

WHAT TICKS And MITES Can Do, To YOUR PETS AND YOU



Nídíshchíí' Ya' Dóó Yaa'
Nííí' Dóó Ni Yee Naanídoot'ííł

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Nídíshchí' Ya' Dóó Yaa' Nilíí' Dóó Ni Yee Naanídoot'íí'

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A R.U.F.F. MISSION

1. Goal: To create a better understanding of the dangers that ticks and mites have for humans and their pets.

Problem statement: Children and adults can occasionally have ticks or mites that will live on them . This happens often when helping out around a sheep camp. Education is the best way to prevent this. Mites also create a serious hazard by causing the disease mange on dogs, and scabies on horses and humans. Mange is a control problem on the reservation.

2. Measurable behavioral objectives: Students will show understanding of the idea visually, in an oral text, and written where applicable. (age consideration)

3. Specific strategies that focus upon students needs: Leading questions that utilizes the five senses. i.e. Ask students if they know what a tick is. Have they seen one? Can a tick cause humans to become ill? Do ticks transmit disease? Have students seen dogs with bald spots on them (no hair)? What causes this to happen? How do you remove a tick from a person or animal? etc.

4 Awareness or readiness level: Students will respond to an appropriate question and answer at any level.

5. Specific plan: (Materials needed): The study of arthropods and arachnids, the different groups of helpful or harmful animals. Viewing arachnids in "bug boxes" where the students can view actual animals up close and in safety. Often ticks can be found at a veterinarians office.

6. Student practices (student activities) Whenever possible, a live tick was put into a sealed "bug box" so that students could view it under a magnifying glass. This is not always possible, but encouragement of research on these pests and discussion about students own experiences.

7. Checking for understanding: (outcome based) Students are encouraged to use the questions at the end of this text as a tool to revisit the script. The first reading of this was probably more of a survey or scanning type, the second or study-type is for comprehension (more as a group decision) and will lead to critical thinking skills that will draw upon the students own experiences.

8. Specific affective and cognitive areas addressed: The students will see how tick and mites can have a dangerous effect if not controlled. What other members of the arachnid family are harmful. What members are helpful?

9. Specific teaching strategies that include student involvement: Students are encouraged to write about different ways they can think of to help control the "mange" problem and to keep livestock and pets free from ticks. Parasites are something we all need to learn to live safely with because they are not going to go away. When students are allowed to view a live tick from a bug box they learn what it looks like and can observe its behavior, somewhat. I had ticks that I kept in bug boxes for over 6 months. They even molted! The kids loved it, they would rush up and gather around in order to be able to view the tick. It was a good teaching tool.

Have the students make a list of the different arachnids. Make a "good" list, and make a "harmful list". Have them choose a member from one of these lists and write a one page report on the animal. Discuss their findings in class.

10. Other (as applicable to a lesson) This lesson is applicable from 3rd to 8th grade.

WHAT TICKS AND MITES CAN DO TO YOUR PETS AND YOU Nídíshchíí' Ya' Dóó Yaa' Nilíí' Dóó Ni Yee Naanídoot'ííí

It is said: In Navajo tradition, one drop of juice from chewing tobacco was used to dislodge ticks, nídíshchíí' ya', in ears or on the body of humans and animals.

What are TICKS and MITES'?



Ticks, nídíshchíí' ya', and mites, yaa', are the names of small animals which belong to the same family that spiders, na'ashjé'ii, and scorpions, séígo', do. They are animals that belong to a major division, or **phylum**, of the animal kingdom called arthropods.

This family of arthropods is called the arachnid, na'ashjé'ii dayikahígíí (*any of various arthropods of the class Arachnida, such as spiders, scorpions, mites, and ticks, characterized by four pairs of segmented legs and a body that is divided into two regions, the cephalothorax and the abdomen.*), order.

Many species of nídíshchíí' ya' and yaa' are parasitic, ch'osh nááná la' ch'osh yee hinání (*characteristic of a parasite: an organism, which grows, feeds and has shelter on or in a different organism, while contributing nothing to the survival of its host*), on man and domestic animals. Plant-eating yaa' can

be serious pests of crops and ornamental plants. Yaa' are able to live everywhere. They occur in every habitat, naaldlooshii dóó nanise' hiinaahgi (*the area in which an organism or community normally lives or occurs*), including polar regions, hot springs, and deserts.

