Software Review: *The Digital Frog*, Version 2.1

**Manufacturer:** Digital Frog International, Inc., Trillium Place, 7377 Calfass Road, RR#2, Puslinch, Ontario, Canada N0B 2J0

**Reviewed by Stephen J. Hecnar**
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Frogs have been widely used for years for dissection in many educational institutions, serving as examples of typical vertebrates (animals with backbones). Countless numbers of teachers, biologists, surgeons, and others, gained their first, or sometimes only, experience in anatomy thanks to these amphibians. Few can argue that academia owes a great debt to frogs, however many scientists are now concerned about the decline of many amphibian species. Tens of thousands of frogs are harvested from the wild annually for educational use and this collection has been implicated as a possible causal factor in the decline of at least some local frog populations. The development of a digital alternative to use of real frogs for dissection is timely considering recent concern over the global decline of amphibians.

*The Digital Frog* is an interactive program that uses over 100 screens, real time movies, animations, and audio clips to demonstrate the basic structure and biology of frogs. According to the manufacturer, the program will run on most newer Macintosh or PC platforms. Minimal requirements are: Macintosh - Power PC 180, System 8.6, 30 MB available RAM, thousands of colours; PC - Pentium 180 (Pentium II recommended), Windows 95/98/Me/NT/2000, 32 MB RAM, VGA, high colour (16-bit). The package is supplied on two CDs, one containing the program itself and the other containing a workbook. The program will run off the CD, but it does run faster if installed on a hard drive as the manufacturer recommends.

I conducted my review on an IBM Thinkpad 1400 with a Celeron 500 MHz processor running the Windows 98 operation system. Initially, I ran the program off the CD and briefly tested each module, finding no problems. I then installed it on my hard drive and spent the better part of two days checking all sections of the program. I found the installation process to be quite easy but it does require a few minutes to complete.

The program starts with a screen showing a leopard frog on a lily pad while spring peeper calls are heard (why not use a leopard frog call?). This screen then leads to a main menu which provides access to the three main sections of the program: Dissection, Anatomy, Ecology. Three other buttons also appear on the main menu: Quick Tour, Map, and Quit. Quick tour provides an informative fully automated tutorial on navigating through the program. It is worthwhile to spend a few minutes taking the Quick Tour prior to entering the rest of the program. The Map button shows all sections of the program in tree form allowing easy and quick access to any part of the program. This would be valuable for studying purposes or fast review. The Quit button allows the user to exit the program and return to the desktop.

Navigation through this large program is easy. It operates by point and click with the mouse and the user is prompted and directed throughout. Single keystrokes in any screen (H for help, M for menu, or F for find) aid in moving about. Once each task is completed, the user is prompted to click or hit the space bar to advance to the next screen. Clicking in most areas of the screen (cursor shows a return arrow) after a section is completed, or using the back (left) key, will allow the user to return to the previous screen. If one gets lost, moving the cursor to the upper left corner activates a pop-up menu for help, exiting, or other options. There appear to be few glitches in the program. However, on three occasions over the last two days I experienced problems. Once, my monitor went black when I tried to return to a previous screen and I had to reboot. Another time I lost the frog calls in the Biodiversity section. The rest of the program worked fine thereafter but I had to restart the program to get the calls working again.

It is difficult to determine if these incidences were bugs in the program or just a couple of those transient Windows things. One apparent glitch in the program itself occurs when one tries to click on the gall bladder in the liver dissection screen for more detail. An error message appears that a file cannot be found and the program crashes. This was the first time that I had gall bladder trouble but it continued to happen each time I tried

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it, suggesting that there is a bug in the program or a compatibility issue. However, this problem can be avoided if the user clicks on a lobe of the liver rather than the gall bladder. Note: Upon contacting the manufacturer of the software regarding this bug, they promptly responded to me, thanking me for contacting them and indicating that the bug can now be fixed with a web update off the toolbar in the program.

