

What is Wrong with My Pet? — An Introduction to Zoonoses

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This lesson is designed for 6th-8th grade life science students and focuses on the transmission of diseases between animals and humans. Ringworm and roundworm will be used as examples of zoonoses (infectious diseases that are transmitted to humans by animals). Students will be assigned specific roles within a group and complete research to identify the organism causing disease, how the disease presents in humans, treatment, and presentation strategies. Through an interview style presentation, students will communicate what they have learned with the class. This lesson integrates science research and uses language arts, drama, and art to apply research to a real life situation.

Disclaimer: The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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Summary

This lesson is designed for 6th-8th grade life science students and focuses on the transmission of diseases between animals and humans. Ringworm and roundworm will be used as examples of zoonoses (infectious diseases that are transmitted to humans by animals). Students will be assigned specific roles within a group and complete research to identify the organism causing disease, how the disease presents in humans, treatment, and presentation strategies. Through an interview style presentation, students will communicate what they have learned with the class. This lesson integrates science research and uses language arts, drama, and art to apply research to a real life situation.

Learning Outcomes

- Students will be able to describe how two specific zoonoses are transmitted to humans.
- Students will be able to identify two organisms that cause disease (ringworm and roundworm) in both people and animals.
- Students will be able to describe the symptoms and treatment of these diseases.
- Students will be able to produce a brochure focusing on educating the community about prevention of these diseases.

Materials

1. Computers with Internet access — one per group of four students
2. Photocopies of Zoonoses Pretest handout — one per student
3. Photocopy of the Zoonoses Pretest Key handout — one for teacher's reference
4. Photocopies of Role Descriptions handout — one per student group
5. Photocopies of Team Requirements handout — one per student group
6. Photocopies of Required Interview Elements form — one per student group
7. Photocopies of Pet Veterinarian scenario — one for each group assigned to this scenario
8. Photocopies of Farm Animal Veterinarian Scenario — one for each group assigned to this scenario
9. Photocopies of the Presentation Rubric handout — one per student group
10. Photocopies of the Brochure Rubric handout — one per student group
11. Photocopy of Required Interview Elements Key — one for teacher's reference
12. Photocopies of Zoonoses Reflection handout — one per student
13. Art supplies including colored markers, drawing pencils, poster board, colored and white copy paper, scissors, and glue

Total Duration

3 hours, 10 minutes

Procedures

Teacher Preparation

The teacher should make one copy of the Zoonoses Pretest (introduction) and Zoonoses Reflection handouts for each student. The teacher should also prepare a packet of lesson plan handouts for each group of four students. The packet should include one copy of the following handouts: Role Descriptions; Team Requirements; Required Interview Elements form; Presentation Rubric; and Brochure Rubric. Each packet should contain either a copy of the Pet Veterinarian scenario or the Farm Animal Veterinarian scenario. If computers are not available in the classroom, the teacher should reserve time in the school's computer lab or media room for the research needed in **Step 3**. The teacher should also prepare art supplies for use in **Step 3**.

The teacher should make one copy of the Zoonoses Pretest Key and the Required Interview Elements Key for their reference.

The Web resource below can be reviewed to provide additional background information for teachers unfamiliar with this topic prior to beginning this lesson.

Web Resource

Title: Healthy Pets, Healthy People

URL: <http://www.cdc.gov/healthypets/index.htm>

Description: This website from the CDC contains detailed information on zoonoses including health information and prevention tools.

Introduction

Duration: 20 minutes

Step 1

Before beginning the lesson, the Zoonoses Pretest will be used to assess students' prior knowledge of zoonoses. After each student has completed the pretest, the teacher will discuss the answers using the Zoonoses Pretest Key as a guide.

Supplemental Documents

Title: Zoonoses Pretest

Description: This pretest that can be used to assess the students' knowledge of animal diseases that can also infect humans.

Title: Zoonoses Pretest Key

Description: This is the pretest answer key that can be used to discuss the students' responses to the pretest.