Yaa' are usually microscopic, ch'osh doo yit'iinii (*so small as to be invisible or indistinct without the use of a microscope, 1.0-0.1 mm*). They lack body division, have sucking type mouth parts, no antennae, bits'áoz'a' bee bił ééhózin, and four pairs of legs as adults. Their life cycle, yit'ih, which includes: egg, ayęęzhii; larvae, yaa' ashch'osh; nymphs, yaa' dóó ch'osh biyázhí; and adult, yaa' stages takes only 2-3 weeks to complete. In this group are free-living forms, plant feeders, and animal parasites, ch'osh yah déesdáhi, in which different stages of the yit'ih may have different feeding patterns.

Chigger and scabies mites, yaa', are parasitic, ch'osh nááná la' ch'osh yee hinání, and are of concern here.

WHAT ARE ARTHOPODS?



An Arthropod is any animal that belongs to the major division of the animal kingdom called the Arthropoda. This term is formed from two Greek words and means jointed feet.

Actually, the legs, rather than the feet, are jointed. All the Arthropoda, or Arthropods, have jointed legs. Among the most important groups of arthropods are the following:



1.) **Insects**, including cockroaches, beetles, bees, butterflies, and many others.

2.) **Crustaceans**, including such well-known animals as crabs, lobsters, shrimps, and barnacles.



3.) **Arachnids**, including mites, ticks, spiders, and scorpions.

4.) **Chilopods**, or centipedes.

5.) **Diplopods**, or millipedes.

The third category, the **arachnids** (also called the CHELICERATA), contains animals having bodies composed of two main body parts. The first part is a CEPHALOTHORAX, which is a fused head and thorax, **azéests'iin** (*the second or middle region of the body of an arthropod, between the head and the abdomen, in insects bearing the true legs and wings*), and it has an abdomen. They have simple eyes and no antennae, **bits'áoz'a' bee bił ééhózin** (*this is one of the paired, flexible, sensory appendages on the head of an insect, a myriapod, or a crustacean used mostly as an organ for the sense of touch*).

Their first set of appendages, **ats'áoz'a'** (*something added or attached*), are feeding tubes called CHELICERAE. Chelicerae are a pair of **ats'áoz'a'** that the arachnid, **na'ashjé'ii dayikahígíí**, uses to seize and kill its prey. The second pair of **ats'áoz'a'** are called PEDIPALPS. Pedipalps are a pair of **ats'áoz'a'** that look like small legs. In **nídíshchíí' ya'** and **yaa'** they are modified to do different functions.

Most **na'ashjé'ii dayikahígíí** are either carnivorous, **naaldlooshii ats'i'iyánígíí** (*flesh eating animals*), or they are parasitic, **ch'osh nááná la' ch'osh yee hinání**. They digest part of their food outside their bodies. They do this by putting enzymes into the tissue of their prey, and this liquefies the skin cells.



The **na'ashjé'ii dayikahígíí**, are all terrestrial, **nihokáá' hináanii** (*an inhabitant of earth*), and this class includes many venomous groups that live in Arizona, including **séigo'**, **na'ashjé'ii**, **yaa'** and **nídíshchíí' ya'**. The last two are of interest, especially concerning our pets, when they live with their human families.



Many people think that **na'ashjé'ii dayikahígíí** are insects. Arachnids have eight legs, whereas ants, bees, beetles, and other insects have only six legs. In addition, most insects have wings and **bits'áoz'a' bee bił ééhózin** but **na'ashjé'ii**

dayikahígíí do not.

The arthropod phylum contains some venomous species. With more than a million and a half different species, arthropods outnumber all other kinds of plants and animals combined. Not only are there many species in this group, but many individuals represent many species, and every geographic region and every conceivable habitat, naaldlooshii dóó nanise' hiinaahgi, has its arthropod residents.

The bodies of arthropods, as well as their legs, are made up of sections. Among some primitive arthropods, each section of the body has its own pair of legs. Most of these legs are used for swimming or walking.

In some types of arthropods, certain legs have developed special shapes and uses. Some serve as sucking organs, some are jaws, some serve as weapons of offense and defense, and some are sense organs.

Arthropods have an outside shell, or exoskeleton, that contains a stiff, horny material called **chitin**. Certain arthropods, such as flies and moths, have only thin, weak shells. Others, including crustaceans, bikáá' nit'izí, for example; crabs and lobsters, have thick strong shells. Nearly all arthropods have a kind of heart and blood system and usually a well-organized nervous system. Some arthropods have simple eyes, some have

compound eyes, and some, including many insects, have eyes of both types.



