

Diseases That Animals and Humans Share: The Words You Need to Know



Skill Level:

- ▶ Beginner to advanced

Life Skills:

- ▶ Communication, critical thinking and disease prevention

Setting:

- ▶ An indoor space where participants can easily hear as well as lay out several vocabulary cards; seating is optional

Time:

- ▶ 30–50 minutes

Materials:

- Diseases That Animals and Humans Share: The Words You Need to Know* vocabulary cards for activity:
 - ▶ 12 cards for beginner participants
 - ▶ 36 cards for advanced participants (set of 12 also used in beginning)
- 48 sticky notes
- 1 permanent marker
- Scissors

Overview:

The *Diseases That Animals and Humans Share: The Words You Need to Know* lesson is designed to give participants a basic understanding of essential vocabulary related to zoonotic diseases that may be unclear or misunderstood. The lesson features a matching game to help give participants an understanding of the vocabulary words as well as the importance of zoonotic awareness.

Objective:

- After completing this activity, participants will be able to:
- ▶ Determine the definition of each zoonotic vocabulary word used.
 - ▶ Match correct terms with definitions.
 - ▶ Understand each vocabulary word when used in a sentence.

PROCEDURE:

Before the meeting:

1. Review the lesson and verify that you have all the vocabulary cards necessary for the activity. Study the vocabulary words and the given definitions to be prepared for the activity. Tables 1 and 2 on page 2 list the vocabulary words and give an example of each used in a sentence. When a participant is confused about a word, use the tables to read an example sentence that contains its proper use. Tables 3 and 4 on pages 3 list the vocabulary words and their definitions. Keep these tables handy for yourself for quick reference.
2. Separate beginner cards from advanced cards. Pair each definition up with its appropriate vocabulary word and lay out the pairs for both groups. You will need these pairs for the introductory exercise.
3. If you do not have a prepared set of vocabulary cards, prepare them by the following methods:
 - A. Cut apart the included cards for the beginner and advanced level participants located at the end of this lesson.
 - B. Beginning at 1, write the numbers 1 through 12 on sticky notes (one number per note using the permanent marker).
 - C. Beginning at 1, write the numbers 1 through 36 on sticky notes (one number per note using the permanent marker).
 - D. Place one number on the opposite site of printing for each set of cards (beginner 1-12, advanced 1-36).
 - E. If you're concerned about knowing the correct definition of a term, keep Tables 3 and 4 handy.
4. Make sure that you have enough space for one or two groups to lay out all of their cards.

Table 1. Diseases That Animals and Humans Share: The Words You Need to Know “Sentence Examples (Beginner)”

Vocabulary Word	Proper Use in a Sentence
Centers for Disease Control and Prevention (CDC)	The Centers for Disease Control and Prevention worked hard to educate Americans about Ebola during the West African outbreak.
disease outbreak	In the past few years, there has been a troubling disease outbreak of porcine epidemic diarrhea on swine farms in the United States.
epidemiologist	Jackie wants to become an epidemiologist and study influenza.
pathogen	The spread of pathogens can be prevented by washing your hands with soap and water.
sterilize	Sterilize laboratory equipment before use to prevent contamination with unwanted germs.
zoonotic	Rabies is a serious zoonotic disease that can be transmitted to humans through a bite from an infected animal.

Table 2. Diseases That Animals and Humans Share: The Words You Need to Know “Sentence Examples (Advanced)”

Vocabulary Word	Proper Use in a Sentence
bacteria	For bacteria to grow there must be nutrients, moisture, oxygen (in most cases) and an appropriate temperature.
blood-borne pathogen	Malaria is a blood-borne pathogen that affects people and is spread by mosquitoes.
<i>E. Coli</i>	The swine became sick from E. Coli after drinking water contaminated with fecal matter.
fomite	You should disinfect fomites , such as boots, in-between farm visits.
foodborne illness	One of the most common foodborne illnesses in the United States is salmonellosis, caused by germs that are generally found in raw meat or eggs.
fungi	The yeast used to help bread rise is actually a type of fungi .
incubation period	The incubation period for rabies is around 1 to 3 months from the time of the bite to when symptoms begin to show.
influenza	H1N1 is a particularly dangerous strain of influenza .
microorganism	Microorganisms are responsible for many illnesses.
quarantine	When a farm is quarantined, there should be no movement of infected animals from that location, and no healthy animals should be introduced to that farm until the quarantine is lifted.
<i>Salmonella</i>	It is possible to contract salmonella from eating raw cookie dough due to the germs in the raw eggs.
state veterinarian	The State Veterinarian’s Office investigates the cause of a disease outbreak in animals by employing epidemiologists.
symptoms	A stuffy nose is a symptom of the common cold.
United States Department of Agriculture (USDA)	The United States Department of Agriculture helps farmers affected by drought, floods, pest infestations and other harmful events.
vaccination	It is extremely important for everyone to stay up to date on vaccinations for their health and the health of those around them.
vector	Mosquitos can be vectors for disease, carrying pathogens from one host to the next when they take a blood meal.
virus	There are 15 types of avian flu viruses that affect birds.
withdrawal period	After a dairy cow is treated with antibiotics for a mastitis infection, she must go through a withdrawal period during which her milk is not used for human consumption.

