

Live demonstrations and experiments involving animals in precollege education can be valuable ways to excite children about science. The humane study of animals in precollege education can provide important learning experiences in science and ethics. Maintaining classroom pets in preschool and grade school can teach respect for other species, as well as proper animal husbandry practices. Introduction of secondary school students to animal studies in closely supervised settings can reinforce those early lessons and teach the principles of humane care and use of animals in scientific inquiry. However, the judicious use of animals in precollege educational settings must be appropriately planned and supervised and must not interfere with an animal's health and well-being.

It should also be noted that many schools have modified the use of animals in their teaching programs in response to societal concerns, and more are contemplating such changes, including the use of the many new alternatives to the use of animals in education. (See ILAR's website at www.national-academies.org/ilar under Links — For Students and Teachers.)



If animals are chosen for educational purposes, the following set of principles for the use of animals in precollege education or in science fair projects should be used. Providing explicit guidance on planning, supervision, animal care, and avoidance of pain and discomfort, the principles are in line with current approaches to the use of animals in higher

education and research. Although the principles are not legally binding, they can help improve the scientific integrity of precollege research and encourage more humane treatment of animals.

Principle 1

Observational and natural history studies that are not intrusive (that is, do not interfere with an animal's health or well-being or cause it discomfort) are encouraged for all classes of organisms. When an intrusive study of a living organism is deemed appropriate, consideration should be given first to using plants (including lower plants such as yeast and fungi) and invertebrates with no nervous systems or with primitive ones (including protozoa, planaria, and insects). Intrusive studies of invertebrates with advanced nervous systems (such as octopi) and vertebrates should be used only when lower invertebrates are not suitable and only under the conditions stated in Principle 10.

Principle 2

Supervision shall be provided by individuals who are knowledgeable about and experienced with the health, husbandry, care, and handling of the animal species used and who understand applicable laws, regulations, and policies.

Principle 3

Appropriate care for animals must be provided daily, including weekends, holidays, and other times when school is not in session. This care must include:

- nutritious food and clean, fresh water;
- clean housing with space and enrichment suitable for normal species behaviors; and
- temperature and lighting appropriate for the species.

Principle 4

Animals should be healthy and free of diseases that can be transmitted to humans or to other animals. Veterinary care must be provided as needed.

Principle 5

Students and teachers should report immediately to the school health authority all scratches, bites, and other injuries; allergies; or illnesses.

Principle 6

Prior to obtaining animals for educational purposes, it is imperative that the school develop a plan for their procurement and ultimate disposition. Animals must not be captured from or released into the wild without the approval of the responsible wildlife and public health officials. When euthanasia is necessary, it should be performed in accordance with the most recent recommendations of the American Veterinary Medical Association's 2000 Report of the AVMA Panel on Euthanasia. It should be performed only by someone trained in the appropriate technique.

Principle 7

Students shall not conduct experimental procedures on animals that:

- are likely to cause pain or discomfort or interfere with an animal's health or well-being;
- induce nutritional deficiencies or toxicities; or
- expose animals to microorganisms, ionizing radiation, cancer-producing agents, or any other harmful drugs or chemicals capable of causing disease, injury, or birth defects in humans or animals.

In general, procedures that cause pain in humans are considered to cause pain in other vertebrates.

Principle 8

Experiments on avian embryos that might result in abnormal chicks or in chicks that might experience pain or discomfort shall be terminated 72 hours prior to the expected date of hatching. The eggs shall be destroyed to prevent inadvertent hatching.

Principle 9

Behavioral conditioning studies shall not involve aversive stimuli. In studies using positive reinforcement, animals should not be deprived of water;

food deprivation intervals should be appropriate for the species but should not continue longer than 24 hours.

Principle 10

A plan for conducting an experiment with living animals must be prepared in writing and approved prior to initiating the experiment or to obtaining the animals. Proper experimental design of projects and concern for animal welfare are important learning experiences and contribute to respect for and appropriate care of animals. The plan shall be reviewed by a committee composed of individuals who have the knowledge to understand and evaluate it and who have the authority to approve or disapprove it. The written plan should include the following:

- a statement of the specific hypotheses or principles to be tested, illustrated, or taught;
- a summary of what is known about the subject under study, including references;
- a justification for the use of the species selected and consideration of why a lower vertebrate or invertebrate cannot be used; and
- a detailed description of the methods and procedures to be used, including experimental design; data analysis; and all aspects of animal procurement, care, housing, use, and disposal.

Exceptions

Exceptions to Principles 7-10 may be granted under special circumstances by a panel appointed by the school principal or his or her designee. This panel should consist of at least three individuals, including a science teacher, a teacher of a non-science subject, and a scientist or veterinarian who has expertise in the subject matter involved.¹ At least one panel member should not be affiliated with the school or science fair, and none should be a member of the student's family.

¹In situations where an appropriate scientist is not available to assist the student, the Institute of Laboratory Animal Research (ILAR) may be able to provide referrals.

ILAR is one of 12 major program units within the National Academies' Division on Earth and Life Studies. The mission of ILAR is to oversee studies and disseminate information on issues related to the scientific, technological, and ethical use of animals and related biological resources in research, testing, and education. Through its study committees and the quarterly *ILAR Journal*, ILAR promotes high quality, humane care of animals and the appropriate use of animals and alternatives. ILAR committees provide independent, objective advice to the federal government, the biomedical research community, and the public.

This publication is based on a 1989 report and reflects the contents of more recent ILAR reports, including *Science, Medicine, and Animals—A Circle of Discovery*, which may be accessed through the ILAR website.

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Principles and Guidelines for the Use of Animals in Precollege Education

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