



**During the meeting:**

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

*Nearly every animal and human becomes sick at some point. Many diseases can be passed between humans and animals; these diseases are known as “zoonotic diseases.” It takes many specialists from various careers to keep humans and animals healthy. From physician to veterinarian to pharmacist, each career plays an important role keeping us healthy. What we often don’t think about is the hundreds of other careers that connect human, animal and environmental health. The concept that recognizes that environmental health, animal health and human health are all connected is known as “One Health.”*

*One way to think about the connections between human and animal health is thinking about a bridge. A bridge is needed to connect one place to another or to cross divides. Careers involving human and animal health are strongly connected just as are all of the materials used to build a bridge. To illustrate that connection, we’ll start by demonstrating how bridges work and these careers work together.*

2. Have the participants arrange themselves in two parallel lines. Have participants face each other with their arms extended forward at chest level. Arms should be parallel to the ground and not touching any other individuals with palms facing down. One individual will extend their arms and another participant will have one arm in between the other individual’s arms. This will be repeated throughout the line with the arms alternating down the line, forming a bridge that doesn’t touch any place. (See photo on the left for clarification.)



**Participants take part in the bridging human and animal health ball activity**

3. Read aloud or paraphrase the following:

*Your goal is to pass a ball from one end of the line to the other, just as if the ball were crossing a bridge. In the game, you will pass a ball down the bridge to the other side with the ball passing along your outreached arms. To add a challenge, do this without using the palms of your hands and without dropping the ball on the ground. If the ball drops, you should make adjustments to the bridge to make it stronger (move to stand closer together). I will get the ball and bring it back to the original location and you will start the process again.*

4. Place the ball at one end of the “bridge” to begin the activity.
5. Once the ball has successfully traveled the entire length of the bridge, have at least two participants standing across from each other drop their arms back down to their sides, removing their arms from the bridge. Those with dropped arms should not move from their places in line. Make sure that you have enough

individuals remove their arms, so the ball will fall through the gap. Have the remaining participants attempt to move the ball back to the other side of the bridge.

6. The ball will drop to the ground unless the other participants move in to help make the bridge stronger. Allow participants to try to move the ball to the other end twice if time allows. End the activity and have participants move back to their seats or area where gathering.
7. Ask the participants the following questions.
  - What happened when some arms were missing or weren't working together? *(The answer should include that the ball fell through the gap, and they were no longer able to pass the ball from one end to the other without making adjustments.)*
  - How is this similar to when careers don't work together? *(Things take longer to complete, information is slow to travel, things are missed, and other similar answers)*

8. Read aloud or paraphrase the following:

*In the activity, you represented the careers in animal and human health. If you are able to work together you can form a strong bridge between human and animal health. This bridge keeps everyone and everything in the ecosystem we call Earth working effectively to keep everyone healthy. But, if we have holes in our bridge where careers are not working together, then we cannot maintain the principles of One Health. This is when humans, animals and our environment get sick.*

*For example, veterinarians work with pork producers to maintain healthy animals. These animals will one day enter our food supply, so it is important to have a healthy meat source for human consumption. Additionally, doctors work with their patients to come up with healthy diets. Humans require high quality protein sources, such as pork, to maintain good health.*

9. Review each of the careers listed in Table 2 with participants. Go through the list selecting about ten careers to discuss with participants. As you go through the list, ask participants how the careers could relate to their own lives. These are the same careers that will be on the "Career Description" cards. If you have more time, go through more cards.