Table 3. Diseases That Animals and Humans Share: The Words You Need to Know “Vocabulary Words (Beginner)”

Vocabulary Word	Definition
zoonotic	A disease that can spread from animals to people.
pathogen	Something such as a virus or bacterium that causes disease.
epidemiologist	A specialist in diseases that affect groups of people or animals.
disease outbreak	When many people or animals in a specific area become ill in greater numbers than normal.
Centers for Disease Control and Prevention (CDC)	Government agency that protects the health, safety and security of Americans from disease threats.
sterilize	To make free from living microorganisms by using physical or chemical agents.

Table 4. Diseases That Animals and Humans Share: The Words You Need to Know “Vocabulary Words (Advanced)”

Vocabulary Word	Definition
microorganism	A microscopic living organism that can be single or multi celled.
virus	Small infectious agent that can only reproduce inside the host cell it infects.
influenza	A highly contagious respiratory disease.
<i>Salmonella</i>	Bacteria that often cause food poisoning in humans, commonly found in chicken and egg products.
<i>E. Coli (Escherichia coli)</i>	Bacteria that often affect the intestinal track (gut) and cause severe diarrhea, and are associated with fecal contamination.
foodborne illness	Sickness caused by food contaminated with bacteria, parasites or viruses.
vector	A living organism (usually a biting insect) that can transfer a disease from one animal or plant to another.
quarantine	Separation and restriction of the movement of people or animals that may have been exposed to an infectious disease to see if they become sick.
bacteria	Single-celled (Prokaryotic) living microorganisms that can cause disease.
fungi	Multi-celled (Eukaryotic) organisms such as yeasts, molds and mushrooms.
blood-borne pathogen	A microorganism in blood that can cause disease, usually transferred by needles or biting insects.
incubation period	The time between being exposed to a pathogen and when symptoms begin.
vaccination	A harmless version of a microorganism that is introduced to humans or animals to help stimulate immunity, making them resistant to infection by that microorganism.
United States Department of Agriculture (USDA)	A government agency focused on food, agriculture, natural resources, rural development, nutrition and the public policy related to these issues.
symptoms	Physical changes in an animal or person caused by a pathogen that are often non-specific (for example, fever, body aches) that may indicate disease being present.
withdrawal period	The amount of time it takes for medicine given to a production animal to decrease to a safe, acceptable level so the animal can be milked or harvested for food.
state veterinarian	The person in charge of receiving notification of reportable animal diseases from all laboratories and veterinarians in the state.
fomite	An object such as a car, boots or even door knobs, that can help carry pathogens from one location to another.

During the meeting:

1. Introduce the activity by reading aloud or paraphrasing the following:

*Often times, the things we cannot see make humans and animals sick. Being able to understand the risks associated with diseases allows us to be better caretakers of ourselves as well as of production and companion animals. Today, we are going to learn about some of the words that describe health and illness for humans and animals. To start, what is a **pathogen**?*

2. Allow participants time to consider the question and then gather answers from volunteers.

3. Read aloud or paraphrase the following:

*A **pathogen** is something such as a virus or a bacterium that causes disease. Illnesses caused by pathogens can spread quickly through a herd or flock, or from animal to human or human to animal. Knowing what the words mean can help you to understand veterinarians (doctors who care for animals) as well as prepare yourself for raising and caring for animals. Today, you will be learning key vocabulary words that allow you to better understand the risks posed to you and your animals.*

4. Read aloud or paraphrase the following:

*To get started, we are going to look at five more definitions. You may have heard or read about an agency called the CDC. **CDC** is an acronym that stands for the Centers for Disease Control and Prevention, a government agency that protects the health, safety and security of Americans from disease threats. For example, the CDC has helped ill and healthy people when they enter the United States from places in West Africa where there is concern about Ebola virus disease. Ebola is actually a zoonotic disease that can also be spread person to person. Does anyone know what **zoonotic** means?*

