



Independent Study IN IDAHO

ED 344

Elementary Science Methods

Independent Study in Idaho
University of Idaho North Campus Center
645 W. Pullman Road, Suite 203
PO Box 443225
Moscow, ID 83844-3225

Local: (208) 885-6641
Toll-free: (877) 464-3246
Fax: (208) 885-5738
indepst@uidaho.edu
<http://www.uidaho.edu/isi>

The University of Idaho in statewide cooperation with
Boise State University — Idaho State University
Lewis-Clark State College

Study Guide

Independent

Study IN IDAHO

PO Box 443225

Moscow ID 83844-3225

Self-paced study. Anytime. Anywhere!

Education 344 Elementary Science Methods

Lewis-Clark State College
3 Semester-Hour Credits

Prepared by:

L.K. Lofaro Coursey, Ph.D.
Assistant Professor
Education Division
Lewis-Clark State College

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Independent Study in Idaho

This course is offered by Lewis Clark State College


Elementary Science Methods

3 Semester-Hour Credit: LCSC

Welcome!

Whether you are a new or returning student, welcome to the Independent Study in Idaho (ISI) program. Before beginning this course, read the information provided below, including course description, prerequisites, required materials, course objectives, and information about lessons, exams, and grading.

Important!

As you read this section, you will see the following icon: 

Use this icon to direct yourself to the **Appendix** in the back of this study guide for essential registration information, Independent Study in Idaho policies and procedures, and forms you will need to successfully complete this course. You are responsible for understanding and following ISI policies and procedures.



Turn to the **Appendix** now. Familiarize yourself with the information in the *Registration* section, student responsibilities in *Academic Integrity*, and the necessary forms. If there is anything you do not understand, please contact the ISI office for clarification before starting your course.

Course Description

Methods of teaching elementary school science utilizes both teacher designed and established commercial model programs. It investigates the role science should play in the education of elementary age youth. Emphasis is placed upon inquiry and discovery approaches in teaching science.

Course Materials

Required Course Materials

- Sherman, S. J. *Science and Science Teaching: Science is Something You Can Do!* New York: Houghton Mifflin Company, 2000. ISBN 0-395-88782-8
- Selsam, Millicent. *Egg to Chick*. New York: Random House, 1970. ISBN: 006444113 or 0833519182

Independent Study in Idaho course materials are available for purchase at the University of Idaho Bookstore. Visit the UI Bookstore's Web site, <http://www.uidahobookstore.com>, select *Textbook, Independent Study* for a list of course materials. You may order online, by telephone, (208) 885-7334, or by e-mail to uibooks@uidaho.edu.

Independent Study in Idaho courses are updated and revised periodically. Ordering course materials from the UI Bookstore at the time of registration allows you to purchase the correct edition(s) of textbooks, study guides, and supplemental materials. If purchasing textbooks from another source, refer to the ISBN(s) for the textbook(s) listed for this course to ensure that you obtain the correct edition(s). If you have questions regarding the course materials you have ordered and received, contact the UI Bookstore.

Useful Classroom Resources

Abruscato, Joseph. *Whizbangs and Wonderments: Science Activities for Young People*. Boston: Allyn and Bacon, 2000. ISBN: 0-205-28409-4

Koch, Janice. *Science Stories: A Science Methods Book for Elementary School Teachers*. New York: Houghton Mifflin Company, 2002. ISBN: 0-618-12281-8

Course Introduction

As you work through this course I would like you to consider thinking about science in the following manner: Curiosity is the key to science, but keep in mind, the activity is **not** the science. Focus on the science process through a few units rather than many isolated units. Think about positive science attitudes. Integrate science with other content areas. Be flexible, and remember your role as a facilitator. Science is something you can do!

It is expected that students will develop competencies in the following areas:

- Knowledgeable decision-making
- Effective communication
- Positive motivation
- Reflective practice
- Critical consumption of materials and resources
- Collaborative professionalism (In today's classroom this is essential- in this Independent Study Course it will be much more difficult to practice.)

Course Objectives

Upon the completion of this course, each student will be able to:

- Identify and evaluate the process skills, products, and attitudes associated with the science curricula.
- Prepare analyses of appropriate curricula and resources for science instruction.
- Demonstrate the understanding of process skills as a form of scientific investigation and supporting explorative/investigative skills.
- Identify learning style preferences which help to promote the learning of science by children.
- Write objectives, exemplifying the knowledge, skills and attitudes, which have been identified in an instructional analysis of science.
- Plan lessons that contain activities which will meet the needs of various learners.
- Develop lesson plans with objectives which are directly related to the process skills.
- Synthesize assessment.
- Integrate other content areas with science.
- Evaluate current elementary science texts and materials.
- Develop an integrated unit in elementary science.
- Self-Reflect about techniques for effective science teaching.

Lessons

Overview

Each lesson includes the following components:

- lesson objectives
- overview
- reading assignments
- written assignment

- self reflection

The lessons included in this course are meant to expand your horizons. Included you will find hands-on activities, working/talking with students, reflection, critical consumption of materials, writing and interaction. Specific objectives are provided for each lesson to help you focus your studies on key aspects. The comments are provided to help you focus on and recognize some important aspects of teaching elementary school science. Hopefully, the variety and pace will keep you interested and encourage you to move forward.

Study Hints

- Complete all assigned readings.
- Set a schedule allowing for completion of the course one month prior to your desired deadline. (An *Assignment Submission Log* is provided for this purpose.)



