

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

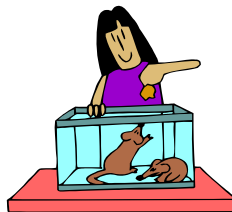


**Baltimore County Public Schools  
Towson, Maryland**

**Office of Science  
2003**

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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, or microorganisms) in the classroom, teachers must refer to the *Maryland Science Safety Manual K-12*, Section IX, pages 4-20, 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).
- **Any venomous (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.
- **Any venomous (poisonous) plant:** This includes but is not limited to: poison ivy, poison oak, poison sumac, and stinging nettle.
- **Any wild mammal:** 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.

## III. INFORMATION: USE OF LIVE ANIMALS

### 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         | • Learning processes              |
| • Heredity and genetics | • Reproduction                    |
| • Special senses        | • Growth                          |
| • Metabolism            | • Behavior                        |
| • Activity cycles       | • Interrelationships of organisms |

1. Teachers and students should consider studying plants, non-harmful bacteria, fungi, protozoa, worms, snails, insects and other invertebrates, farm animals, zoo animals, wild animals, domestic pets, and themselves.
2. Whenever possible, animals should be observed in the wild.

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3. **Students shall never be permitted to handle a restricted organism in the classroom or the field.**
  4. In the Outdoor Science program, teacher naturalists occasionally capture, safely display, and then release *restricted organisms* that are accidentally encountered in the natural environment. For a definition of Restricted Organisms, see the classifications on pages 10 - 12. 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*]). Please refer to the specific information about poisonous plants provided in Appendix A.
- B. General Rules (Secondary):** In secondary school science programs, live animals may be used for observational studies as in A above and also 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:
    - field studies and natural history (life cycle, incidence in nature, social structure, etc.)
    - germination
    - genetics
    - reproduction
    - 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.**

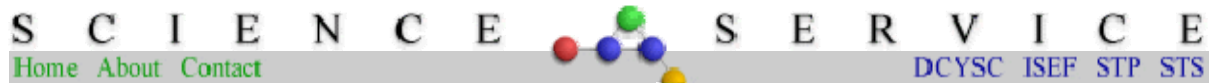
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4. Neither teachers nor students shall perform surgery on live vertebrate animals.
5. Examples of non-painful, non-hazardous projects involving vertebrate species (including, in some instances, human beings) include activities already mentioned under item 2 above and the following:
  - group behavior
  - normal growth and development
  - properties of hair
  - pulse rate and blood pressure
  - 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. When non-pathogenic microorganisms are cultured for demonstration purposes, demonstration plates must be sealed with paraffin or tape. To dispose of these materials, place them in double plastic bags secured by twist ties. **Exception: Laboratory activities involving microorganisms, which are required in the Advanced Placement Biology curriculum (e.g., development of Ampicillin-resistant *E. coli.*), are permitted. However, teachers are cautioned to follow proper procedures when handling the microorganisms and to enforce safe procedures within the laboratory.)**
7. 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.
8. Diets deficient in essential nutrients are prohibited.
9. On rare occasions, it may be appropriate to pith a live frog for an educational demonstration. The correct procedure is rapid and virtually painless, and the animal should never recover consciousness. However, if done incorrectly, this procedure can cause pain. The technique should be learned initially using dead animals. **Only a teacher knowledgeable in the technique should undertake pithing live animals.** Maximum efforts should be made to study many biological principles and to utilize as many body tissues as possible from a single animal.
10. No procedure requiring euthanasia and/or the administration of anesthesia, including the pithing of a frog, should be done in the classroom in front of students.
11. Science fair or other research projects involving animals should be reviewed in advance of the start of work by a qualified adult supervisor (teacher, parent, scientist, or others). 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. Refer to the "Position Statement on the Use

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of Animals in Pre-College Science Research” provided on the following page, or go to (<http://www.sciserv.org/position.asp>).



## Position Statement on the Use of Animals in Pre-College Science Research

Science Service affirms its conviction that the humane use of animals by students under qualified adult supervision is necessary and important for learning about the life sciences. As science educators, one of our major roles is to establish guidelines for the appropriate use of animals in pre-college research projects and in classrooms. We are committed to the promulgation and strict enforcement of existing rules that were designed to ensure the humane and proper treatment of any animal used in our science competitions.