Step 2

Duration: 30 minutes

Now that students have been introduced to the topic, students should be divided into teams of four. The teacher may pre-assign these teams, or allow the students to choose their own team members. The teacher will provide each team with a project packet that contains all the handouts needed to complete the lesson. The teacher should explain that each team will be provided with one of two possible scenarios involving an animal with an unidentified illness. The team will be responsible for identifying the illness and answering the questions on the Required Interview Elements form. For the presentation portion of the

activity, students will be required to portray one of the following roles: pet or animal owner; veterinarian; pathogen or infected person; and the interviewer. In addition, each group will create a brochure that educates the community on the dangers of the disease. Each student must have a speaking role during the presentation. Encourage students to make the presentations and brochures as creative and engaging as possible.

After distributing the packets, the teacher should go over each handout and answer questions from the students. The teacher should be sure to emphasize that although each student will play a specific role in the presentation, all students must help with the research, preparing the presentation, and developing the brochure. Make a special note to go over the Required Interview Elements form, the Presentation Rubric, and the Brochure Rubric, as they describe the basis of the students' evaluations.

Supplemental Documents

Title: Role Descriptions

Description: This document describes the overview of the lesson and a description of the roles students will need to play.

Title: Team Requirements

Description: This document provides an overview of the requirements for each team.

Title: Required Interview Elements Form

Description: This document contains the questions the team must research and address in their presentation.

Title: Pet Veterinarian Scenario

Description: This document provides information on a disease scenario that each team will research.

Title: Farm Animal Veterinarian Scenario

Description: This document provides information on a disease scenario that each team will research.

Title: Presentation Rubric

Description: This rubric will be used to evaluate each team's presentation.

Title: Brochure Rubric

Description: This rubric will be used to evaluate each team's brochure.

Step 3

Duration: 60 minutes

Now that the students have been assigned teams and received their lesson plan packets, they are ready to begin Internet research on the given scenario and work on their presentations. There should be one computer available for each team in the classroom or the school's media center. Remind students that the entire team should work together to complete the Required Interview Elements form using the Healthy Pets, Healthy People website. The teacher should also remind students to search for pictures to be used in their brochures. The students should reference the Team Requirements handout for further instructions.

Web Resources

Title: Healthy Pets, Healthy People

URL: <http://www.cdc.gov/healthypets/index.htm>

Description: This CDC website contains detailed information on zoonoses including health information and prevention tools.

Title: Public Health Image Library

URL: <http://phil.cdc.gov/phil/home.asp>

Description: This CDC website displays photographs, and multimedia files of public health images. Students can use this website to search for images to be used in their presentation and brochure.

Step 4

Duration: 60 minutes

Students will present their research in the form of an interview. All information collected on the Required Interview Elements form should be included in the presentation. Presentations and brochures will be evaluated using the Presentation Rubric and the Brochure Rubric. The teacher should collect each team's Required Interview Elements form. The Required Interview Elements Key provides answers to both scenarios.

Conclusion

Duration: 20 minutes

After the presentations, the teacher should distribute the Zoonoses Reflection handout to each student. This document provides an opportunity for students to pull together what they have learned and provide feedback to the teacher on the performance of each team member.

Supplemental Document

Title: Zoonoses Presentation Reflection

Description: This document allows students to write what they have learned and serves as a tool for instructors to evaluate the effort put in by each team member.

Assessment

Students will be evaluated on the project using the Required Interview Elements form, Presentation Rubric and Brochure Rubric in Step 4. Each team member also will be evaluated on their contribution to the presentation using the Zoonoses Reflection handout in the conclusion.

Modifications

Extensions

Teachers can have students research other organisms that can cause animal transmitted diseases such as hantavirus, rabies, and tapeworms. Additional scenarios could be written to provide a wider range of diseases.

Teachers could also videotape the presentations and show them to other classes or parents to inform them of the possibility of disease transmission between pets and people.

