

Exploring a Fresh Mammalian Heart in a Learning-Cycle Laboratory

Ann O. Wilke

Department of Biology, University of Missouri-St. Louis
Lake St. Louis, Missouri 63367
(314) 625-8990

When seeking materials for laboratories, use the local butcher shop as one supply source. In my classes I use fresh hearts, bones, and muscles tissue from a farming-community or urban kosher shops. On ordering a fresh beef heart, I ask butchers to leave long vessels. Before using it, I remove some of the surrounding fat and close small vessels and extraneous knife cuts with a sewing needle and thread.

Students use the fresh heart as the first exploratory activity in a laboratory on the structure and function of the heart (Wilke, 1993a, 1993b). On examining the heart with sight and touch and by running water into its vessels, students develop structure-function concepts such as the heart has two separate flow pathways and each pathway flows unidirectionally. In additional activities, students explore detailed heart structure in preserved whole and preserved frontally-sectioned hearts. They determine the structural details that explain the observed flow patterns in the fresh heart.

To check and reinforce their understanding, students apply their concepts in two ways: (1) Students compare the structure of the postnatal heart to the fetal heart and infer prenatal blood-flow patterns (or they can compare it to the three-chambered frog heart). (2) They predict the effects of described human structural abnormalities on blood flow and the individual.

The learning-cycle teaching strategy consists of three components: exploration, concept formation, and application. In these laboratories, students use hands-on activities to develop and apply concepts. Student-designed experiments may be in either the exploration or application component. In this teaching strategy, the teacher does *not* deliver facts but is a facilitator of students' concept development through questions that encourage their thinking. If you are interested in additional information on the learning cycle, I recommend a monograph of the National Association for Research in Science Teaching (NARST) by Lawson et al. (1989). Mosby-Year Book Inc. produced a 27-minute video tape about the learning-cycle teaching strategy, which shows students engaged in this heart laboratory.

Lawson, A. E., M. R. Abraham, and J. W. Renner. 1989. A theory of instruction: Using the learning cycle to teach science concepts and thinking skills. The National Association for Research in Science Teaching, 131 pages.

Wilke, A. O. 1993a. Exploring biology today. Mosby-Year Book, St. Louis, 401 pages.

———. 1993b. Teacher's guide to accompany exploring biology today. Mosby-Year Book, St. Louis, 217 pages.