The International Rules and Guidelines have been written to teach students about the humane treatment of animals as well as respect for all living things. Alternatives are encouraged and must be explored during the pre-approval process. The requirement for prior project review and approval as well as the direct supervision of student research has raised the quality of scientific research in the pre-collegiate arena and protected the welfare of animals. Science Service and the International Science and Engineering Fair Scientific Review Committee promote and enforce these guidelines and have processes in place to ensure those competing are in compliance.

Science Service has taken the responsibility of establishing the comprehensive guidelines for student science research. They are widely accepted and are becoming the standard for pre-college science research. These guidelines are reviewed annually and are appropriately more strict and comprehensive than those of the federal government. We believe prohibition of animal-based research projects at the Intel ISEF and affiliated fairs will eliminate these established guidelines governing animal use. If animal research projects at Intel ISEF are eliminated, unregulated and unsupervised animal research at the secondary and lower levels will increase. Students will proceed with experimentation without rules or guidelines undoubtedly resulting in the proliferation of inhumane science projects and classroom activities. National and state mandated educational standards that require scientific inquiry will be seriously compromised. This action would be detrimental to science education and animals and would not serve the public interest.

12. High school students may wish to take assistant positions with professional scientists working in established, USDA-registered research institutions.
13. Laboratory-bred or non-native species should not be released into the wild. For instance, in some climates, *Xenopus* frogs or gerbils, if released, can disturb the normal ecosystem or become pests.
14. No animal or animal products from recognized endangered species should be kept and/or displayed.
15. **The feeding of live vertebrate animals to other live vertebrate animals (e.g., feeding of a rodent to a snake) should never be done in view of students.**

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- C. Live Animal Care and Safety Factors in the School Setting – When using animals not included on the previous prohibited list, **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.**

Preparations for the use of animals not included on the previous prohibited 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.
  - 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.
  - 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.
  - h. Develop a plan for care of the animals during emergency school closings or in the event that the regular caregiver is not available.
  - i. Lymphocytic Choriomeningitis (LCM) is an uncommon but potentially serious viral disease transmitted to humans by infected guinea pigs, hamsters, and mice. Verify that the animal is certified by the vendor to be free of LCM. (See [Appendix C.](#))
  - j. Maintain a file of any and all documentation on classroom animals that you may have.

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## IV. INFORMATION: USE OF DEAD ANIMALS

- A. Wild mammals recently killed by motor vehicle (often referred to as “road kills”) are inappropriate for use in the classroom.
- B. **For teacher use only:** Fresh fish or butchered meats (such as beef heart, brain, or stomach; pig intestines; cow eyes, etc.) should be placed in a preserving solution or placed on ice until used for classroom instruction. **Students are never permitted to handle fresh tissue.** However, there are two exceptions to this rule:
- In the Grade 6 curriculum, students are asked to dissect white perch
  - In the Grade 7 curriculum, students examine fresh cow eyes.
- In both instances, students are permitted to handle the fresh tissues. It is important that
- students be properly gloved
  - students be cautioned about putting fingers or items such as pencils or pens in their mouths
  - students thoroughly wash their hands after the activity
  - surfaces be thoroughly wiped with a disinfecting solution such as a commercial product or 5% solution of sodium hypochlorite (Clorox) water.
- C. Preserved animals purchased from an educational supply source should be kept in sealed containers until ready for use.

## V. PERSONAL HEALTH BEHAVIORS WHEN CARING FOR ANIMALS

Common sense precautions when caring for animals:

- A. Wash hands and exposed areas with hot water and soap 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 health aide 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. Use 5% sodium hypochlorite (Clorox) or Lysol. Rinse cage thoroughly with tap water.

### B. Aquaria and Terraria

Careful cleaning is essential so that organic materials do not act as a reservoir for micro-organisms. Remove mineral accumulation with a vinegar solution and rinse. 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 insect programs at both Days Cove and Oregon Ridge involve students in 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 wildly or swat at a stinging insect that is attracted to food or drink.**

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.**

**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

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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.
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 or novelties or to color, dye, stain, or otherwise change the natural color of the baby chickens, ducklings, or other fowl.