5. Allow participants time to consider the question and then gather answers from volunteers.

6. Read aloud or paraphrase the following:

***Zoonotic** or **zoonosis** refers to a disease that can be spread from animals to humans. Because people are around animals so much, we must know the risks and take preventive measures to keep both our animals and ourselves healthy. **Epidemiologists** help keep everyone healthy. These are scientists who specialize in diseases that affect groups of people or animals. They investigate patterns and causes of disease in humans. They mostly study any sudden increase in the presence of a disease (when many people or animals in a specific area become ill in greater numbers than normal), which is called a **disease outbreak**. If you are counting, we have already reviewed five words so that leaves one more: **sterilize**. To sterilize means to remove living microorganisms by using physical or chemical agents.*

7. Pass out the 12 cards from the beginner portion of the lesson (6 vocabulary words and 6 corresponding definitions). Have participants work as a group to match the individual holding the vocabulary word to the individual holding the correct definition. If you have less than 12 people, use less cards, making sure that the correct definitions and vocabulary words are included in those that are passed out. You may have more cards than you have participants. If so, just make sure each participant has a card. If you have fewer cards than participants or an odd number of participants then they may pair up and have one word or definition for two people.

8. Read aloud or paraphrase the following:

Now we are going to apply what we just learned. Twelve of you are going to get a card. Once you have your card, you are to work as a large group to match the individual holding the vocabulary word to the individual holding the correct definition. Once the match is complete, link arms. You have 2 minutes starting now.

9. Once the group has matched each individual holding the vocabulary word to each individual holding the corresponding definition, announce that time is up. Check that participants have matched the correct word with its definition. Use the six *Diseases That Animals and Humans Share: The Words You Need to Know* “Vocabulary Words (Beginner)” as your key. If partners are paired incorrectly, allow them to switch to a new partner, but do not give the correct answer. Check pairs again and assist participants as needed. Once all pairs are matched, go around the circle of pairs and have a participant in each pair read the vocabulary word and definition.

10. If you are working with young participants, skip to step 13. If you are working with advanced participants, continue here by reading aloud or paraphrasing the following:

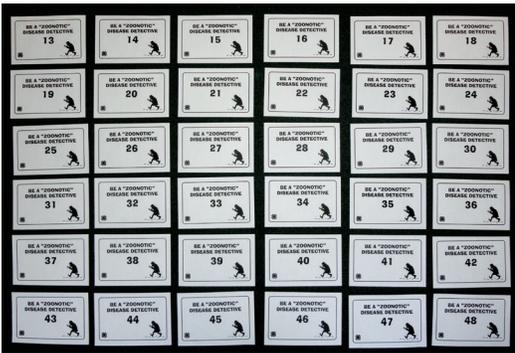
Knowing the definition ahead of time makes a matching game much easier. Now let’s try a little tougher version. Each of you will get one card and without being told the definition ahead of time, you will be asked to go find your match. Just like before, once you have your cards, individuals holding a vocabulary word will need to match up with the individual holding the corresponding definition. Once the match is complete, link arms. You have 4 minutes starting now.

11. Once all individuals holding vocabulary words match up with individuals with corresponding definitions, announce that time is up. Check that participants have matched the correct word with its definition. Use the 36 *Diseases That Animals and Humans Share: The Words You Need to Know* “Vocabulary Words (Advanced)” as your key. If any are incorrect, allow them to switch to a new partner, but do not give the correct answer. If participants seem to struggle with the matching, assist them by providing the answer or asking other participants to assist them to make the match correct. Once all pairs are matched, go around the circle of pairs and have a participant in each pair read the vocabulary word and definition.

12. To increase retention, have participants place all of the pairs in a pile and then form a circle. Pass out the cards in random order so that participants most likely get a new card. Announce that you are going to try the same activity again providing 4 minutes for them to find their match. Follow the instructions in step 11 to determine correct answers. Repeating the definitions as a group is optional.



Example of card layout for a beginner game version using a prepared card set. A “match” has been turned over.



Example of card layout for an advanced game version using a prepared card set.

13. Read aloud or paraphrase the following:

Building our vocabulary takes time, but all of you are doing great. Next, we are going to try a matching game using the same vocabulary words. On my signal, please number off with every other person being a one or a two. Then the ones will be on my right (We will call them Team 1) and twos on my left (We will call them Team 2). You will work together as a group taking turns to match the correct vocabulary word with its definition. Go ahead and number off and move to your new team.