Education Standards

National Science Education Standards

LIFE SCIENCE, CONTENT STANDARD C

As a result of their activities in grades 5-8, all students should develop understanding of

- **Structure and function in living systems**
- Reproduction and heredity
- Regulation and behavior
- Populations and ecosystems
- **Diversity and adaptations of organisms**

SCIENCE AS INQUIRY, CONTENT STANDARD A

As a result of activities in grades 9-12, all students should develop

- **Abilities necessary to do scientific inquiry**
- **Understandings about scientific inquiry**

SCIENCE AND TECHNOLOGY, CONTENT STANDARD E

As a result of activities in grades 9-12, all students should develop

- Abilities of technological design
- **Understandings about science and technology**

Zoonoses Pretest

What is Wrong with My Pet? — An Introduction to Zoonoses

Patricia L. Dick and Gabriel Ayyavoo, CDC's 2007 Science Ambassador Program

Name _____

1. What does the word zoonosis (zoo-nose-sis) or zoonoses (zoo-nose-sees) mean?

2. Name 4 types of pathogens (germs) that can be transferred from animals to humans.

a. _____

b. _____

c. _____

d. _____

3. Name 3 common worms that humans can get from animals.

a. _____

b. _____

c. _____

4. Ringworm is caused by a (circle one) a. parasite b. fungal infection

5. Rabies is caused by a (circle one) a. Bacteria b. Virus

6. Give two examples of an animal that may transmit diseases to a human.

Zoonoses Pretest Key

What is Wrong with My Pet? — An Introduction to Zoonoses

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Name _____

1. What are zoonoses?

ANSWER: Diseases that can be passed from pets to humans. (1)

2. Name 4 types of pathogens that are transferred from animals to humans.

ANSWER:

- Parasites
- Protozoa
- Viruses
- Bacteria

3. Name 3 common worms that humans can get from animals.

ANSWERS may vary but include:

- Roundworm
- Hookworm
- Tapeworm

4. Ringworm is caused by a (circle one)

ANSWER: Fungal infection

5. Rabies is caused by a (circle one)

ANSWER: Virus

6. Give two examples of an animal that may transmit diseases to a person.

ANSWERS may vary but might include

Birds

Cats

Dogs

Reptiles (e.g., snakes, lizards, turtles)

References

1. Centers for Disease Control and Prevention. Healthy Pets Healthy People: Glossary. [online]. 2007 [cited 2007 June 8]. Available from URL: <http://www.cdc.gov/healthypets/glossary.htm>

Role Descriptions

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Directions

Your team will teach your peers about the disease described in the Farm Animal Veterinarian scenario or the Pet Veterinarian scenario (found in your packet). You will work as a team to research identification of the disease, treatment of the disease and prevention. You will then prepare a presentation that will have the interviewer question the remaining members of your group

- The veterinarian
- The Interviewer
- The pet or animal owner
- The pathogen or the infected person

Each team member must have a speaking role in the presentation.

2. Veterinarian

You are going to role play the veterinarian called to treat the diseases in the included scenario. Part of your job is to educate the public about diseases they can get from animals and how they can protect themselves.

3. Interviewer

Your main job is to interview the other members of the team. Your questions should cover all the information from the Required Interview Elements form.

4. Pet or Animal Owner

You will play the pet/animal owner in the included scenario. In the presentation, your role will be to describe the symptoms of the animal and other information the veterinarian can use to diagnose the illness.

5. Pathogen or Infected Person

You are going to play either the pathogen or the infected family member with the pathogen. You will describe the symptoms of the disease in humans and any other questions the interviewer might ask you.

All members of the team must work together to complete the Required Interview Elements form and take an active role in the preparation of the presentation and brochure.

Team Requirements

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Interview

Research will need to be done by the whole team to complete the Required Interview Elements form before the presentation. Interview questions should be developed from the information collected to complete this handout. Each team will be free to change the wording of questions and choose the team member to direct questions to. Remember, all information collected on the Required Interview Elements Form must be addressed in the interview.

Brochure

You are also required to create a brochure to distribute to the public. The purpose of the brochure is to educate the public about the dangers of your particular disease.

The brochure must include the following elements

- Description of symptoms
- Description of how disease is transferred from animals to humans
- Picture or drawing of the organisms causing disease
- List of ways humans can avoid catching the disease

The brochure must also be creative, appealing to the eye and grammatically correct.

Reflection

Each person in the team will write a short reflection on what they have learned and evaluate the contributions of their team members to the presentation.