E. The Baltimore County Office of Science supports the position of the National Science Teachers' Association (NSTA) that "observation and experimentation with living organisms give students unique perspectives of life processes that are not provided by other modes of instruction. Studying animals in the classroom enables students to develop skills of observation and comparison, a sense of stewardship, and an appreciation for the unity, interrelationships and complexity of life" (<http://www.nsta.org/159&psid=2>). When called for in the curriculum, dissection of a preserved specimen is an appropriate and valuable educational activity. The following are important guidelines when considering dissection:

1. 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
  - based on carefully planned objectives
2. The Office of Science is adamant that students **shall not be permitted to dissect cats or fetal pigs**. If dissection of a mammal species is required, teachers are directed to use **laboratory rats** that are available through reputable biological supply houses. Exceptions to this guideline may be necessary in Advanced Placement (AP) and International Baccalaureate (IB) level biology courses.
3. Science teachers of courses in which animals are utilized for study shall:
  - a) **Inform the student in writing at the beginning of a course that involves animals (living or dead) for dissection during the course.** The intent of this notification is to:
    - Assure that both students and parents understand that one of the requirements for the course is dissection of a preserved specimen;
    - To provide a rationale for the appropriateness of dissection in that course.

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- b) Obtain signatures from students and parents and keep the signed notices on file for the remainder of the school year.
- 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;
  - not react in a negative way to a student's personal beliefs or attitudes about dissection;
  - not lower a student's grade if that student is opposed to dissection and is willing to do an alternative assignment.
- e) Properly pith a frog if one needs to be sacrificed to meet the objectives of the course. Such courses may include Physiology, Biology, and Advanced Placement Biology or other electives. The teacher must be experienced in this technique. **No student is ever permitted to pith a frog for study or to observe the pithing process.**

### VIII. RELATED PROCEDURES: HUMAN TISSUES

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

1. Human blood
2. Human cheek cells
3. Human body fluids and wastes

**Exception:** Preserved slides of the items listed above.

### IX. RISK CLASSIFICATION OF ANIMALS

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.

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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.

## **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 Rats <sup>2</sup>

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

Gerbils <sup>2</sup>

Laboratory Rabbits <sup>2</sup>

Guinea Pigs <sup>1</sup>

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

Protozoan species supplied by a Microbiology Teaching Center or Biological Supply House

Other species not otherwise restricted in Classes II or III

- <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.

<u>Organism</u>	<u>Risk</u>	<u>Conditions For Safe Use</u>
1. Domestic Cat	Toxoplasmosis	Hazard of infection to pregnant women transmitted by eggs shed in cat feces. Observe precautions A, C, and D located on the next page. 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 on the next page.
2. 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.
3. Birds – wild or domestic	Salmonella; often carry lice; injury from beak and claw.	Apply precautions A, B, C, D, F, G, and H.
4. 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 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 hot water and soap 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.

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- 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 health aide and principal at once.
- H. Clean thick gloves and appropriate clothing are recommended when handling animals to prevent bites or scratches

### **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 a properly completed permission form obtained through the Office of Science.

- |   |   |
|---|---|
| 1. Any species of microorganism known to cause human, plant, or animal disease.   | 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 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 whatever 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.).   | Undefined source of rabies virus. 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> |

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## **\*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 student with another student to the school nurse for first aid treatment.**

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.**

## **Disease Glossary**

**Psittacosis and Ornithosis** – viral infections transmitted to humans by birds of various species (including turkeys). These diseases are serious respiratory infections with mortality rates of up to 20%. Neither of these infections is 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** – a fungal infection producing serious respiratory illness in susceptible hosts. Although there was an outbreak of limited scope in the Woodmoor area in the 1960's, this is a real problem only 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 (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 reported significant plague outbreaks during 1976 in Colorado, Arizona, and New Mexico. Care should be taken to warn students to avoid contact with any wild rodents, living or dead.

**Tularemia (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. Skinning of freshly killed wild rabbits should be done with care, and the hands disinfected immediately afterward.

## **X. MAINTENANCE AND UPDATING OF THESE PROCEDURES:**

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

## **X1. EFFECTIVE DATE:**

October 1, 2003

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

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## APPENDIX A

### POISONOUS PLANTS

#### 1. POISON IVY, POISON OAK, AND POISON SUMAC

**NOTE:** Teachers and parent helpers should visit <http://poisonivy.aesir.com/> for detailed information about these common poisonous plants. Other websites are provided below.

### POISON IVY: How to Identify and Control

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#### AN IRRITATING PLANT . . .

