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Supplemental Materials

for

Community Partnership Designed to Promote Lyme Disease Prevention and Engagement in Citizen Science

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Appendix 1: Lesson plan.

Title: Lesson on Lyme disease: a citizen science project provides field research experience to secondary students.

Objectives:

- Gain hands on fieldwork and data collection experience while contributing to a current ecological assessment of disease.
- Collaborate with a scientist.
- Appreciate the many controlled aspects of conducting a field survey and developing a hypothesis based on scientific method.
- Provide education on deer ticks and Lyme disease as well as tools for preventing infection.

Materials:

The Tick Kit –

- Tick drag cloth- white, nappy fabric (1 square meter), dowel- ½" to 1" in diameter, string, adhesive tape, and lead sinkers
- Tick data sheet
- Tick ID cards
- tweezers
- lab gloves
- vials
- labels
- markers
- GPS
- Tick repellent

Student Prior Knowledge:

Student prior knowledge about Lyme disease and deer ticks varied school to school. Students from the Duluth and Twin Cities areas had scant awareness of ticks and the Lyme disease process, and how to prevent it. Meanwhile, rural areas such as Esko and Eveleth had significantly greater understanding of ticks and disease threats associated.

Introduction: (15 min.)

Local scale: Introduce an issue of local health concern. The first question posed to the students is whether or not they know of anyone who has found a deer tick on them, or had Lyme disease.

Global scale: Epidemiology of Lyme disease is a National concern. The East coast and North Midwest states have the highest risk for Lyme disease and even Southern states like Texas and Pacific coast states such as California are

Appendix 1: Lesson plan.

presenting with confirmed cases of Lyme. There are approximately 13 species of *Borrelia* resulting in Lyme Borreliosis on a global scale. As spirochetes are evolutionarily highly adaptable to host environments, and as climatic warming trends enhance habitats for reservoir hosts and vectors, anticipated incidence for disease is increasing.

Students are provided with a power point introductory presentation that highlights aspects of Lyme disease transmission, bacterium and host ecologies, vector transmission, how to advocate prevention of tick attachment and disease, and practices for capturing ticks, conducting a field survey and recording data. Students are also trained on how to differentiate between deer ticks, *Ixodes scapularis*, and dog ticks (or wood ticks), *Dermacentor variabilis*. This is an important distinction, as only deer ticks are capable of transmitting *Borrelia* bacteria to humans.

*See power point.

Lesson/Activities: (30 min – 3 hours)

Students are assigned to groups of three. Each group is equipped with all the contents of one tick kit, and each student has a specific job that contributes to the team in the effort of collecting ticks.

The Dragger: the same person remains the dragger throughout one field session. This maintains consistency in height and speed of the collection method, in keeping with scientific convention. The dragger walks along a 100 m transect and drags the drag cloth on the ground, keeping the cloth low to the ground in the hopes of nabbing ticks from the grassy or wooded area. Students should check for ticks every 10 meters along each 100 meter transect.

The Collector: helps locate ticks on the cloth and pick them off. The collector carries the vials that the ticks will be stored in, along with markers and labels to record the date, time and place (a general location or GPS location on vials) where each tick was found. If more than one tick is found in an area of grouped transects, they may all be placed in one vial. The goal is to establish a general area where deer ticks are prevalent. Wood ticks may be collected as well, but are of less significance to the study. The collector reports how many ticks are gathered at each stop, and what type, what life stage and what gender each tick is to the Recorder.

The Recorder: collects information from the Dragger and the Collector while also capturing information on a formal data sheet throughout the field survey. Students should write in detail about the weather, about the terrain where the survey is conducted, including specifics on the flora, fauna and soil of their

surroundings in order to attempt to establish trends in tick heightened activity by place or time of day or type of weather.

Students can conduct this survey in any grassy area around the school or their neighborhoods during or after regular school hours.

A field trip can be and has been established around this activity resulting in more fruitful conclusions and is recommended.

Conclusion/Assessment:(15 min.)

A formal survey in evaluation of student knowledge gain and any enhancement in science appreciation or interest in post secondary education is given a day after the field experience. To most effectively assess any gain in knowledge, a pre-survey should be given. Also, a control group can be established with a survey for non-participants that is to be given to students in science classes at the same institution who do not participate in the field work and were not exposed to the presentation on deer ticks and Lyme disease.

*See surveys.

Appendix 1: Lesson plan.

Day of Science Outreach

In working with area high schools, in exchange for students conducting field research, I created a field trip for them to visit University of Minnesota-Duluth Medical school, casually referred to as Experience Science Day at UMD. The visit consists of introductions to aspects of science at the University.

A sample field trip:

1 hr Planetarium lesson = Star gazing and black hole documentary.
Led by Planetarium Director

30 min, 1 hr Anatomy lesson = Complete with plastonics.
Led by Faculty/Staff of Medical School

30 min, 1 hr Geology tour = Holographic topography maps, and hands on
handling of rocks throughout ages.
Led by Geology Student Group

30 min, Microscopy = Electron microscopy of deer ticks!
Led by Geology Faculty/Staff

30 min, 1hr Lunch panel = Provide a lunch and invite Faculty and Staff from the experience day, as well as Graduate Students, Undergraduate Students, Professors, Mentors, and Technicians in various science fields and posts to visit with students in a casual fashion to discuss first hand experiences and opportunities in the sciences.

Appendix 1: Lesson plan.

MINNESOTA ACADEMIC STANDARDS THIS LESSON MEETS:

9.1.1.1.2
Understand that scientists conduct investigations for a variety of reasons, including: to discover new aspects of the natural world, to explain observed phenomena, to test the conclusions of prior investigations, or to test the predictions of current theories.

9.1.1.1.4
Explain how societal and scientific ethics impact research practices.

9.1.1.1.6
Describe how changes in scientific knowledge generally occur in incremental steps that include and build on earlier knowledge.

9.1.1.1.7
Explain how scientific and technological innovations —as well as new evidence— can challenge portions of, or entire accepted theories and models including, but not limited to: cell theory, atomic theory, theory of evolution, plate tectonic theory, germ theory of disease, and the big bang theory.

9.1.1.2.1
Formulate a testable hypothesis, design and conduct an experiment to test the hypothesis, analyze the data, consider alternative explanations and draw conclusions supported by evidence from the investigation.

9.1.1.2.2
Evaluate the explanations proposed by others by examining and comparing evidence, identifying faulty reasoning, pointing out statements that go beyond the scientifically acceptable evidence, and suggesting alternative scientific explanations.

9.1.1.2.3
Identify the critical assumptions and logic used in a line of reasoning to judge the validity of a claim.

9.1.2.1.1
Understand that engineering designs and products are often continually checked and critiqued for alternatives, risks, costs and benefits, so that subsequent designs are refined and improved.

9.1.2.1.2
Recognize that risk analysis is used to determine the potential positive and negative consequences of using a new technology or design, including the

evaluation of causes and effects of failures.

9.1.3.1.3
Describe how positive and/or negative feedback occur in systems.

9.1.3.2.1
Provide examples of how diverse cultures, including natives from all of the Americas, have contributed scientific and mathematical ideas and technological inventions.

9.1.3.2.2
Analyze possible careers in science and engineering in terms of education requirements, working practices and rewards.

9.1.3.4.2
Determine and use appropriate safety procedures, tools, computers and measurement instruments in science and engineering contexts.

9.1.3.4.4
Relate the reliability of data to consistency of results, identify sources of error, and suggest ways to improve data collection and analysis.

9.3.4.1.1
Analyze the benefits, costs, risks and tradeoffs associated with natural hazards, including the selection of land use and engineering mitigation.

9.3.4.1.2
Explain how human activity and natural processes are altering the hydrosphere, biosphere, lithosphere and atmosphere, including pollution, topography and climate.

9.4.1.1.1
Explain how cell processes are influenced by internal and external factors, such as pH and temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.

9.4.1.2.3
Describe how viruses, prokaryotic cells and eukaryotic cells differ in relative size, complexity and general structure.

9.4.4.1.1
Describe the social, economic and ecological risks and benefits of biotechnology in agriculture and medicine.

Appendix 1: Lesson plan.

9.4.4.1.2
Describe the social, economic and ecological risks and benefits of changing a natural ecosystem as a result of human activity.

9.4.4.2.1
Describe how some diseases can sometimes be predicted by genetic testing and how this affects parental and community decisions.

9.4.4.2.2
Explain how the body produces antibodies to fight disease and how vaccines assist this process.

9.4.4.2.3
Describe how the immune system sometimes attacks some of the body's own cells and how some allergic reactions are caused by the body's immune responses to usually harmless environmental substances.

9.4.4.2.4
Explain how environmental factors and personal decisions, such as water quality, air quality and smoking affect personal and community health.

