

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

COURSE OUTLINE

COURSE TITLE: Teaching Science and Math

CODE NO. : ED 273 **SEMESTER:** 4
(2000W)

PROGRAM: Early Childhood Education

AUTHOR: Lorna Connolly Beattie, 759-2554 ext. 563
Office #E3209
e-mail: lorna.connolly-beattie@saultc.on.ca

DATE: Jan 2000 **PREVIOUS**
OUTLINE DATED: Sept 1998

APPROVED:

Donna Tremblay, Dean
Health, Human Services and Criminal Justice

DATE

TOTAL CREDITS: 3

PREREQUISITE(S): ED 272

LENGTH OF COURSE: 15 weeks **TOTAL CREDIT HOURS:** 45

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*For additional information, please contact Donna Tremblay, Dean
School of Health, Human Services and Criminal Justice
(705) 759-2554, Ext. 690*

Course Name

Code No.

I. COURSE DESCRIPTION:

This is an advanced methods course dealing specifically with math and science concepts and skills with emphasis on Piagetian theory. The focus of this course is familiarizing the students with classification and discovery systems applicable in child care settings.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course the student will demonstrate the ability to:

1. research and translate fundamental principles of science and math into learning experiences for children.**Potential Elements of the Performance:**

- analyze Piaget's developmental stages of concept and skill development as it relates to math and science
- recognize the needs and interests of the preschool child relating to science and math
- assess children's developmental level and plan appropriate learning experiences
- examine and interpret the fundamental principles of science and math
- research and plan science and math activities based on fundamental concepts and skills
- implement science and math activities in the preschool setting

2. present a comprehensive, developmentally-appropriate curriculum which fosters math and science principles in young children.**Potential Elements of the Performance:**

- identify, locate and utilize available resources for a science and math program
- organize chosen science and math learning environments for pre-school children
- apply knowledge, understanding and skill in designing a sequence of science and math learning experiences
- develop a curriculum package on a science related topic

Course Name

Code No.

3. Use process-oriented and divergent teaching techniques to incorporate science and math experiences throughout the curriculum.

Potential Elements of the Performance:

- select appropriate methods of presentation of science and math experiences using process-oriented, open-ended teaching methods.
- communicate and interact effectively with colleagues by planning preschool science curriculum
- present math and science activities in the preschool setting
- evaluate one's teaching and the learning of the children following the presentation of math and science activities.

III. TOPICS:

1. Concept Development in Science and Math
2. Fundamental Concepts and Skills and Activities involving Math and Science
3. Scientific Investigations

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

1. Math and Science for Young Children, 3rd Edition, Charlesworth and Lind: Delmar Publishers, 1999

V. EVALUATION PROCESS/GRADING SYSTEM:

1. Science Learning Activity – 10%

Working with a partner, students will present a science learning activity to the class. A handout outlining the activity will be provided for each student in the class. Specific criteria and schedule for presentation will be discussed in class.

 Course Name

Code No.

 2. Math Activity Resource Book – **20%**

Each student will prepare a “Math Activity Resource Book” to include examples that are specifically related to the following fundamental concepts. The book will be handed in during the semester for evaluation. Each activity will be described in detail using the attached form. (Example forms are also attached)

Fundamental ConceptsDue Date

One to One Correspondence;
 Number & Counting;
 Sets & Classifying;
 Ordering & Patterning;
 Shape;
 Space;

February 17
 (6 activities – 10%)

Parts & Whole;
 Comparing;
Measurement:
 Time;
 Volume;
 Weight;
 Length;
 Temperature
 (Choose 4 of the 5 measurement
 concepts for use in the Resource Book)

March 23
 (6 activities – 10 %)

 3. Math Learning Activity – **10%**

Working with a partner, students will present a math learning activity to the class. A handout outlining the activity will be provided for each student in the class. Specific criteria and schedule for presentation will be discussed in class.

 Course Name

Code No.

4. Curriculum Project - 25%

Each student will prepare and implement a curriculum project in their fieldwork placement. It will have a strong emphasis in math and science principles based on children's identified interests. Complete criteria will be explained in class. Students will share the results of their project with the class.

