

**School intervention for vector-borne diseases in Maine:
Program to educate grades 3-5 on tick-borne diseases and prevention methods**



**Infectious Disease Epidemiology Program, Maine Center for Disease
Control and Prevention**

Don't Let the Ticks Bite!

Tick School Intervention Program

Overview: DON'T LET THE TICKS BITE

GOALS: The goals of this lesson are to:

- Increase students' ability to differentiate between deer ticks and dog ticks
- Increase students' ability to identify the symptoms of tick-borne diseases
- Increase students' ability to demonstrate knowledge of methods of preventing tick bites

LEARNING OBJECTIVES: After completing this lesson, participants will have or be able to:

- Knowledge of tick biology and ecology
- Knowledge of diseases ticks can transmit to people and animals and symptoms of the diseases
- Demonstrate personal protection methods
- Demonstrate proper tick removal

STRATEGIES/METHODS:

- Facilitator/lecture presentation
- Hands-on group activities
- Individual activity booklet
- Class discussion
- Demonstrations
- Pre-/post-tests
- Take-home sheet

MATERIALS NEEDED:

- ✓ Computer
- ✓ Projector (if space allows)
- ✓ Stop-watch
- ✓ Velcro
- ✓ Felt
- ✓ Tick Removal Kit (recommended)

MATERIALS PROVIDED:

- ✓ "Don't Let the Ticks Bite" PowerPoint presentation with facilitator notes (approx. 20 minutes)
- ✓ Small Group Activities (approx. 40 minutes total)
 - Pack a Back Pack Relay Race (approx. 10 minutes)
 - TICK-Tac-Toe (approx. 10 minutes)
 - Tick ID Walk (approx. 10 minutes)
 - Proper Tick Removal (approx.. 10 minutes)
- ✓ Tick Activity Book
 - Tick Fun Facts
 - Tick Vocabulary
 - Find the Hidden Tick Message
 - Tick Word Search

- What Would You Do? Tick Activity
- Answer Keys
- ✓ Tick Removal Kit
- ✓ Tick Take-Home Sheet
- ✓ Teacher Feedback Form
- ✓ Pre-Test/ Post-Test
- ✓ Answer Key

PREPARATION NEEDED:

- ✓ Print or PowerPoint slide large-scale images of deer and dog ticks (5 of each)
- ✓ Print or PowerPoint slide Tick-Tac-Toe review questions list
- ✓ Print or PowerPoint slide images of deer and dog ticks, mice, deer, birds, brush, leafy trees and cut grass
- ✓ Get at least one piece of felt
- ✓ Cut Velcro pieces into small pieces (about the size of a raisin or smaller)
- ✓ Copies of take-home sheet and activity books

RECOMMENDED FORMAT

Maine CDC recommends presenting the “Don’t Let the Ticks Bite!” in one-session. Changes can and should be made with the program to accommodate class schedules and needs.

- 1) Give Pre-test
- 2) Present “Don’t Let the Ticks Bite!” PowerPoint presentation
- 3) Break into small groups for activities
- 4) Distribute Tick Activity Book and Take-Home Sheet and encourage students to share information with their families
- 5) Give Post-test two-weeks following initial session
- 6) Review answers with class

This presentation fits nicely with the “Fight the Bite!” mosquito education curriculum as there are common skills learned in both curricula.

TOTAL INSTRUCTIONAL TIME: 60 minutes

MAINE LEARNING RESULTS IN HEALTH EDUCATION: A1, A3, A4, C2

MAINE LEARNING RESULTS IN SCIENCE & TECHNOLOGY: E1, E4

FEATURES OF THE PROGRAM

- Free
- Downloadable and printable presentation
- Downloadable and printable activity books
- Downloadable and printable small group activity instructions
- Pre- and Post-test and Answer Key

DON'T LET THE TICKS BITE

ABOUT THE PROGRAM

Ticks can carry several diseases that affect humans and animals. Tick-borne illnesses recognized in Maine include Lyme disease, Anaplasmosis, Babesiosis, and Powassan. Lyme disease is the most common tick-borne illness in Maine and is found in all 16 counties. Children in Maine ages 5-14 are a high-risk cohort for Lyme disease.