How to track Lyme Disease

Catching Ticks

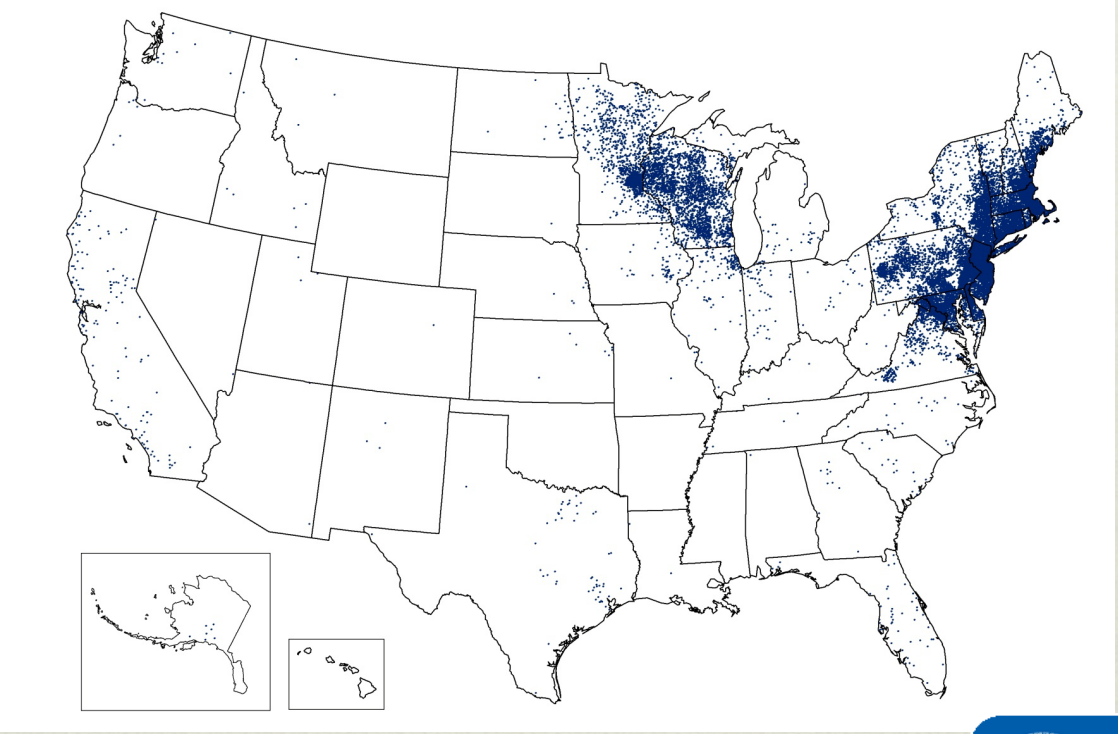
Appendix 2

Outline

- Causes of Lyme disease
- Ecological overview of Lyme disease
  - Mice
  - Ticks
- Field experiment and data collection
- Symptoms of Lyme
- Prevention methods

Reported Cases of Lyme Disease—United States, 2010

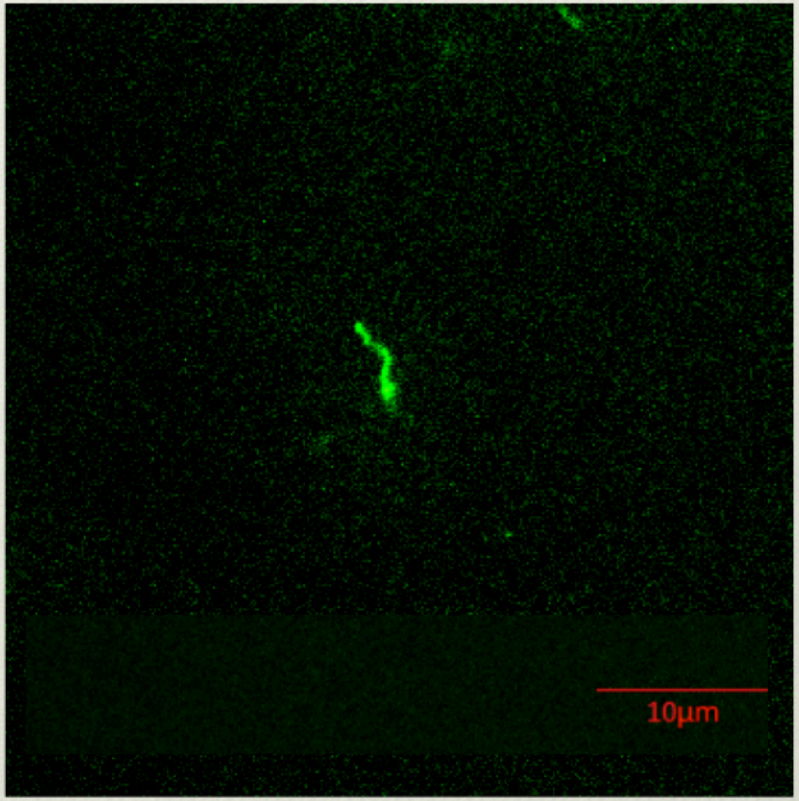
One dot is placed randomly within the county of residence for each confirmed case. Though Lyme disease cases have been reported in nearly every state, cases are reported based on the county of residence, not necessarily the county of infection.



National Center for Emerging and Zoonotic Infectious Diseases
Division of Vector Borne Diseases | Bacterial Diseases Branch

Lyme Disease

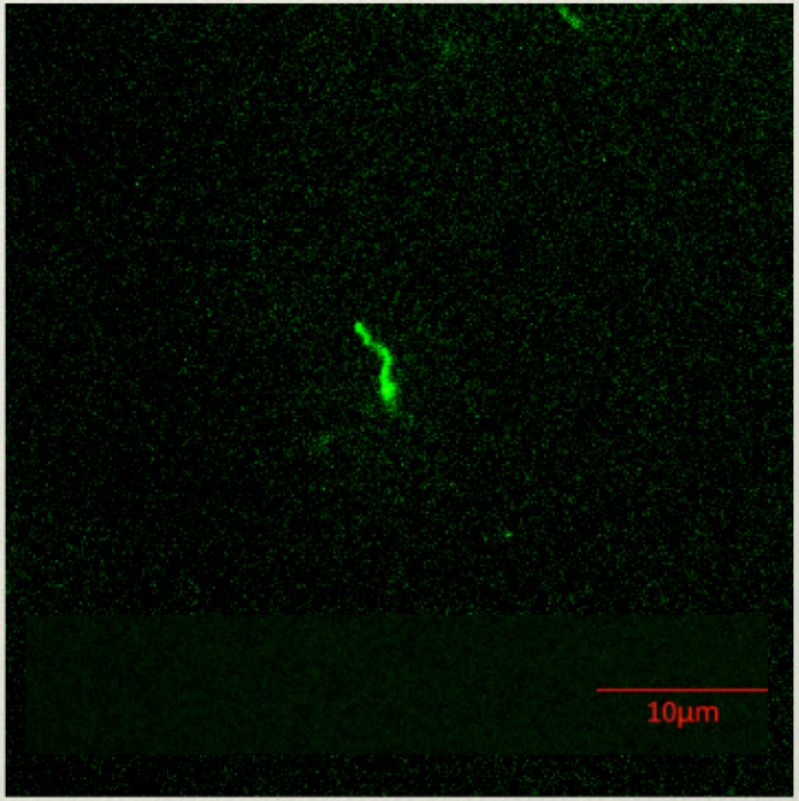
- *Borrelia burgdorferi*
  - Spirochete bacteria



Picture by Veronica A. Nelson and Samantha Toivenen.

Lyme Disease

- *Borrelia burgdorferi*
  - **Spirochete** bacteria



Picture by Veronica A. Nelson and Samantha Toivenen.

Bacterial Shapes:

- There are three main bacterial shapes:

