4H1671

Be A "Zoonotic" Disease Detective

Name _____

Age _____ County _____

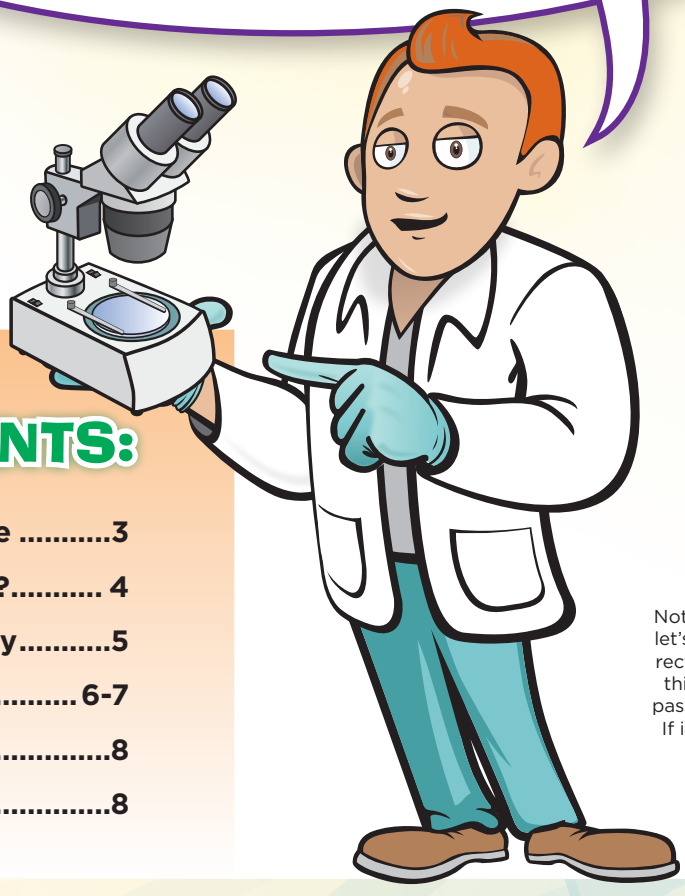
4-H Club or Group _____

Michigan 4-H Youth Development

MICHIGAN STATE UNIVERSITY | Extension

4-H and the Centers for Disease Control

have formed a partnership to help you learn more about zoonoses and how to protect yourself against disease. Whether you have pets at home, show livestock, or visit a petting zoo, protecting yourself against the transfer of disease can often be accomplished through practicing healthy habits. Join me as we become Disease Detectives to explore the microorganisms behind these diseases and ways to protect yourself and others from the spread of germs!



CONTENTS:

Think Green!
Not just 4-H Green...but let's help do our part to recycle and reuse. Save this book, reread it or pass it along to a friend. If it's too worn, please recycle it.

Michigan Grade Level Content Expectations for Science

The content of *Be a "Zoonotic" Disease Detective* has been correlated to the Michigan Grade Level Content Expectations for science processes and life science that are listed here. The complete Michigan Academic Standards are available online at www.michigan.gov/mde/0,4615,7-140-28753_64839_65510---,00.html.

SCIENCE PROCESSES: Inquiry Process (IP)

S.IP.E.1/S.IP.M.1 Inquiry involves generating questions, conducting investigations, and developing solutions to problems through reasoning and observation.

S.IP.01.12 Generate questions based on observations.

S.IP.03.11 Make purposeful observation of the natural world using the appropriate senses.

S.IP.03.12 Generate questions based on observations.

S.IP.05.11 Generate scientific questions based on observations, investigations, and research.

SCIENCE PROCESSES: Inquiry Analysis and Communication (IA)

S.IA.E.1/S.IA.M.1 Inquiry includes an analysis and presentation of findings that lead to future questions, research, and investigations.

S.IA.01.12 Share ideas about science through purposeful conversation.

S.IA.01.13 Communicate and present findings of observations.

S.IA.03.12 Share ideas about science through purposeful conversation in collaborative groups.

S.IA.05.13 Communicate and defend findings of observations and investigations using evidence.

SCIENCE PROCESSES: Reflection and Social Implications (RS)

S.RS.E.1/S.RS.M.11 Reflecting on knowledge is the application of scientific knowledge to new and different situations. Reflecting on knowledge requires careful analysis of evidence that guides decision making and the application of science throughout history and within society.

S.RS.03.15 Use evidence when communicating scientific ideas.

S.RS.05.19 Describe how science and technology have advanced because of the contributions of many people throughout history and across cultures.

LIFE SCIENCE: Organization of Living Things (OL)

L.OL.E.4 Classification – Organisms can be classified on the basis of observable characteristics.

L.OL.03.42 Classify animals on the basis of observable physical characteristics (backbone, body coverings, limbs).

