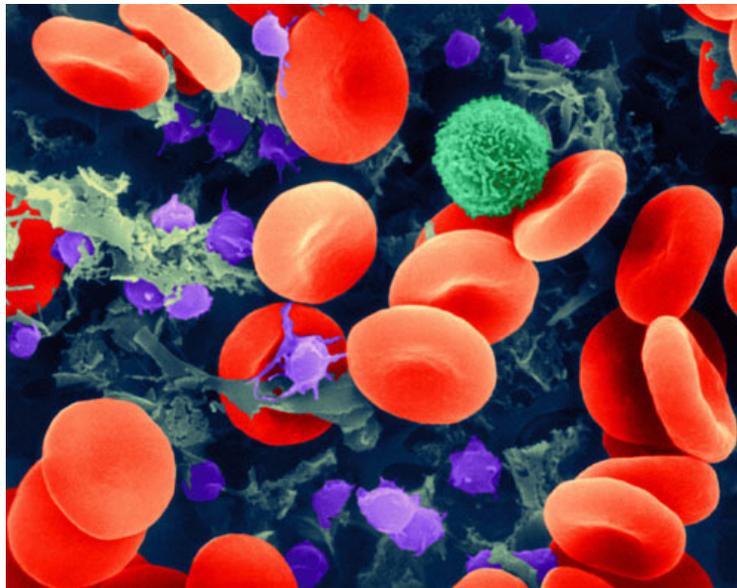


Unit 2: Disease Prevention

Instructional Activities for Teens



PKIDs' Infectious Disease Workshop

Made possible by grants from the Northwest Health Foundation,
the Children's Vaccine Program at PATH and PKIDs.

PKIDs' Infectious Disease Workshop

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Producing this workshop has been a dream of ours since PKIDs' inception in 1996. It has been more than two years since we began work on this project, and many people helped us reach our goal. It's not done, because it is by nature a living document that will evolve as science makes strides in the research of infectious diseases, but it's a great beginning.

There are people who've helped us whose names are not on this printed list. That omission is not deliberate, but rather from our own clumsiness in losing important pieces of paper, and we apologize.

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[Click here to go back to the PKIDs' IDW website.](#)

This publication contains the opinions and ideas of its authors. It is intended to provide helpful and informative material on the subject matter covered. Any information obtained from this workshop is not to be construed as medical or legal advice. If the reader requires personal assistance or advice, a competent professional should be consulted.

The authors specifically disclaim any responsibility for any liability, loss, or risk, personal or otherwise, which is incurred as a consequence, directly or indirectly, of the use and application of any of the contents of this workshop.

Introduction

PKIDs (Parents of Kids with Infectious Diseases) is a national nonprofit agency whose mission is to educate the public about infectious diseases, the methods of prevention and transmission, and the latest advances in medicine; to eliminate the social stigma borne by the infected; and to assist the families of the children living with hepatitis, HIV/AIDS, or other chronic, viral infectious diseases with emotional, financial and informational support.

Remaining true to our mission, we have designed the *Infectious Disease Workshop (IDW)*, an educational tool for people of all ages and with all levels of understanding about infectious diseases. In this workshop, you will learn about bacteria and viruses, how to prevent infections, and how to eliminate the social stigma that too often accompanies diseases such as HIV or hepatitis C.

We hope that both instructors and participants come away from this workshop feeling comfortable with their new level of education on infectious diseases.

The IDW is designed to “train-the-trainer,” providing instructors not only with background materials but also with age-appropriate activities for the participants. Instructors do not need to be professional educators to use these materials. They were designed with both educators and laypersons in mind.

The IDW is comprised of a master Instructor’s Background Text, which is divided into six units: Introduction to Infectious Diseases, Disease Prevention, Sports and Infectious Disease, Stigma and Infectious Disease, Civil Rights and Infectious Disease, and Bioterrorism and Infectious Disease.

For each unit, instructors will find fun and helpful activities for participants in five age groups: 2 to 6 years of age, 6 to 9 years of age, 9 to 12 years of age, 13 to 18 years of age and adults.

We welcome any questions, comments, or feedback you may have about the IDW or any other issue relating to infectious diseases in children.

PKIDs
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FAX: (360) 695-6941
EMAIL: pkids@pkids.org
WEBSITE: www.pkids.org

Dear Parents,

Our class will soon be studying infectious diseases. We will learn about what germs are and ways we can keep from spreading germs. We will also learn that people who have infectious diseases don't have to be treated differently or singled out just because they have a disease.

