

**School intervention for vectorborne diseases in Maine:
Program to educate grades 3-5 on tickborne diseases and prevention methods**

Don't Let the Ticks Bite!

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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 tickborne 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 germs ticks can transmit to people and animals and symptoms of the diseases they can cause
- Demonstrate personal protection methods
- Demonstrate proper tick removal

STRATEGIES/METHODS:

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

MATERIALS NEEDED:

- ✓ Computer
- ✓ Projector (if space allows)
- ✓ Stop-watch
- ✓ Tick Samples
- ✓ 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)
 - Tick Identification (approx. 10 minutes)
 - Lyme Disease Poster (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

PREPARATION NEEDED:

- ✓ Print large-scale images of deer and dog ticks (5 of each)
- ✓ Print Tick-Tac-Toe review questions list
- ✓ Print images of deer and dog ticks, mice, deer, birds, brush, leafy trees and cut grass
- ✓ 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) Present “Don’t Let the Ticks Bite!” PowerPoint presentation
- 2) Break into small groups for activities
- 3) Distribute Tick Activity Book and Take-Home Sheet and encourage students to share information with their families

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

DON'T LET THE TICKS BITE

ABOUT THE PROGRAM

Ticks can carry several germs that affect humans and animals. Tickborne illnesses present in Maine include Lyme disease, anaplasmosis, babesiosis, and Powassan. Lyme disease is the most common tickborne illness in Maine and is found in all 16 counties. Children in Maine ages 5-14 are a high-risk group for Lyme disease.

The Public Health Corps (PHC) within Maine Center for Disease Control and Prevention's (Maine CDC) Infectious Disease Program designed the school-based intervention to educate third-fifth grade students in Maine.

The program provides educators with tools concerning tick biology, germs that can be transmitted by ticks and the diseases they cause, 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 germs and how you prevent getting the diseases they can cause.

2. Continue by saying:

Ticks can cause several diseases in humans and animals. The most common disease in Maine that is caused by ticks is Lyme disease. People your age are high 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 germs they can carry, and how to prevent (or make sure you don't get) the diseases these germs cause.

Then we will break up into small groups and do four 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.

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.

What do ticks look like?

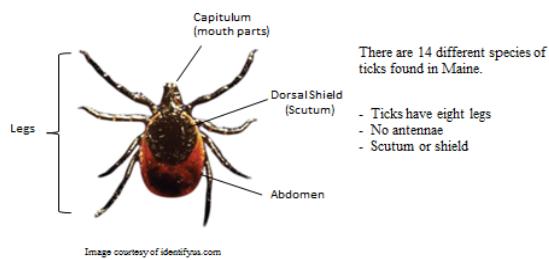


Image courtesy of identifyusa.com

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Bite is Worse than the Bark

*Ticks have a barbed beak

*Ticks makes your skin where it is biting you numb so that you don't notice it feeding on you

*Bottom image: a deer tick nymph attached to a person



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Tick biology

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

There are 14 different species of ticks found in Maine.

Ticks are arachnids—along with mites, spiders, and scorpions.

Ticks have eight legs, no antennae, and a flat, hard body. They have a **capitulum**, which is the mouthpart, the **scutum**, or shield near the back of the head, and an **abdomen** which is where germs are carried. Ticks start off hatching from eggs and grow larger as they get older.

Vocabulary:

- **Capitulum** – mouthparts
- **Scutum** – “shield”, a bony, horny, or chitinous plate; part of the back of the tick near the head
- **Abdomen** – stomach, carries germs

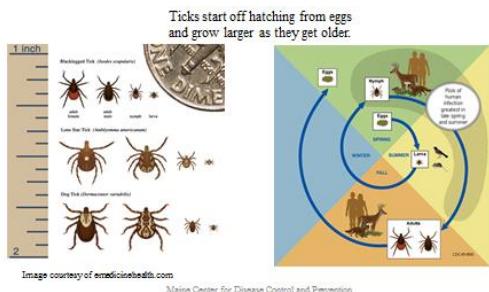
2. How do they bite me? (Slide 4)

Ticks have a **barbed** beak that allows them to attach to your skin. The tick’s saliva has an **anesthetic** property that numbs the area on your skin that the tick is attaching to so that you do not even notice they are biting.

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.

What size are ticks?



Are all ticks the same?



*Deer tick

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

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Are all ticks the same?



*Dog tick

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

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3. What size are ticks? (Slide 5)

Ticks are different sizes at different stages in their lives.

4. Are all ticks the same? (Slide 6 and 7)

The two most common ticks in Maine are deer ticks (also known as Black Legged Ticks) and dog ticks. Deer ticks can transmit the bacteria that causes 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 to May.

Dog ticks are a pest in Maine. They are not known to cause diseases in Maine but can carry germs that cause diseases in other parts of the country. 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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Ticks and Habitat

*Unfavorable habitat

- *Open, dry habitats



Photos: MMCR1

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Vocabulary:

- **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

Tick ecology

5. Where do ticks live? (Slide 8 and 9)

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 being dried 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 organism

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



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Diseases that Maine ticks can cause

***Lyme disease**

***Anaplasmosis**

***Babesiosis**

***Powassan**

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6. How do ticks move? (Slide 10)

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 clothing or fur when someone walks by (like a hitchhiker). Once the tick is on your body, it will crawl around to find a good place to feed.