STAYING DISEASE FREE

Raising and caring for animals can be fun and a great learning experience, but it's important to know that we can sometimes get sick from them if we aren't careful.

Sometimes infected animals appear healthy and clean but can be spreading germs that make people sick. Yuck! When many people or animals get sick at one time, it is called a **disease outbreak**.

People who investigate outbreaks are disease detectives called **epidemiologists** (ep-i-de-mi-ol-o-gist). Epidemiologists are scientists who work in public and animal health—that means they are in charge of the health and safety of groups of people and animals, unlike doctors who usually take care of one patient at a time. Epidemiologists often work with doctors and veterinarians to find the cause of a disease outbreak by asking people questions about where they were and what they did before they got sick. When epidemiologists figure out the cause of an outbreak, they recommend actions to stop it and to prevent more outbreaks in the future.

Where do epidemiologists work?

Most epidemiologists work at state and local health departments, and many also work for the Centers for Disease Control and Prevention (CDC) based in Atlanta, Georgia. CDC is the country's health protection agency and works to protect America from health and safety threats. CDC and state and local health departments watch for outbreaks of disease around the world. When an outbreak starts, they do their best to limit the spread of infection and help keep you, your friends, and your family safe. CDC studies many different diseases in people including diseases that people can catch from animals called **zoonoses** (zo-o-no-sees). Epidemiologists also work in the U.S. Department of Agriculture (USDA) to protect animal health. Epidemiologists in public health and animal health work together to investigate and prevent outbreaks of zoonoses.

We want you to use your **Head, Heart, Hands and Health** (just like in the 4-H pledge) to learn about germs that can spread between humans and animals, and how to reduce everyone's risk of catching them. Check out the handy tips and learning activities in the pages that follow, so that you can learn to be a disease detective too!

SPOTLIGHT ON CAREERS

The Centers for Disease Control and Prevention is the country's health protection agency. Awareness of careers within government and public administration is a part of your detective work this year.

What types of careers do you think are available within the Centers for Disease Control and Prevention?

_____

_____

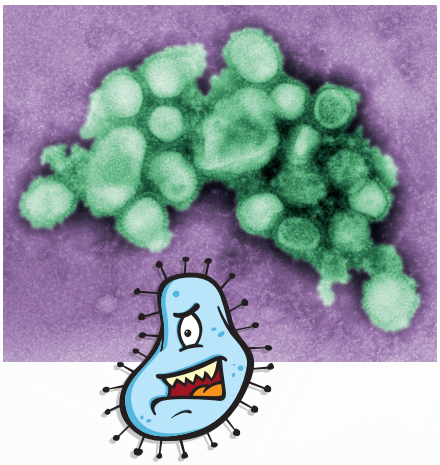
WHAT ARE ZOONOSES?

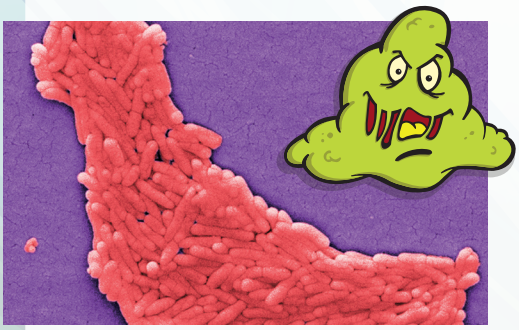
Zoonoses is a term scientists use to describe diseases that pass between people and animals. Zoonoses are caused by microorganisms (or germs) like viruses and bacteria.

Did you know that our own animals can spread zoonoses? Animals don't have to be sick to spread diseases to people. In fact, many times animals appear healthy and clean, and the germs don't make them sick at all. But, if people catch zoonoses, they can become very sick. Animals that spread zoonoses may have germs all over their bodies (on their fur, feathers, and scales, for example) and in the areas where they live and roam (for example, a cage or bedding).

Young children, older persons, and people whose bodies are less able to fight off diseases are more likely than others to develop severe illness from zoonoses. Because of this, epidemiologists would say these people are at "high risk" for zoonotic diseases. We have listed some common zoonotic diseases below. These can often be spread between animals and people at fairs and petting zoos.

