

# **Guidelines for the Use of Animals, Plants, and Other Organisms in the School Setting and in Outdoor Science Programs**



**Baltimore County Public Schools  
Towson, Maryland**

**Office of Science, PreK-12**

# Guidelines for the Use of Animals, Plants, and Other Organisms in the School Setting and in Outdoor Science Programs

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# Guidelines for the Use of Animals, Plants, and Other Organisms in the School Setting and in Outdoor Science Programs

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## I. PURPOSE:

To clarify the procedures for using animals (to include both vertebrates and invertebrates), plants, and other organisms in the classroom setting and in the outdoor science programs of the Baltimore County Public Schools, and to set standards for alternatives to dissections by students.

**NOTE: Before using any live or preserved specimens (animals, plants, fungi, protozoa, or microorganisms) in the classroom, teachers must refer to the [Maryland Science Safety Manual K-12, Section IX \(full manual found here\)](#) for guidelines, handling procedures, and precautions.**

## II. DEFINITIONS:

- **Animal:** The use of the word “animal” in these guidelines, unless otherwise stated, refers primarily to vertebrates (animals with backbones) and invertebrates (animals without backbones).
- **Venomous:** Organisms capable of delivering venom to other organisms through a bite or sting.
- **Poisonous:** Organisms whose poisons are delivered to other organisms when ingested, inhaled, or absorbed.
  - **Venomous or poisonous animal:** This includes but is not limited to rattlesnakes, copperheads, water moccasins, coral snakes, Gila monsters, black widow spiders, brown recluse spiders, bees, wasps, hornets, lionfish, stinging jellyfish, scorpions, and tarantulas.
  - **Venomous or poisonous plant:** This includes but is not limited to poison ivy, poison oak, poison sumac, and stinging nettle.
- **Wild mammal:** A mammal that lives on its own in a natural, undomesticated state. This includes but is not limited to bats, skunks, raccoons, foxes, minks, weasels, ferrets, opossums, stray or unvaccinated dogs or cats, ground squirrels, mice, rats, chipmunks, groundhogs, moles, and shrews.

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## III. INFORMATION: USE OF LIVE ANIMALS

The Baltimore County Office of Science supports the position of the National Science Teaching Association (NSTA) on the use of live animals in the science classroom that “encourages districts to ensure that animals are properly cared for and treated humanely, responsibly, and ethically. NSTA supports including live animals as part of instruction in the K-12 science classroom because observing and working with animals firsthand can spark students' interest in science as well as a general respect for life while reinforcing key concepts” ([Responsible Use of Live Animals and Dissection in the Science Classroom](#)).

*Prior to exploring the idea of having an animal in the classroom, teachers should consult the school nurse for information on all students with pet fur allergies.*

**A. General Rules (Elementary):** In elementary schools, live animals should be used in the classroom only for observational studies leading to the appreciation and understanding of various life forms and life processes. Teachers may plan lessons that involve students in the study of normal animal functions, such as:

- Communication
- Heredity and genetics
- Special senses
- Metabolism
- Activity cycles
- Learning processes
- Reproduction
- Growth
- Behavior
- Interrelationships of organisms

1. Whenever possible, animals should be observed in the wild.
2. **Students shall never be permitted to handle a restricted organism ([see Section VIII](#)) in the classroom or the field.**
3. In the Outdoor Science program, teacher naturalists occasionally capture, safely display, and then release *restricted organisms* that are unintentionally encountered in the natural environment. For a definition of restricted organisms, see the classifications in [Section VIII](#). The purpose in capturing and displaying restricted organisms is to make students aware that potentially harmful organisms are a normal part of the natural world. After being shown to students, these organisms are released back into their natural environments. Restricted organisms frequently encountered in the Outdoor Science program include but are not limited to non-venomous snakes (such as garter, hognose, water, and green); turtles; a few species of mammals (such as raccoons, muskrats, and opossums); and poisonous plants (such as poison ivy, poison oak, poison sumac [Genus, *Toxicodendron*], and stinging nettle [*Urtica dioica*]). ([See Appendix A](#)).

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**B. General Rules (Secondary):** In secondary school science programs, live animals may be used for observational studies as in elementary grades (see [Section A](#) above) and for experimentation studies as described below. Animals may be used in experimental studies according to the following guidelines:

1. Organisms such as various species of plants, bacteria, fungi, protozoa, worms, snails, insects, and other invertebrate animals should be used whenever possible for experiments and biological procedures involving living organisms.

2. Some sample plant, protozoan, and/or invertebrate projects include:

- germination
- genetics
- reproduction
- field studies and natural history (life cycle, incidence in nature, social structure, etc.)
- effect of light, temperature, and other environmental factors, or hormones on growth and development
- feeding behavior, nutritional requirements
- circulation of nutrients to tissues
- metabolism
- water balance
- excretion
- movement
- activity cycles and biological clocks
- responses to gravity and light
- perception to touch, humidity, or vibration
- learning and maze running
- habitation and communication
- pheromones
- observations of food chains and the interdependence of one species on another

3. No experimental procedures shall be attempted on mammals, birds, reptiles, amphibians, or fish that cause the animal pain or distinct discomfort or that interfere with its health. As a rule of thumb, a teacher shall undertake only those procedures on vertebrate animals that could be done on humans without pain or hazard to health.

4. Neither teachers nor students shall perform surgery on live vertebrate animals. Procedures requiring euthanasia and/or the administration of anesthesia are prohibited.