Diseases ticks can cause in people and animals and symptoms of these diseases

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

Different ticks can transmit different germs and some ticks, such as the deer tick, can carry more than one disease-causing germ.

Maine ticks can cause: **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 the bacteria that causes Lyme disease.

Vocabulary:

- **Lyme disease** – tickborne disease caused by the bacterium *Borrelia burgdorferi*
- **Anaplasmosis** – tickborne disease caused by the bacterium *Anaplasma phagocytophilum*
- **Babesiosis** – tickborne disease caused by the parasite *Babesia microti*
- **Powassan** – tickborne disease caused by the Powassan virus

8. What is Lyme disease? (Slide 12)

What is Lyme disease?

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



The scientific name for the bacteria that causes Lyme disease is *Borrelia burgdorferi*, which can pass from the tick into your body. The image on this slide is a microscopic view of the bacteria. Ticks can get the bacteria 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 the bacteria that can cause Lyme disease. Once a tick gets the bacteria 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.

The disease bacteria that can cause Lyme disease 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.

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



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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.

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

Different symptoms of Lyme disease can be present but the most common is the '**bull's-eye rash**', also known as **erythema migrans**. 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 contact your provider.

Vocabulary:

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

Symptoms of diseases other than Lyme

Typical symptoms of additional diseases caused by ticks

Anaplasmosis: Fever, headache, muscle pain, tiredness, chills, nausea, abdominal pain, cough and confusion

Babesiosis: Flu-like symptoms, most often fever and fatigue

Powassan: Headache, fever, nausea, vomiting, stiff neck, and sleepiness



Image courtesy of invitaehealthblog.com

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10. Symptoms of diseases other than Lyme. (Slide 14)

Anaplasmosis, babesiosis, and Powassan all have different symptoms to be aware of.

Anaplasmosis can cause fever, headache, muscle pain, tiredness, chills, nausea, abdominal pain, cough and confusion.

Babesiosis can cause flu-like symptoms, most often fever and fatigue.

Powassan can cause headache, fever, nausea, vomiting, stiff neck, and sleepiness.

If you have these symptoms you should also check with your doctor.

Tick bite prevention methods

11. How do I protect myself? (Slide 15)

How do I protect myself?

1. Wear protective clothing

Tuck your pants into your socks and wear long pants and long-sleeved shirts

Wear light-colored clothing so you can see ticks more easily



2. Use a repellent

3. Be careful in tick-infested areas

Walk in the middle of trails and paths
Don't brush up against bushes

4. Perform daily tick checks



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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/>

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/>

The screenshot shows a search interface for insect repellents. At the top, there are dropdown menus for 'How much time will you need to be protected from biting insects?' (set to 'Any') and 'Do you need protection from mosquitoes, ticks or both?' (set to 'Mosquitoes and ticks'). Below these are two small illustrations of a mosquito and a tick. A note states: 'All products work against mosquitoes, and not all against ticks.' The main search area has a heading 'You can refine your search by specifying one or more of the following options:' followed by several input fields:

- 'Which product are you interested in?' with a note: 'You can leave blank to get a list of all products which fall under your criteria.'
- 'Are you interested in a particular active ingredient?' with a dropdown menu set to 'All Ingredients'.
- 'Are you looking for a specific company name?' with a dropdown menu set to 'All Companies'.
- 'Do you know the EPA registration number of the product you are looking for?' with a note: 'You can leave blank to get a list of all products which fall under your criteria.'

At the bottom right of the search area are 'Search' and 'Reset' buttons.

- 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, you can place your clothes in a dryer for ten minutes. 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 the bacteria that can cause Lyme disease, so quick removal can prevent Lyme disease.

Vocabulary:

- **Repellent** – a spray applied to skin to prevent insect bites
- **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

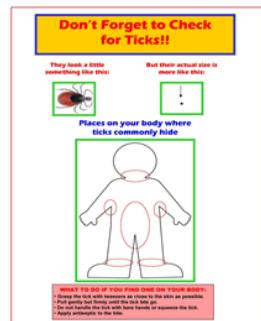
Check your body daily!

Perform a “Tick Check”:

Use your finger tips and your sight to feel around your body for ticks

Pay attention to: your head, hairline, neck, armpits, waist, between your legs, thighs, and behind your knees

Check your pets, too!



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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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checks every time you come in from the outdoors, especially if you have been in a tick habitat.

12. Check your body daily! (Slide 16)

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.

Nymphal 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!

Proper tick removal

13. What if I find a tick on me? (Slide 17)

- 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 germs that cause disease.
- 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.

Why remove a tick?

*Ticks can cause diseases so we want to remove them as soon as possible



Photo: Massachusetts Department of Public Health

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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



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14. Why remove a tick? (Slide 18)

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

15. 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 Program by email at phc.dhhs@maine.gov.

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>