5. Midterm Test – February 18- **15%**
End of Term Test - April 27 - **20%**

These tests will be based on the material presented in class and in the textbook.

The following semester grades will be assigned to students in post secondary courses:

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
A+	90 - 100%	4.00
A	80 - 89%	3.75
B	70 - 79%	3.00
C	60 - 69%	2.00
R (Repeat)	59% or below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field placement or non-graded subject areas.	
U	Unsatisfactory achievement in field placement or non-graded subject areas.	
X	A temporary grade. This is used in limited situations with extenuating circumstances giving a student additional time to complete the requirements for a course (see <i>Policies & Procedures Manual - Deferred Grades and Make-up</i>).	
NR	Grade not reported to Registrar's office. This is used to facilitate transcript preparation when, for extenuating circumstances, it has been impossible for the faculty member to report grades.	

Course Name

Code No.**VI. SPECIAL NOTES:**Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your instructor and/or the Special Needs office. Visit Room E1204 or call Extension 493, 717, or 491 so that support services can be arranged for you.

Retention of course outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. Students who engage in “academic dishonesty” will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course, as may be decided by the professor. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

The Professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

Students must complete tests on the designated date. If the student cannot attend the class for the test, the student must telephone the professor prior to the time of the test (759-2554 ext. 563) to make alternate arrangements (Refer to Testing Policy for Human Sciences and Teacher Education). If this procedure is not followed, a grade of zero will be applied for the test.

All assignments are due on the date indicated by the professor unless the appropriate number of NQAs is attached. Assignments will not be accepted more than five days after the due date.

Course Name

Code No.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the instructor.

VIII. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.

Course Name

Code No.

EXAMPLE**MATH ACTIVITY FORM****ACTIVITY TITLE:** Matching – Dogs and People**AGE GROUP:** 3 – 5**DEVELOPMENTAL STAGE:** Pre-operational**FUNDAMENTAL CONCEPT:** One-to-One Correspondence**OBJECTIVE:** To make joined groups of three objects**MATERIALS:** Two sets of three objects which normally would go together, for example, doll people holding dogs on leashes.**ACTIVITY:** “Here are some people and some dogs. The dogs are on leashes. Does each person have a dog? Show me how you can tell.” Note if the children can show or explain that the leashes connect the dogs and people.**FOLLOW UP:** Use other groups of objects such as cats and kittens; cups and saucers; houses and roofs; etc. Increase number of items in each group as the 3 to 3 task becomes easy.

ASSESSMENT**METHOD:** Demonstration/Interview**SKILL:** Child can match joined groups of 3 objects.**PROCEDURE:** Present activity to child as outlined above. If the child cannot do the task, try it with 2 or 1 joined object.**EVALUATION:** The child can explain or demonstrate that the leashes connect the dogs and people to demonstrate understanding of one-to-one correspondence.

Course Name _____

Code No. _____

MATH ACTIVITY FORM

Activity Title:
Age Group:
Developmental Stage:
Fundamental Concept:
Objective:
Materials:
Activity:
Follow-Up:
<u>ASSESSMENT</u>
Method:
Skill:
Procedure:
Evaluation:

Course Name

Code No.

SCIENCE CATEGORIES AND TOPICS**PHYSICAL SCIENCES:**

Magnets

Simple Machines

Electricity – static and current

Light and Shadows

Gravity

Sound

Energy

States - liquid, solid, gas
- density

Matter

EARTH SCIENCES:

Rocks and Minerals

The Four Elements – Water, Air, Fire and Earth

Fossils

Dinosaurs

Weather

Outer Space

LIFE SCIENCES:

Ecosystems – food chains

Life Cycles

Plant Life - trees
flowering/non-flowering plants
seeds and germination

Course Name

Code No.

LIFE SCIENCES (CONTINUED) :

Man and Environment

- Compost
- Landfill Sites
- Endangered Species
- Recycling

Nutrition – Where does our Food come from

Human Body

Five/six senses

ANIMALS:

Annelids

Insects

Arachnids

Reptiles

Fish

Birds

Mammal - Non-humans

Habitat

- Ponds/Wetlands
- Ocean
- Desert
- Forest – different types
- Rivers/Lakes