The Public Health Education Corps (PHEC) within Maine Center for Disease Control and Prevention's (Maine CDC) Division of Infectious Disease designed and piloted a school-based intervention to educate third-fifth grade students in Maine.

The program provides educators with tools concerning tick biology, diseases that can be transmitted by ticks, and instruction on ways to decrease the risk of tick bites.

Introduction and Overview

1. Open the lesson by saying:

The purpose of this program is to begin to understand that ticks can carry diseases and how you prevent getting those diseases.

2. Continue by saying:

Ticks can spread several diseases in humans and animals. The main illness in Maine that is spread by ticks is Lyme disease. People your age are at greatest risk for getting a disease from a tick.

3. Talk about:

We'll start with a presentation on ticks, what they look like and where they're found, the diseases they can carry, and how to prevent (or make sure you don't get) the diseases.

Then we will break up into small groups and do three activities.

4. Summarize by saying:

We're going to learn about ticks and how you can keep yourself safe and healthy from them. Don't be afraid to ask questions. When you go home today be sure to talk to your family about what you learned.

Before you begin, ask students whether any of them have had a tick on them and where they were when it happened.

Then distribute the pre-test to gauge students' content knowledge about tick biology, tick-borne diseases, and prevention methods.

This text accompanies a PowerPoint presentation, "Don't Let the Ticks Bite!" As you read the text, there will be a note about which PowerPoint slides relate to that section of text.

Each slide includes a list of definitions for new vocabulary.

Tick biology

1. What do ticks look like? (Slide 3)

There are 14 different species of ticks found in Maine.

Do you think ticks are arachnids or insects? Ticks are arachnids—along with mites, spiders, and scorpions.

Ticks have eight legs, no antennae, and a flat, hard body. Ticks start off hatching from eggs and grow larger as they get older.

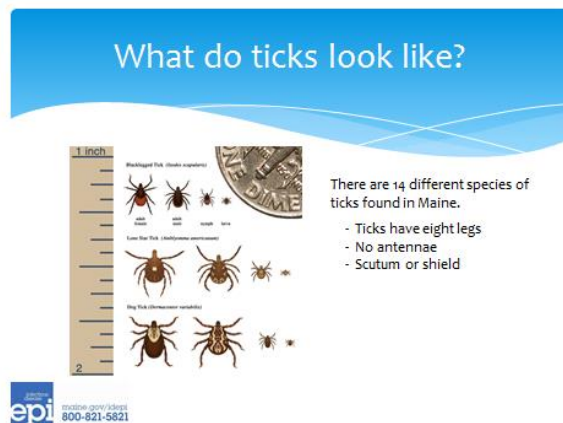
2. How do they bite me? (Slide 4)

The Lyme disease bacteria are in the belly of the tick. It takes 24-48 hours for the bacteria to go from the belly of the tick and into a person after the tick starts feeding on your blood.

Many people, when bitten by a deer tick, quickly develop a red area at the site of the bite. This red area is not the 'bull's-eye rash' (which we'll discuss more shortly) but just a reaction to the tick bite. Depending on the person's individual sensitivity, the red area may remain itchy for several days after removing the tick.

Vocabulary:

- **Barb**—a point or pointed part projecting backward
- **Anesthetic**—a substance causing loss of sensation/pain reliever. The tick has anesthesia in its saliva to numb your skin so you don't know it is starting to bite.



Are all ticks the same?



- **Deer tick**
 - Dark **scutum** (dot/shield behind the head)
 - More common in the spring and fall

Deer tick, larger than actual size



Are all ticks the same?