The workshop we will use has been created by PKIDs (Parents of Kids with Infectious Diseases), a national nonprofit organization dedicated to supporting families touched by infectious diseases.

Your child may have questions about germs or may come home with new ideas about preventing the spread of germs. Here are a few ways you can stay informed:

View PKIDs' website. PKIDs' website can be found at www.pkids.org. You may also request information by calling PKIDs at 1-877-55-PKIDS.

View the instructor's background text for the Infectious Disease Workshop (IDW). The primary purpose of this text is to provide teachers with background information on infectious diseases. It is a good text for anyone seeking general information on infectious diseases. The text provides information about specific diseases, methods of disease prevention, and civil rights for those affected by infectious disease. Visit www.pkids.org for a link to the IDW background texts in PDF format.

View descriptions of the activities we will be doing in class. Visit www.pkids.org for a link to the activities and handouts in PDF format.

The world becomes smaller every day and germs from near and far continue to threaten our health. It is extremely important to educate our young people, equipping them with prevention methods to protect their health and stop the spread of disease.

As always, please feel free to contact me with any questions!

Sincerely,

WORD SEARCH WITH A HIDDEN MESSAGE

LEVEL

Teens

OBJECTIVE

Students will identify infectious disease terminology.

MATERIALS

One copy of the word search handout (included with lesson) per student.

PREP

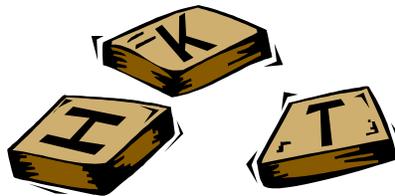
None

INSTRUCTIONAL COMPONENTS

None.

ASSESSMENT

The unused letters of the puzzle should spell out the hidden message, “ANYONE CAN GET INFECTED.”



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

INFECTIOUS DISEASE WORD LIST

AIDS	FAD	KEY	SANITARY
AILING	FUNGI	LOSE	SEX
ALONE	GEL	MEASLES	SHOT
BATHES	GERMS	MENINGITIS	SMASH
BLOODBORNE	GET	MUMPS	STANDARD
BODILY FLUIDS	HANDWASHING	PERTUSSIS	STING
DIPHTHERIA	HEALTH	POLIO	STOP
DISEASE	HEPATITIS	PRECAUTIONS	TETANUS
DOSAGES	HIB	RUBELLA	THINK
DRUG	HITCH	SAD	VACCINE
EXAM	HIV	SAFE	VIRUS

HIDDEN MESSAGE:

HANDWASHING EXPERIMENT

LEVEL

Teens

OBJECTIVE

- Students will predict which handwashing techniques will be more effective.
- Students will discriminate between effective and ineffective handwashing techniques.

MATERIALS

- Cooking oil.
- Cinnamon or nutmeg.
- Soap, sink with cold and warm water, towels—preferably at a location where there are a few sinks together.
- Stopwatch (with seconds).
- Handwashing Experiment handout (1 per student).

PREP

Locate sink area to be used for experiment.

INSTRUCTIONAL COMPONENTS

1. Students will need to work in pairs so that if their partner is volunteering, they can make observations for both of them.
2. Distribute handout.
3. Read the top of the handout together. For every blank box in the table, you will need one person with “dirty” hands to wash their hands for that specific amount of time using that particular method. How many volunteers you have at a time will depend on how many sinks are available and/or the space available around each sink.

PROCEDURES

1. The first group of volunteers “dirties” their hands by covering them with oil and then rubbing in cinnamon/nutmeg. Decide who will wash for how long and with what method.
2. Volunteers get ready to wash by wetting their hands (and squeezing soap onto them, if applicable), but NO scrubbing. If you only have 1 sink, you will obviously only be able to do cold or hot water people at the same time.
3. The stopwatch operator indicates when to start and volunteers begin rubbing/scrubbing hands. Stopwatch operator should indicate the 5 second intervals, at which point that hand-washer should stop washing, rinse off, and wait until the last person is done.
4. The class observes and notes the cleanliness factor of each volunteer’s hands using the handout provided.
5. Volunteers may dry off and make their own observations or use their partner’s answers.
6. Repeat process until all methods and lengths of time have been demonstrated.

ASSESSMENT

- Students should observe their data and reach conclusions about which methods/lengths of time for handwashing are the most effective. Have them share their conclusions with the class.
- Students can compare their findings with established health standards for handwashing and discuss differences or similarities.



HANDWASHING EXPERIMENT

Name: _____

Have you ever gone to the bathroom and forgotten to wash your hands? Or were you just in a hurry? Or did you not realize the importance of washing your hands in order to prevent the spread of disease? This experiment will help you discover what's important when washing your hands.

