

Lesson Plan

Lesson Title	Ticks: Biology, Disease and Safety Tips
Grade Level	3 rd grade and up
Topic	Ticks
Lesson time	40-45 mins.
Materials Required	<ul style="list-style-type: none"> • Ticks: Biology, Disease and Safety Tips(available here) • Tick Life Cycle Kit • Activity Book (available here)
Standards addressed	<ul style="list-style-type: none"> • 3-LS1-1: Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death • 4-LS1-1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction • 5-LS2-1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment

Ticks: Biology, Disease and Safety Tips (PowerPoint)

Slide 1: Introduction and Expectations

The tick we are studying today is called the western black-legged tick. It is common locally and is important because it is a **vector**. Ask students if anyone knows what that means (an animal that can spread disease).

* Note: The words in the lesson plan that are typed in **bold** are used in a game at the end of the lesson—so make sure to use these words.

Slide 2: Tick Habitat

Just like all animals, ticks have certain habitats where they can survive. Ask a student what the definition is, and an example of a habitat. Ask students to describe the oak woodland habitat in the picture (trees, logs, grass, leaves, hills, animals, etc.). See if they can find all the animals in the photo (deer, lizard, rodent). Ask students to share activities that they might like to do in this habitat type (**hiking, camping, hunting, bird-watching, biking, etc.**). Point out that all of these activities are healthy, but when we go into natural habitats, we need to be careful because ticks might around. Ask if anyone noticed a tick in the picture. When you click/tap, an enlarge picture of a tick will appear

Slide 3: Life Cycle/Three Facts

Explain that ticks have a life cycle that is similar to, but not exactly the same as insect. Most insects have 4 life stages (egg, larva, nymph, adults), but ticks are **arachnids** (like spiders), and their life cycle stages include (egg, larva, nymph, adult). Tiny tick larvae hatch from eggs, and wait for a **host** (the animal they will bite). A larva usually bites a small animal (rodents, birds) and then grows into a nymph. The nymph also bites small animals (especially rodents and **lizards**) but will also bite people. The nymph grows to an adult. The adult ticks are much larger than the nymphs or larvae. They are often found in **grass** and other vegetation along trails. Adult ticks will bite people and other large animals like dogs and **deer**. The

problem with this is that ticks sometimes spread germs when they bite and they can make people very sick (vectors). Each click reveals an important fact. Following each we have provided some background information to guide the discussion.

1. All stages feed on blood
 - This is different than mosquitoes- only adult female mosquitoes bite
2. This cycle can take over 3 years
 - This is different than most “bugs” students are familiar with
 - Most of this time is spent simply waiting for a host to come along
3. Nymphs and adults will bite people
 - Many students are familiar with the adult ticks, but most are unfamiliar with the much smaller nymph

Slide 4: Safety Tips

The following tips can be helpful for the next time you visit tick habitat. Each click will reveal a new tip. Notice there are things to do before you enter tick habitat, while you are in tick habitat, and after you leave.

1. Wear light-colored clothing so it is easier to see any ticks that might be climbing on you.
2. Wear tick repellent. Encourage students to remind their parents to read the directions very carefully before they put anything on their skin.
3. If you are hiking, stay in the middle of the trail because ticks cannot fly or jump.
4. Check yourself and the people/pets you are with for ticks.
5. When you get home, put your clothes, shoes and small items like backpacks in the dryer. Ticks can sometimes survive the washer, but not a dryer.
6. Take a **shower** and have a parent check for ticks.

Slide 5: Removing a Tick

Follow the directions on the slide. Students often have their own ideas about removing ticks, but this is what the CDC recommends.

Slide 6: Lyme Disease

Lyme disease is the most commonly reported vector-borne disease in the United States. It is one example of a disease that is spread by certain ticks. In California, the western black-legged tick is the vector of this disease. The following slides will explain a little about how the bacteria (germs) that cause this disease are moved around the environment:

- In this picture we have a rodent that is already infected with the germs that cause Lyme disease (red dot), and a western black-legged tick larva that is not infected (green dot).
- Click 1: The uninfected tick bites the infected rodent.
- Click 2: The larva is now infected (green dot changes to red).
- Click 3: Now that the larva has fed, it can molt (change) into a nymph. Unfortunately, the tick is still infected (red dot).
- Click 4: If the infected nymph bites a human, the human may be infected the germs that cause the disease.

- Click 5: If an infected nymph molts into an adult tick, it is still infected.
- Click 6: If an infected adult bites a human, the human may be infected with the germs that cause the disease. So, infected nymphs or infected adult ticks can spread these germs to humans.

Slide 7:

- Once again, we have an uninfected larva and an infected rodent.
- Click 1: Just like before, the larva bites the infected rodent and is now also infected.
- Click 2: The larva molts and becomes a nymph that is still infected.
- Click 3: This time, the infected nymph bites a western fence lizard (aka blue-belly lizard).
- Click 4: When the infected nymph bites the lizard, the nymph gets the blood that it needs, but the germs that cause Lyme disease are killed (red dot changes to green).
- Click 5: The nymph molts into an adult that no longer has the infection.
- Click 6: Since it is no longer infected, this tick cannot pass the infection to a human when it bites. The lizards are one of the reasons why not every single adult western black-legged tick that was infected as a larva carries the germs for the rest of its life.

Slide 8: Tick Scramble

- This is a game to review what was learned in the lesson. At the top of the screen is a clue, and at the bottom of the screen there are letters that are mixed up. The letters need to be unscrambled to reveal a word that was used in the lesson (they are the words in bold in the lesson plan notes). There is also a shaded area where the word will fit. This game works well if you make sure that everyone knows that everyone gets to answer each time. They do not have to raise their hands, but they must not say their answer until after the teacher reads the entire clue. Ideally everyone answers at the same time. This way everyone is involved. Simply click to reveal the answer after reading the clue, and click again to bring up the next clue.

Visit the [Mosquito School website](#) for more information or email erice@msmosquito.com