- Sphere-shaped

- Rod-shaped

- Spiral-shaped
  - -

- Sphere-shaped
  - Coccus

- Rod-shaped
  - Bacillus

- Spiral-shaped
  - Spirochete*

SINGULAR

Appendix 2

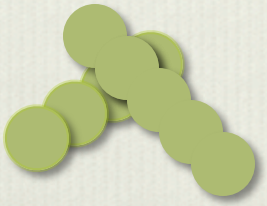
- Sphere-shaped
  - Coccus
  - Cocci

- Rod-shaped
  - Bacillus
  - Bacilli

- Spiral-shaped
  - Spirochete*
  - Spirochetes

PLURAL

Appendix 2



- Sphere-shaped
  - Cocci

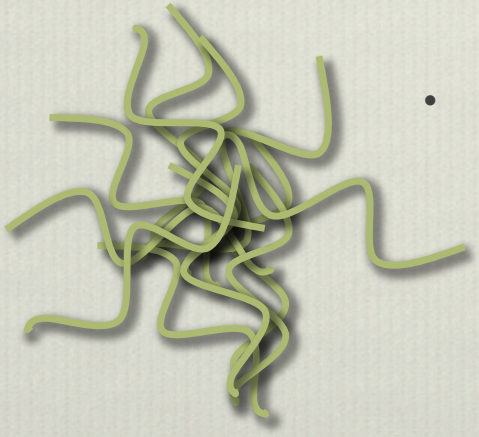
- Rod-shaped
  - Bacilli

IN CHAINS

Appendix 2

- Sphere-shaped: in clusters
  - Cocci

- Rod-shaped: in clusters
  - Bacilli



- Spiral-shaped: in clusters
  - Spirochetes

IN CLUSTERS

Appendix 2

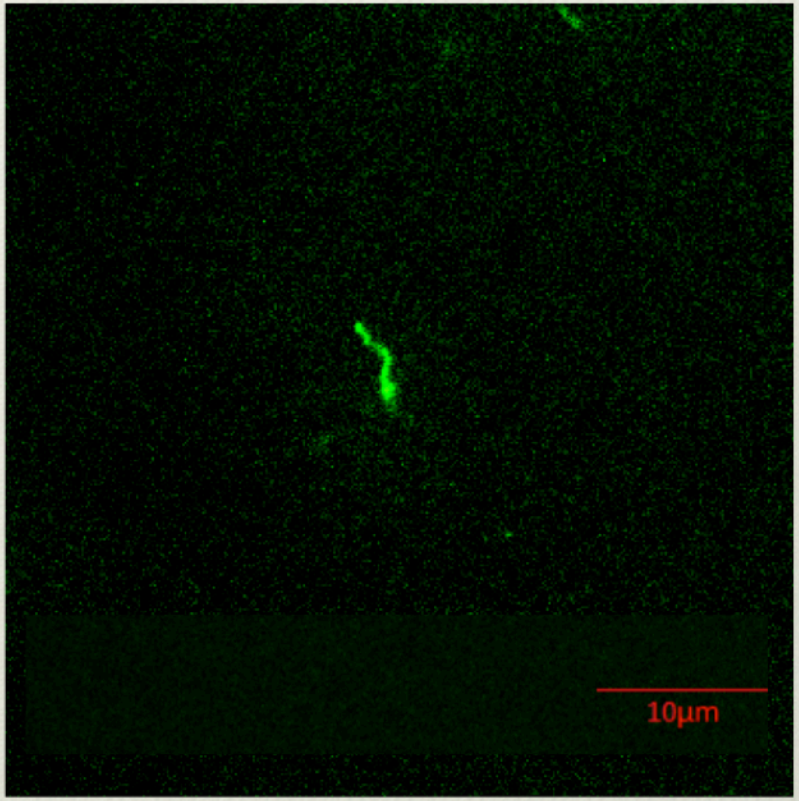
- Coccobacilus

- Vibrio

…and everything in between

Lyme Disease

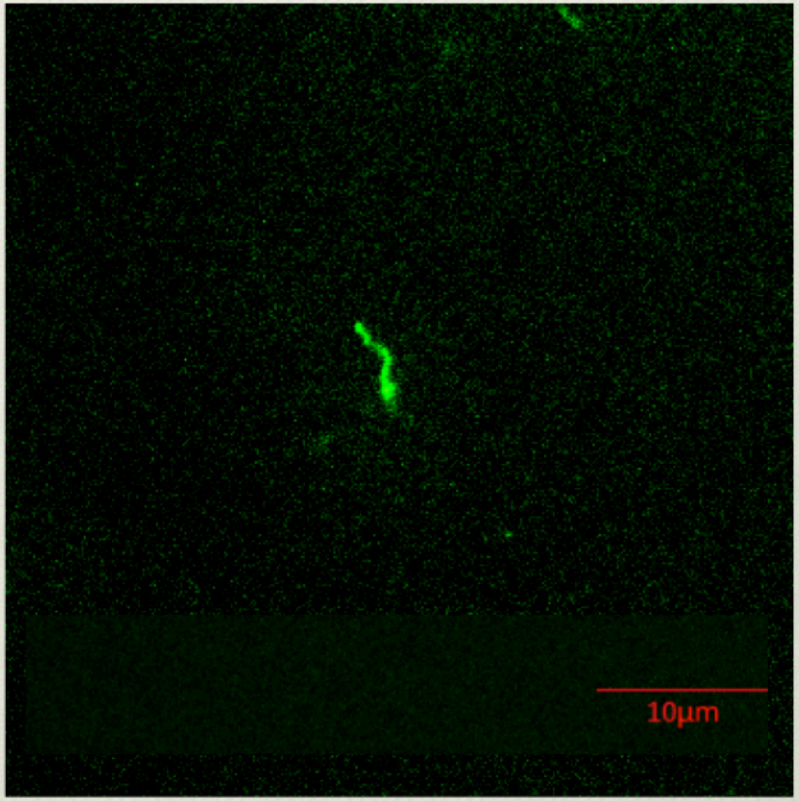
- *Borrelia burgdorferi*
  - Spirochete bacteria



Picture by Veronica A. Nelson and Samantha Toivenen.

Lyme Disease

- *Borrelia burgdorferi*
  - Spirochete bacteria
  - Zoonotic



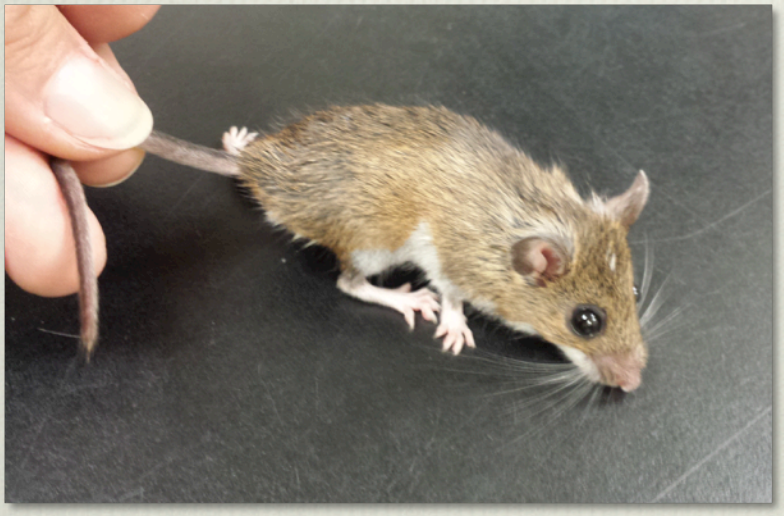
Picture by Veronica A. Nelson and Samantha Toivenen.

Zoonotics: The Ecology of Disease

- Zoonoses depend on animal hosts
  - "Zoo" = *animal*
  - small and large vertebrates
- Ecology = study of [environmental] interactions and relationships.