Before starting this experiment, make a hypothesis. (A *hypothesis* is an educated guess at what the result of an experiment will be.) Which method(s) will be the most effective? The least effective? Why? Write your hypothesis below.

LENGTH OF TIME TO WASH

Scale of effectiveness: 1 = Nasty! 3 = Halfway clean 5 = Spotless!

Handwashing Method	5 Seconds	10 Seconds	15 Seconds	20 Seconds	25 Seconds	30 Seconds
Cold water no soap						
Cold water soap						
Warm water no soap						
Warm water soap						

Now check your results against your hypothesis. Were you correct? Why or why not? Do your class results reflect standards established by the CDC? Why or why not? What do you conclude about the importance of handwashing?



HEALTHY HABITS POSTERS

Five Common Disease Transmission Scenarios

LEVEL

Teens

OBJECTIVE

Students will portray correct (and incorrect, where appropriate) methods for preventing disease transmission in common, everyday activities.

MATERIALS

- Butcher paper or posterboard.
- Markers, paints, etc.
- Handout on Disease-Causing Scenarios included with lesson (optional).

PREP

None

INSTRUCTIONAL COMPONENTS

1. According to the Centers for Disease Control and Prevention, there are five common ways in which diseases are transmitted in everyday activities. Pass out the included handout, or review these scenarios with students.
2. Students can then make posters for the scenarios, individually or in groups.
3. Each student/group should determine who their “audience” will be. Possibilities include the student’s family, fellow students (e.g., the poster could be displayed in the bathroom), a local daycare facility or younger students in the elementary schools.
4. Students/groups can make 1 poster portraying all five concepts, or they can make a poster for each concept.
5. Students may want to consider portraying/describing poor disease prevention actions as well. The posters should be age-appropriate.

ASSESSMENT

1. Does the poster clearly portray and emphasize appropriate methods for preventing transmission of diseases?
2. Is the poster age-appropriate?

Five Common Disease Transmission Scenarios

In all of these scenarios, disease transmission can be prevented by handwashing (scrubbing with warm water and soap for at least 15 seconds).

HANDS to FOOD: Microscopic amounts of body waste may stick to our hands and get on the food we prepare, if we don't wash after using the toilet.

INFANT to HANDS to OTHER CHILDREN: Traces of body waste can adhere to hands after changing a baby's diaper. That waste can then be transferred to others we touch, if we don't wash our hands.

FOOD to HANDS to FOOD: Raw, uncooked foods like chicken and eggs may contain harmful germs. When handling these foods, it is important to wash our hands before handling any other foods. While cooking the chicken or eggs will kill any germs present on them, the other raw foods we touch, e.g., salad, will retain the harmful germs.

NOSE/MOUTH/EYES to OTHERS: Germs can be found in saliva, mucous and nasal discharge. Sneezing, coughing, or rubbing the eyes or nose and then touching people prior to washing hands can transmit germs.

FOOD to HANDS to INFANTS: In the same way germs can be transmitted from certain uncooked food to other foods, they can also be transmitted to an infant if the caregiver neglects to wash his/her hands between food preparation and tending the infant.



STANDARD PRECAUTIONS Practice/Demonstration Stations

LEVEL

Teens

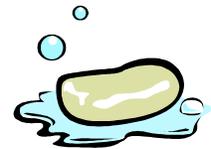
OBJECTIVE

- Students will practice and/or observe proper practice of standard precautions.
- Students will create displays/demonstrations relating to a particular set of standard precautions.
- Students may teach other participants appropriate observation of standard precautions.

MATERIALS

Note: Students may be able to “create” some of these materials themselves (e.g., a simulated refrigerator from a cardboard box).

1. *Handwashing and Gloves Station:* Must effectively demonstrate proper methods for washing hands, when to use gloves, and then explain why these precautions are important.
 - Alcohol-based handrub
 - Soap.
 - Sink (can be a prop sink).
 - Non-permeable gloves.
 - Plastic bag for “garbage.”
 - Plastic sandwich bags (demo as substitute if no gloves are available).
2. *Mask and Eye Protection Station:* Must effectively demonstrate use of eye/face protection equipment and explain why these precautions are important.
 - Goggles.
 - Surgical-type mask.
 - Bandanna.
 - Face shield.
 - Glasses/sunglasses/person wearing glasses (demo as substitute if no goggles are available).
3. *Contaminated Clothing Station:* Must effectively demonstrate procedures for isolating and cleaning soiled clothing and explain why these precautions are important.
 - Various articles of clothing.
 - Fake blood (ketchup for clothing that can be ruined, construction paper for good clothing).
 - Plastic bag with twist-tie (for storage of clothes until cleaned or disposed of).
 - Bottle of bleach (preferably empty) to add to laundry wash cycle.
4. *Dinnerware and Other Inanimate Objects:* Must effectively demonstrate procedures for cleaning and disposal of various items and explain why these procedures are important.
 - Dish, cup, spoon—1 of each: washable and disposable.