**Table 2. Career Descriptions and How They Relate to Your Life**

<b>Career</b>	<b>Description</b>	<b>How it relates to your life</b>
<b>Behaviorist</b>	Observes behavior habits in animals and uses these observations to develop training techniques	Studies animals in the wild or in captivity
<b>Biologist</b>	Conducts research on infectious diseases with expertise in bacteriology, virology, immunology, molecular biology, biochemistry and many other fields	Studies living organisms such as mammals, reptiles, birds and microbes; can assist in the development of medications including antibiotics
<b>Biosystems Engineer</b>	Develops, designs and adapts structures and systems to help people and animals better coexist with the environment	Works with the biological environment and agricultural sciences to create systems for the community including turning waste products into useable resources for the public
<b>Breeding Technician</b>	Works with caretakers to maximize reproductive success	Suggests mating decisions, determines the optimal time to breed and assists with breeding
<b>Community Health Worker</b>	Oversees public health threats, provides education and promotes healthy lifestyles	Holds events to educate the community about health and safety
<b>Conservation Officer</b>	Protects wildlife and the environment (law enforcement official)	Tracks wildlife movement and population numbers to help design laws and regulations
<b>Environmental Health Specialist (Health Inspector)</b>	Administers and enforces legislation and provides support to minimize health and safety hazards	Ensures that food processing plants and food preparation kitchens are up to federal standards (health code)
<b>Environmentalist</b>	Studies the environment and environmental concerns	Researches ways to minimize human and animal impact on the environment such as improving recycling methods and rebuilding wildlife habitats
<b>Epidemiologist</b>	Specializes in diseases that affect groups of people or animals	Works for agencies to help minimize the impact of disease outbreaks
<b>Extension Educator</b>	Communicates with and educates stakeholders including the agricultural community and the general public with research-based content	Educates the public with information provided by research and creates materials to educate people within communities
<b>Farmer/Herdsman</b>	Manages the health and care of livestock	Produces food consumed by both humans and animals
<b>Geneticist</b>	Conducts research on genes and gene mapping, and applies findings	Helps people who have genetic disorders, helps people understand their genetic pre-dispositions to diseases, helps farmers maximize the genetic progress they make with their livestock
<b>Meat Scientist</b>	Works with processed animal products for human consumption	Develops the best way of cutting and preserving meat so humans are protected from food poisoning and zoonotic diseases while also enjoying new flavorful cuts of meat; assists in creating food safety regulations

**Table 2. Career Descriptions and How They Relate to Your Life, continued**

<b>Career</b>	<b>Description</b>	<b>How it relates to your life</b>
<b>Nurse</b>	Performs tests, relays information to doctors, educates patients about various medical conditions, and tends to provide direct patient care	Is responsible for the majority of daily patient care and has the most direct interaction with patients
<b>Nutritionist</b>	Develops and formulates diets for animals or humans	Develops diets and guidelines for nutritious, well-balanced food for you and your animals
<b>Pharmacist</b>	Advises and distributes prescription drugs to individuals	Fills prescriptions prescribed by the doctor
<b>Physical Therapist</b>	Examines patients and develops a plan using treatment techniques to promote the ability to move, reduce pain, restore function and prevent disability	Teaches patients how to prevent or manage their conditions so that they will achieve long-term health benefits
<b>Physician</b>	Oversees patient care, diagnosis and treatment (medical professional)	Approves of diagnoses and courses of treatment
<b>Physician Assistant</b>	Performs many of the same tasks as a doctor, but always works under the supervision of a physician (medical professional)	Treats patients performing many of the same tasks as a doctor such as prescribing medication, interpreting lab results and analyzing scans or X-rays
<b>Professor</b>	Educates students at the collegiate or university level	Holds the highest academic rank at universities and research institutions; often works in research, teaching, outreach or all three
<b>Quality Assurance Specialist</b>	Works to ensure the safety of products	Validates the quality of products made available to consumers
<b>Sales Consultant</b>	Sells products, equipment and other materials to clients	Distributes and educates clients about pharmaceutical, medical, feed or other specialty products for companies
<b>Support Staff</b>	Assists other occupations in completing daily tasks	Aids in tasks and can specialize in janitorial, secretarial, maintenance and other positions
<b>Veterinarian</b>	Provides treatment for animals (medical professional)	Diagnoses, oversees treatments and performs surgeries on animal patients
<b>Veterinary Technician</b>	Performs many of the same tasks as a veterinarian but cannot diagnose patients and must always work under the supervision of a veterinarian (medical professional)	Treats patients performing many of the same tasks as a veterinarian such as giving injections, assisting in surgery, and collecting lab samples
<b>Zoologist</b>	Studies animals or wildlife in confinement or natural habitats	Discovers new species and studies the impact of humans on the wildlife

