

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

PROGRAM: Early Childhood Education

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DATE: Jan 2004 **PREVIOUS**
OUTLINE DATED: Jan 2003

APPROVED:

Dean Health and Human Services

DATE

TOTAL CREDITS: 3

PREREQUISITE(S): ED 272

HOURS PER WEEK: 3

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For additional information, please contact Dean
School of Health and, Human Services
(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. Implementing a Science Project using the Project Approach
2. Concept Development in Science and Math
3. Fundamental Concepts and Skills and Activities involving Math and Science
4. Scientific Investigations

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

1. Math and Science for Young Children, 4th Edition, Charlesworth and Lind: Delmar Publishers, 1999
2. Practical Guide to Early Childhood Curriculum, 6th Edition, Eliason and Jenkins, (purchased in previous semester)
3. Project Approach, Book 2, Sylvia Chard: Scholastic (purchased in previous semester)

V. EVALUATION PROCESS/GRADING SYSTEM:

1. Science Learning Activity – **10%**

Each student will present a science learning activity to the class. The science activity will be thoroughly researched so that the student can answer questions concerning the scientific principles related to the activity. A typed Learning Activity lesson form with a typed summary of the research will be distributed to class when the activity is presented. Specific criteria and schedule for presentation will be discussed in class.

Course Name

Code No.

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

Each student will prepare a “Math Activity Resource Binder” to include examples that are specifically related to the following fundamental concepts. The binder will be handed in during the semester for evaluation. This binder will also be used to hold science activities received from classmates. Each activity will be described in detail using the attached form. (Example forms are also attached). All activities must be typed.

Fundamental ConceptsDue Date

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

week of February 16
 (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)

week of April 5

(6 activities – 10 %)

3.. Science Curriculum Project and Resource Kit – **40%**

Each student will prepare and implement a Science Curriculum Project in their fieldwork placement. It will have a strong emphasis in science principles based on children's identified interests. Each student will also prepare a Resource Kit with appropriate props to complement their Science Curriculum Project.. Students will share the results of their project and kit with the class. Complete criteria and due dates will be explained in class.

3. Midterm Test –week of February 16- **10%**End of Term Test - week of April 19 - **10%**

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

4. In-Class Activities, Attendance & Participation and Math & Science Binder - **10%**

Course Name**Code No.**

Various in-class activities are assigned to be handed in and/or reported on in class. As this class involves many demonstrations and presentations, attendance is a requirement for successful completion. Each student will prepare a Math and Science binder with appropriate dividers. The binder will contain the Math Resource activities and the Science Activities that each student receives from their classmates.

Course Name

Code No.

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%	4.00
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50-59%	1.00
F (Fail)	49% 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.	
W	Student has withdrawn from the course without academic penalty	

Note: For such reasons as program certification or program articulation, certain courses require minimums of greater than 50% and/or have mandatory components to achieve a passing grade.

It is also important to note, that the minimum overall GPA required in order to graduate from a Sault College program remains 2.0

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

Course Name

Code No.

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.

Course Name

Code No.

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 at the beginning of class. Late assignments will be deducted 5% per day. Assignments will not be accepted more than 1 week after the due date.

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 senses

ANIMALS:

Annelids

Insects

Arachnids

Reptiles

Fish

Birds

Mammal - Non-humans

Habitat

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