5. Examples of non-painful, non-hazardous projects involving vertebrate species (including, in some instances, human beings) include activities already mentioned under item 2 above and the following:

- group behavior
- normal growth and development
- properties of hair
- pulse rate and blood pressure

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- various normal behaviors such as grooming, reaction to novelty or alarm, nervous reflexes, and conditioned responses
  - special senses (touch, hearing, taste, smell, and proprioceptive responses)
  - respiration
6. Experimental procedures shall not involve use of microorganisms that can cause diseases in humans or animals, ionizing radiation, cancer-producing agents, or administration of alcohol or other harmful drugs or chemicals known to produce toxic or painful reactions or capable of producing birth defects. Exception: Approved laboratory activities embedded in current curricula (e.g., Biotechnology, Microbiology, Living Systems, Etc.) and in the Advanced Placement Biology Lab Manual are permitted. Teachers are cautioned to follow proper procedures when handling the microorganisms and to enforce safe procedures within the laboratory.
7. When non-pathogenic microorganisms are cultured for demonstration purposes, demonstration plates must be sealed with paraffin or tape. All microorganisms should be handled as if they were pathogens. Proper aseptic techniques should be used at all times when working with bacterial, viral, or microbial cultures. Decontamination prior to disposal must involve one of the following methods.
- a. Steam sterilization in an autoclave at a pressure of approximately 15 psi and a temperature of 121° C (250° F) for at least 15 minutes will destroy microbial life, including high numbers of microbial spores.
  - b. Dry heat sterilization at temperatures of 160-170°C (320-338°F) for 2-4 hours.
  - c. Place materials in double plastic bags tightly secured. These bags shall be transferred to the designated satellite waste storage area for pick-up by the Office of Environmental Services within BCPS Department of Physical Facilities (after completing required forms per Chemical Hygiene Plan).
  - d. The infectious waste may be immersed in household bleach for 6-10 hours. Treated materials may then be placed in double plastic bags tightly secured and disposed of in the regular trash.
8. Behavioral studies should use only reward (such as providing food) and not punishment (such as electric shock). Food, when used as reward, shall not be withdrawn for periods longer than 12 hours.
9. Diets deficient in essential nutrients are prohibited.
10. No blood should be drawn from living animals for use in the classroom.
11. The pithing of frogs is prohibited.
12. Science fair or other research projects involving animals should be reviewed in advance of the start of work by a qualified adult supervisor (ex. teacher, parent, scientist, etc.).

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Extracurricular projects involving vertebrate animals should be conducted in a suitable area in the school or scientist's laboratory, but not in the student's home. [International Science and Engineering Fair \(ISEF\)](#) Rules and Regulations should be used for all secondary (grades 6-12) science fair projects. The use of non-animal research methods and the use of alternatives to animal research are strongly encouraged and must be explored before conducting a vertebrate animal project. If the use of vertebrate animals is necessary, students must consider additional alternatives to reduce and refine the use of animals. When students conduct research with animal subjects, health and well-being is of high priority. For specific guidelines related to vertebrates see the [Society for Science - Vertebrate Animals](#) website.

13. High school students may take assistant positions, volunteer, and serve as interns with professional scientists working in established, USDA-registered research institutions.

14. Laboratory-bred or non-native species should not be released into the wild, as they may disrupt the ecosystem or harm the organism.

15. No animal or animal products from recognized endangered species should be kept and/or displayed.

16. **The feeding of live vertebrate animals to other live vertebrate animals (e.g., feeding of a rodent to a snake) shall never be done in view of students.**

**C. Live Animal Care and Safety Factors in the School Setting:** When using animals not included on the restricted organism list ([see Section VIII](#)), **it is the responsibility of the teacher to seek the approval of the principal and the Office of Science prior to bringing animals into the classroom** ([officeofscience@bcps.org](mailto:officeofscience@bcps.org)).

1. Preparations for the use of animals not included on the restricted list should include:
  - acquisition of knowledge on the type and nature of care appropriate for that species
  - housing and other equipment needs
  - food
  - planning for care of the living creature after the completion of the study
2. The purpose of having an animal in the school setting is to enhance the learning process for students. The teacher has the responsibility to:
  - a. assure that the animal is obtained from a qualified animal distributor, licensed pet shop, or breeder.
  - b. provide a safe and healthful area to maintain the animal in the classroom. ([See Section V](#))

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- c. assure that the adult/teacher caring for the animal knows how to properly feed, water, and handle the animal.
- d. maintain a latched or locked cage for the animal, as appropriate. Often, the food put out for an organism in the classroom is attractive to other organisms and may lead to rodent or insect infestations. The adult responsible for the care of the organism should, therefore, carefully consider the type of material used in cage construction (e.g., gauge of screening, size, shape, and fit of lids and doors, spacing of spindles, etc.) to minimize the chance of rodent or insect infestations. ([See Section VI](#))
- e. assure that the animal is properly immunized, including a current rabies vaccination, as appropriate.
- f. monitor daytime and nighttime classroom temperatures as appropriate for specific animals.
- g. design a plan for animal care over weekends, holidays, and on those days when schools are not in session as well as during emergency school closings or if the regular caregiver is not available.
- h. verify that the animal is certified by the vendor to be free of Lymphocytic Choriomeningitis (LCM). LCM is an uncommon but potentially serious viral disease transmitted to humans by infected guinea pigs, hamsters, and mice. ([See Appendix C](#))
- i. maintain a file of all documentation on classroom animals that they may have.
- j. The feeding of live vertebrate animals to other live vertebrate animals (e.g., feeding of a rodent to a snake) shall never be done in view of students.**



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## IV. INFORMATION: USE OF DEAD ANIMALS

The Baltimore County Office of Science supports the position of the National Science Teaching Association (NSTA) on the use of dissection in the science classroom “that help students:

1. develop skills of observation and comparison,
2. discover the shared and unique structures and processes of specific organisms, and
3. develop a greater appreciation for the complexity of life.” ([Responsible Use of Live Animals and Dissection in the Science Classroom](#)).