14. While participants are numbering off, place the cards in a random order on a hard surface such as a table or floor in a grid pattern so that the cards are easy to flip over.

15. Read aloud or paraphrase the following:

Now time for the game! To play, we will alternate with Team 1 and Team 2 taking turns trying to find matches. When I say “go,” Team 1 should flip up two cards at a time as a team. (Members can take turns flipping or choose a team captain to do it.) If the team believes they have a definition and its correctly matching vocabulary word, set both cards aside. If it is not a correct pair (that is, two definitions or the wrong vocabulary word for the definition), flip both cards back over and allow Team 2 to try. You will repeat this until we match all of the definitions to the correct vocabulary word.

16. Each time a new vocabulary word is flipped, use both the beginner and advanced versions of *Diseases That Animals and Humans Share: The Words You Need to Know* “Sentence Examples” to say the word in a sentence. Repeat words and sentences if desired to assist participants in making matches. If needed, assist participants by telling them it is not the correct answer so that the game keeps moving.

17. Once this portion of the game is complete, consider allowing the beginner participants to add in some of the advanced words. If desired, count off by ones and twos again to create new teams, and repeat the game to increase retention.

18. Read aloud or paraphrase the following:

Today we have learned about just some of the terms that professionals in agriculture discuss every day. Being able to understand the terminology allows for you as consumers and producers to make educated decisions. These decisions help you in preventing disease outbreaks and enable you to better understand animal and human health concerns.

ADAPTATIONS & EXTENSIONS:

- ▶ To ensure that participants are not memorizing numbers, change the number on the card by writing a new number on a sticky note and placing it on the card. Make notes on your sheet if needed to help serve as the key.
- ▶ Take portions of the lesson and use them at county fairs to increase zoonotic disease literacy of fairgoers and participants.
- ▶ For older or more experienced participants:
 - Have all cards face up so that the vocabulary word and definition are visible. Time each participant to see how quickly and accurately they can pair the word and definition.
 - For a larger audience, adapt steps 13-16 to number participants into additional teams so that participants are more active.
 - Consider dividing the cards if needed to have smaller matching games if additional volunteers are available to assist with running the game.
 - Form teams and allow each team to work together to match the vocabulary word to the definition and time how long it takes to accurately complete the task.
 - If working with a smaller group, create an additional card and allow participants to play a version of Old Maid. Begin by handing out an equal number of cards to each player. To play, begin with one person and then each player takes turns offering a card to the person on the left. That person selects a card and adds it to his or her cards. This player then sees if the selected card matches the definition of any of his or her original cards. If so, the vocabulary word and definition is discarded face up as well. Other players approve the definition and then the player who just took a card then offers his or her hand to the person to the left and so on.
- ▶ For younger or less experienced participants:
 - Have participants draw pictures as a group or individually of what they believe each of the six beginner vocabulary words would look like. For example, they would draw people to present the CDC staff working to learn more. Compare drawings at the end to help increase understanding.
 - Over time, add in additional cards to the game by selecting cards from the advanced card group to increase vocabulary of participants.
 - To increase readability, take the included terms and definitions in Table 3 and print each out on a separate sheet of paper. Number each sheet 1 through 12 and then place the sheets on the floor so that participants can read the sheets from a distance when playing the matching game.

TALKING IT OVER:

Ask the group the following questions.

- ▶ What is a zoonotic disease? Why should we continue to learn more about them?
- ▶ How might some of these vocabulary words help you in working with agricultural youth organizations?
- ▶ What are some careers relating to animal and human health?
- ▶ Based on what you learned, what are some things you can do to help keep you and your animals healthy?

ALIGNMENT TO SCIENCE AND ENGINEERING PRACTICES:

How 4-H Increases Science Literacy

Nationally and in Michigan, 4-H has long enjoyed a reputation for engaging young people in positive, experiential (hands-on), and nonformal activities that are inquiry-based. The lessons in the 4-H Animal Science Anywhere series can be used to enhance classroom science education in Michigan and elsewhere. The lesson activities are aligned with the eight Scientific and Engineering Practices (SEP) from *A Framework for K-12 Science Education* (National Research Council, 2012, p. 42).

The Michigan State Board of Education adopted a set of new state science standards in late 2015 that are based on the SEP. The *4-H Animal Science Anywhere: Diseases That Animals and Humans Share – The Words You Need to Know* lesson was evaluated for alignment with the SEP by MSU Extension Educator Tracy D’Augustino in 2016. The results appear in Table 5.