Reservoir host

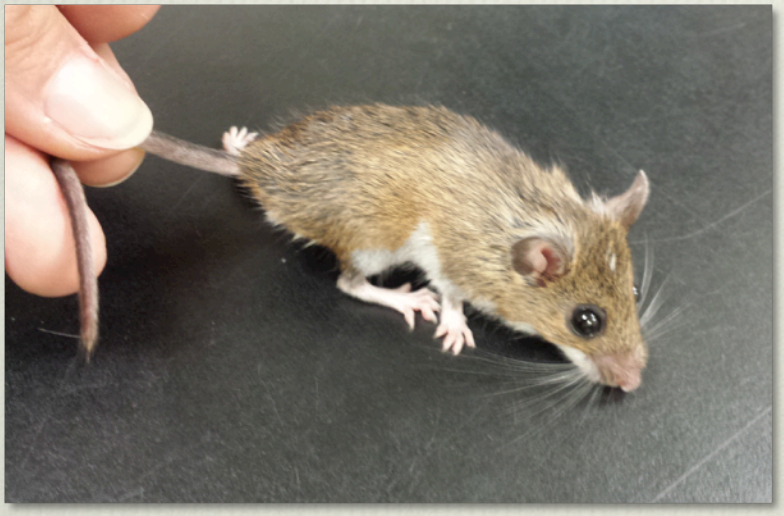
P. leucopus



White-footed mouse

Reservoir hosts

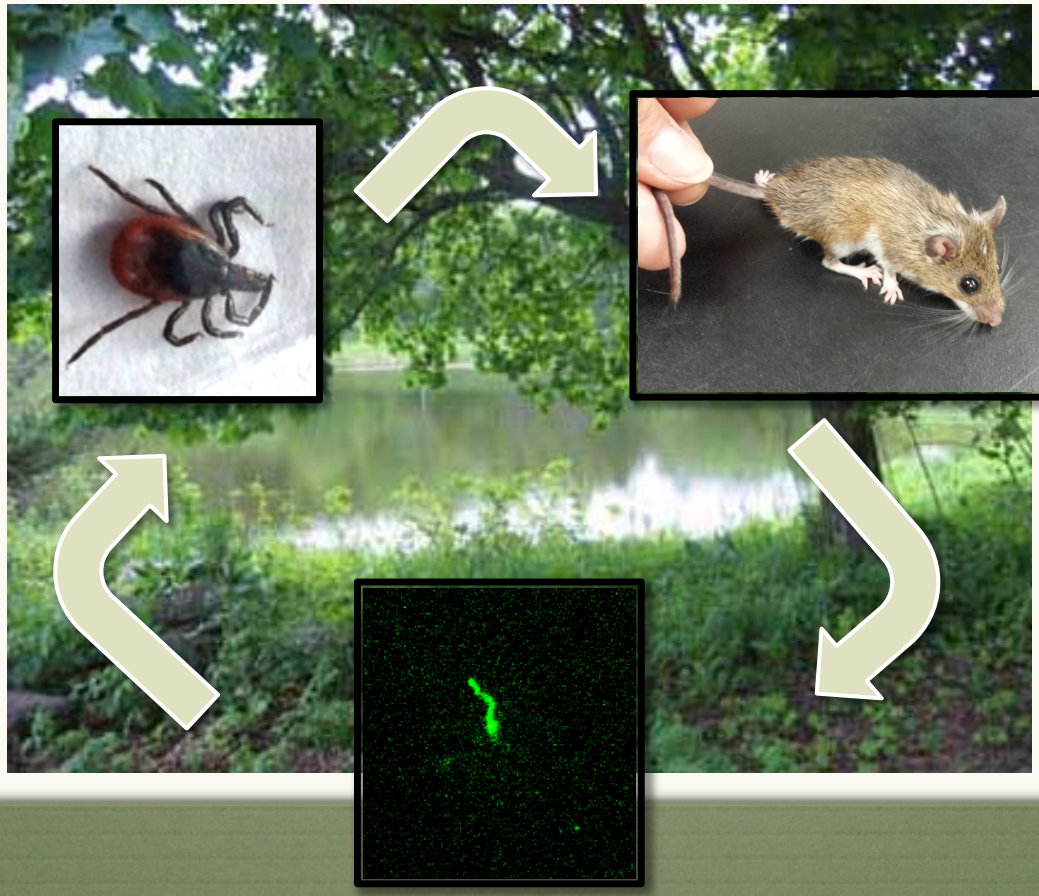
P. leucopus



White-footed mouse

P. maniculatus

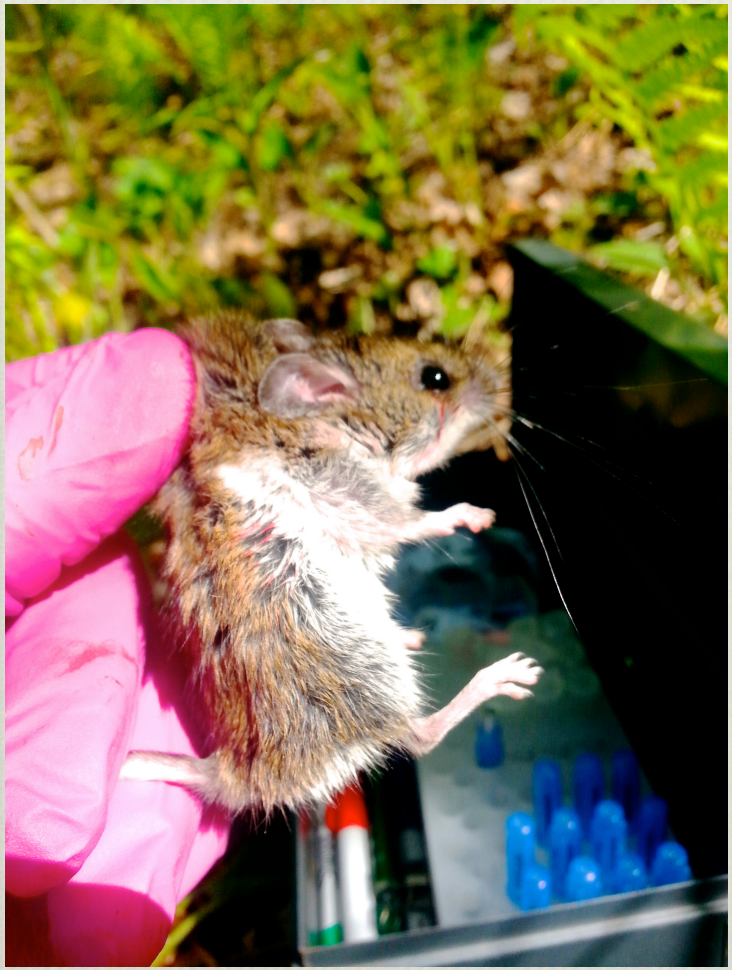
Deer mouse



the zoonotic triangle

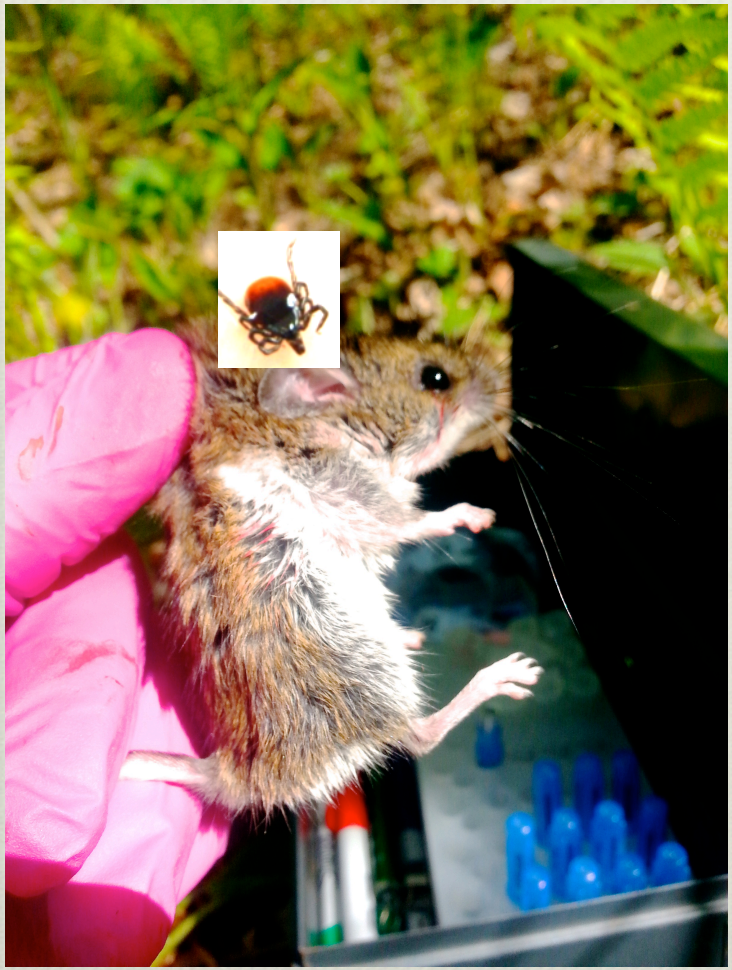
tick. mouse. bacteria.

Appendix 2



- The spirochete occurs in nature, living in small mammals.

Ticks get infected

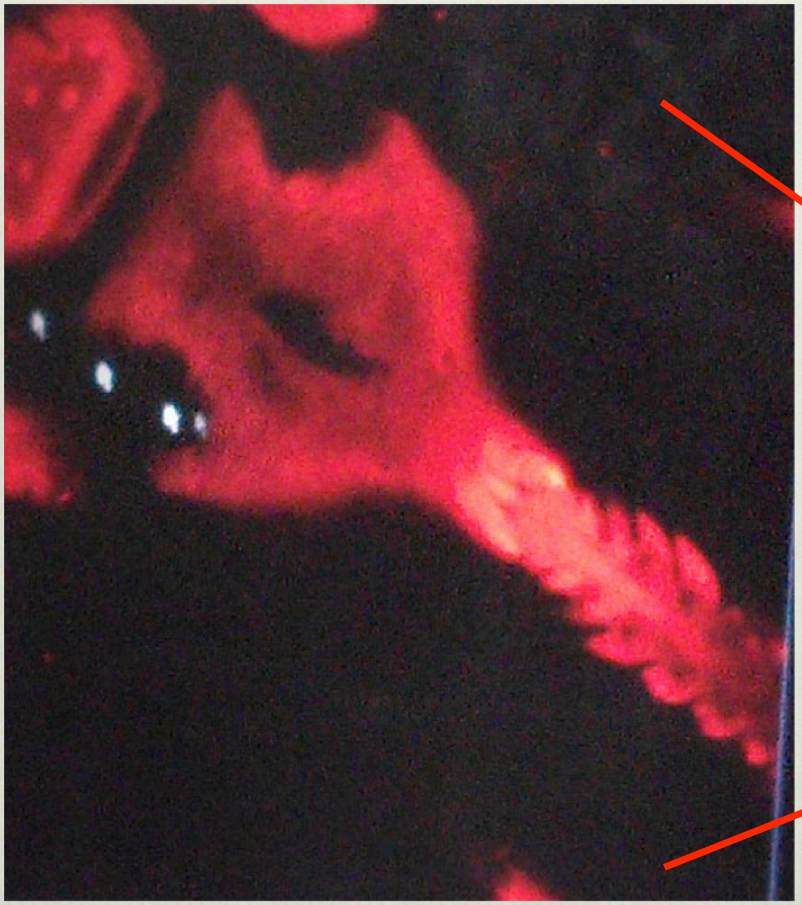


- The spirochete occurs in nature, living in small mammals.
- Deer ticks take blood from these small mammals and contract the bacterium.

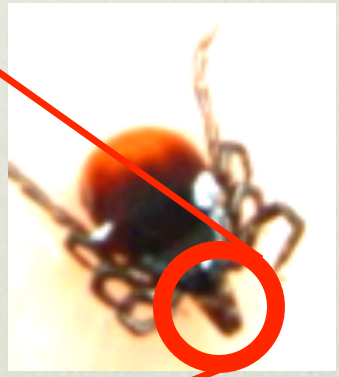
…and infect us!

- A tick sticks its proboscis-like mouth, called a hypostome, into our skin.

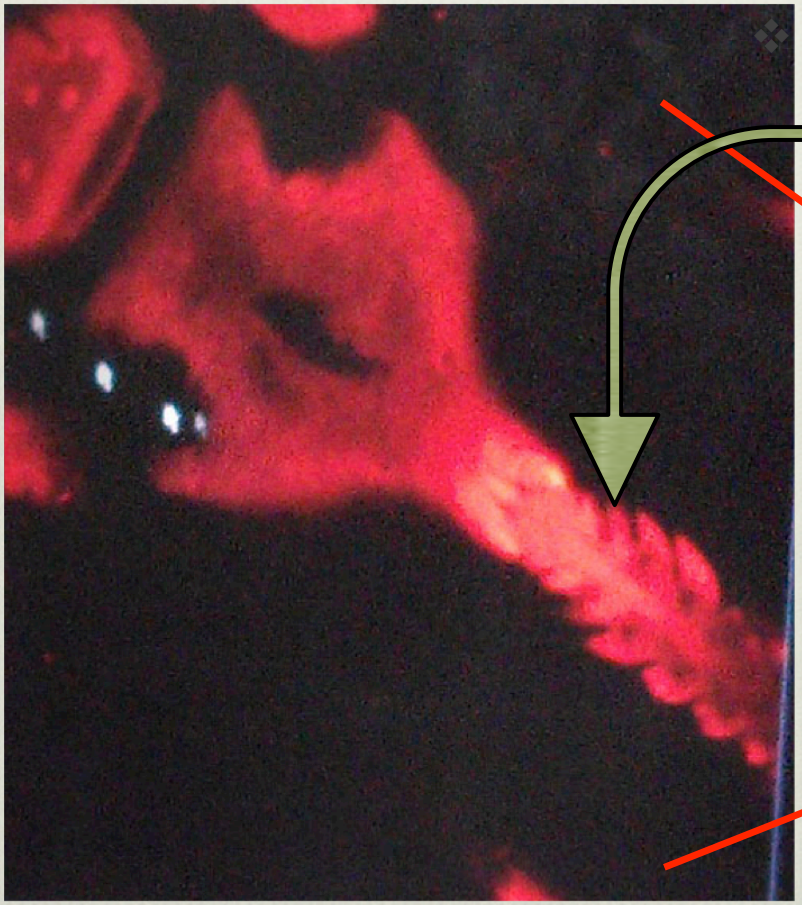
…and infect us!