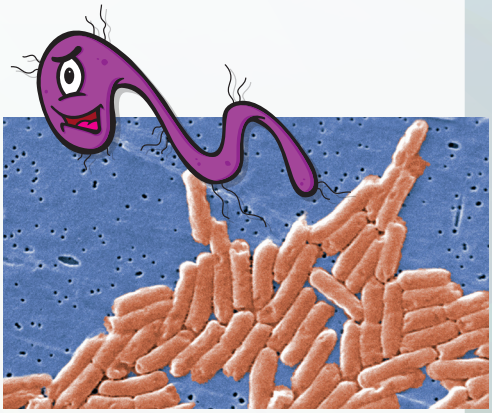
- **Influenza** (also known as "flu"): Influenza is a virus that can cause fever, cough, sore throat, runny nose, body aches, headaches, fatigue, and sometimes even vomiting and diarrhea in people. There are human flu viruses and flu viruses that usually spread only in animals, such as pigs and birds, but these viruses also can spread back and forth between humans and animals. Flu viruses are normally spread by sick people or animals while coughing, sneezing, or talking. To protect themselves from getting human flu viruses, most people should get a flu vaccine every year. But it's important to know that this vaccine usually won't protect against animal flu viruses. In addition to the "high-risk" groups mentioned above, people with medical conditions like asthma or heart disease also are more likely to get very sick from the flu and may even need to go to the hospital.





- ***Salmonella***: *Salmonella* is a kind of bacteria that can cause diarrhea, fever, and stomach pain in people. Some animals infected with *Salmonella* get sick, but most look healthy and clean. *Salmonella* is spread to people through contaminated food (eggs, meats, fruits, vegetables, and raw milk) or contact with certain infected animals including chickens and other live poultry, turtles and other reptiles, amphibians (such as frogs), cows, pigs, and many other types of pets and livestock. You don't have to touch an animal to get sick. Contact with an animal's fur, skin, feathers, or scales or anything in the areas where they live and roam (for example bedding or water in a turtle tank) can lead to illness.

- ***E. coli*** (short for *Escherichia coli* O157:H7): *E.coli* are bacteria that can cause severe stomach cramps, diarrhea (often bloody), and vomiting in people. *E. coli* O157:H7 can also lead to kidney failure in some people. *E. coli* O157:H7 infections are spread to people through contaminated food or through contact with certain animals including goats, sheep, and cattle. Most animals carrying *E. coli* O157:H7 look normal but can shed germs in their manure that can make people sick. You don't have to touch an animal to get sick. Contact with anything in the areas where animals live and roam (for example a fence or bedding) can lead to illness.



KEEPING GERMS AWAY

Read these handy tips for keeping germs away and then test yourself to see if you are ready to be a **Disease Detective**. Follow these tips every day to protect yourself and others from the spread of germs.

Avoid sick people and animals. Avoid close contact with people and animals that are sick. When you are sick, keep your distance from other people and from animals to protect them from getting sick too. If possible, stay home from school, work, and after school activities when you are sick. Also, when your animals are sick, keep them away from other animals and people.

Clean your hands. Washing your hands often will help protect you from germs. If soap and water are not available, use an alcohol-based hand sanitizer, then wash your hands as soon as you can find a sink. Running water and soap are best.

It is especially important to wash your hands with soap and water right after touching animals, working around animals (even if you did not touch an animal), after going to the bathroom, right before eating and drinking, before preparing or serving food or drinks, and after removing dirty clothes or shoes.

Cover your mouth and nose. Cover your mouth and nose with a tissue when coughing or sneezing. It may prevent those around you from getting sick. Don't forget to wash your hands afterwards.

Avoid touching your eyes, nose, or mouth. Germs are often spread when a person touches something that has germs on it and then touches his or her eyes, nose, or mouth.

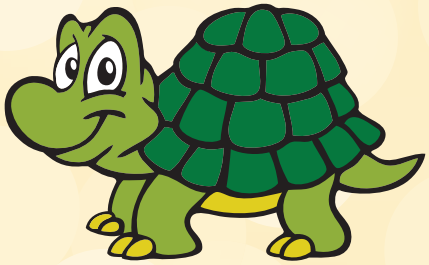
Get a flu vaccine every year. To help stay safe from the "normal" flu, get a flu shot every year. But remember that this won't always protect you from the kind of flu you can get from animals. And even after getting vaccinated, it's still important to protect yourself by doing the other things listed here.

Don't eat or drink around animals. Don't share your food or drink with animals. Keep animals away from areas where food and drink is prepared, served, or stored such as kitchens or outdoor patios.

Clean cages and equipment. Clean any equipment or materials associated with raising or caring for animals outside of the house, such as cages or feed and water containers. This will help prevent cross-contamination of germs from happening inside your house.

Practice other good health habits. Get plenty of sleep, be physically active, manage your stress, drink plenty of fluids, and eat nutritious food.

Don't snuggle or kiss animals. Some animals are likely to carry germs like *Salmonella* including chicks and other poultry, turtles and other reptiles, and frogs and other amphibians.



DISEASE DETECTIVE

See if you can solve these cases like a real Disease Detective!

CASE #1:

Jordan was very excited about his new baby chicks! For his science fair project, he wanted to see if large chicken eggs hatched faster than small eggs. Jordan had been impatiently watching these eggs in the incubator for the past three weeks, and two days ago they finally hatched—at the exact same time! Now, every day when Jordan gets home from school, he runs up to his room to change the newspaper and straw in the bottom of the cage, and give the chicks fresh food and water.