- **Dog tick**
 - White **scutum** or white "racing stripes" down their back
 - More common in the summer

Dog tick, larger than actual size



Vocabulary:

- **Scutum** – “shield”, a bony, horny, or chitinous plate; part of the back of the tick near the head
- **Nymph** – pre-adult stage of the tick life cycle; very tiny, about the size of a poppy seed, so they can be difficult to see

3. Are all ticks the same? (Slide 5 and 6)

The two most common ticks in Maine are deer ticks (also known as Black Legged Ticks) and dog ticks. Deer ticks can transmit Lyme disease, but dog ticks don't, so it's a good idea to know the difference.

These are some of the key differences between deer ticks and dog ticks.

Deer tick females have a black **scutum**—the part on the back near the head—and a reddish abdomen/belly.

Deer tick **nymphs** (the immature or child-like stage of a tick) are about the size of poppy seed and are active from June through August, while the adults are a bit larger (about the size of an apple seed) and are active from October to December, and March -May.

Dog ticks are a pest in Maine. They are not known to spread diseases in Maine but do spread diseases in other parts of the county. They are larger than deer ticks and are active from April through July.

Dog ticks have white markings on their backs. To tell the difference between dog ticks and deer ticks, it's a good idea to look for the whitish markings.

With practice it gets easier to tell the difference between deer and dog ticks.

Where do ticks live?

- Favorable habitat
 - Leafy tree covered areas
 - Forests
 - Shrubby areas




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800-822-5822

Photos: HMCRI

Ticks and Habitat

- Unfavorable habitat
 - Open, dry habitats




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800-822-5822

Photos: HMCRI

Tick ecology

4. Where do ticks live? (Slide 7 and 8)

Deer ticks prefer protective environments, like forests and forest edges. They are more common in forests with trees that lose their leaves seasonally such as oaks and maple trees because they make a thick leaf layer as shelter for them.

Deer ticks are also found in groups of bushes, which provide food for the **hosts** of a tick, such as deer, mice, and birds. The bushes also protect the ticks from drying out by the sun and wind.

Generally, deer ticks prefer woods, while dog ticks prefer grassy meadows.

Ticks do not like open, dry habitats where there is no protection from the sun and wind. Ticks like moist areas.

These examples show areas unsuitable for deer ticks; there is no protection for the ticks from the sun and wind.

Vocabulary:

- **Host** – a living animal or plant that provides food or shelter for another

How Ticks Move

- Ticks do not fly or jump
- Ticks grab onto people or their clothes when they walk through a grassy or wooded area
- A tick will crawl to a feeding spot on the person's skin



5. How do ticks move? (Slide 9)

Ticks cannot jump or fly so they will wait on grasses and shrubs for a person or animal to brush up against them. They grab onto clothes or fur to attach (like a hitchhiker). Once the tick is attached to you, it will crawl around to find a good place on you to feed.

Why remove a tick?

• Ticks can carry diseases so we want to remove them as soon as possible




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Photos: Massachusetts Department of Public Health

Diseases that Maine ticks can carry

- **Lyme disease**
 - Most common in Maine
- **Anaplasmosis**
 - 2nd most common in Maine
- **Babesiosis**
 - Emerging in Maine
- **Powassan**
 - Rare in Maine

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Diseases ticks can transmit to people and animals and symptoms of the diseases

6. Why remove a tick? (Slide 10)

If you have a tick on you, it is important to remove the tick from you as soon as you notice it. It can take 24 to 48 hours for a tick to pass along germs that can make you sick, so you want to remove it right away.

7. Diseases that Maine ticks can carry (Slide 11)

Different ticks can transmit different diseases and some ticks, such as the deer tick, can carry more than one disease.

Diseases that Maine ticks can carry include: Lyme disease, **Anaplasmosis** (ANA-PLAZ-MOSIS), **Babesiosis** (BA-BEEZ-IOSIS), and **Powassan** (PUH-WOSS-AN). It is important to note two things:

- 1) Not all types of ticks carry germs that can make you sick, and
- 2) Not all deer ticks carry Lyme disease.