Poison ivy is a woody shrub or vine with hairy looking aerial roots. It grows to 10 feet or more, climbing high on trees, walls and fences or trails along the ground. All parts of poison ivy, including the roots, are poisonous at all times of the year.

The toxin in poison ivy is *urushiol*, an oil that causes an irritating skin reaction on many people. The reaction, an itchy rash with clear blisters, is variable in severity among people, and can vary from year to year on the same individual.

The poison ivy reaction can be reduced if you change clothing immediately and wash the exposed skin with soap and water. If you can wash all the oil off exposed skin within 5 minutes of contact, no reaction will occur. Even water from a running stream is an effective cleanser. The oil from poison ivy can remain active on clothing and footwear as long as a year so be careful not to expose yourself to the oil again. The oil can also be transmitted on pet fur and in the smoke of burning poison ivy.

You can use various products such as MultiShield applied prior to anticipated exposure or Tecnu Skin Cleanser to cleanse exposed skin. However, the best way to avoid the irritating rash is being able to identify poison ivy.

Poison ivy is a nuisance to people but compensates by having considerable wildlife value. The white, waxy berries are a popular food for songbirds during fall migration and in winter when other foods are scarce. Robins, catbirds and grosbeaks especially like the berries. Many birds feed on insects hiding in the tangled vines. Small mammals and deer browse on the poison ivy foliage, twigs and berries.



#### URUSHIOL OIL IS POTENT

- The word, urushiol, is derived from *urushi*, the Japanese word for lacquer.
- Only 1 nanogram (billionth of a gram) of urushiol oil is needed to cause rash.
- The average exposure for most people is 100 nanograms.
- Urushiol oil is so potent that 1/4 ounce would cause a rash **in every person on earth**.
- Specimens of urushiol oil several centuries old have been found to cause dermatitis in sensitive people.
- 1 to 5 years is normal for urushiol oil to stay active on any surface, including the surface of dead plants.

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## POISON IVY, OAK, AND SUMAC

- The most common allergy in the country, claiming half the population
- Sensitivity to urushiol oil can develop at any time.
- Solutions or cures are those that annihilate urushiol oil.
- Everyone appears to react slightly differently to all the remedies.
- The first published records of poison ivy in North America date back to the 1600s.
- “Poison Ivy” was coined by Captain John Smith in 1609.
- Western Poison Oak was discovered by David Douglas (1799-1834) on Vancouver Island.



## MYTHS vs. FACTS

 MYTH	 FACT
Poison Ivy rash is contagious.	Rubbing the rashes won't spread poison ivy to other parts of your body (or to another person). You spread the rash only if urushiol oil has been left on your hands.
You can catch poison ivy simply by being near the plants.	Direct contact with a plant is needed to release urushiol oil. Stay away from forest fires, direct burning, or anything else that can cause the oil to become airborne, such as a lawnmower, trimmer, etc.
Do not worry about dead plants.	Urushiol oil stays active on any surface, including dead plants, for up to 5 years.
Breaking the blisters releases <b>urushiol</b> oil that can spread the rash to other parts of the body.	<b>Not true.</b> But, your wounds can become infected and you may make the scarring worse. In very extreme cases, excessive fluid may need to be withdrawn by a doctor.
I've been in poison ivy many times and never broken out. I'm immune.	Not necessarily true. Upwards of 90% of people are allergic to urushiol oil; it is simply a matter of time and exposure. The more times you are exposed to urushiol oil, the more likely it is that you will break out with an allergic rash. For the first time sufferer, it generally takes longer for the rash to show up -- generally 7 to 10 days.

### IDENTIFICATION

Poison ivy is commonly confused with other plants. Here are the key differences to look for to distinguish poison ivy from its look-alikes:

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<i>Poison Ivy</i>	<i>Fragrant Sumac</i>	<i>Box Elder</i>	<i>Virginia Creeper</i>
<ul style="list-style-type: none"> <li>● three divided leaves</li> <li>● center leaflet on a longer stalk</li> <li>● white, waxy berries along the stem</li> <li>● leaves alternate</li> <li>● erect shrub or climbing vine</li> </ul>	<ul style="list-style-type: none"> <li>● three divided leaves</li> <li>● center leaflets not on a stalk</li> <li>● red, fuzzy berries at the end of stem</li> <li>● erect shrub</li> </ul>	<ul style="list-style-type: none"> <li>● three to seven divided leaves</li> <li>● leaflets pinnate like a feather</li> <li>● leaves opposite</li> <li>● erect tree</li> </ul>	<ul style="list-style-type: none"> <li>● three to five divided leaves</li> <li>● leaflets palmate like an outstretched hand</li> <li>● blue-black berries along the stem</li> <li>● trailing or climbing vine</li> </ul>