When called for in the curriculum, dissection of a preserved specimen is an appropriate and valuable educational activity. The following are guidelines that must be followed when considering dissection in a BCPS classroom.

- A. Dissection specimens should only be obtained from a reputable educational supply source and should be kept in sealed containers until use. Wild animals recently killed by motor vehicles (often referred to as “road kills”) are inappropriate for use in the classroom.
- B. Students are permitted to handle fresh animal tissue (such as chicken wings, liver, pig’s feet, etc.) if purchased from a grocery store and have met USDA standards for human consumption. Tissues should be stored properly until their use. The use of animal blood in the classroom is prohibited.
- C. When appropriate to the curriculum, students are permitted to dissect preserved animal parts (such as hearts, brain, eyes, etc.) if they have been obtained from a reputable educational supply source. Preserved specimens used in the classroom should be formaldehyde-free.
- D. When handling dissection specimens or fresh tissues it is important that:
  - students be properly gloved,
  - students wear goggles,
  - students be cautioned about putting fingers or items such as pencils in their mouths,
  - students thoroughly wash their hands after the activity, and
  - surfaces be thoroughly wiped with a disinfecting solution upon completion of the activity.
- E. All dissection activities must be:
  - conducted with consideration and appreciation for the organism,
  - conducted in a clean and organized workspace with care and laboratory precision,
  - appropriate for the maturity level of the students, and
  - based on carefully planned objectives.
- F. **The use of cats or fetal pigs for dissection is not permitted in any class.** If dissection of a whole mammal species is required, teachers are directed to use only laboratory rats that are available through reputable educational supply source.
- G. Science teachers of courses in which dissections are utilized for study shall:
  - a. **inform the student in writing at the beginning of a course that it involves animal dissection during the course.** The intent of this notification is to:

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- assure that both students and parents understand that one of the requirements for the course is dissection of a preserved specimen; and
  - to provide a rationale for the appropriateness of dissection in that course.
- b. obtain signatures from students and parents and keep the signed notices on file for four years.
- c. be open to suitable and equivalent alternative educational activities for students whose parents request it in writing. Parental requests for alternative assignments must be made to the school principal at least two weeks prior to the activity. Please refer to [Appendix D](#) for a list of alternatives to dissection.
- d. respond appropriately to views or beliefs of students who are sensitive to dissection. For example, teachers must:
- be able to provide equivalent and appropriate alternative assignments for a student who is opposed to dissection ([see Appendix D](#)),
  - not react in a negative way to a student's personal beliefs or attitudes about dissection, and
  - not lower a student's grade if that student is opposed to dissection and is willing to do an alternative assignment.

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### **V. PERSONAL HEALTH BEHAVIORS WHEN CARING FOR ANIMALS**

Follow these precautions when caring for animals:

- A. Wash hands and exposed areas with soap and water immediately after handling or feeding animals and after cleaning cages.
- B. Avoid hand-to-mouth contact when handling animals or cages.
- C. Clean and disinfect cages as appropriate to the animal's requirements to insure clean and odor free cages.
- D. Dispose of feces and bedding in a sanitary manner by sealing in plastic bags and placing it in a dumpster for removal to sanitary landfill.
- E. Do not place animals, animal feed, or cages in areas where food for human consumption is stored, prepared, or consumed.
- F. Keep all animal food in rodent resistant containers.
- G. Report any bite, scratch, or equipment-inflicted injury of a student, including allergies or illness, to the school nurse and principal at once.
- H. Clean, thick gloves and appropriate clothing are recommended when handling animals to prevent bites or scratches.

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## VI. SAFETY ASPECTS FOR ANIMALS IN THE SCHOOLS

### A. Cages

1. Cages should be constructed of 1/4-inch metal mesh (hardware cloth) or finer to prevent finger insertion.
2. Students should not place bare hands into cages.
3. Keep cages clean of wastes.
4. Cages and equipment for cages should be sterilized before and after use, and frequently during use. Rinse cages thoroughly with tap water.

### B. Aquaria and Terraria

1. Students should not place bare hands into aquaria and terraria.
2. Keep aquaria and terraria clean of wastes. Careful cleaning is essential so that organic materials do not act as a reservoir for microorganisms.
3. Remove mineral accumulation with a vinegar solution and rinse.
4. Do not store glass aquaria at the floor level.

### C. Insect Collections

A killing jar for insects can be prepared by taping a swab of cotton moistened with ethyl acetate, acetone, or fingernail polish remover into the lid. Potassium cyanide is NOT permitted.

The Outdoor Science programs may involve students collecting insects with sweep nets. Venomous insects such as wasps, bees, and hornets are frequently captured. Parent volunteers, trail guides, and staff members place captured venomous insects into glass collecting jars for student observation. The insects are eventually released. Every precaution must be undertaken to prevent students from insect stings and bites. Classroom teachers and parents accompanying their students must:

- **be aware of which students are at risk for allergic reactions to insect and spider stings and bites,**
- **carry appropriate medical kits, and**
- **be trained in the administration of medications and treatments for allergic reactions resulting from insect stings or bites.**

Insects, especially bees and wasps, are frequent visitors while students are eating lunch outside. **Students should be reminded not to swing or swat at a stinging insect that is attracted to food or drinks.**

All spiders are venomous, although most have fangs that cannot penetrate human skin. Follow the same procedures for spider bites as for venomous insect bites.