Some of the arthropod species are parasitic, ch'osh nááná la' ch'osh yee hinání (*which means that it lives on other animals*), but most are free living. Members of this group have been on earth for an extremely long time. The oldest known arthropods in the fossil record are the extinct **Trilobites**, marine animals that flourished from the Cambrian to Silurian periods, 550 to 450 million years ago.

SCABIES MITE



Warning: Scabies mites cause serious disease that, if untreated, may result in life-threatening complications. Any person who suspects he or she has contacted scabies should consult a physician experienced in diagnosing and treatment of the disease.



WHAT IS SCABIES?

Scabies is a contagious skin disease that causes intense itching, yihxéęsgo. In adults and older children, scabies may affect any part of the body

from the neck down. It most frequently involves the skin between the fingers; under the arms; and on the wrists, elbows, and lower back. Babies may be infected over their entire body, including the head.

Scabies is caused by the "itch mite" or "scabies mite," a spiderlike animal known scientifically as *Sarcoptes scabiei*. This *yaa'* can barely be seen with the unaided eye.

The scabies *yaa'* is round, translucent, dirty white, and scarcely visible to the naked eye. These *yaa'* have very short legs. Identification of scabies requires skin scrapings, by a doctor or a veterinarian, to be taken from the suspected infested area and examined microscopically.



The scabies *yaa'* usually burrow into the skin within 2-5 minutes after contacting it. Once in, they form torturous burrows through the skin in which the females deposit *ayęęzhii* at 2-3 day intervals. *Ayęęzhii* hatch in 3-8 days, and the *larvae, yaa' ashch'osh,* migrate to the skin surface and molt, *táádítłeeh,* twice. The female remains in the burrow, *a'áán* (which may be as long as 3 cm), for her lifespan of about two months.

Yaa'ashch'osh move freely over the skin, and they and nymphs, ch'osh biyázhí, frequently reside in hair follicles. The entire *yit'ih* takes 10-14

days. Mating occurs on the host's skin. Egg-laden mated females may reinfect the current host or, given the opportunity, move onto another host.

Some doctors and scientists think that different *yaa'* attack humans and animals. Although humans have contracted the scabies *yaa'* from horses and sometimes dogs. These *yaa'* cause the 'mange', *naaldlooshii bikágí binaałniih,* in domestic animals, and scabies, known as the "seven year itch" in man.

Infestations of this *yah déesdáhi* may progress extensively before being noticed. About a month after contact, a rash and intense *yihxęęsgo* appears in the area of the burrows. The *yihxęęsgo* becomes worse at night.

It is caused by the toxic, k'aasdá (*of, relating to, or caused by a toxin or other poison*), secretions and excretions of the burrowing, ahoodzáągo ílłééh, mites. Tiny blisters form above the burrows on the skin's surface. Scratching, yihxęęsgo, usually causes a secondary infection and can result in bleeding. Bleeding is usually insignificant



The most common form of this *yaa'*, is on the dog. The disease is called mange, naaldlooshii bikágí binaałniih (*any of several chronic skin*

diseases of mammals caused by parasitic mites and characterized by skin lesions, itching, and loss of hair). After coming in contact with an infected dog, symptoms of **naaldlooshii bikágí binaañiih** usually start showing within 7-10 days. For this to occur, it only takes a touching of noses, or a mere brushing of hair in passing. Dogs generally will start to **yihxéęsgo** wherever the actual touching took place.

Generally, the most common places are the hind legs, base of tail, stomach, and under the front legs. The **yihxéęsgo** is intense and the dog will bite at itself and **yihxéęsgo** repeatedly until the skin bleeds. Eventually, hair loss occurs and the skin has a red, dry, cracked appearance with a smelly odor.

When dogs get to this point, the **naaldlooshii bikágí binaañiih** is hard to control, and almost impossible to kill all of the **ya'a'** because they have such a strong hold. Death will usually take place due to infection of the skin that eventually gets into the bloodstream. This can take up to two years.

Severe **naaldlooshii bikágí binaañiih** can also cause kidney damage. Please take your dog to the veterinarian as soon as the **yihxéęsgo** is noticed. The earlier this disease is caught the easier it is to cure.



