

# Alternatives In Education

*“Classes involving animal use may have negative psychological effects on students. Furthermore, such classes may not contribute to the proper attitude-building of students, i.e. that animals deserve respect and have an intrinsic value.”<sup>1</sup>*

Thankfully, the prevalence of cruelty-free science classes and use of [non-animal dissection alternatives](#) is increasing, as more and more people learn that the use of animals in science education is no longer a necessity or requirement, and as fewer educators consider it the most productive route to learning or doing science. Many students today are committing to avoiding the harmful use of animals in education as they pursue careers in medicine, biology, veterinary medicine, and other areas of science. Most medical and veterinary schools now offer students the choice to train through modern non-animal models and methods or through supervised training on animals in need. Educators expect the student to master the same body of knowledge and pass the same examinations as those learning through traditional animal labs or dissections. Studies show that these students tend to do as well—if not better—on exams compared to students taking traditional classes that involve the harmful use of animals.

The [Ethical Science Education Campaign \(ESEC\)](#), the educational affiliate of NEAVS, works to guarantee students at all levels of science education the right to learn science without having to harm or kill animals. Through ESEC, we offer a free [Loan Library](#) that contains over 300 non-animal dissection and other teaching alternatives, providing students with the tools and support they need to maintain their humane values.

## Dissection alternatives

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[Alternative dissection programs, CDs/DVDs, and models](#) are widely available; most are cost-effective or available at no cost. All provide comparable learning experiences to traditional classroom specimen dissections. Alternatives save not only animals' lives, but also impact school budgets by dramatically reducing dissection lab costs as students can reuse alternative programs, year after year. Utilizing animals involves the purchase of new specimens each semester along with costs associated with the proper disposal of the body parts, as required by environmental laws—not a cost-effective initiative, especially when school systems are struggling to keep programs due to budget cuts. Alternatives also have a far smaller environmental impact than does the harvesting of frogs, use of toxic preserving chemicals, and after-class disposal of body parts.

Research suggests that students who learn from anatomical models, computerized dissection software programs, charts, interactive CDs and DVDs, audiovisual aids, or other alternatives perform as well or better on tested subject matter compared to students who used animal specimens. In addition to superior learning, educational alternatives allow students to learn at their own pace, to make up missed classes or content, and ultimately to make learning more fun, interactive, and humane. Since dissection destroys much of the integrity of the specimen's

skeletal structure and spatial relationships among tissue and organs, computerized dissection simulates better science by allowing the student to reexamine, pause, reverse, repeat, or zoom in or out on specific organs without compromising the specimen. More importantly, once a student finishes with the computerized study module, the computer program will put the animal back together—ready for the next student.

In April 2008, the National Science Teachers Association (NSTA) revised its dissection position to acknowledge the educational value of non–animal learning methods as replacements for animal dissections, and to establish the principle of dissection choice for all classrooms. The NSTA’s acknowledgement of the educational efficacy of these alternatives is further evidence of their viability as learning tools and the future of science education.

## Elementary and secondary schools

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In teaching pre–college science courses, educators use millions of animals each year. U.S. high school classes alone annually dissect an estimated six million vertebrates. In dissection labs, some students may participate by choice; others may not be given or realize that they have another option.

There are, however, a number of states that have taken legal steps to ensure a student’s right not to have to participate in animal dissection, thus decreasing the number of animals killed for this explicit purpose. Currently eleven states—CA, CT, FL, IL, NJ, NY, OR, PA, RI, VT, VA—have student choice laws that allow public school (and sometimes also private school) students K–12 to use non–animal alternatives in place of traditional animal dissections without penalty. Five additional states—LA, ME, MD, MA, NM—and Washington, D.C. have a similar policy in place, either as a state or a Department of Education Resolution. Dissection choice allows students who have ethical concerns to use alternatives to animal specimens and ensures a future generation of compassionate scientists by guaranteeing that students at all levels of science education have the right to learn without harming or killing animals.

There are hundreds of highly effective, non–animal alternatives for students to use instead as well, from realistic animal models to advanced virtual reality–based dissection software programs. For example, the [CatWorks CD-ROM](#) by ScienceWorks is a highly interactive computer simulation allowing the user to digitally dissect a cat. Testing functions allow the evaluator to provide online quizzes and to monitor and track student performance and progress. Movies of actual dissections are included, with a Glossary and Pronunciations of all key words and phrases. The [BioLab Pig CD-ROM](#) is learning software that provides in–depth details of a pig’s digestive, respiratory, urogenital, endocrine, and skeletal systems. It gives students the ability to perform in–depth dissections and also introduces the concepts of physiology alongside anatomy. There are two mini–labs covering carbon dioxide production and heart rate as well as extensions on peristalsis, heart function, antagonistic muscles, kidney function, and hormone balance. Students expand their knowledge with interactive experimentation, high quality illustrations, and discussions about how form relates to function.