### CONTROL

Poison ivy control can be done at any time of the year, but is best achieved May through July while the plants are flowering. Poison ivy should be accurately identified before you attempt any control measures. *Spraying is recommended over burning because poison ivy oil vaporizes when hot, carries in smoke and can cause a severe rash.*

Poison ivy foliage within reach can be sprayed with glyphosate (sold under the trade names *Roundup*, *Kleenup*, and others) according to label directions. When using this or any herbicide, always read and follow label directions carefully. Take care to avoid other plants and do not spray so heavily the herbicide drips off the leaves. Glyphosate is a nonselective herbicide and will kill any vegetation it contacts.

To kill poison ivy that climbs high into trees, cut the vine off 6 inches above ground level. Treat the stump with glyphosate (according to label directions) immediately after cutting to kill the roots and prevent sprouting. If resprouting does occur, treat the leaves with glyphosate.

Poison ivy can be very persistent, so you may have to spray the vines two or more times for complete control. Poison ivy can spread along fence or hedge rows and under trees by birds dispersing the seeds. Treating young seedlings with glyphosate will kill them and limit the spread of poison ivy.

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

- <http://ncnatural.com/wildflwr/obnoxious.html>
- <http://www.aad.org/pamhlets/PoisonIvy.html>
- <http://muextension.missouri.edu/explore/wildthing/poisonivy.htm>
- <http://poisonivy.aesir.com/view/faq.html>
- <http://poisonivy.aesir.com/view/rashes.html> (not for the faint of heart)
- [http://res2.agr.ca/ecorc/poison/symptom\\_e.htm](http://res2.agr.ca/ecorc/poison/symptom_e.htm)
- <http://www.dermik.com/skin/rashes/sri-ivy.html>

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### 2. STINGING NETTLE or WOOD (BULL) NETTLE

*Urtica dioica*; *Laportea canadensis*

**TOXICITY RATING:** Low. Local irritation is the most common sign, which shortly resolves on its own.

**DANGEROUS PARTS OF PLANT:** Stems, leaves.

**CLASS OF SIGNS:** Facial and skin irritation; possible ocular irritation.

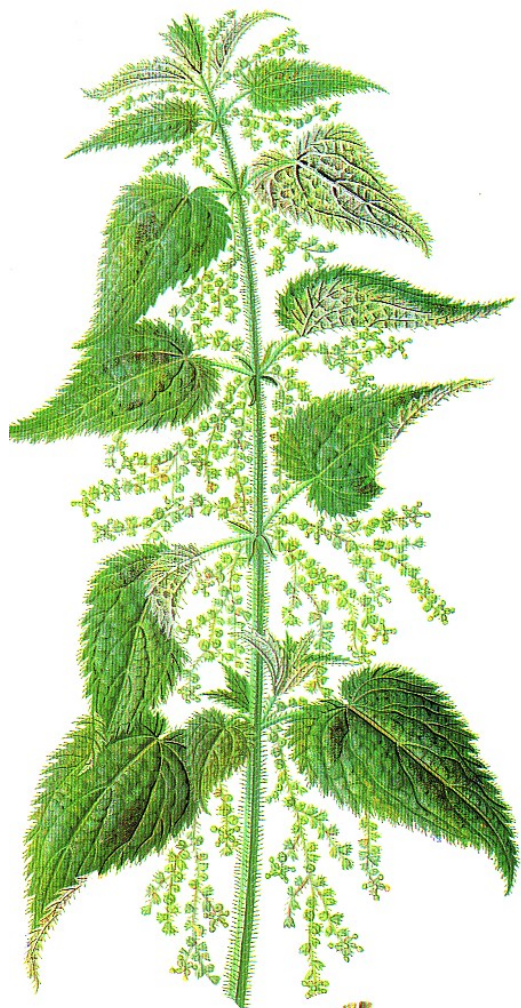
**PLANT DESCRIPTION:** These herbaceous perennials are common on moist ground in flood plains, woodlands, and along stream and riverbanks. They often occur in colonies so large that they are the only herbaceous plant present. The tough unbranched stems grow 2 to 5 feet tall from fibrous roots and are 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.