When we allow dogs to roam around with **naaldlooshii bikágí binaañiih** the spreading of this disease is impossible to control.

TICKS



The tick, **nídíshchíí' ya'**, is oval in shape with a leathery appearance. The bodies of **nídíshchíí' ya'** seem to be all in one piece, but their sucking mouth parts form a head-like structure known as the capitulum. Some of them have a groove behind the head. The head of a **nídíshchíí' ya'** is a movable part at the front end of the body. They are a **yah désdáhí**.

Nídíshchíí' ya' feed on blood. They draw in the blood of their victims through a beak. Blood from a vertebrate, **bíígháán hólónígíí** (*having a backbone or spinal column*), host is required for them to survive and complete their **yit'ih**. **Nídíshchíí' ya'** can cause various diseases in human beings and in domestic animals. **Nídíshchíí' ya'** often carry certain disease germs in their bodies and transfer these germs to the blood of their victims. Some female ticks can lay up to 18,000 eggs at one time.

Like most other **na'ashjé'ii dayikahígíí**, adult ticks, and immature **ch'osh biyázhí** (the young), have eight

legs which stick out on the sides like those of a crab. The *yaa' ashch'osh* (hatchlings), has six legs.

Although there are many species of *nídíshchí' ya'* in Arizona, humans are likely to encounter five. Two of these, the brown dog tick, and the Rocky Mountain wood tick, are "hard ticks", and they can transmit Rocky Mountain spotted fever, a disease of humans.

This disease causes a few deaths each year in the United States. Deer ticks transmit lyme disease to humans. If untreated, this disease can lead to chronic arthritis and heart and nerve disorders.

The common English sheep tick which lives in America, infests dogs and humans. The fifth species is the adobe tick. It is a "soft shell tick" belonging to the family Argasidae.

BROWN DOG TICK AND ENGLISH SHEEP TICK

The adult males of these *nídíshchí' ya'* are about 4 mm in length, uniformly reddish-brown, with tiny pits on the top surface. Female ticks before feeding are similar to the male in size, shape, and color. Females that are filled with blood reach 12 mm in length and the engorged part of the body then changes in color to a grey-blue or light olive color.



These *nídíshchí' ya'* will attack humans, and they are particularly fond of laying their *ayëëzhii* in ears.

Nídíshchí' ya' have four stages in their life history.

The *yit'ih* begins when a female, after feeding, drops from the dog, or other mammal. She then seeks a sheltered place, sometimes among the dead leaves or other ground rubbish, to lay her mass of 1,000 to 3,000 tiny dark brown eggs. The female then dies, and her *ayëëzhii* hatch in 19-60 days.

The "seed ticks" (larvae), *yaa' ashch'osh*, climb walls (if in the house or barn) or they wait on grass stalks and shrubs. They then attach themselves to a passing dog or other mammal at the first opportunity.

Once attached, they gorge on the blood of these animals and swell up. After feeding on the host for 3-6 days, the *yaa' ashch'osh* drop, hide and molt, *táádítëeh* (*shed their outer coverings*), into the nymph, *ch'osh biyázhí* (*eight-legged*), form. The nymphs, *ch'osh biyázhí*, feed again for 4-9 days then they drop to form adults.

The adult tick finds a host again. They feed, mate, and the females drop to lay their *ayëëzhii*. Living for as long as eighteen months without feeding is possible for adult brown dog ticks. Besides infesting dogs, this *nídíshchí' ya'* species is a serious nuisance in urban

dwellings where it emerges from hiding places and climbs the walls.



When attempting to remove a *nídíshchíí' ya'* forcibly from a host, a portion of the head often will break off and remain inside the flesh and may cause a festering sore. To remove a *nídíshchíí' ya'* cover it with petroleum jelly, or a heavy oil, such as mineral oil, salad oil, or machine oil.

Wait about a half hour and then carefully remove the *nídíshchíí' ya'* using tweezers. Wash the affected area of the skin thoroughly with soap and water. This process works because the *nídíshchíí' ya'* breaths through its skin and the oil cuts off the air supply which causes it to suffocate. Remember: Do not squeeze the body of the tick as you are removing it. You may cause blood and germs to be injected from the tick's body into you or your animal.

Veterinarians, especially in rural areas, have found horses, sheep, goats, cattle, dogs, cats and other animals infested with *nídíshchíí' ya'*. While working with the mobile veterinarian clinic in Chinle, Arizona, I was a witness to several cases of *nídíshchíí' ya'* infestation.