Photo by ANR Communications

What disease could Jordan catch from his baby chicks?

_____

What are three things he should or should not do when handling the chicks to keep himself safe from getting an infection?

1. _____
2. _____
3. _____

Read the passage below and underline anything Jordan does that could put him at high risk for catching an infection from his pet chicks:

When Jordan got home on Thursday, he stopped in the kitchen to grab some peanut butter crackers before running upstairs to clean the chicks' cage. While eating his peanut butter crackers, he changed the newspaper on the bottom of the cage and refilled the chicks' water bowl. The chicks seemed to really like the smell of peanut butter on his fingers, so Jordan picked up a chick and laughed as the chick nibbled on one of his crackers. Of course the baby chick couldn't eat the whole cracker, so Jordan tossed the rest of it in his mouth and went to get the chick feed. Jordan kissed the birds and waved goodbye as he ran downstairs to help his mom make dinner.

What could Jordan have done differently?

_____

_____

Visit ***http://msue.anr.msu.edu/resources/zoonotic_disease*** to check your answers to the questions in this book.

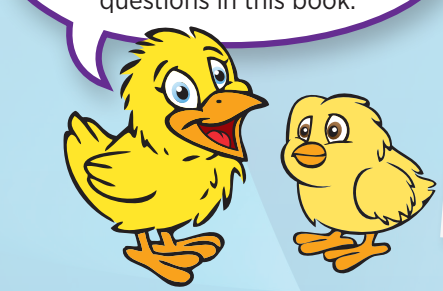


Photo by Ashley Herman

Photo by Julie Thelen

DISEASE DETECTIVE

CASE #2:

Brittany is happy to be back in school after the long summer break. She is excited to see all of her friends. After the second week of school, many of her friends were missing class because they were sick with the flu. Brittany has asthma, so when she gets sick, she can get very sick, and sometimes has to go to the doctor. To protect herself from the flu, she gets her flu vaccine every year. Lucky for Brittany, she didn't get sick like the rest of the kids this year. This week, her class is taking a field trip to the state fair. She wants to be a veterinarian when she grows up and loves visiting all of the animals.

In addition to having asthma, what other things could make a person at "high-risk" for getting very sick from a zoonotic disease?

_____

_____

Once the class gets to the fair, there are so many animals to visit. Brittany loves all of the animals, but especially the baby pigs. They are so cute! Before entering the barn, Brittany notices a sign at the entrance saying that "high-risk people" should not enter the pig exhibit because there is a flu virus spreading in pigs that may also infect people. Brittany already got her flu vaccine this year, so she thinks it's okay to go into the barn to pet the cute pigs. Just before Brittany went into the barn, her teacher told her she shouldn't go in. The teacher said she needed to be extra careful because she has asthma, and the flu vaccine usually won't protect against the kind of flu you can get from animals. Although Brittany really wanted to go in, she knew it was better to be safe than sorry.

Photo by Julie Thelen

Photo by Al Conover

What are some things everyone can do to protect themselves from getting sick from animals at a fair or a petting zoo?

_____

_____

SPOTLIGHT ON CAREERS

Health protection careers often require marketing efforts to communicate important messages to the public. Continue your work as a Disease Detective and create a marketing message to promote healthy habits when interacting with animals.

Sort of like this one!

Use your Head, Protect your Heart, and Clean those Hands for a Healthy Start!

HEALTHY HABITS

Circle the number that represents how often you normally do each task. Circle a 1 if you never do it and a 5 if you always do it. If one of the tasks does not apply to you, skip it and move on to the next one.

Task/Habit	Never				Always
I wash my hands after using the bathroom.	1	2	3	4	5
I wash my hands before eating or preparing food.	1	2	3	4	5
I wash my hands after working or playing with animals.	1	2	3	4	5
I wash my hands after touching animals at fairs and petting zoos.	1	2	3	4	5
I get a flu shot every year.	1	2	3	4	5
I avoid animals when I'm sick.	1	2	3	4	5
I avoid animals that look sick.	1	2	3	4	5
I cover my mouth when I cough or sneeze.	1	2	3	4	5
I tell an adult when I think an animal is sick.	1	2	3	4	5
I avoid touching my face when my hands are dirty.	1	2	3	4	5
When they are sick, I keep my animals away from other animals and people.	1	2	3	4	5
I follow public health tips to help keep myself, my family, and my community safe and healthy.	1	2	3	4	5
I tell my parents or an adult when I am sick in case I need to see a doctor.	1	2	3	4	5

Look at your answers. If you have marked mostly 5s, you almost always have safe habits when working with animals. Take note of any answers where you did not mark 5 and think of ways you can develop safer habits. Discuss your 1, 2, or 3 answers with your family.

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