**10.** Answer any questions that may arise based on the discussion of the career descriptions you selected to discuss.

**11.** Ask for a volunteer to assist you in demonstrating the activity.

**12.** Read aloud or paraphrase the following:

*Each of you will receive one of the “Career Description” cards once the activity begins. Do not look at the card. During the activity, place the card on your forehead without looking at the text, and hold your card against your forehead. You will then ask other participants “yes” or “no” questions about the careers we just discussed in order to determine what career card you received. Once you believe you have determined the career on your card, ask another participant if your guess is correct. If you are correct, remove your career card from your forehead, but continue to answer questions for other participants until everyone has determined the careers on their cards. If you are incorrect, continue asking questions about what career you may have. Now we will begin by having a volunteer help demonstrate the activity.*

**13.** Pull a “Career Description” card from the pile without looking at the text and place it on your forehead with the text facing the demonstration participant.

**14.** Then ask the demonstration participant “yes” or “no” questions about the career on your “Career Description” card. (Some questions might include: “Do I work with animals?”, “Do I build things?”, “Do I raise animals?”, “Do I teach people?”)

**15.** Use the demonstration participant’s “yes” or “no” responses to determine which career is on your “Career Description” card.

**16.** Once you think you know which career you have, ask the demonstration participant if your guess is correct.

**17.** Answer any questions about the steps mentioned or demonstrated above.

**18.** Before passing out the cards, read aloud or paraphrase the following:

*The goal of this activity is to determine which “Career Description” cards you have without looking. To play, you will need to work together. Move around the area and read the other participants’ cards to yourself (not aloud). Ask “yes” or “no” questions to other participants to figure out your own card. Once you’ve asked a question, the other person should take a turn asking questions about his or her card. You should respond “yes” or “no” to the questions without stating the career. If another participant guesses his or her career, and if the participant is incorrect, inform him or*

her and continue answering questions. If the participant is correct, tell him or her, and continue trying to determine your own career card.

19. Begin the activity by reminding participants that they should not look at the cards you will pass out to them. Give one of the “Career Description” cards to each participant. Without looking at the text on the card, each participant should place the “Career Description” card up to his or her forehead with the text facing other participants.
20. Once all cards are held up against participant foreheads, the activity begins. Allow the activity to run for 15 minutes or less depending on the size of the group. (Smaller groups need less time.)
21. Once all participants have guessed their careers correctly or you have ended the activity, collect the “Career Description” cards. Gather the participants together to continue the lesson.
22. Ask participants the following questions. If participants are not able to think of ideas, share the examples included.
  - What are some examples of careers that you have come into contact with in your everyday life and are important for your health? (*Physician [doctor], Veterinarian, Nutritionist, Environmentalist, Farmer, etc.*)
  - Before today, what are some examples of careers you wouldn’t have thought were important for your health? (*Physician Assistant, Veterinary Technician, Environmental Health Specialist, Biosystems Engineer, etc.*)
  - What are some examples of careers that bridge human and animal health? (*Nutritionist, Community Health Worker, Behaviorist, Epidemiologist, etc.*)
23. To summarize, read aloud or paraphrase the following:

*You may not have realized it, but each of you helped bridge together human and animal careers. If we think about the last activity, each of you could have represented the career printed on the card you held to your forehead. You each had to work together to determine which career you were holding, just as each career professional must work with others to bridge human, animal and environmental health (One Health). Additionally, some of the careers that contribute to maintaining One Health aren’t careers we would normally think of. As we saw with the bridge and card activities, all careers are equally important. As you think about your future, consider ways that you can help bridge One Health within your future career.*

### TALKING IT OVER:

Ask the group the following questions.