Kittens were found in a box on the side of the road in Mexican Hat, and were brought into the clinic's office. Upon examination of the kitten's ears,

we removed more than 300 hundred ticks out of just one of the kitten's ears.

This can be a common problem in rural areas. *Nídíshchíí' ya'* not only carry disease but can cause *nídíshchíí' ya'* paralysis in animals, especially young animals often leading to death.

Dr. Kim Draper kept a jar that contained more than 500 ticks in it. She had removed them from a grown horse. This horse could hardly stand on its own when it was brought to the clinic. She did not know what the problem was until she ran her hand along the animal's side and felt all the "bumps." Realizing that the horse was infested with *nídíshchíí' ya'* she began removing them with oil and tweezers. The horse made an amazing recovery after all the *nídíshchíí' ya'* were removed.

Please, check your pets and their ears regularly for *nídíshchíí' ya'*. They can be removed with a special solution that the veterinarian has. When *nídíshchíí' ya'* are found in the ears of animals, applying medication from the veterinarian to kill the *nídíshchíí' ya'* is much safer, or, let the veterinarian or doctor remove them.



= thematically tied-in with biology, science, health and community related issues.

Suggested questions are:

1. What family does the tick belong to?
2. What family does the mite belong to?
3. What does terrestrial mean?
4. Are humans terrestrial?
5. Can ticks only be found on dogs?
6. What does a tick eat?
7. Can ticks cause disease on humans? What kind?
8. Can mites cause disease on humans? What is it?
9. How do arachnids differ from insects?
10. How many eggs can an adult tick lay at one time?
11. Can mites cause disease on dogs? What is it?
12. Where does the scabies mite lay its eggs?
13. What is the oldest known arthropod in the fossil record?
14. What does phylum mean?
15. What does the word arthropod mean? Where does it come from?
16. What are the most important groups of arthropods?
17. What animals make up the arachnid group?
18. How can you safely remove ticks from a host?

Vocabulary for Ticks and Mites. Please find the definition for each word and use it in a sentence. Navajo words added for cultural enrichment.

1. What ticks and mites can do to your pets and you	Nídíshchíí' Ya' Dóó Yaa' Nilíí' Dóó Ni Yee Naanídoot'ííł	page 1
2. ticks	nídíshchíí' ya'	page 5
3. mites	yaa	page 5
4. spider	na'ashjé'ii	page 5
5. scorpion	séigo'	page 5
6. arachnids	na'ashjé'ii dayikahígíí	page 5
7. parasitic	ch'osh nááná la' ch'osh yee hinání	page 5
8. habitat	naaldlooshii dóó nanise' hiinaahgi	page 5
9. microscopic	ch'osh doo yit'iinii	page 5
10. antennae	bits'áoz'a' bee bił ééhózín	page 5
11. life cycle	yit'ih	page 5
12. egg	ayęęzhii	page 5
13. larva	yaa'ashch'osh	page 5
14. nymphs	ch'osh biyázhí	page 5
15. parasite	ch'osh yah déesdáhí	page 5
16. thorax	azéests'iin	page 6
17. appendages	ats'áoz'a'	page 6
18. carnivorous	naaldlooshii atsi'yiyánígíí	page 6

21. terrestrial	nihokáá' hináanii	page 6
20. crustaceans	bikáá' nit'izí	page 7
21. itching	yihxéęsgo	page 7
22. molt	táádítłeeh	page 8
23. scratching	yihxéęsgo	page 8
24. mange	naaldlooshii bikágí binaaʼniih	page 8
25. toxic	k'aasdá	page 8
26. burrowing	ahoodzáągo ílleeʼh	page 8
27. vertebrate	bíígháán hólónígíí	page 9



Dear Parents,

We are currently working on a thematic unit dealing with the RUFF Program in attempting to help integrate learning by providing you with discussion topics for home to school transfer.

1. Do you know what a tick is?
2. What is mange? What causes it?
3. Can we help to prevent the spread of mange? How?
4. Should people allow their dogs to roam free?
5. What is scabies? How can we get this disease?

Please talk with your child concerning these issues this week. If there are any questions, please do not hesitate to call me.

Sincerely,

Your child's teacher

FOR MORE R.U.F.F. "MISSIONS"

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