What is Lyme disease?

- Lyme disease is caused by the bacteria *Borrelia burgdorferi*
- The bacteria can make people and pets sick



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8. What is Lyme disease? (Slide 12)

The scientific name for the bacteria that cause Lyme disease is *Borrelia burgdorferi*. They are bacteria that pass from the tick into your body. The image on this slide is a microscopic view of the bacteria. Ticks can get the germ by biting and feeding on mice, birds, and other small animals that have the bacteria.

Note that not all animals and not all ticks carry Lyme disease. Once a tick gets the germ it has it for the rest of its life.

People and pets can get sick if they get bitten by a tick that carries these bacteria.

How will I know if I have Lyme disease?

* Symptoms

- * Bull's-eye rash (not always present at the site of the bite; sometimes multiple rashes will occur)
- * Sore muscles
- * Very tired
- * Chills, fever, and headache
- * Swollen lymph nodes

If you have any symptoms, see your doctor



10. How will I know if I have Lyme disease? (Slide 13)

Different symptoms (or signs) of Lyme disease can be present but the most common is the '**bull's-eye rash.**' It looks like a bull's-eye or a target with a dark red circle in the middle, a clear area, and then a lighter red circle surrounding it. The rash may not show up where the tick bit you, so it is important to check your whole body (including the back and head).

While some people do not have a rash at all, others might have multiple rashes from a single bite.

You can also have swollen knees or other joints, sore muscles, or become very tired.

If you are experiencing flu-like symptoms (like those mentioned above) during the summer months, you should see your doctor.

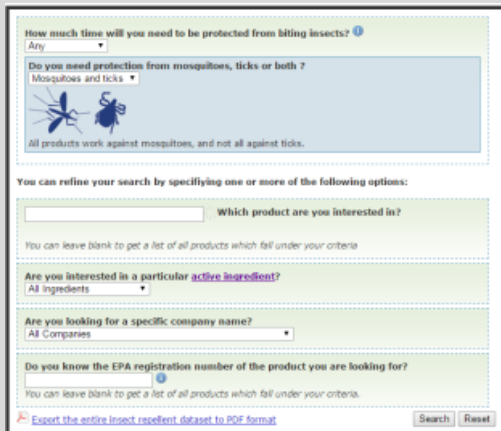
Vocabulary:

- **Bulls-eye rash**— a red, expanding rash that looks like a target or a bull's eye. This is the most common symptom of Lyme disease.



NOTE: Educators are encouraged to show this website to students and scroll down the page to the section Search for a Repellent that is Right for You and search repellents that repel both ticks and mosquitoes)

<http://cfpub.epa.gov/oppref/insect/>



Tick bite prevention methods

11. How do I protect myself? (Slide 14)

- Wear long pants and long-sleeved shirts to reduce the amount of your skin that is uncovered. Tuck your pants into your socks to form a barrier to your skin. Light-colored clothing makes ticks easier to see.
- Use a repellent (also known as “spray”) that is approved by the EPA (Environmental Protection Agency) for repelling ticks.

When using a repellent, follow the label instructions carefully. You can find the repellent that will work best for you here:

<http://cfpub.epa.gov/oppref/insect/>

- Since ticks cannot jump, they wait for you to brush up against them so they can attach to you. When you are walking in the woods, stay in the center of the trail so you do not brush up against grasses and bushes where ticks are waiting.
- After coming inside from outdoors, you can place your clothes in a dryer for approximately one hour. Laundry detergents alone will not generally kill ticks, but the heat from the dryer will kill ticks that might be on clothing. The clothes may then be washed to remove ticks from them.
- Perform a **tick check** daily. Check your body for ticks, looking particularly for what may look like

nothing more than a new freckle or speck of dirt.

Remember, ticks need to feed for at least 24 hours in order to transmit Lyme disease, so quick removal can prevent Lyme disease.