- ▶ What careers are **directly** related to your health? (*Physician, Physician Assistant, Physical Therapist, Pharmacist, etc.*)
- ▶ What careers are **indirectly** related to your health such as those careers keeping animals and the environment healthy? (*Veterinarian, Veterinary Technician, Farmer, Meat Scientist, Conservation Officer, Quality Assurance Specialist, etc.*)
- ▶ What are some examples of careers that bridge human, animal and environmental health? (*Environmentalist, Nutritionist, Biologist, Geneticist, Epidemiologist, etc.*)

## ADAPTATIONS & EXTENSIONS:

### For Older or More Experienced Participants:

- ▶ Have participants brainstorm a list of careers not included on the “Career Description” cards. Use the list to create additional cards to use in a similar format.
- ▶ Allow participants to read the cards to determine their careers. Then have each participant find a career that links or bridges to the one he or she has. The participant should pair with another participant and then discuss how the careers relate. Once pairs are identified, then have participants gather in groups of four and discuss how those careers relate. Continue this for as many participants are in the group to show that all careers relate.
- ▶ Have participants research a career discussed today and have them share the information that they learned in a brief presentation at a club meeting. The National 4-H curriculum *Build Your Future: Choices . . . Connections . . . Careers* will assist with this effort. (See References & Resources section on page 10.)
- ▶ Challenge teen leaders to create a game for younger participants by creating a new set of careers with even more basic descriptions or using images.

### For Younger or Less Experienced Participants:

- ▶ Conduct only the first activity that uses the ball with participants. Then, select five careers from the listing to discuss in depth with participants.
- ▶ Conduct both activities but limit the second activity by selecting only 10 careers to use for the “Career Description” cards game. Make additional copies of these careers for larger groups to limit the number of career options participants will need to remember.
- ▶ Allow participants to read their “Career Description” cards and sort themselves by a career that is either, animal human or both. Discuss each career and why participants think it relates to each category.
- ▶ Invite a local professional in a career listed in the lesson to speak with participants and share how his or her job connects with One Health.
- ▶ Help participants come up with a creative song, slogan or catchphrase about careers in One Health. For example, a poster could show a pig with the caption, “Veterinarians, Doctors, Farmers and Researchers. We need all of YOU to keep US 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 activities in the *4-H Animal Science Anywhere: Careers – Bridging Human and Animal Health* lesson were evaluated for their alignment with the SEP by Michigan State University (MSU) Extension Educator Tracy D’Augustino in 2016.

**Table 3. 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 discuss how each of the careers affects the community and the environment.	9
	▶ Participants brainstorm careers that bridge human and animal health.	22
2. Developing and using models	Participants use the bridge activity to model the importance of careers working together.	1-6
3. Planning and carrying out investigations		
4. Analyzing and interpreting data	▶ Participants analyze and discuss the results of removing “careers” from the bridge.	7
	▶ Participants discuss what careers are directly and indirectly related to their health.	Talking It Over
5. Using mathematics and computational thinking		
6. Constructing explanations and designing solutions	▶ Participants explain how the model bridge results connect to human and animal health.	7
	▶ Participants explain why careers are directly or indirectly related to their health.	Talking It Over
	▶ Participants explain how careers bridge human and animal health.	22
7. Engaging in argument from evidence	▶ Participants explain why careers are directly or indirectly related to their health.	Talking It Over
	▶ Participants explain how careers bridge human and animal health.	9, 22
8. Obtaining, evaluating, and communicating information	Throughout the lesson and activities, participants are learning about One Health careers. They obtain and evaluate information about human and animal health careers.	Whole lesson, Talking It Over

## REFERENCES & RESOURCES:

- Michigan 4-H Youth Development. (2014). *4-H animal science anywhere: Basics of biosecurity (4H1661)*. East Lansing: Michigan State University, MSU Extension. Retrieved from [http://msue.anr.msu.edu/uploads/236/65684/4H1661\\_AnimalScienceAnywhere-Biosecurity.pdf](http://msue.anr.msu.edu/uploads/236/65684/4H1661_AnimalScienceAnywhere-Biosecurity.pdf)
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# Career Description Cards