- Sharps container (optional?)—show single use disposal of sharp objects.
 - Garbage bag in garbage can with lid (or some other means of showing how to keep items in the garbage out of reach of children)—show disposal of single use non-sharp objects.
 - Plastic toys—show disinfection of multiple use objects.
 - Countertop—show disinfection of multiple use objects.
5. *Resuscitation—optional*: Must effectively demonstrate use of barriers during resuscitation and explain why these precautions are important.
- Doll or mannequin.
 - Mouthpieces, resuscitation bags, plastic wrap with hole in it—show means of providing a barrier between individuals. However, resuscitation should only be performed by a trained individual—do not practice on people, only dolls or mannequins.
6. *Diaper-Changing Station*: Must effectively demonstrate procedures for cleaning/disinfecting hands and surfaces before and after diaper changes and explain why these precautions are important.
- Doll.
 - Diaper.
 - Non-permeable gloves.
 - Bleach solution in spray bottle—to clean counter with afterwards.
 - Bleach solution recipe for display.
 - Soap and sink, or other appropriate means of showing handwashing.
 - Plastic-lined garbage can with lid (or other means of keeping out children) for diaper disposal.
7. *Kitchen Station*: Must effectively demonstrate procedures for cleaning/disinfecting hands and surfaces before and after food preparation and explain why these precautions are important.
- Small refrigerator, box, or picture of refrigerator.
 - Examples of food that should be kept refrigerated.
 - Bleach solution in spray bottle—for cleaning countertops.
 - Example of raw meat.
 - Sink (or simulation of)—to wash hands in after preparing raw meat.
 - Scrubbing brushes or pads—to demonstrate washing them in the dishwasher after use.
 - Simulation of dishwasher.

PREP

Decide how the stations will be used. Ideas include:

- At a school-wide “health fair” students can be “station supervisors,” helping people visiting their display to correctly manipulate objects and perform standard precaution activities.
- For the instructor to demonstrate to students.
- For students to explore individually.
- For students to demonstrate to other classes/groups.

INSTRUCTIONAL COMPONENTS

1. Introduce the assignment to students.
2. Explain that standard precautions are various types of actions we can take to prevent infectious disease transmission between ourselves.
3. Note that although standard precautions were issued for health care workers caring for patients in hospitals and other medical settings where the risk of disease transmission is greater, they make sense for everyone in general, and PKIDs has adapted them to everyday situations.
4. For instructor and student reference, a more detailed explanation of standard precaution concepts for everyday life can be found in the PKIDs' IDW *Unit 2: Disease Prevention* Instructor's Background Text.
5. Assign students to the various stations. A sign-up sheet may work well.
6. Make sure each group understands the concepts they must address.
7. You may wish to do a demonstration of each activity/station for the entire class so that students have a better idea of the nature of standard precautions.
8. Allow class time for group collaboration and work. Encourage students to make their stations as "hands on" and visually oriented as possible, including posterboards, etc., summarizing the standard precaution concepts covered at their particular station (i.e., what to do and when to do it).

ASSESSMENT

Each student should be able to use the equipment at each station appropriately and should be able to explain why correct use of equipment and procedures is important.

THE IMMUNE SYSTEM IN ACTION

LEVEL

Teens

OBJECTIVE

Students will compose a presentation on the functions of the immune system.

MATERIALS

For teacher and student reference:

- National Cancer Institute's *Understanding the Immune System*
newscenter.cancer.gov/sciencebehind/immune/immune00.htm
- National Institute of Allergy and Infectious Diseases: How HIV Causes AIDS
www.niaid.nih.gov/factsheets/howhiv.htm
- National Institute of Allergy and Infectious Diseases: The Immune System
www.niaid.nih.gov/final/immun/immun.htm
- Medline Plus Medical Encyclopedia: Immune Response
www.nlm.nih.gov/medlineplus/ency/article/000821.htm
- The library!

PREP

- Determine length of time allowed for completion.
- Set aside class time to view presentations.