Required Interview Elements Form Key

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Infectious Organism Pet Scenario: Roundworm/Hookworm
Infectious Organism Farm Animal Scenario: Ringworm

1. What symptoms did the animal display?

ANSWER : Roundworm/hookworm

- Small white worms in stool
- Vomiting
- Loss of appetite

Ringworm

- Reddish ring-shaped rashes

2. What is the name of the disease and the organism described in the scenario?

ANSWER: Roundworm/hookworm in Pet scenario

- Ringworm in the Farm Animal scenario

3. How can this pathogen harm people?

ANSWER: Roundworm

- In most cases wandering worms cause no symptoms or apparent damage. However, in some cases, they produce a condition called visceral larva migrans. The larvae may cause damage to tissue and sometimes affect the nerves or even lodge in the eye. In some cases, they may cause permanent nerve or eye damage, even blindness. (1)

Hookworm

- Hookworm larvae typically move about within the skin, causing inflammation in the affected skin. This is called cutaneous (skin) larva migrans. One type of hookworm can penetrate into deeper tissues and cause more serious damage to the intestine and other organs (1)

Ringworm

- Ringworm causes itchy, red, raised, scaly patches that may blister and ooze. The patches often have sharply-defined edges. They are often redder around the outside with normal skin tone in the center. This may create the appearance of a ring. Your skin may also appear unusually dark or light. (2)
- When the scalp or beard is infected, bald patches may result. (2)
- If nails are infected, they become discolored, thick, and even crumble. (2)

Name one possible way the disease could be transmitted to a person.

ANSWER: Roundworm/hookworms

- People get roundworms and hookworms through direct contact with infected feces. This usually happens by chance ingestion (eating) of contaminated soil, sand, or plant life. (1)

Ringworm

- Ringworm is transmitted from direct contact with an infected animal's skin or hair. (2)

4. Name three ways to help prevent the spread of this disease.

Answers may vary but may include the following:

Roundworm

- Have puppies and kittens dewormed at an early age. (1)
- Start or keep your pets on a preventative drug program that treats and controls these worms. (1)
- Learn to recognize and avoid possibly contaminated soil, sand, plants, and other objects. Teach children to do the same. (1)
- Keep play areas, lawns, and gardens around your home free of animal waste. (1)
- Bag and dispose of pet feces
- Cover sandboxes when not in use

Ringworm

- Keep your skin and feet clean and dry. (2)
- Shampoo regularly, especially after haircuts. (2)
- Do not share clothing, towels, hairbrushes, combs, headgear, or other personal care items. Such items should be thoroughly cleaned and dried after use. (2)
- Wear sandals or shoes at gyms, lockers, and pools. (2)
- Avoid touching pets with bald spots. (2)

References

1. Centers for Disease Control and Prevention. What Every Pet Owner Should Know about Roundworms and Hookworms. [online]. [cited 2007 June 8]. Available from URL: http://www.cdc.gov/healthypets/Merial_CDCBroch_rsgWEB.pdf
2. Medline Plus. Ringworm. [online]. 2007 [cited 2007 June 8]. Available from URL: <http://www.nlm.nih.gov/medlineplus/ency/article/001439.htm>

Pet Veterinarian Scenario

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A young mother comes into the veterinarian's office with a new puppy. The mother found small white worms in the puppy's stool. The puppy also has not been eating and has been vomiting over the last few days. The mother has recently had a baby who is just beginning to crawl. She is worried about the possibility that the baby may become infected with these worms. The puppy is still learning to use the bathroom outside and has had several accidents in various areas of the home.

Directions

Using the above scenario and the Web resource below, begin to answer the questions in the Required Interview Elements form.

Healthy Pets, Healthy People

<http://www.cdc.gov/healthypets/index.htm>

Farm Animal Veterinarian Scenario

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A veterinarian for farm animals was called after a kindergarten class visited a local farm. The children were allowed to pet many of the animals. Several children soon developed ring-shaped rashes on their bodies that were often very itchy. The owners of the farm requested that a veterinarian come to the farm and see if he could find the source of the problem. The veterinarian found a calf that had the same reddish ring-shaped rashes as the children.

Directions

Using the above scenario and the Web resource below, begin to answer the questions in the Veterinarian Interview handout.