The Dissection section begins with a dorsal (top) view of a leopard frog. A list of basic external features is presented and the area on the image becomes highlighted in red when the cursor is moved to each area. Clicking on each area provides more detail. The user can begin the dissection in any of three body regions (head, body cavity, legs). The dissections are interactive and prompts lead the user through the entire process. A novel feature is that the cursor acts as a virtual scalpel and the mouse must be used with some coordination to make incisions. If the scalpel path remains off the course the path is shown in white. If the path deviates, its track is illuminated in red and the dissection cannot proceed. This feature is reminiscent of the old Milton Bradley "Operation" board game and ensures that students will take some care in their dissection. After the correct incision is made, a QuickTime movie appears in a small window along with explanatory audio demonstrating the dissection procedure on a real preserved specimen. For the most part, the movies are very useful but resolution could be improved. I found the image a bit too blurry and dark in some screens to detect details (e.g. cross-section heart details). However, double clicking on the movie window will enlarge the screen and help somewhat with details. As internal organs are exposed, interactive features lead the user through the anatomy of the organ and allow the dissection to proceed in an orderly fashion. Clicking on organs allows more detail to be shown.

The Anatomy section covers eight organ systems (e.g. respiratory, urogenital, immune) as separate modules. In each, basic anatomy and function is well-described in both figures and text. A nice feature is the opportunity to compare the frog example with humans by clicking on an icon. If students have difficulty with some of the technical terms, a mouse click on a word will provide a definition (4000 words covered) and a correct audio pronunciation for over 700 words is available.

The Ecology section opens with a pond-landscape scene and provides access to six modules (Biodiversity, Behaviour, Niches, Life Cycle, Adopt-a-Pond, Environmental Concerns) by clicking on images. The biodiversity section is separated into maps of North and South America. Images of 12 and 6 representative species appear on each continent respectively. Clicking on each image will provide a short description of the natural history of each species, a range map, and clicking on the species name will display the species advertisement call. The Behaviour screen leads to three of four sections that are accessible via the menu (Hibernation, Feeding, Mating). The Vocalization section can be accessed only through the map or via menu (an oversight?). The Niches section provides a short description under four topics (Water, Habitat, Predator, Prey). The Life Cycle screen shows the different developmental stages with text description and a movie depicting development and metamorphosis is available. The Adopt-a-Pond section advertises the Metro Toronto Zoo's amphibian conservation program that encourages schools or other groups to adopt and monitor a local pond. Within this section, the information on commercial pond liners could be more informative and current. The Environmental Concern section briefly highlights some of the threats to amphibians that have been implicated as factors in the global decline of amphibians.

The Digital Frog is a unique software package that will undoubtedly set a benchmark for digital education in biology. It is clear that much effort went into researching and designing the program. It is easy to use and it can provide either very basic or more detailed information for those students who wish to delve deeper. I personally found it quite entertaining as well as being highly informative. Considering the computer literacy of today's student, and their penchant for computer games, the quality of the program guarantees that it will be well-received. I found the information provided in the package to be very accurate. I thought that a few statements were over-simplified or that some important or interesting details were omitted. However, I am biased in that I teach senior level courses in herpetology.

The Digital Frog would provide a valuable tool primarily for teaching biology at the high school level. I suspect that this is the target level that the manufacturers had in mind. The program provides not only information on frogs but about vertebrate biology in general. It may also be useful in first year zoology or biology labs at the college or university level. It is not detailed enough to be used extensively in senior vertebrate anatomy or herpetology courses in university. However, it may be of value for interested students to use as a 'dry run' before commencing actual dissections.

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in senior undergraduate laboratories, or for those students who are philosophically opposed (or too squeamish) to dissecting real specimens.

However, The Digital Frog is the next best thing to a real specimen. It is likely also more economical to use and makes conservation sense.

Is The Digital Frog better than the real thing? In a word, no. Likely nobody would like to be operated on by a surgeon who has never practised on a cadaver nor would one like to fly on an airliner that is piloted by a person that has only flown simulators.

A variety of pricing packages are available ranging from $85 dollars for a home version, $425 to $599 for multiple station lab packages, to $899 for a building site licence. These prices seem very reasonable considering the quality of the product and relative to many other commercial education products.

I thoroughly enjoyed reviewing this quality crafted and informative software package and highly recommend its adoption and use in teaching. Digital Frog International has certainly set the standard for this media and I look forward to their development of new products in biological education.