INSTRUCTIONAL COMPONENTS/ASSESSMENT

1. Students will research the functions of the immune system and compose a presentation actively illustrating an immune response.
2. Students should use correct terminology. Terminology used in the course of the presentation may include: *pathogen, antigen, lymphocyte, antigen-presenting, plasma cell, antibodies, B and T cells, lymphoid organs, phagocytosis, macrophage*. More advanced terminology might include: *eosinophils, monocytes, neutrophils, complement, MHC and receptor proteins, antigen peptides, accessory molecules, lymphokines, cytotoxic*. (Use of terminology/depth of research may vary with the grade level.)
3. Students should be creative with the setting of their presentation. For example, they could use diagrams/photos that portray the immune system components as they actually are. Or, they could set their drama in the 1940s, where the mobsters are antigens, the detectives are lymphocytes, the police station is a lymph organ.
4. Award points for creativity! Possible presentation mediums include:
 - Claymation
 - Cartoon/animation
 - Powerpoint
 - Video with actors
 - Games

Bibliography

Alliance of Professional Tattooists
www.safe-tattoos.com

Altman, Lawrence. “Many gay men in U.S. unaware they have H.I.V., study finds.” The New York Times, July 8, 2002.

American Academy of Dermatology
www.aad.org

American Academy of Pediatrics: Childhood Immunization Support Program
www.cispimmunize.org

American Medical Association
www.ama-assn.org

American Society for Microbiology: *Why Is Washing Hands So Darn Important?*
www.asmtusa.org, www.washup.org

Centers for Disease Control and Prevention
www.cdc.gov

Children’s Hospital of Philadelphia: Vaccine Education Center
vaccine.chop.edu

DiscoverySchool.com: *All About Vaccines*
school.discovery.com/lessonplans/programs/vaccinations/index.html

Harrison, Shannon, M.D., Internal Medicine and Infectious Diseases, Teton Hospital, Jackson, WY

Hetzner, Amy. “Dirty hands, messy problem: Schools get re-educated on need for cleanliness.” Milwaukee Journal Sentinel, June 3, 2001.
www.jsonline.com

Humiston, Sharon, and Cynthia Good. *Vaccinating Your Child: Questions and Answers for the Concerned Parent*. Atlanta: Peachtree Publishers Ltd., 2000.

Immunization Action Coalition
www.immunize.org

Johns Hopkins: Healthcare Epidemiology and Infection Control
www.hopkins-heic.org

Journal of the American Medical Association: *Recommendations for Prevention and Control of Hepatitis C Virus (HCV) Infection and HCV-Related Chronic Disease*
www.ama-assn.org

National Association of Children's Hospitals
www.childrenshospitals.net

National Centers for Disease Control and Prevention, "*Questions and Answers about Male Latex Condoms to Prevent Sexual Transmission of HIV*," CDC Update (CDC: Atlanta, GA: April 1997).

National Childcare Information Center
nccic.org

National Library of Medicine
www.nlm.nih.gov

National Network for Immunization Information
www.immunizationinfo.org

Offit, Paul, and Louis Bell. *Vaccines: What Every Parent Should Know*. New York: IDG Books, 1999.

Parents of Kids with Infectious Diseases (PKIDs): *Pediatric Hepatitis Report*
www.pkids.org

Planned Parenthood Federation
www.plannedparenthood.org

St. Edwards University: *AIDS 101*
www.stedwards.edu

Sandler, G. "*Density and turnover rate important risk factors in day care infections.*" *Infectious Diseases in Children*. July 1996.
idinchildren.com

Sexuality Information and Education Council of America. *SIECUS Report*. Volume 27, Number 1, October/November 1998.
www.siecus.org

Venes, Donald, M.D., M.S.J. *Taber's Cyclopedic Medical Dictionary*. 19th ed. Philadelphia: F.A. Davis Company, 2001.

World Health Organization
www.who.int

Additional Activities and Resources for Teachers, Students and Parents

Band-aids and Blackboards: When Chronic Illness or Some Other Medical Problem Goes to School. An interactive website especially for kids with illnesses. Also contains links to other kid-oriented health/science activity websites.

www.faculty.fairfield.edu/fleitas/contents.html

Big Chalk on the Web and Homework Central

Lesson plans and homework resources for students and teachers in elementary, middle and high school.

www.bigchalk.com

Discoveryschool.com: Lesson plans for teaching AIDS issues, the health risks of body art, and other health-related concepts.

school.discovery.com

The Handwasher's Brigade Presents: How To Wash Your Hands! Videotape. PKIDs, 1999.

The National PTA: Resources especially for parents on a variety of issues, including infectious diseases in schools.

www.pta.org