Additional alternatives available through our [ESEC Loan Library](#) include:

- Concise Frog Dissection Chart (8 ½" x 11" chart of high quality photography and microphotography depicting the complete dissection of a frog, including the organs)
- the Great American Bullfrog (a vinyl plastic replica of a sexually mature female bullfrog that places special emphasis on the 3-chambered amphibian heart and has ten full-colored organ systems represented as well as 175 anatomical features)

NEAVS believes that all 50 states and their school boards should adopt dissection choice laws and policies and ensure that there is fair and equitable access to science education across the nation. Without such legal protections, students of conscience and compassion who refuse to harm animals and yet aspire to a career in sciences are cut short in middle and high schools across the U.S.—making the willingness to hurt or kill an animal an unspoken requirement to enter science. Guaranteeing the choice of a cruelty-free science education is the only way to allow, support, and encourage compassionate students to enter the field of science and ultimately change the way science does science.

## Colleges and universities

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Many of the ways that students use animals in high schools—especially in advanced biology courses—repeat in collegiate level courses, from the dissection of cats and dogs in anatomy to the [pithing](#) of frogs in physiology and use of rats in psychology.

While there are currently no state laws that require private or state colleges and universities to offer animal lab alternative choices for students, there are a number of schools that have adopted their own student choice policies or at least allow students to use dissection alternatives. At least 27 colleges and universities have student choice policies in place and an additional 37 schools allow non-animal dissection alternatives. Available alternatives include computer software programs that simulate animal dissection or human anatomy and physiology, models, and human or animal cadavers donated through ethical sources like willed body donation programs or educational memorial programs.

One example of a popular, interactive computer software program is V-Frog™, a virtual reality-based frog dissection program. V-Frog™ is one of the latest alternatives to use in place of real frogs and is available to borrow for free through our [ESEC Loan Library](#) program. Designed for high school to graduate level biology courses, a PC mouse allows students to pick up a scalpel, cut open skin, explore internal organs, watch a beating heart, observe digestion, conduct an endoscopy, look at underlying muscles, bones, and organs, and observe nerve and muscle response, as well as other capabilities not possible with a physical specimen. V-Frog offers real-time interaction, unlimited manipulation, and 3-D navigation, making every dissection reflect a student's individual work. The award-winning Digital Frog 2, an interactive CD-ROM, allows students to perform an in-depth "dissection" of a computer-generated frog with a digital scalpel. The program also includes animations, quizzes, videos, and information about frog behavior, ecology, and environmental issues. The DryLab Plus Fetal Pig CD-ROM is interactive software that allows students to investigate the complex internal and external anatomy of the

fetal pig. Difficult dissections like the nervous system are available in full view, along with other detailed diagrams, slides, and over 100 photos of specimens at 8 different stages of gestation.

## Medical and veterinary schools

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The use of animals in graduate education has dramatically declined over the past few decades, as [medical and veterinary schools](#) incorporate new teaching resources and alternative methods that do not involve the use of or harm to animals.

### Medical schools

Overall, significant progress has been made in ending the use of animals in medical education. Over 95 percent of all U.S. medical schools, including such top medical schools as Yale, Stanford, Harvard, Tufts, Emory, Duke, and Boston University, have eliminated live animal laboratories in favor of modern, cost-effective, and humane alternatives such as manikins, human patient simulators, and other interactive and advanced computer simulations.

Only [seven](#) (a mere 4%) out of 159 medical schools in the U.S. still use animals in the student curriculum, and only three (less than 2%) out of 177 accredited medical schools in the U.S. and Canada still use live animals in their surgery clerkships (medical student training that takes place in a teaching hospital). More than 95 percent of Advanced Trauma Life Support (ATLS) courses taught in the U.S. use only human-based simulators, like the TraumaMan system, and over 94 percent of U.S. pediatrics programs now use non-animal training methods for teaching endotracheal intubation in their residency programs; alternatives such as CPR training manikins or other human-like simulators are used by both the American Academy of Pediatrics and the American Heart Association.