**SIGNS:** 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. Also, as the skin reacts, a rash forms lasting about a day.

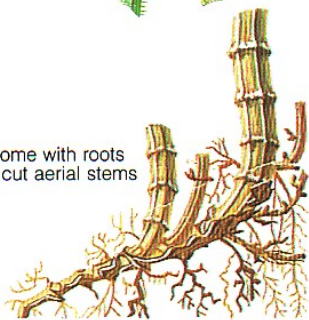
**FIRST AID:** Limit further exposure as much as possible. If you come in contact with stinging nettle:

- Stinging nettle acid can be neutralized by applying a paste of baking soda (made by adding a little water). Apply to the infected area immediately.
- Human saliva may help when rubbed into the itchy area if baking soda is not handy.
- A local plant, the Curled Dock (*Rumex crispus*), grows in the same habitat as stinging nettle and can help when crushed and rubbed on the itchy area.

**PREVENTION:** Use caution in marshy or wooded areas where dense stands of nettle may be located. Prevent animals contacting the plants as much as possible.



Rhizome with roots and cut aerial stems



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## APPENDIX B

### TICKS

**From left to right:** The deer tick (*Ixodes scapularis*) adult female, adult male, nymph, and larva on a centimeter scale.



### CHARACTERISTIC SKIN RASH OF LYME DISEASE




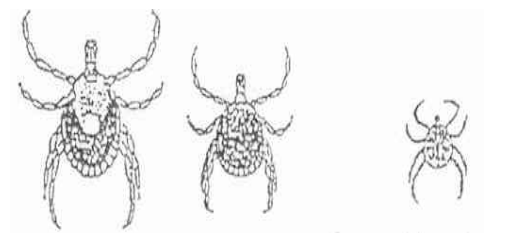
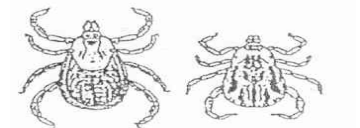
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## Protect Yourself from Tick-Bourne Diseases

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.

Tick Species	Disease	Pathogen
 <p style="text-align: center;"><b>Adults</b> Female      Male Ixodes scapularis Black-legged tick also known as deer tick</p> <p style="text-align: center;"><b>Nymph</b></p>	<p>Lyme Disease</p> <p>Human granulocytic ehrlichiosi</p> <p>Babesiosis</p>	<p><i>Borrelia burgdorferi</i></p> <p><i>Ehrlichia sp.</i></p> <p><i>Babesia microti</i></p>
 <p style="text-align: center;"><b>Adults</b> Female      Male Ablyomma americanum (lone-star tick)</p> <p style="text-align: center;"><b>Nymph</b></p>	<p>Hyman monocytic ehrlichiosis</p> <p>Lyme disease-like symptoms</p>	<p><i>Ehrlichia chaffeensis</i></p> <p><i>Borrelia sp.</i></p>
 <p style="text-align: center;"><b>Adults</b> Female      Nymph Male</p> <p style="text-align: center;">Dermacentor variabilis (American Dog-Tick)</p>	<p>Rocky Mountain Spotted Fever</p>	<p><i>Rickettsia rickettsii</i></p>

**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 RMSF, but only in the Rocky Mountain States.

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## LYME DISEASE FACT SHEET

Lyme disease is a bacterial infection that is transmitted by tick bites; mainly the deer tick. The adult deer tick is about the size of a sesame seed. The male tick is all black. The female tick is black with rust colored parts.

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
- Achiness
- Joint pain
- Chills
- Enlarged lymph nodes (lymph glands)
- Sore Throat
- Fever
- Arthritis-like symptoms

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. If diagnosed quickly and treated with antibiotics, Lyme disease is almost always curable.

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.

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. Students should do this only 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.

Treatment of Lyme disease involves a course of antibiotics that are taken for 3 to 4 weeks. Treatment with antibiotics is more effective if Lyme disease is diagnosed in its early stages.

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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**

Each of the major science vendors offers products that can be used as alternatives to dissection. These products vary in price from as little of \$50.00 to upwards of \$400.00 depending on the nature of the item under consideration. Products range from videos and DVDs to CD-ROMs and “virtual dissection” for which special 3-D glasses are required.