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**TICK ALERT:** At all outdoor sites, it is possible to contact deer ticks and wood ticks in the field. **Have students check for ticks after the outdoor experience and again when they return to their classroom.** For information about ticks, [see Appendix B](#). It is recommended that teachers present information to students about deer ticks and Lyme disease before taking part in any outdoor activities, whether on the school campus or at an outdoor center.

## D. Chick Embryos and Baby Chicks

**NOTE: The Office of Science must approve all embryo investigations.**

1. In producing embryos for study, no embryo developed more than 18 days should be used. If chick eggs are hatched, the teacher must abide by Maryland Law described in item 4 (in this section) below.
2. Do not work with virus-injected eggs.
3. Because of the possibility of the presence of pathogenic bacteria, properly dispose of dead embryos.
4. In the state of Maryland, it is unlawful for any person, firm, or corporation to sell, offer for sale, barter, or give away baby chickens, ducklings, or other fowl, (under three weeks of age) as pets, toys, premiums, novelties or to color, dye, stain, or otherwise change the natural color of the baby chickens, ducklings, or other fowl.

## VII. RELATED PROCEDURES: HUMAN TISSUES

Due to safety and health issues, the following list is prohibited in all classroom and laboratory settings in BCPS:

1. Human blood
2. Human cheek cells
3. Human body fluids (saliva, urine, etc.) and wastes

Exception: Preserved slides of the items listed above.

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## VIII. LIVE ANIMALS: RISK CLASSIFICATION

There are three identified levels of risk in using animals in the classroom. These levels are as follows:

**Class I Unrestricted** – Organisms that are safe for classroom use, maintenance, etc.; presenting minimal risk of injury or infection.

**Class II Conditional** – Organisms that present risk of infection or injury only to certain persons, or organisms that present risk of infection or injury unless specific precautions are taken.

**Class III Restricted** – Organisms that present a high risk of infection or injury and may not be used in the classroom or laboratory without special permission.

Following is a summary of the animals and organisms in each class of risk. The teacher must become familiar with the necessary precautions to be followed when handling each specimen. Should a question arise, please contact the Office of Science ([officeofscience@bcps.org](mailto:officeofscience@bcps.org)).

### **Class I Unrestricted**

Within the limits of proper care and sanitation, these organisms present minimal risk of injury or infection and are safe for classroom and laboratory use. The precautions in the footnotes should be followed.

Laboratory Mice <sup>1,2</sup>

Laboratory Rabbits <sup>2</sup>

Laboratory Rats <sup>2</sup>

Guinea Pigs <sup>1</sup>

Golden Hamsters <sup>1,2</sup>

Nonpoisonous small reptiles or amphibians <sup>3</sup>

Gerbils <sup>2</sup>

Protozoan species supplied by a microbiology teaching center or biological supply house

Other species not otherwise restricted in Classes II or III, as approved

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<sup>1</sup> It is recommended that these animals be certified by the vendor as “LCM Free.” LCM (Lymphocytic Choriomeningitis) is an uncommon but serious viral disease transmitted to humans from infected house mice, and/or naturally infected guinea pigs, hamsters, mice, monkeys, dogs, or swine. Cages should be of such construction and location to prevent any contact with wild mice that might transmit LCM virus to caged laboratory animals. [See Appendix C](#) for more information about LCM.

<sup>2</sup> It is recommended that leather gloves be worn when handling animals to prevent bites or scratches. Report any accident or injury of a student to the school nurse.

<sup>3</sup> Hands should be washed after handling reptiles and/or amphibians due to the possibility of toxic secretions.

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### **Class II – Conditional**

These organisms present a risk of infection or injury either to certain susceptible persons or hosts unless certain precautions are taken. The use of these organisms requires meeting all conditions prescribed.

<b><u>Organism</u></b>	<b><u>Risk</u></b>	<b><u>Conditions For Safe Use</u></b>
Domestic Cat	Toxoplasmosis	Hazard of infection to pregnant women transmitted by eggs shed in cat feces. Observe precautions A, C, and D located below. Women should avoid contact during pregnancy.
	Larva Migrans	Associated with certain intestinal Ascarid worms. Can be precluded by effective de-worming. Observe Precautions A, C, and D located below.
Domestic Dog and Cat	Traumatic injury; tooth or claw	Use only dogs or cats having recent certification of rabies vaccination. Do not allow stray animals in the classroom. Apply precaution H and consider any scratch or bite as significant. Apply Precautions A and E immediately. Report injury immediately to the school.
Birds – wild or domestic	<i>Salmonella</i> ; often carry lice; injury from beak and claw	Apply precautions A, B, C, D, F, G, and H.
Pure cultures of bacteria or fungi	Infection and contamination of classroom surfaces	Transfer or maintenance should be attempted only by trained teachers or aides. Use should be within the guidelines specified in the Science Safety Manual, <a href="#">Section IX</a> sections C and E and bulletins of a microbiology teaching center of biological supply house. Apply precautions A, C, E, F, and G.

### **Precautions**

- A. Wash hands and exposed areas with soap and water immediately after handling.
- B. Clean cages daily with disinfectant.
- C. Avoid hand-to-mouth contact.
- D. Dispose of feces in a sanitary manner (flush into toilet or place in dumpster for removal).
- E. Do not place animals, animal feed, or cages in areas where food for human consumption is stored, prepared, or consumed.
- F. Keep all animal food in rodent resistant containers.
- G. Report any bite, scratch, or equipment-inflicted injury of a student including allergies or illness to the school nurse and principal at once.
- H. Clean, thick gloves and appropriate clothing are recommended when handling animals to prevent bites or scratches.

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### Class III – Restricted

These organisms present a high risk of infection and/or injury and *may not be used in the classroom or laboratory without permission obtained by the Office of Science* ([officeofscience@bcps.org](mailto:officeofscience@bcps.org)).