<p style="text-align: center;"><b>Behaviorist</b></p> <p>Observes behavior habits in animals and uses these observations to develop training techniques.</p>	<p style="text-align: center;"><b>Community Health Worker</b></p> <p>Oversees public health threats, provides education and promotes healthy lifestyles</p>
<p style="text-align: center;"><b>Biologist</b></p> <p>Conducts research on infectious diseases with expertise in bacteriology, virology, immunology, molecular biology, biochemistry and many other fields</p>	<p style="text-align: center;"><b>Conservation Officer</b></p> <p>Protects wildlife and the environment (law enforcement official)</p>
<p style="text-align: center;"><b>Biosystems Engineer</b></p> <p>Develops, designs and adapts structures and systems to help people and animals to better coexist with the environment</p>	<p style="text-align: center;"><b>Environmental Health Specialist</b> <b>(Health Inspector)</b></p> <p>Administers and enforces legislation and provides support to minimize health and safety hazards</p>
<p style="text-align: center;"><b>Breeding Technician</b></p> <p>Works with caretakers to maximize reproductive success</p>	<p style="text-align: center;"><b>Environmentalist</b></p> <p>Studies the environment and environmental concerns</p>

Career Description Cards, continued

<p style="text-align: center;"><b>Epidemiologist</b></p> <p style="text-align: center;">Specializes in diseases that affect groups of people or animals</p>	<p style="text-align: center;"><b>Meat Scientist</b></p> <p style="text-align: center;">Works with processed animal products for human consumption</p>
<p style="text-align: center;"><b>Extension Educator</b></p> <p style="text-align: center;">Communicates with and educates stakeholders including the agricultural community and the public with research-based content</p>	<p style="text-align: center;"><b>Nurse</b></p> <p style="text-align: center;">Performs tests, relays information to doctors, educates patients about various medical conditions and tends to provide direct patient care</p>
<p style="text-align: center;"><b>Geneticist</b></p> <p style="text-align: center;">Conducts research on genes and gene mapping and applies findings</p>	<p style="text-align: center;"><b>Nutritionist</b></p> <p style="text-align: center;">Develops and formulates diets for animals or humans</p>
<p style="text-align: center;"><b>Farmer/Herdsman</b></p> <p style="text-align: center;">Manages the health and care of livestock</p>	<p style="text-align: center;"><b>Pharmacist</b></p> <p style="text-align: center;">Advises and distributes prescription drugs to individuals</p>

Career Description Cards, continued

<p style="text-align: center;"><b>Physical Therapist</b></p> <p>Examines patients and develops a plan using treatment techniques to promote the ability to move, reduce pain, restore function and prevent disability</p>	<p style="text-align: center;"><b>Quality Assurance Specialist</b></p> <p>Works to ensure the safety of products</p>
<p style="text-align: center;"><b>Physician</b></p> <p>Oversees patient care, diagnosis and treatment (medical professional)</p>	<p style="text-align: center;"><b>Sales Consultant</b></p> <p>Sells products, equipment and other materials to clients</p>
<p style="text-align: center;"><b>Physician Assistant</b></p> <p>Performs many of the same tasks as a doctor, but always works under the supervision of a physician (medical professional)</p>	<p style="text-align: center;"><b>Support Staff</b></p> <p>Assists other occupations in completing daily tasks</p>
<p style="text-align: center;"><b>Professor</b></p> <p>Educates students at the collegiate or university level</p>	<p style="text-align: center;"><b>Veterinarian</b></p> <p>Provides treatment for animals (medical professional)</p>

## Career Description Cards, continued

**Veterinary Technician**

Performs many of the same tasks as a veterinarian but cannot diagnose patients, must always work under the supervision of a veterinarian (medical professional)

**Zoologist**

Studies animals or wildlife in confinement or natural habitats