Table 5. How This Lesson Aligns With the Science and Engineering Practices (National Research Council, 2012, p. 42)

Science & Engineering Practice	Action	Activity Step
1. Asking questions and defining problems	Participants brainstorm possible definitions for the words <i>pathogen</i> and <i>zoonotic</i> .	1-2, 4-5
2. Developing and using models		
3. Planning and carrying out investigations		
4. Analyzing and interpreting data	Participants discuss the need to know the specialized vocabulary of different fields and how this knowledge might help them. Participants apply the knowledge they gain while learning the vocabulary to discuss things they can do to keep themselves and their animals healthy.	Talking It Over
5. Using mathematics and computational thinking		
6. Constructing explanations and designing solutions		
7. Engaging in argument from evidence		
8. Obtaining, evaluating, and communicating information	Participants obtain information (new vocabulary words), discuss the words and their implications, then communicate this information with each other and with other young people at the fair or other events.	Whole lesson

REFERENCES & RESOURCES:

Michigan 4-H Youth Development. (2014). *Be a “zoonotic” disease detective* (4H1671; adapted from Georgia 4-H original). East Lansing: Michigan State University, MSU Extension.

National Center for Infectious Diseases. (2008). *Teachers’ tools: Educational resources for teachers at k-12 levels*. Atlanta, GA: Centers for Disease Control and Prevention. Retrieved from http://www.cdc.gov/NCIDOD/teachers_tools/index.htm

United States Department of Agriculture. (2014). *Animal health*. Washington DC: Author. Retrieved from http://www.usda.gov/wps/portal/usda/usdahome?navid=ANIMAL_HEALTH

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Author:

- ▶ Hannah Piper, Michigan State University Undergraduate Student, Class of 2017
- ▶ Julie Thelen, 4-H Livestock and Veterinary Science Educator, Michigan State University Extension

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zoonotic



pathogen

**A specialist in diseases that
affect groups of people or
animals.**



disease outbreak

Government agency that protects the health, safety and security of Americans from disease threats.



To make free from living microorganisms by using physical or chemical agents.

When many people or animals in a specific area become ill in greater numbers than normal.



A disease that can spread from animals to people.

sterilize



**Something such as a virus
or bacterium that causes
disease.**

epidemiologist



**Centers for Disease
Control and
Prevention (CDC)**

A microscopic living organism that can be single or multi celled.



Sickness caused by food contaminated with bacteria, parasites or viruses.

The time between being exposed to a pathogen and when symptoms begin.



The amount of time it takes for medicine given to a production animal to decrease to a safe, acceptable level so the animal can be milked or harvested for food.

fomite



virus

microorganism



**Small infectious agent that
can only reproduce inside
the host cell it infects.**

**A highly contagious
respiratory disease.**



**Bacteria that often cause
food poisoning in humans,
commonly found in chicken
and egg products.**

Bacteria that often affect the intestinal track (gut) and cause severe diarrhea, and are associated with fecal contamination.



Salmonella

A living organism (usually a biting insect) that can transfer a disease from one animal or plant to another.



Separation and restriction of the movement of people or animals that may have been exposed to an infectious disease to see if they become sick.

blood-borne pathogen



fungi

**A microorganism in blood
that can cause disease,
usually transferred by
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influenza

vaccination



**A government agency
focused on food, agriculture,
natural resources, rural
development, nutrition and
the public policy related to
these issues.**

symptoms



E. Coli
(Escherichia coli)

The person in charge of receiving notification of reportable animal diseases from all laboratories and veterinarians in the state.



An object such as a car, boots or even door knobs, that can help carry pathogens from one location to another.

foodborne illness



vector

**Multi-celled (Eukaryotic)
organisms such as yeasts,
molds and mushrooms.**



quarantine

A harmless version of a microorganism that is introduced to humans or animals to help stimulate immunity, making them resistant to infection by that microorganism.



Physical changes in an animal or person caused by a pathogen that are often non-specific (for example, fever, body aches) that may indicate disease being present.

**United States
Department of
Agriculture
(USDA)**



bacteria

**Single-celled (Prokaryotic)
living microorganisms that
can cause disease.**



incubation period

withdrawal period



state veterinarian



BE A "ZOOONOTIC" DISEASE DETECTIVE

1



BE A "ZOOONOTIC" DISEASE DETECTIVE

2



**BE A "ZOOONOTIC"
DISEASE DETECTIVE**

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**BE A "ZOOONOTIC"
DISEASE DETECTIVE**

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BE A "ZOOONOTIC" DISEASE DETECTIVE

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