Species Type	Risk
1. Any species of microorganism known to cause human, plant, or animal disease. See exceptions in <a href="#">Section III</a> section B.	No sources of infection should ever be found in the classroom or laboratory.
2. Any species of venomous animals including but not limited to certain reptiles, amphibians, insects, arachnids, and poisonous or venomous plants such as poison ivy, poison oak, poison sumac, and stinging nettle.	<b>*Toxic reaction source</b>
3. Any species of sub-human primate including but not limited to apes, monkeys, marmosets, lemurs, etc.	Carriers of a wide variety of simian viruses, many of which are virulent and fatal to humans; <b>*traumatic injury source</b>
4. Any bats.	<b>*Endemic rabies</b>
5. Any piranha or similarly sizable, aggressive, or dangerous exotic fish species.	<b>*Traumatic injury source</b>
6. Any turtles under 4 inches in diameter.	<b>*Salmonella infection source;</b> restricted by State Law
7. Any crocodilians (crocodiles, alligators).	<b>*Traumatic injury source</b>
8. Any carnivorous mammals other than dogs or cats (including but not limited to raccoons, skunks, foxes, ferrets, weasels, opossums, coatis, including pups, cubs or kits from any source).	<b>*Cannot be certifiably immunized against rabies; presents high risk</b>
9. Any wild rodent (including but not limited to ground squirrels, squirrels, mice, rats, moles, rabbits, chipmunks, groundhogs, etc.).	<b>Undefined source of rabies virus.</b> Several species known to carry bacterial infections dangerous to humans. Regular carriers of ectoparasitic lice and ticks that may transmit serious bacterial or rickettsial infections; <b>*traumatic injury source</b>

### \*Traumatic Injury – Animal Bites

For non-rabies source organisms (such as reptiles, amphibians, fish, turtles, birds, insects, etc.) that do not carry or transmit rabies virus: **Send injured person with another person to the school nurse for first aid treatment.**



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For rabies source organisms (such as carnivorous mammals, rodents, bats, and species of sub-human primates, etc.): **Report bites or scratches to the school nurse immediately and to the Office of Science on the day of occurrence** ([officeofscience@bcps.org](mailto:officeofscience@bcps.org)).

## Disease Glossary

**Psittacosis and Ornithosis** (*Chlamydia psittaci*) –infections transmitted to humans by birds of various species (including turkeys). These diseases are serious respiratory infections. Infections are not a serious risk if birds are acquired from licensed animal dealers in this state. The requirements imposed on dealers to inoculate, and quarantine imported birds provide reasonable protection against entry of infected birds into the local market.

**Histoplasmosis** (*Histoplasma capsulatum*) – a fungal infection producing serious respiratory illness in susceptible hosts. This is known to be a problem when bird droppings have accumulated over very long periods of time. Regular cage cleaning and sanitary disposal of bird or fowl droppings should prevent any hazard.

**Plague** (*Yersinia pestis*) – a bacterial infection that is endemic among wild rodent populations in certain areas. The Center for Disease Control (CDC) of the Public Health Service tracks plague cases, see information on their [website](#). Care should be taken to warn students to avoid contact with any wild rodents, living or dead.

**Tularemia** (*Francisella tularensis*) – is an infection of wild rabbits that is easily transmitted to humans. The bacteria can pass through unbroken skin. The same caution noted under plague should be stressed with students.

## **IX. MAINTAINING AND UPDATING THESE PROCEDURES:**

The Office of Science will maintain and update these procedures, as necessary.

## **X. EFFECTIVE DATE:**

October 1, 2003; Revised 2013, 2021

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*Disclaimer: Links from the Guidelines for the Use of Animals, Plants, and Other Organisms in the School Setting and in Outdoor Science Programs to other sites are provided for your convenience and information only and do not constitute an endorsement by the BCPS Office of Science, PreK-12. We are not responsible for and do not control nor monitor the content of these sites. If you find a broken link or one that you feel is misdirected, contact us immediately at [officeofscience@bcps.org](mailto:officeofscience@bcps.org).*

## APPENDIX A: POISONOUS and VENEMOUS PLANTS

### 1. **Poison Ivy** (*Toxicodendron radicans*), **Poison Oak** (*Toxicodendron pubescens*), and **Poison Sumac** (*Toxicodendron vernix*)

NOTE: Teachers and parent helpers should visit [Medline Plus](#) for detailed information about these common poisonous plants. Other websites are provided below.



The information below is from the [Food and Drug Administration](#):

#### **Recognizing Poison Ivy, Poison Oak, and Poison Sumac**

**Poison Ivy:** Found throughout the United States except Alaska, Hawaii, and parts of the West Coast. Can grow as a vine or small shrub trailing along the ground or climbing on low plants, trees and poles. Each leaf has three glossy leaflets, with smooth or toothed edges. Leaves are reddish in spring, green in summer, and yellow, orange, or red in fall. May have greenish-white flowers and whitish-yellow berries.

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**Poison Oak:** Grows as a low shrub in the Eastern and Southern United States, and in tall clumps or long vines on the Pacific Coast. Fuzzy green leaves in clusters of three are lobed or deeply toothed with rounded tips. May have yellow-white berries.

**Poison Sumac:** Grows as a tall shrub or small tree in bogs or swamps in the Northeast, Midwest, and parts of the Southeast. Each leaf has clusters of seven to 13 smooth-edged leaflets. Leaves are orange in spring, green in summer, and yellow, orange, or red in fall. May have yellow-greenish flowers and whitish-green fruits hang in loose clusters.