Healthy Pets, Healthy People

<http://www.cdc.gov/healthypets/index.htm>

Presentation Rubric

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Score

	1	2	3	4	Total
Organization	Audience cannot understand presentation because there is no sequence of information.	Audience has difficulty following presentation because student jumps from subject to subject.	Student presents information in logical sequence that audience can follow.	Student presents information in logical, interesting sequence that audience can follow.	
Subject Knowledge	Student does not have grasp of information; student cannot answer questions about subject.	Student is uncomfortable with information and is able to answer only rudimentary questions.	Student is at ease with expected answers to all questions, but fails to elaborate.	Student demonstrates full knowledge (more than required) by answering all class questions with explanations and elaboration.	
Graphics	Student uses superfluous graphics or no graphics.	Student occasionally uses graphics that rarely support text and presentation.	Student's graphics relate to text and presentation.	Student's graphics explain and reinforce screen text and presentation.	
Mechanics	Student's presentation has four or more spelling errors and/or grammatical errors.	Presentation has three misspellings and/or grammatical errors.	Presentation has no more than two misspellings and/or grammatical errors.	Presentation has no misspellings or grammatical errors.	
Eye Contact	Student reads all of report with no eye contact.	Student occasionally uses eye contact, but still reads most of report.	Student maintains eye contact most of the time but frequently returns to notes.	Student maintains eye contact with audience, seldom returning to notes.	
Elocution	Student mumbles, incorrectly pronounces terms, and speaks too quietly for students in the back of class to hear.	Student's voice is low. Student incorrectly pronounces terms, audience members have difficulty hearing presentation.	Student's voice is clear. Student pronounces most words correctly. Most audience members can hear presentation.	Student uses a clear voice and correct, precise pronunciation of terms so that all audience members can hear presentation.	
				Total Points:	

Reference

North Carolina State University. North Carolina Department of Public Instruction. Presentation Rubric. [online. 1997 [cited 2007 June 8]. Available from URL: <http://www.ncsu.edu/midlink/rub.pres.html>

Brochure Rubric

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CATEGORY	(4) Excellent	(3) Good	(2) Almost	(1) Not Yet
Attractiveness and Organization (Organization)	The brochure has exceptionally attractive formatting and well-organized information.	The brochure has attractive formatting and well-organized information.	The brochure has well-organized information.	The brochure's formatting and organization of material are confusing to the reader.
Content and Accuracy (Ideas) See checklist under team requirements handout.	The brochure has all of the required information (see checklist) and some additional information.	The brochure has all of the required information (see checklist).	The brochure has most of the required information (see checklist).	The brochure has little of the required information (see checklist).
Writing and Mechanics (Conventions)	All of the writing is done in complete sentences. Capitalization and punctuation are correct throughout the brochure.	Most of the writing is done in complete sentences. Most of the capitalization and punctuation are correct throughout the brochure.	Some of the writing is done in complete sentences. Some of the capitalization and punctuation are correct throughout the brochure.	Most of the writing is not done in complete sentences. Most of the capitalization and punctuation are not correct throughout the brochure.
Graphics and/or Pictures	The graphics go well with the text and there is a good mix of text and graphics.	The graphics go well with the text, but there are so many that they distract from the text.	The graphics go well with the text, but there are too few.	The graphics do not go with the accompanying text or appear to be randomly chosen.
Sources	There are many citations from a variety of sources accurately listed on the brochure.	There are some citations from a variety of sources accurately listed on the brochure.	There are a few citations accurately listed on the brochure.	Incomplete citations are listed on the brochure.

Total Points: _____

Reference

Kent School District. Brochure Rubric. [online]. [cited 2007 June 8]. Available from URL: http://www.kent.k12.wa.us/curriculum/tech/K6/3/puget_sound/brochure_rubric.htm

Zoonoses Reflection

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Name: _____

Think back over your focus on zoonoses. Write a reflection about what you learned about animal transfer of disease to humans and the experience of role playing the different situations. Your reflection should include the following:

1. What you learned about ways diseases can be spread to humans from animals.
2. What you learned about ways diseases can be prevented.
3. What you learned about educating the public.

Pulling the presentation together was a team effort. Rate each person in your group on their contribution to the effort. On a scale of 1 to 10, let 1 be lowest and 10 be highest.

Name	Rating (circle one)									
_____	1	2	3	4	5	6	7	8	9	10
_____	1	2	3	4	5	6	7	8	9	10
_____	1	2	3	4	5	6	7	8	9	10

Write three things you enjoyed about the zoonoses activity.