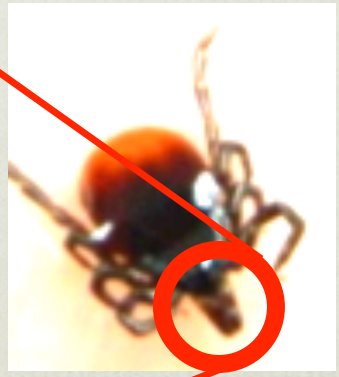
- A tick sticks its proboscis-like mouth, called a hypostome, into our skin.



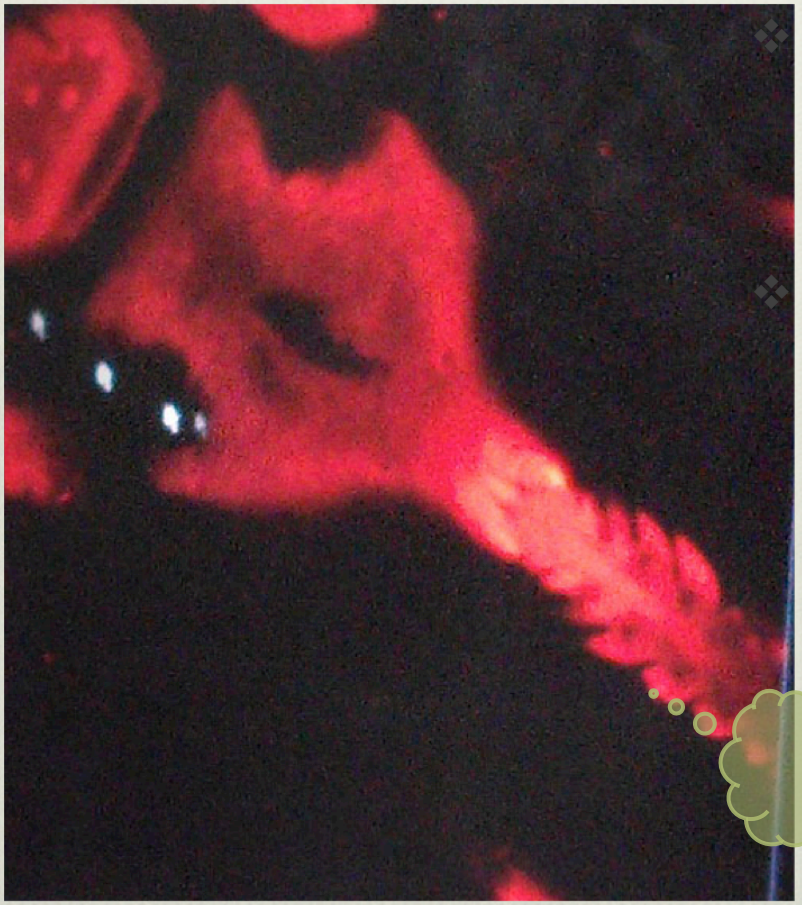
…and infect us!



A tick sticks its proboscis-like mouth, called a **hypostome**, into our skin.



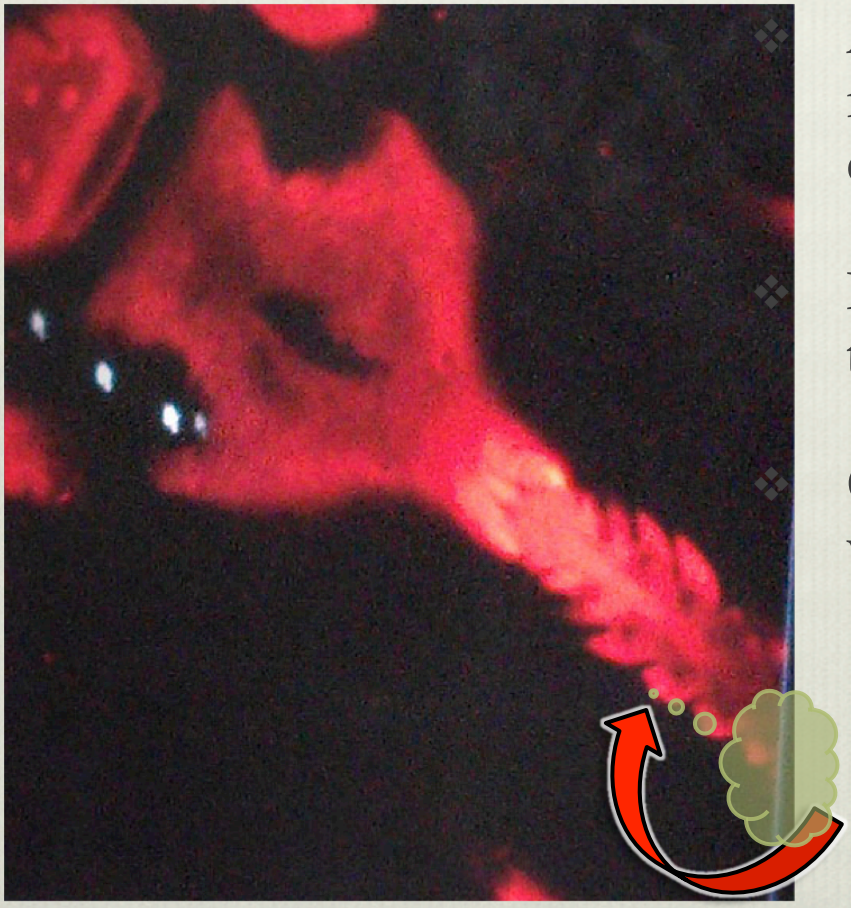
…and infect us!



A tick sticks its proboscis-like mouth, called a **hypostome**, into our skin.

Releases saliva that anesthetizes the area and thins the blood.

…and infect us!



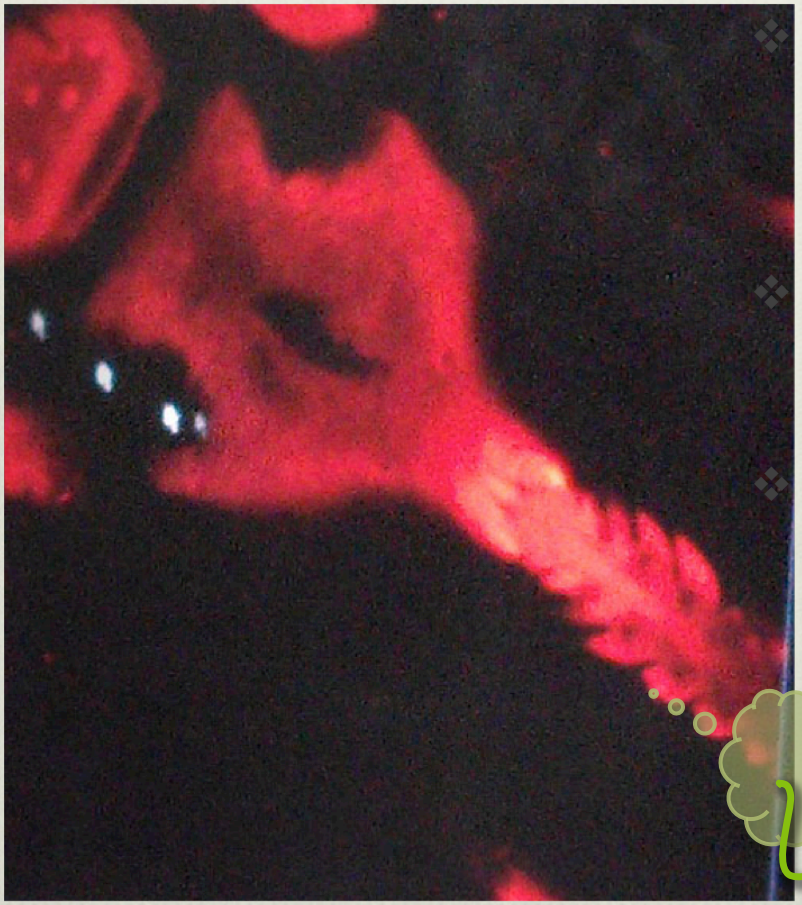
A tick sticks its proboscis-like mouth, called a **hypostome**, into our skin.

Releases saliva that anesthetizes the area and thins the blood.

Outward-flowing saliva alternates with inward-moving blood:

- it sucks your blood
- while spitting into you

…and infect us!



A tick sticks its proboscis-like mouth, called a **hypostome**, into our skin.