## Poison Plant Rashes Aren't Contagious

Poison ivy and other poison plant rashes can't be spread from person to person. But it is possible to pick up the rash from plant oil that may have stuck to clothing, pets, garden tools, and other items that have come in contact with these plants. The plant oil lingers (sometimes for years) on virtually any surface until it's washed off with water or rubbing alcohol.

The rash will occur only where the plant oil has touched the skin, so a person with poison ivy can't spread it on the body by scratching. It may seem like the rash is spreading if it appears over time instead of all at once. But this is either because the plant oil is absorbed at different rates on different parts of the body or because of repeated exposure to contaminated objects or plant oil trapped under the fingernails. Even if blisters break, the fluid in the blisters is not plant oil and cannot further spread the rash.

## Tips for Prevention

Learn what [poison ivy, oak, and sumac plants look like](#) so you can avoid them ([watch our video](#)).

Wash your garden tools and gloves regularly. If you think you may be working around poison ivy, wear long sleeves, long pants tucked into boots, and impermeable gloves.

Wash your pet if it may have brushed up against poison ivy, oak, or sumac. Use pet shampoo and water while wearing rubber gloves, such as dishwashing gloves. Most pets are not sensitive to poison ivy, but the oil can stick to their fur and cause a reaction in someone who pets them.

Wash your skin in soap and cool water as soon as possible if you come in contact with a poisonous plant. The sooner you cleanse the skin, the greater the chance that you can remove the plant oil or help prevent further spread.

## Tips for Treatment

Don't scratch the blisters. Bacteria from under your fingernails can get into them and cause an infection. The rash, blisters, and itch normally disappear in several weeks without any treatment.

You can relieve the itch by:

- Using wet compresses or soaking in cool water.

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- Applying over the counter (OTC) topical corticosteroid preparations or taking prescription oral corticosteroids.
- Applying topical OTC skin protectants, such as zinc acetate, zinc carbonate, zinc oxide, and calamine dry the oozing and weeping of poison ivy, poison oak, and poison sumac. Protectants such as baking soda or colloidal oatmeal relieve minor irritation and itching. Aluminum acetate is an astringent that relieves rash.

See a doctor if:

- You have a temperature over 100° Fahrenheit.
- There is pus, soft yellow scabs, or tenderness on the rash.
- The itching gets worse or keeps you awake at night.
- The rash spreads to your eyes, mouth, genital area, or covers more than one-fourth of your skin.
- The rash is not improving within a few weeks.
- The rash is widespread and severe.
- You have difficulty breathing.

For more information about poison ivy and its relatives, visit these other websites:

- [Mayo Clinic - Poison Ivy](#)
- [Pediatrics - Poison Ivy](#)
- [Drugs.com - Poison Ivy](#)
- [WebMD Poison Ivy, Oak, or Sumac](#)
- [Medline Plus Poison Ivy, Oak, and Sumac](#)
- [National Institute for Occupational Safety and Health Poisonous Plants](#)

### 2. Stinging Nettle or Wood (Bull) Nettle *Urtica dioica*; *Laportea canadensis*

**Dangerous Parts of the Plant:** Stems, leaves

**Toxicity Rating:** low; local irritation is the most common sign, which typically resolves on its own within 24 hours.

**Plant Description:** These herbaceous perennials are common on moist ground in flood plains, woodlands, and along streams and riverbanks. They often occur in colonies so large that they are the only herbaceous plant present. The tough unbranched stems grow 2 to 5 feet tall from fibrous roots and are covered with stinging bristles. The leaves are opposite, thin, egg-shaped, toothed, and tapered at the tip. They measure 2 to 6 inches by 1 to 2 inches in stinging nettle and 3 to 8 inches by 3 to 5 inches in wood nettle. The 3 to 5 main veins from the base make the leaf (especially in wood nettle) strongly resemble the leaves of white snakeroot. However, the stinging hairs on the lower surface of the leaves prove the plant's identity. The tiny, green or greenish-white flowers droop in axillary clusters in stinging nettle and stand upright in branching clusters at the top of the stem in wood nettles.

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**Signs:** Stinging nettle rash occurs when the skin comes into contact with stinging nettles. The small, hollow hairs in stinging nettle contain several irritating substances such as histamine (the mediator of some allergic reactions), serotonin, acetylcholine, and formic acid (ants contain a high concentration of formic acid). These substances, coupled with the hairs ability to scratch the skin and mucus membranes, results in almost immediate burning, itching, and irritation. As the skin reacts, a rash forms lasting about a day. Stinging nettle can cause facial, skin, and possible ocular irritation.

**First Aid:** Limit further exposure as much as possible. If you come in contact with stinging nettle:

- Stinging nettle acid can be neutralized by applying a paste of baking soda (made by adding a little water).
- Wash the area with soap and water.
- Apply a moistened cloth and/or ice pack to the affected area.
- Severe reactions may occur that last longer than 24 hours. Scratching can lead to infection of the area.
- An allergic reaction to one of the chemicals in the stinging nettle is the most severe complication of stinging nettle rash and can be life-threatening. Consult a medical provider if symptoms are severe and/or you experience an allergic reaction.

**Prevention:** The best prevention is to avoid contact with stinging nettle plants. Wearing long sleeves and long pants can help reduce contact with stinging nettle plants.



Image by [John Tann](#)  
from Sydney, Australia CC BY 2.0



[Image Source](#)

# Guidelines for the Use of Animals, Plants, and Other Organisms in the School Setting and in Outdoor Science Programs

## APPENDIX B: TICKS

### Protect Yourself from Tick-Borne Diseases

Ticks can carry and transmit (vector) a wide variety of disease-causing organisms (pathogens). Different kinds (species) of ticks generally transmit different pathogens, that is, they are considered vectors for specific disease organisms. Some ticks can be vectors for more than one kind of pathogen.

