made up of B cells, T cells, macrophages, natural killer cells, red blood cells; destroys old red blood cells...like check point to catch antigen enemies in the blood
- Lymph Nodes - filter antigens out of lymph; found throughout the body; composed mostly of T cells, B cells, and macrophages...like check point to catch antigen enemy in the lymph

Immune System Parts

Cooperation Systems of the Body Week 8

Cells of Immune System = Leukocytes = "white blood cells"

- Lymphocytes = lymph cells
 - T-Cells activate other white blood cells to fight off infection by secretion
 - B Cells produce antibodies in response to foreign proteins of bacteria, viruses, and tumor cells (antigens); antibodies are specialized proteins that specifically recognize and bind to one particular antigen; B cells and T cells remember the antigen throughout the lifetime of an animal and will attack it again.
 - Natural Killer Cells (NK) cells directly kill certain tumors
- Granulocytes surround antigens and break them down with powerful enzymes
- Macrophages eat the antigens

7 Step Defense

Cooperation Systems of the Body Week 8

Immune 7 Step Response

1. Enemy enters = bacteria, virus, parasite, tumor = antigen...invasion
2. T cell identifies and signals to make antibodies to match antigen...look out
3. B cell makes antibodies specific to the invading antigen...call out army soldiers
4. Antibodies bind to antigens signaling for granulocytes and macrophages to come...1st line of soldiers holding the enemy
5. Granulocytes surround the antigen and break it down...2nd line of soldiers surrounding the enemy
6. Macrophages to engulf (eat) and kill them...execute enemy
7. Antibodies also signal natural killer (NK) cells and macrophages to kill any body cells that are infected with the virus or bacteria...wipe out any bases that have been infiltrated and are making more of the enemy using our own supplies

Antibodies

Cooperation Systems of the Body Week 8

- Proteins made by immune system
- Bind to foreign proteins = bacteria, virus, tumor that cause disease = antigens
- Eliminate bacteria or virus = antigens and keep the body healthy

Bubonic Plague

Cooperation Systems of the Body Week 8

Bubonic Plague or Black Death killed about $\frac{1}{2}$ of all Europeans in the 1300's

- Cause by a bacteria
- Transmitted by fleas usually leaving rats and infecting humans
- Swelling buboes (lymph glands)
- Red spots turned black
- Fever
- Heavy breathing
- Vomiting blood
- Aching limbs
- Terrible pain
- Decaying skin while the person is still alive

Activities (cont'd 4)

Cooperation Systems of the Body Week 8

Thursday: Advances in Treating Diseases

Read about the men whose discoveries contributed to the immune system.

30 (p.61) Explain ways to protect yourself from getting sick.

32 (p.61) Research the simple way people could have avoided cholera and typhoid fever.

Research and discuss vaccinations.

Research antibacterial drugs and the men who discovered them.

Research what happens when the Immune system malfunctions, as well as what causes such a malfunction.

Create a review game of "Are You Smarter than a 5th Grader?"

Scientists

Cooperation Systems of the Body Week 8

- **Edward Jenner - Discovered vaccination using cowpox to vaccinate for smallpox. (Vaccination)**
- **Joseph Lister - Discovered the first antiseptic, carbolic acid (phenol), to sterilize wounds, incisions, and instruments. Also introduced hand washing and gloves. (Antiseptics)**
- **Walter Reed - Discovered yellow fever was transmitted by mosquitoes. (Epidemiology)**
- **Alexander Fleming - Discovered (Penicillin).**
- **Jonas Salk - Discovered a vaccine for polio. (Polio vaccine)**

Staying Well

Cooperation Systems of the Body Week 8

Cleanliness

- Wash hands and body daily; clean fingernails
- Sanitation of sewage
- Wash food well and cook food thoroughly

Get Rid of Vectors

- Mosquitoes
- Rats with fleas

Inspection Laws

- Purify all water and check it
- Inspect meat and food

Boosting Immune System

- Take Vitamin C
- Good housing with warmth

Antibiotics

- Penicillin
- Streptomycin
- Sulfa drugs

Vaccines

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Vaccines are a weakened dose of a disease purposely given to a person so his body will produce the specific antibodies to fight the "real disease" successfully; person is said to be immune to the disease for which they were vaccinated, meaning he will NOT get the disease if he is exposed to it; each disease must be vaccinated for separately, because each disease is caused by its own germ.

Common vaccines provide immunity to:

Measles

Mumps

Rubella

Polio



Mercury in Vaccines



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The number of cases of autism and ADD/ADHD continue to escalate. There appears to be a strong correlation between childhood developmental disorders and unacceptable mercury levels in vaccines.

Dr. David Ayoub, MD, makes the case for mercury poisoning on the following website. (Must see)

<http://video.google.com/videoplay?docid=6890106663412840646&ei=pMcLSf6dDpSM-QHc6NiXCg&q=vaccines>

Antibiotics/Drugs

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Chemical substance made from good mold or bacterium that can kill bad bacterial infections; when antibiotics were first discovered they were called "wonder drugs."

Today certain strains of bacteria have become drug resistant. Every time a patient takes penicillin or another antibiotic for a bacterial infection, the drug may kill most of the bacteria but a few germs may survive, multiply quickly, creating drug-resistant strains. The presence of these strains may mean that the patient's next infection will not respond to the first-choice antibiotic therapy. Also, the resistant bacteria may be transmitted to others around the patient.

Fun Review

Cooperation Systems of the Body Week 8

Create a game like World's Smartest 4th Grader and ask questions from all eight weeks of Systems of the Body.

Week 1 The Skin

Week 2 Cell + Skeleton

Week 3 Muscles +
Endocrine

Week 4 Nervous

Week 5 Digestive

Week 6 Circulatory

Week 7 Respiratory

Week 8 Immune

Activities (Cont'd 5)

Cooperation Systems of the Body Week 8

Friday: Review and Prepare Show-and-Tell

Review all the systems you have studied.

Finish writing, illustrating, and editing your body adventure.

Practice reading the adventure or having someone read the adventure as you point to your body.

Practice explaining how each system works.

Have Show-and-Tell.

Permission Slip

Permission Coupon

Free pass to skip one activity
or other assignment
(Feel free to copy as often as needed)

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or other assignment
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Field Trips

Cooperation Systems of the Body Week 8

NONE

Suggestions for Dad

Cooperation Systems of the Body Week 8

- Talk to your children about proper hygiene.
- Treat a wound or sore with good first aid techniques. Emphasize keeping area sterile.
- Be the moderator for the Quiz Show.
- Give out "Honorary Doctor" awards to the children (and your wife) for their knowledge of **SYSTEMS OF THE BODY**.

KONOS, Inc.

Honorary Doctor of Medicine

John Doe

**Be it known by all men that this student has
faithfully completed the rigorous study of
Systems of the Body with Home School Mentor
and is awarded the honorary degree of
Doctor of Medicine for the Fall semester, 2008.**

Focus of the Week

Cooperation Systems of the Body Week 8

Practicing being cooperative

**Learning about lymphatic and immune systems
and their parts**

Learning about bacteria, viruses, and diseases

Observing God's design of the human body

Making agar and grow bacteria

Studying microbes, bacteria, and viruses

Researching lymphatic system and its parts

Practicing ways to prevent spreading diseases

**Experimenting to see how germs travel through
wounds**

**Understanding the difference between
contagious and non-contagious disease**

Closing with a grand finale

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Thanks,
Wade and Jessica Hulcy