

EDUCATION 476-4

Designs for Learning Science

INTERSESSION, 1995

M. Roth

PREREQUISITE:

1. Educ 401/402 (although not a prerequisite, it is of advantage to have completed Educ 405). At the beginning of the course, students are expected to be familiar with the use of SFU's electronic mail system, to have their accounts activated, and to have their passwords).
2. Students are expected to have read the first chapter of the textbook for the first day of class.

COURSE CONTENTS:

Designs for Learning Science: There are two major components to this course: (a) *Learning* science and (b) *designing* classroom instruction. Thus, in this course, students will read and discuss current research on how students learn science (see textbook) and design a unit of instruction. The instructor will use materials and videotapes from a recent curriculum development and research project to illustrate designs for learning about simple machines. The following is an outline of topics to be discussed during the course. This outline is not exhaustive and may include some topics which will not be covered. Additional topics may be added at the discretion of the instructor).

1. What is the nature of scientific knowledge? What is science? How is scientific knowledge constructed?
2. Problem solving. Open-inquiry laboratory activities. What is the scientific method? Does it exist? What does this mean for teaching?
3. Students' views of scientific concepts
4. Analyzing and improving science teaching
5. The integration of science, mathematics, and technology (computers and others).
6. Collaborative concept mapping
7. Vee-mapping
8. Teacher learning and change
9. Reflective practice in science teaching

REQUIREMENTS AND EVALUATION:

Students are expected to read the complete textbook and all readings (a timeline will be presented on the first day of class). Some of the chapters will be discussed in class. Specifically, students are to:

1. Submit 5 reflections (400-600 words) on readings/chapters by using *electronic mail* (@ 5%/assignment).
2. Develop and present a unit suitable for teaching secondary students based on the perspectives discussed in class. Students are to develop one complete set of manipulatives, instructions, transparencies, evaluation guidelines, etc. This project will begin on the first day in class, and will be completed as work in process throughout the course. Students are expected to present their work during the discussion period scheduled in each class. If students chose to do this in collaboration with another person, two complete sets of materials are to be submitted. A progress report is to be submitted each period. (75%)

REQUIRED TEXT:

Roth, W.M. (1995). *Authentic school science: Knowing and learning in open-inquiry laboratories*. Dordrecht, Netherlands: Kluwer Academic Publishing. (ISBN: 0-7923-3307-1).