Releases saliva that anesthetizes the area and thins the blood

Outward-flowing saliva alternates with inward-moving blood

- Infection enters the body system with saliva

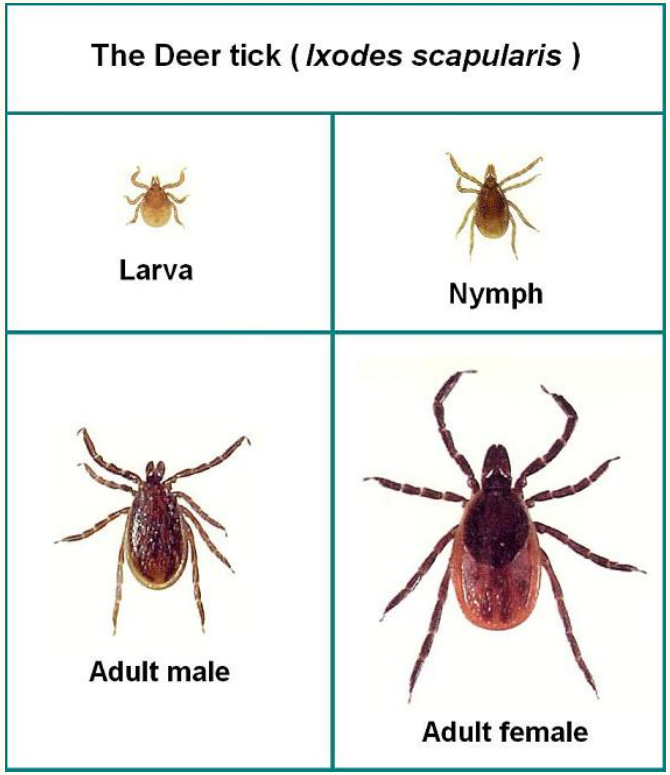
About Deer Ticks:

Appendix 2

About Deer Ticks:

They are really small

Appendix 2



Tick Identification Card

by the American Lyme Disease Foundation

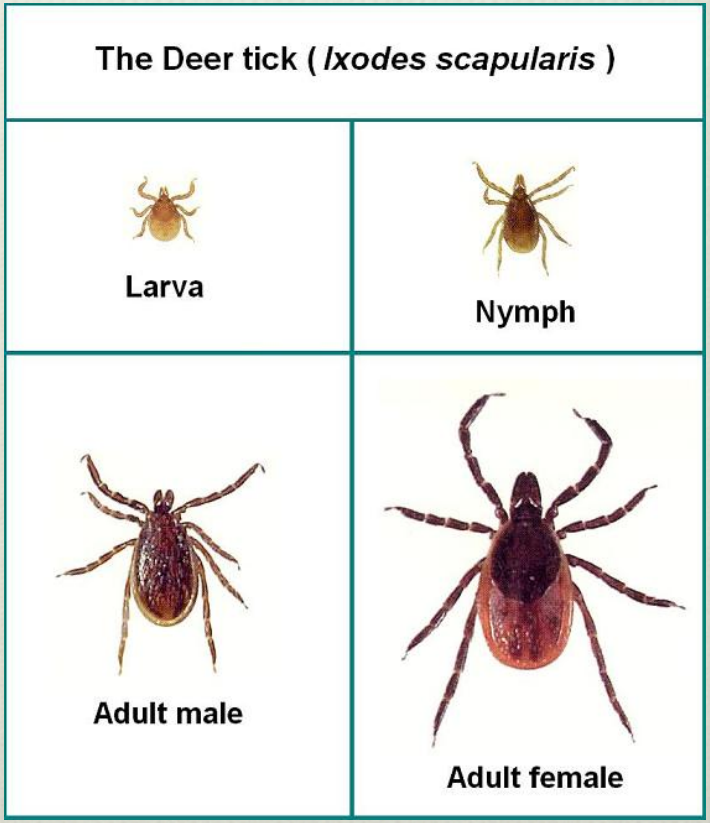
Appendix 2

Deer Tick Season

Field seasons:

SPRING

FALL



Appendix 2

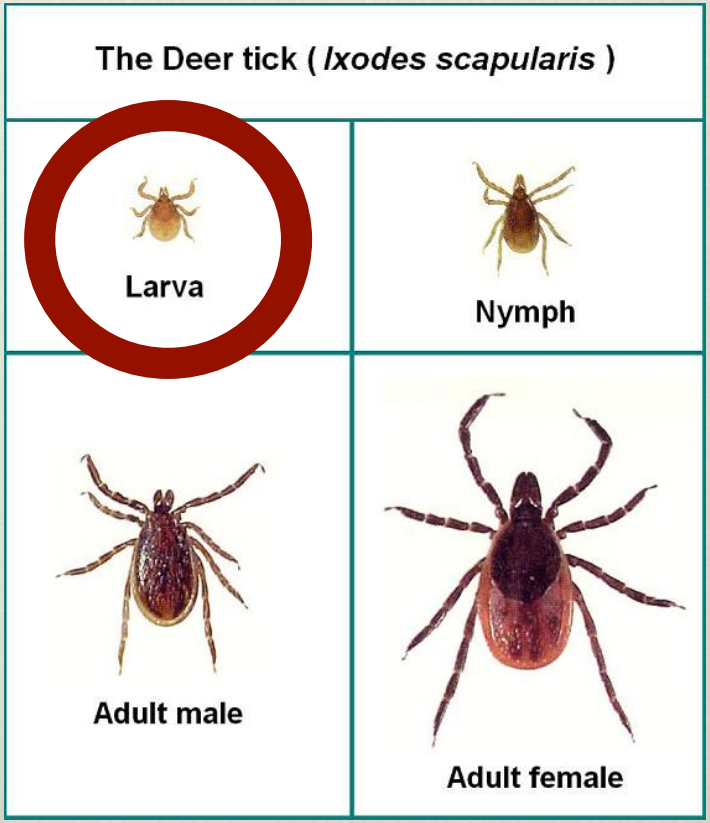
Tick ID card by the American Lyme Disease Foundation

Life Cycle: Year 1

Larvae

- hatch in the spring from eggs laid the previous fall
- first blood meal typically summer, on small mammals
- molt into nymph stage over the fall and winter

No risk of Lyme



Appendix 2

Tick ID card by the American Lyme Disease Foundation

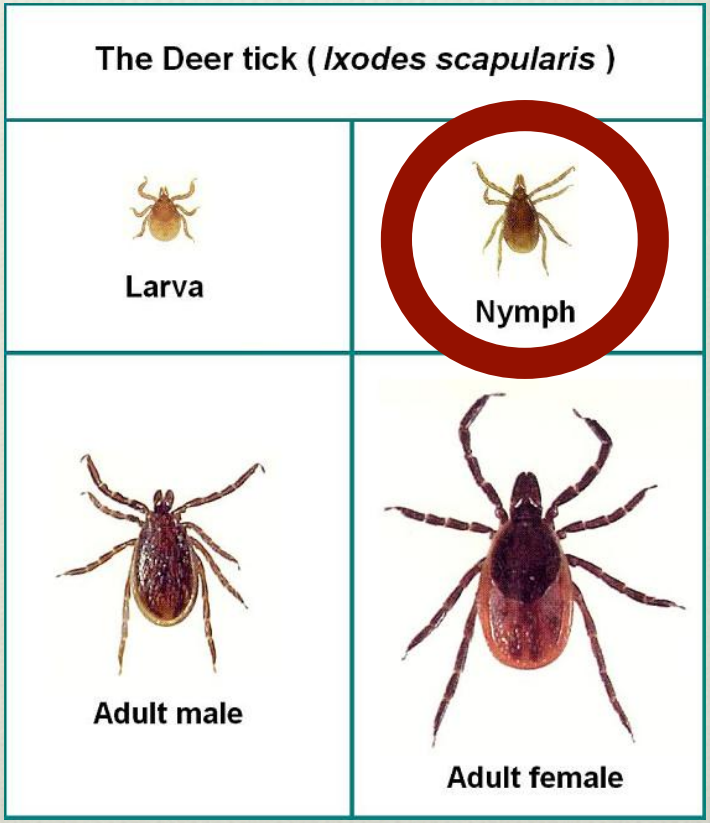
Life Cycle: Year 2

Nymph

- emerges from larval stage
- feeds in the **SPRING**
- molts into adult over the summer

Lyme risk!