Not all ticks are infected, so a tick bite does not necessarily mean you will get a disease. In addition, even if a tick is infected it must be attached to your skin for at least several hours before it can successfully transmit the pathogens to you. Therefore, the sooner you removed the attached ticks, the safer you will be.

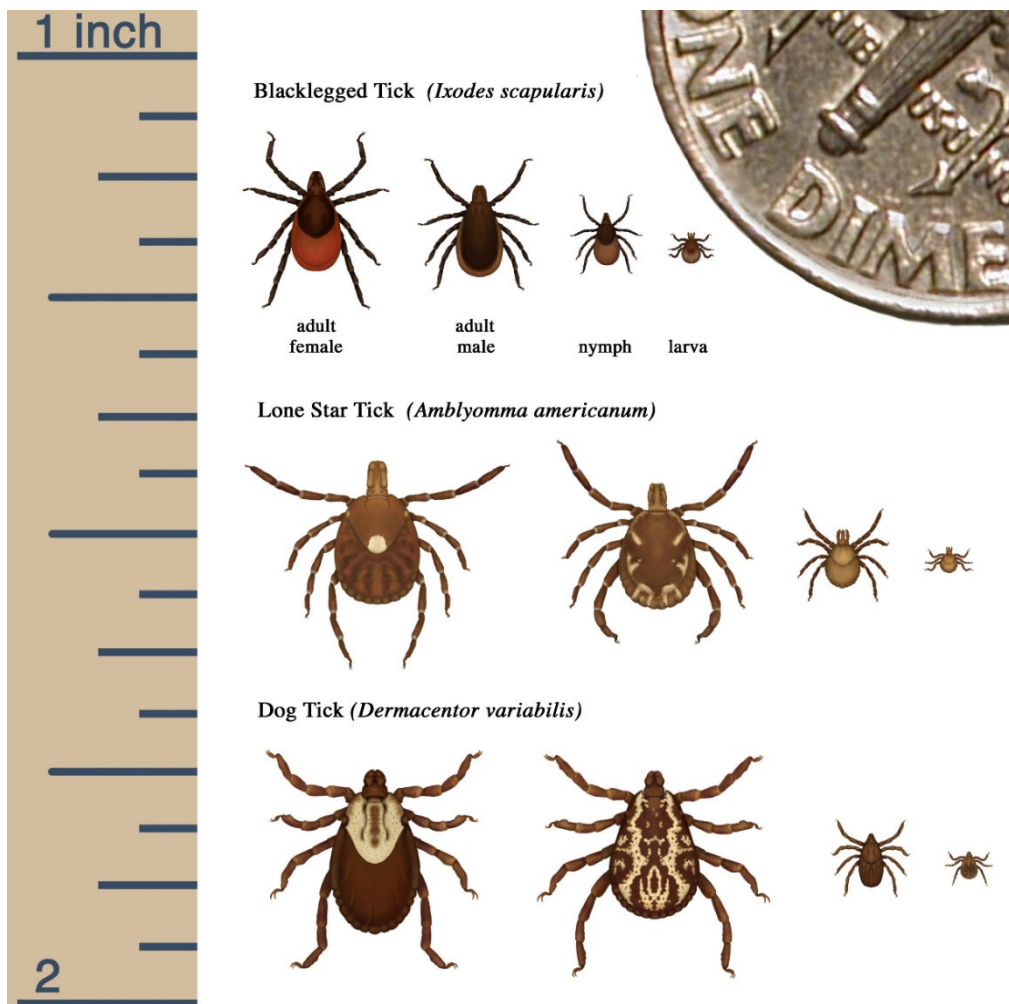


Image and content from the [Centers for Disease Control](https://www.cdc.gov) (CDC).



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There are additional tick species that bite humans in limited areas of the United States. They include: *Ixodes pacificus* (western black-legged tick) which looks identical to *Ixodes scapularis* and transmits the same or closely related pathogens as that tick species but is present only in the Pacific Coast states; and *Dermacentor andersoni* (Rocky Mountain wood tick), which looks very similar to *Dermacentor variabilis*, and transmits Rocky Mountain spotted fever (RMSF).

Rocky Mountain spotted fever (RMSF) is a bacterial disease spread through the bite of an infected tick. Most people who get sick with RMSF will have a fever, headache, and rash. Additional symptoms may include nausea, vomiting, stomach pain, muscle pain, and lack of appetite. Rash is a common sign in people who are sick with RMSF. Rash usually develops 2-4 days after fever begins. The look of the rash can vary widely over the course of illness. Some rashes can look like red splotches and some look like pinpoint dots. While almost all patients with RMSF will develop a rash, it often does not appear early in illness, which can make RMSF difficult to diagnose. RMSF can be deadly if not treated early with the right antibiotic. As of January 1, 2010, cases of RMSF are reported under a new category called Spotted Fever Rickettsiosis (SFR). For additional information about RMSF see the [CDC website](#).

### Lyme Disease Fact Sheet

Lyme disease is the most common vector-borne disease in the United States. Lyme disease is caused by the bacterium *Borrelia burgdorferi* and rarely, *Borrelia mayonii*. It is transmitted to humans through the bite of infected blacklegged ticks.

Some of the signs and symptoms of Lyme disease include:

- A red-ringed bull's eye rash that appears usually 1 to 2 weeks after the disease is transmitted. The rash may persist for 3 to 5 weeks.
- Fatigue
- Headache
- Aches
- Joint pain and arthritis-like symptoms
- Chills
- Enlarged lymph nodes (lymph glands)
- Sore Throat
- Fever

CHARACTERISTIC SKIN RASH OF LYME DISEASE



Symptoms usually appear within a week of infection but may develop up to 30 days after the tick bite. In some cases, there are no symptoms at all. Treatment of Lyme disease involves a course of antibiotics that are taken for 3 to 4 weeks. Most cases of Lyme disease can be treated successfully with a few weeks of antibiotics. Treatment with antibiotics is more effective if Lyme disease is diagnosed in its early stages.