Vocabulary:

- **EPA** (Environmental Protection Agency) – federal agency devoted to protecting human health and the environment
- **Tick check**– use your finger tips and your sight to feel around your body for ticks; it is recommended to do tick checks every time you come in from the outdoors, especially if you have been in a tick habitat



12. Check your body daily! (Slide 15)

Perform a "Tick Check" – inspect your body after being outdoors, and again a few hours later.

Ticks like damp, dark places so pay attention to your head, hairline, nape of the neck, armpits, waist, between your legs, thighs, and behind the knees. Check your pets, too.

Nymph ticks can be very small (the size of a poppy seed), so use your hands to feel your skin along with a close visual inspection. Ticks can blend in with freckles too, so if you have a lot of freckles or moles, check to make sure none of your freckles have legs!

What if I find a tick on me?
Ask a grown-up to take it off

With a Tick Spoon

- Put the wide part of the notch on the skin near the tick (hold skin tight if necessary)
- Applying a little pressure on the skin, slide the spoon forward so the small part of the notch is framing the tick
- Continue sliding the spoon until the tick detaches

With Tweezers

- Grasp the tick close to the skin with tweezers
- Pull gently until the tick lets go



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Proper tick removal

14. What if I find a tick on me? (Slide 16)

- Tell a grown-up as soon as you notice a tick on your skin, so that they can help you take it off.
- Use fine-tipped tweezers or a tick spoon to remove the tick.
- Do not use petroleum jelly, a hot match, nail polish, or other products to remove a tick. These will only upset the tick and may cause it to vomit what's in its stomach back into your body, which can cause irritation.
- Clean your skin with soap and warm water.
- Do not worry if the tick's mouthparts remain in the skin. Once the mouthparts are removed from the rest of the tick, it can no longer transmit the Lyme disease bacteria.
- Ticks are difficult to kill, and may climb back out if you simply put them in the trash. To kill ticks, drop them into a small container of rubbing alcohol.

Make your yard safer

- Remove brush, leaf litter and tall grass
- Create a dry border between woods and lawn
- Remove plants that attract deer and construct physical barriers that may discourage deer from entering your yard



Photo: Massachusetts Department of Public Health

TICK REMOVAL DEMONSTRATION

Activity D includes a “Tick Removal” station where students demonstrate the ability to remove a tick. Instructors are encouraged to have student wait and practice this at the station or can do this activity immediately following this slide.

You can also show the video “Tick Removal” by the University of Maine Cooperative Extension (30 seconds):

<https://www.youtube.com/watch?v=Un882vnPT1U&feature=youtu.be>.

13. Make your yard safer (Slide 17)

- What more can we do to keep ourselves safe from ticks?
- You can reduce ticks in your yard by keeping the grass mowed and raking piles of leaves.
- Wood chips, gravel, or mulch can be placed between the woods and the grass in your yard as a barrier. When the ticks cross the path to enter the yard, they would be in direct sunlight and therefore at risk for drying out (remember, ticks like moist areas).
- The barrier also acts as a reminder to people that crossing the path puts them into the wooded area, where they may be at higher risk of having ticks bite them.
- You can also remove plants that attract deer and other animals to your yard that might carry ticks.

QUESTIONS AND FEEDBACK

If you have any questions about “Don’t Let the Ticks Bite!” or if you need additional educational materials, please contact Maine CDC Infectious Disease Epidemiology Program by email at disease.reporting@maine.gov.

Maine CDC requests that you share your pre- and post-test results and instructor feedback forms with us so that we can gauge the success of the program.

Please mail pre- and post-tests and instructor feedback forms to this address:

Attn. Muskie Public Health Education
Corps
Maine CDC - Infectious Disease
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Augusta, ME 04333

Other materials are available free of charge from Maine Center for Disease Control and Prevention.

Visit this link to order:

<http://www.maine.gov/dhhs/mecdc/infectiousdisease/epi/order-form-wn.shtml>