Since this tick has had one blood meal, it has potentially been exposed to infection



Appendix 2

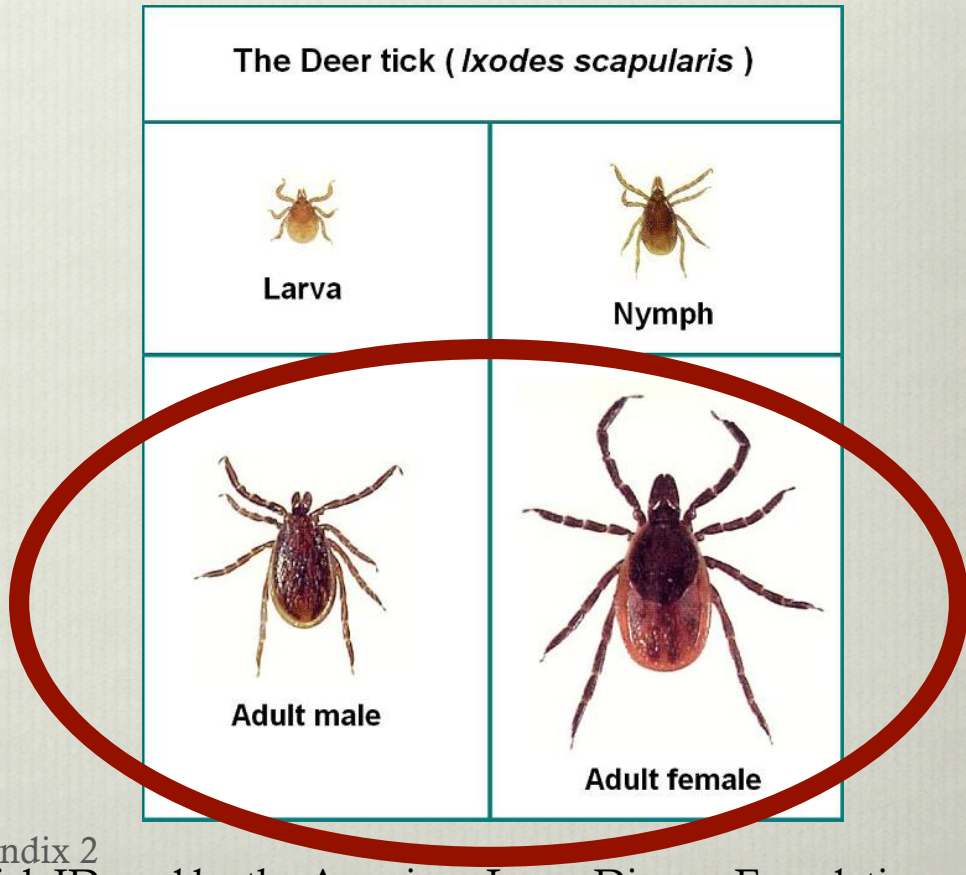
Tick ID card by the American Lyme Disease Foundation

Life Cycle: Year 2

Adult

- feeds in the **FALL**
- after a blood meal, adult females spit eggs and die

Lyme risk!



Appendix 2

Tick ID card by the American Lyme Disease Foundation

Habitat

- Wooded areas, forests, over-grown grassy areas and trails
- Prefer moist and humid environments
- Frost does nothing to them
  - they burrow in leaves to overwinter
- Sit on tips of grass and “quest” for a host

Collecting Ticks

How would you do it?

Appendix 2

How to make a drag

Materials:

- Light-colored nappy fabric
- Dowel
- Rope

Appendix 2

The Dragger :

- One person performs the drag in a session
- Maintain consistency:
  - Height
  - Speed
- Keep the cloth low to the ground
- Check for ticks every 10 meters with The Collector.

The Collector :

- Helps The Dragger locate and pick ticks off the cloth.
- In charge of the vials
  - Labels: date, place
- Reports
  - How many
  - What kind
  - Age
  - Gender

Data Collection

- Report on ticks
  - How many
  - What kind
  - Age
  - Gender
- Vials
  - Labels: date, place
- Environmental factors

Appendix 2

Sampling Data Sheet 1:

Data Sheet: *Ixodes Scapularis*

Name:	**Program:**	**Date:**
		Start Time:

GPS	Latitude	Longitude

Place	Nearest City:	State:

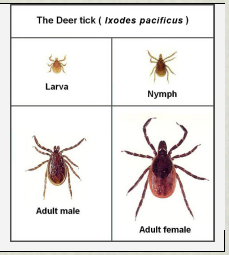
Weather Description:

Temp:	Humidity:

Soil Type	Sandy ☐ Sandy Loam ☐ Loam/Clay ☐ Clay ☐ Soil pH: Litter depth (mm):
	Soil Temp: Soil moisture:
Topology	

Describe Plants/Trees

Vial	**Time**	**Deer Ticks**		**Wood Ticks**	
#	**Of Collection**	**Nymphs**	**Adult**	**Nymph**	**Adult**
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					



Appendix 2

Secondary Data Sheet 2:

Data Sheet: *Ixodes Scapularis*

Name:	**Program:**	**Date:**
		Start Time:

GPS	Latitude	Longitude

Place	Nearest City:	State:

Weather Description:

Temp:	Humidity:

Describe Plants/Trees

Vial	**Time**	**Deer Ticks**		**Wood Ticks**	
#	**Of Collection**	**Nymphs**	**Adult**	**Nymph**	**Adult**
1					
2					
3					
4					
5					
6					
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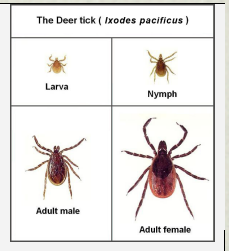
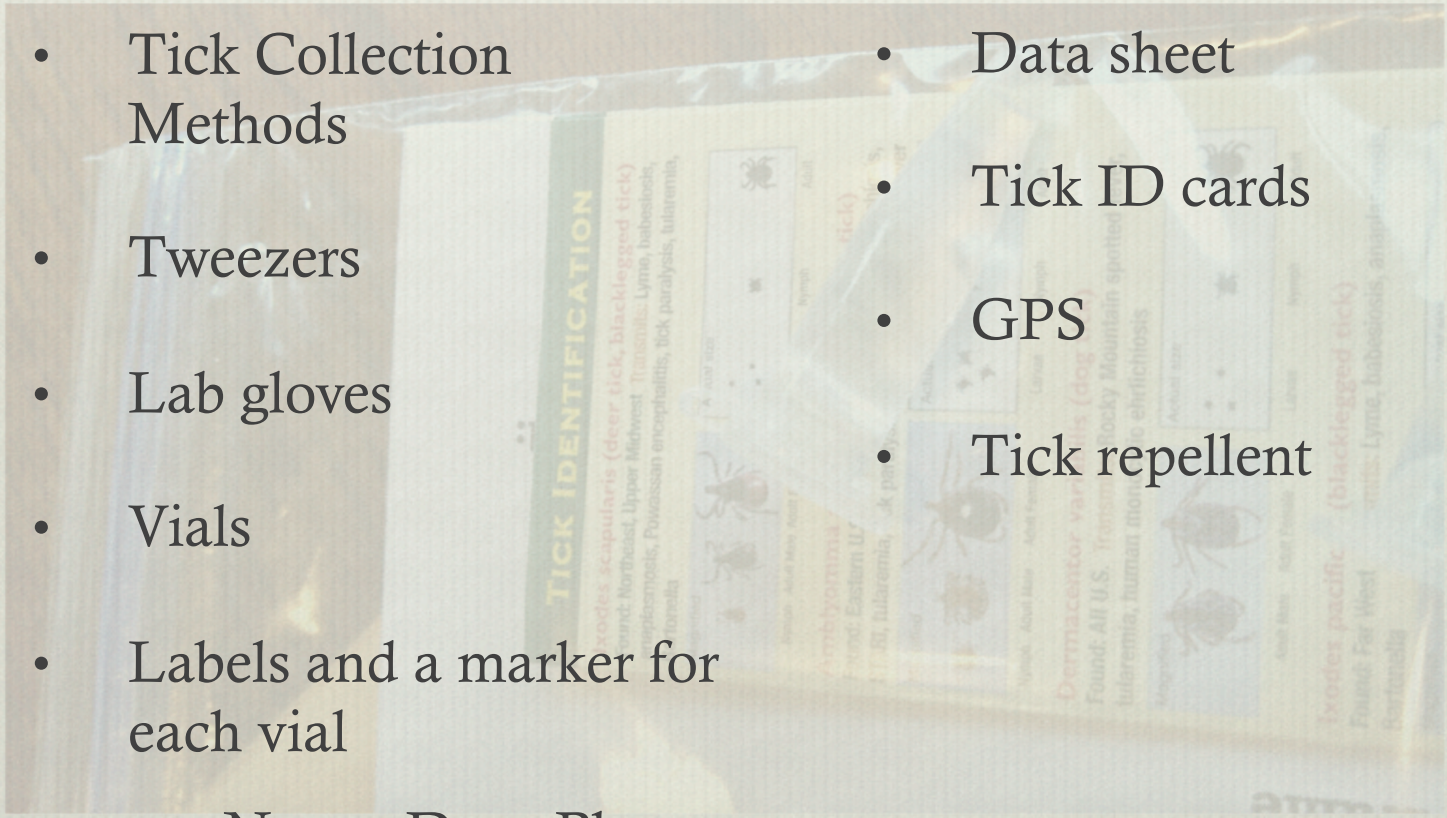
14					
15					



The kit:

Appendix 2

The kit:



- Tick Collection Methods
- Tweezers
- Lab gloves
- Vials
- Labels and a marker for each vial
  - Name. Date. Place.
- Data sheet
- Tick ID cards
- GPS
- Tick repellent

Symptomology

Of Lyme Disease

Appendix 2

Stage 1 Symptoms

Early infection

- Skin Rash
  - ~40 -75%
- Fevers
- Chills
- Swollen Lymph Nodes
- Headache
- Stiff Neck
- Muscle Fatigue

- These symptoms may appear from one day up to a month after infection.

Lyme Disease in humans

- Lyme is a multisystem inflammatory disease
  - affects the skin in the early stage
  - can spread to the joints, nervous system and may affect organ systems.

Long term Lyme…

- Bacteria burrows in body tissues, including vital organs.
- Bad news

Lyme: It takes time

- A nymph or adult tick transmits Lyme in 36 to 48 hours
  - generation time of bacteria: ~ 12 hrs
- It takes several hours before a large enough dose can infiltrate the new host.

An ounce of prevention…

…is worth a pound of cure!