Since 2007, nine new medical schools have opened with established animal-free curricula from inception and the American College of Surgeons, the American Medical Student Association, and the Accreditation Council for Graduate Medical Education all actively support the replacement of animals in medical education. With such acknowledgment that medical students do not need to use animals in order to learn, nursing schools and other medical training programs likely will follow.

### Veterinary schools

The majority of veterinary schools have already begun to restructure their student training programs with progressive alternatives to the harmful use of animals. Many schools are integrating non-animal teaching methods and advanced computer technology, like three-dimensional dissection software programs, into their student curriculum, while also providing Shelter Medicine programs. These programs increase the number of opportunities that veterinary students have to learn with small animals, to utilize humane protocols, and to meet the “real world” challenges of their ill or injured patients. For example, by performing spays, a major abdominal surgery, students hone their instrument and tissue handling skills, practice hemostasis and anesthesia monitoring, and, very importantly, get to observe their patients post-operatively. In fact, studies show that these students tend to do as well—if not better—on exams compared to students taking traditional classes/labs that involve the harmful use of

animals. A study by faculty at the Tufts University Cummings School of Veterinary Medicine, MA, actually showed that students who performed repeat spay/neuter surgeries at a local shelter outperformed students who learned surgical skills in the traditional terminal dog lab. In terminal labs, students perform surgery and other invasive procedures on healthy animals and then euthanize them.

In 2000, NEAVS/ESEC worked successfully with Tufts to make it the first veterinary school in the country to end all small animal terminal labs. Today, Tufts has “eliminated terminal procedures for [their] core surgery teaching laboratories” and “strongly encourages that healthy animals involved in the teaching program not be subjected to invasive or terminal procedures.”<sup>2</sup> Out of the 28 veterinary schools in the U.S., 25 allow alternatives for at least some or all of their courses involving invasive or terminal procedures on animals.

Alternative training methods include:

- mannequins and models
- interactive computer simulations
- digital surgery programs
- animal cadavers obtained from ethical sources (i.e., Educational Memorial Programs, or EMPs, or Willed Body Donation programs)
- interactive virtual computer training programs that combine 3-D control with realistic images of dissected and non-dissected organs

EMPs or Willed Body Donation programs allow people to donate their deceased companion animals for students to study, offering them the chance to gain a deeper understanding of anatomy and improve their skills without taking a life. By using ethically-sourced cadavers, vet schools and students benefit from a humane and cost-efficient alternative to the purchasing of animals from biological supply companies, [random source dealers](#), or animal shelters. The Western University of Health Sciences College of Veterinary Medicine (of which NEAVS was a founding funder) in Pomona, CA has a Willed Deceased Animals for Veterinary Education (WAVE) program that includes both large and small animals and serves as the sole source of animal cadavers for the school’s teaching purposes. As part of their founding philosophy, the veterinary college is committed to a no harm approach to the use of animals in its teaching programs and maintains a “reverence for life and for all animals, and [does] not limit such reverence to owned or valued animals.”<sup>3</sup>

Positive changes like these continue, with one of the most recent being in 2010 with the Ontario Veterinary College in Canada ending their terminal surgery labs on animals. Today, there are no veterinary colleges in Canada that conduct terminal surgeries, and in the U.S. 50 percent of veterinary schools no longer require terminal labs as part of the student curriculum.

**Twenty-five (25) U.S. veterinary schools that allow alternatives for some or all courses involving invasive or terminal procedures on animals** (please inquire prior to application as this list may have changes not yet recorded):

- Auburn University (Alabama)
- University of California-Davis

- Colorado State University
- University of Florida
- University of Georgia
- University of Illinois at Urbana Champaign
- Iowa State University
- Kansas State University
- Louisiana State University
- Michigan State University
- University of Minnesota\*
- Mississippi State University
- University of Missouri\*
- North Carolina State University
- Ohio State University
- Oklahoma State University
- Oregon State University
- University of Pennsylvania
- Purdue University (Indiana)
- University of Tennessee\*
- Texas A&M
- Tufts University
- Virginia-Maryland Regional College of Veterinary Medicine\*
- Washington State University
- Western University (California)
- University of Wisconsin

\* Based on information from 2004

[1] Capaldo, T. (2004). The Psychological Effects on Students of Using Animals in Ways that They See as Ethically, Morally or Religiously Wrong. *ATLA*, 32, 525-531.

[2] Tufts University. (n.d.). [Animal Use](#).

[3] Western University. (n.d.). [Veterinary Principles](#).