Lyme disease is usually diagnosed by the appearance of the circular bull-eye's rash. In the absence of the rash, blood tests may be necessary to obtain diagnosis.

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There are several ways to prevent Lyme disease. These include:

- Wear enclosed shoes and boots, long-sleeved shirts, and long pants. Tuck pants into boots or shoes to prevent ticks from crawling up the legs.
- Wear light-colored clothing that makes it easier to spot crawling ticks.
- Keep long hair pulled back or tucked into a cap for added protection.
- While outdoors check yourself and your child frequently for ticks.
- If you are a student, you can do a “buddy check” or “spot check.” Take turns with a friend to check each other for ticks.
- Apply insect repellent to any bare skin areas that are not covered by clothing, with adult supervision.

Ticks can bite anywhere, but they prefer certain areas of the body such as behind the ears, the back of the neck, under the arms, in the groin area, and behind the knees.

Additional information can be found on the [University of Maryland Extension Ticks in Maryland](#) website.



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## APPENDIX C: LYMPHOCYTIC CHORIOMENINGITIS (LCM)

**Definition:** Lymphocytic choriomeningitis (LCM) is a viral infection of the membranes surrounding the brain and spinal cord and of the cerebrospinal fluid.

**Description:** Lymphocytic choriomeningitis virus infection is relatively rare, and recovery usually occurs spontaneously within a couple of weeks. Many cases are probably not even identified because the symptoms range from extremely mild to those resembling severe flu. A few patients develop symptoms of meningitis. In some rare cases, the LCM viral infection can spread throughout the central nervous system and may even be fatal.

**Causes and symptoms:** LCM is caused by an arenavirus, which is an RNA virus and is a mild cousin in the family containing the much more threatening arenaviruses that cause hemorrhagic fever. Humans acquire LCM virus from infected rodents by coming in contact with the animals or their excretions. Exposure to the virus is not as unlikely to occur, as it seems, because the viral hosts can be common house mice and even pets, such as hamsters and chinchillas. Most cases of LCM occur in fall and winter, when mice seek warmth inside dwellings. Food and dust can become contaminated by the excretions of rodents infected with LCM virus. In 1997, French scientists alerted physicians to suspect LCM viral infection in people who had contact with Syrian hamsters.

The symptoms of LCM occur in two phases. The first stage (prodrome phase) can produce fever, chills, muscle aches, cough, and vomiting. In the second phase, characteristic meningitis symptoms of headache, stiff neck, listlessness, and nausea and vomiting may occur. In adults, complications are rare, and recovery may even occur before the second phase.

The virus is not spread from person to person, except through pregnancy. LCM virus is one of the few viruses that can cross the placenta from mother to child during pregnancy and may be an under-recognized cause of congenital infection in newborns. Infection with cytomegalovirus, (*Toxoplasma gondii*) or LCM virus can appear similar enough in infants to be confused when diagnosed. In cases that have been recognized among infants, LCM viral infection has a high mortality rate (about one-third of the babies studied died).

**Diagnosis:** LCM can be distinguished from bacterial meningitis by the history of prodrome symptoms and the period of time before meningitis symptoms begin, which is about 15-21 days for LCM.

**Treatment:** No antiviral agents exist for LCM virus. Treatment consists of supporting the patient and treating the symptoms until the infection subsides, generally within a few weeks.

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## APPENDIX D: ALTERNATIVES TO DISSECTION

The major BCPS approved biological science vendors offer products that can be used as alternatives to dissection. These products vary in price, typically ranging from \$50.00 to \$400.00, depending on the nature of the item under consideration. Products are often in the form of site licenses for interactive, web-based software, but may include videos, DVDs, and/or CD-ROMs.

### Additional Resources for Alternatives to Dissection:

Wellesley College offers online videos of a [crayfish, frog, and sheep brain dissection](#).

[Virtual Pig Dissection](#) by Whitman College. Students click through various categories related to the anatomy of the fetal pig.

[Dissection 101 Resources](#) from PBS contains videos and/or resources for dogfish shark, earthworm, clam, crayfish, sea star, sheep heart, cow eye, frog, and perch dissections.

[The Biology Corner](#) has lesson plans, worksheets, tutorials and resources for teachers and students related to dissections (materials include frog, fetal pig, rat, and other organisms).

With the [Virtual Frog Dissection Kit](#), you can both dissect a frog, and use the Virtual Frog Builder game to put one back together. The interactive pages are available in seven different languages.

[Exploratorium's](#) online Cow Eye Dissection has videos, graphics, and information about the eye.

Access dissection videos, photos, slideshows, worksheets, and quizzes from [ZeroBio](#). Click on Grade 11 and/or Grade 12 to explore the resources. Videos include the fetal pig, frog, and sheep heart.

[The Frog: A Virtual Dissection](#) – students click through to view images and learn about the frog anatomy.

[Frog Dissection Video](#) – YouTube video of students conducting a frog dissection.

[Virtual Dissection Library Resources](#) – Fox Valley Technical College collection of links to resources related to virtual dissections.

[The Science Bank](#) includes items that can be loaned for use as alternatives to dissection. It also includes links to online resources in their other resources section. This site offers free items but requires payment for return shipping expenses.

[Anatomy Corner](#) contains a variety of resources, including images, videos, and quizzes about anatomical structures.

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