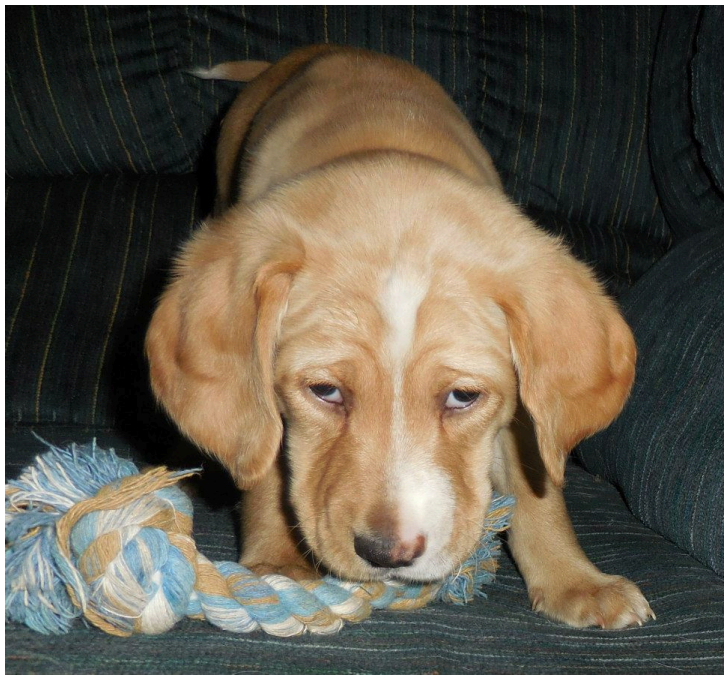
Appendix 2

Prevention: it's a fashion trend!

- Wear clothing that covers the skin -all seasons!
- Socks over pants: to prevent ticks from crawling up under your pants.
- Wear bright and light colored clothing, ticks are more visible against the light color.
- Tick repellents: Deet, Promethrin.

Check yourself every day, every way.

and your pets!



If you find a tick…

- Be Careful How you Remove it

  - Don't use fire.
  - Don't use lubricants.
  - Do use tweezers –as close to the head as you can
    - So the mouth does not get stuck in your skin.
  - Do save the tick to give to your doctor
    - but don't expect a diagnosis based on testing the tick

…save it for research?

Appendix 2

Where to send ticks:

- **DMED Biomedical Sciences**
  SMed 321
  1035 University Dr
  Duluth, MN 55812University of Minnesota

Appendix 3: Data collection sheet. *Ixodes Scapularis* (Deer Tick)

Name:	**Program:**	**Date:**
		Time of Day:

GPS	Latitude	Longitude

Place	Nearest City:	State:

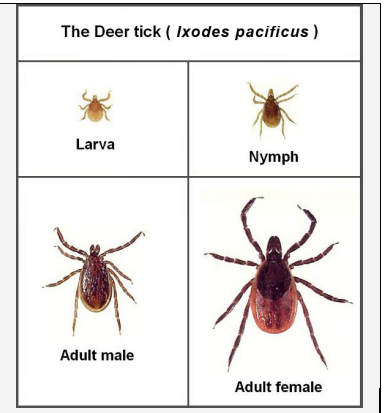
Weather Description:

Temp:	Humidity:

Soil Type	Sandy ☐ Sandy Loam ☐ Loam/Clay ☐ Clay ☐ Soil pH: Litter depth (mm):	
	Soil Temp:	Soil moisture:
Topology		

Describe Plants/Trees

Vial	**Time**	**Deer Ticks**		**Wood Ticks**	
#	**Of Collection**	**Nymphs**	**Adult**	**Nymph**	**Adult**
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					



Tick Attack Learning Inquiry: participants

Please rate your agreement with each of the following statements (**1** = strongly disagree, **5** = strongly agree)

Before participating in the Tick workshop…
…my level of confidence in being able to correctly identify a deer tick, and tell the difference from a wood tick was

1 – 2 – 3 – 4 – 5

Please identify the deer tick: 

…my level of awareness of the symptoms associated wtih Lyme disease was

1 – 2 – 3 – 4 – 5

…my level of awareness in being able to prevent Lyme disease was

1 – 2 – 3 – 4 – 5

…my interest in participating in scientific research was

1 – 2 – 3 – 4 – 5

…my interest in going to college was

1 – 2 – 3 – 4 – 5

…my interest in pursuing science in college was

1 – 2 – 3 – 4 – 5

…my interest in going to graduate school was

1 – 2 – 3 – 4 – 5

…my interest in pursuing science in graduate school was

1 – 2 – 3 – 4 – 5

Tick Attack Learning Inquiry: participants

Please rate your agreement with each of the following statements (**1** = strongly disagree, ***5*** = strongly agree)

After participating in the Tick workshop…

…my level of confidence in being able to correctly identify a deer tick, and tell the difference from a wood tick is

1 – 2 – 3 – 4 – 5

…my level of awareness of the symptoms associated wtih Lyme disease is

1 – 2 – 3 – 4 – 5

…my level of awareness in being able to prevent Lyme disease by checking myself for ticks thoroughly and frequently is

1 – 2 – 3 – 4 – 5

…my interest in participating scientific research is

1 – 2 – 3 – 4 – 5

…my interest in going to college is

1 – 2 – 3 – 4 – 5

…my interest in pursuing science in college is

1 – 2 – 3 – 4 – 5

…my interest in going to graduate school is

1 – 2 – 3 – 4 – 5

…my interest in pursuing science in graduate school is

1 – 2 – 3 – 4 – 5

General Comments and Suggestions about your Experience Science Day at UMD

…about the experimental methods (ways you would improve the methods) for the field research of collecting ticks

…any questions you may still have about conducting scientific research or opportunities in science and pursuing education for the sciences:

Appendix 4: Surveys.

Tick Attack Learning Inquiry: non-participants

At this time, my ability to correctly identify a deer tick, and to tell the difference between deer ticks and wood ticks,

is **1 – 2 – 3 – 4 – 5**

My level of confidence in being able to correctly identify a deer tick is

1 – 2 – 3 – 4 – 5

My level of awareness of symptoms of Lyme disease is

1 – 2 – 3 – 4 – 5

My level of awareness in being able to prevent Lyme disease by checking myself for ticks thoroughly and frequently

is **1 – 2 – 3 – 4 – 5**

My interest in participating scientific research is

1 – 2 – 3 – 4 – 5

My interest in going to college is

1 – 2 – 3 – 4 – 5

My interest in pursuing science in college is

1 – 2 – 3 – 4 – 5

My interest in going to graduate school is

1 – 2 – 3 – 4 – 5

My interest in pursuing science in graduate school is

1 – 2 – 3 – 4 – 5

Appendix 4: Surveys.

General Science Attitude Inquiry:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I do not do very well in science.	SA	A	N	D	SD
Science is easy for me.	SA	A	N	D	SD
I usually understand what we are talking about in science.	SA	A	N	D	SD
No matter how hard I try, I cannot understand science,	SA	A	N	D	SD
Most people should study some science.	SA	A	N	D	SD
Science is useful for solving the problems of everyday life.	SA	A	N	D	SD
Science is helpful in understanding today's natural world.	SA	A	N	D	SD
Science is of great importance to a country's development.	SA	A	N	D	SD
It is important to know science in order to get a good job.	SA	A	N	D	SD
I like the challenge of science assignments.	SA	A	N	D	SD
It is important to me to understand the work I do in the science class.	SA	A	N	D	SD
I have a real desire to learn.	SA	A	N	D	SD

Appendix 5: Consent form for parents.

INFORMED CONSENT
PARENT PERMISSION LETTER

DATE:

Dear Parent or Guardian,

I am conducting a research study entitled "A Lesson on Lyme Disease" with high school students at _____ High School.

Students are invited to participate in authentic field research in your area. Students who would like to take part in this opportunity will be asked to evaluate the effectiveness of this experience through surveys. The purpose of providing this opportunity is to promote enthusiasm for science, while increasing knowledge and understanding of scientific processes. With the permission of your student's principal and science teacher, we are requesting that you allow your child to participate.

Students of _____'s classroom will learn about Lyme disease with a power-point lecture on the topic given by a researcher on the topic. This lesson includes prevention techniques to ward against tick-borne illnesses and guides to identifying ticks that carry disease, and how to recognize symptoms of Lyme disease.

Students will additionally have an opportunity to conduct scientific field research. With the supervision of their teacher, and guidance of a visiting scientist, students would hunt for ticks, while learning about data collection and developing a scientific method. To gauge the success of this experience-based learning opportunity, students will be asked to fill out surveys and brief questionnares, both before and after the lesson plan is executed. Neither names, nor personal information will be used to fill out any forms associated with this study, and all responses will be kept anonymous.

Participation in the field research aspect of this opportunity and any of the surveys are entirely voluntary, and students will not be penalized should they decide not to participate. Parental/guardian consent does *not* mean a student must participate in any aspect of this opportunity. Participants are free to stop taking part in the study at any time.

The opportunity will extend over multiple days, as determined by their science teacher. Students who opt to participate in the lesson and the fieldwork will do so during school hours, during the current semester. This lesson meets multiple state academic standards within your student's curriculum.

Please give your permission by signing the enclosed consent form and having your child return it to their science teacher tomorrow. Please keep this letter for your records. Should you have any questions about the study please contact my office 1.xxx.xxx.xxxx.

Sincerely,

Veronica A. Nelson
Masters Student, Integrated Biological Sciences
Univeristy of Minnesota-Duluth

Appendix 5: Consent form for parents.

University of Minnesota's Institutional Review Board (IRB) 1309E42103 has reviewed this study.

Consent to Participate

I have read the attached informed consent letter and agree to allow my child to participate in the Lesson on Lyme disease citizen science project and the surveys associated.

Student's Name

Parent's or Guardian's Name (please print)

Parent's or Guardian's Signature Date