See the **Appendix** at the back of this study guide for essential *ISI policies on submitting lessons to your instructor*. See the letters sent in your registration packet for *your instructor's requirements: how to format and submit lessons; number of lessons you may submit at one time, and lesson guidelines*.

Examinations/Projects

Overview

- You must wait for grades and comments on lessons prior to taking each subsequent exam.
- For your instructor's exam guidelines, refer to the letters sent in your registration packet and the *Exam Information* sections in this study guide.

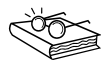
The course requires two examinations. The exams are not comprehensive. The examinations contain short essay questions. You are responsible for all lesson material on examinations. Use the study guide questions provided to help you prepare. Your answers should specifically address the topic, include concise personal experience as well as text or other reference material, and show more than rote learning.

The course also requires two projects. Please refer to the lessons for Projects One and Two to obtain more information about your projects.

See *Grading* for specific information on exams, points, and percentages.

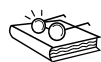
Choosing a Proctor/Scheduling Exams

All exams require a proctor unless an exam is self-administered.



See the **Appendix** for guidelines on *how to choose a proctor and schedule exams*.

Self-Administered Exams



See the **Appendix** for important information on *self-administered exams*.

Grading

The instructor determines each student's final grade for the course by an analysis of all lessons, projects, and examinations. The instructor does not have a rigid formula for weighing one grade against another.

Some factors, such as an apparent increase in ability and comprehension, do not fit into a mathematical formula. For this reason, the instructor reserves the right to give this type of factor special consideration.

The various components of the course are weighed approximately on a basis of 440 points:

13 graded lessons	310 points
Lesson 6: Project 1	30 points
Lesson 10: Project 2	50 points
Examination 1	25 points
<u>Examination 2</u>	<u>25 points</u>
	440 points

Written papers worth 10 points each will be graded on the following scale. Please refer to these guidelines when completing the writing assignments:

- 9-10 = **outstanding work**--indicators would be:
typed, double-spaced if sent via conventional mail (**2 page maximum**), single-spaced if sent via the e-mail, correct spelling and grammar usage, specifically addresses the topic, includes concise personal experience as well as text or other reference material, shows more than rote learning
- 7-8 = **work which meets the requirements** as noted above, may have minimal errors
- 6-5 = **work is not up to standard** quite a few errors and did not include everything that was asked for in directions
- 0-4 = **work did not meet criteria** please conference with instructor

The final course grade is issued after **all** lessons and exams have been graded.



See the **Appendix** for information about *confidentiality of student grades, course completion and time considerations*, and *requesting a transcript*.

About the Course Developer

I am very pleased to have the opportunity to share my love and excitement about science education with you. I have had a wide variety of experiences that have brought me to teaching elementary science methods. As an elementary classroom teacher, it became more and more apparent to me that elementary school teachers did not like to teach science. They saw it as a “have to” instead of something that touched them and their students daily. The students on the other hand were always wanting to “do science.” My colleagues found me to be the “go-to” person who would help by designing and implementing science for students “to do.”

While I am aware that everyone does not have the same interest in the sciences that I do, I hope to help you gain an appreciation and hopefully an enthusiasm which will make science and its relationship to all the other content areas a priority in your future teaching and your life. Learn with your students! Rediscover the excitement in exploring! In other words, be a kid again.

Sincerely,

L.K. Lofaro Coursey

Contacting Your Instructor

You will receive *course and instructor contact information* in your registration packet.



See the **Appendix** for detailed information on *contacting your instructor*.

Disability Support Services



See the **Appendix** for *information on Disability Support Services (DSS)*.

Assignment Submission Log

Lesson 1: The Elementary Science Classroom (25 points)

- _____ How do you “know” and “understand”(15 points)
- _____ Description of an inquiry-based, constructivist classroom (10 points)

Lesson 2: Scientists at Work (30 points)

- _____ Your science autobiography (20 points)
- _____ What are the important aspects in designing an experiment (10 points)

Lesson 3: Science Processes (30 points)

- _____ A rubric for each of the five students being assessed (15 points)
- _____ An analysis of how you and your students reacted to the activities (15 points)

Lesson 4: Guiding Inquiry (20 points)

- _____ Written discussion of inquiry-centered classroom (10 points)
- _____ Discussion of supports needed and anticipated pitfalls (10 points)

Lesson 5: Children’s Learning (15 points)

- _____ Chart the attempts of the participants (5 points)
- _____ Discuss the process of assimilation, accommodation, and equilibration as it relates to your participants. Do they work through all three stages? (Think Piaget) (10 points)

Lesson 6 - Project 1: Process Skill Posters (30 points)

- _____ 6 process skill posters (5 points each)
- _____ Examination 1 (25 points)

Lesson 7: Planning for Instruction (25 points)

- _____ Lesson plan (25 points)

Lesson 8: Linking Instruction and Assessment (25 points)

- _____ Chart for activity (10 points)
- _____ Discuss how would you assess a student’s results and gain information about a students’ understanding of floating and sinking. (15 points)

Lesson 9: Designing Performance Assessments for Inquiry-Based Science (15 points)

- _____ Your discussion of diagnostic assessment, formative assessment, and summative assessment, including specific examples to describe the unit using information from the chapter. (15 points)

Lesson 10 - Project 2: Connect Science and Mathematics through Measurement (50 points)

- _____ Diagram of earth model (5 points)
- _____ Paragraph describing the model (15 points)
- _____ Paragraph describing what you learned about how to create a scale model (15 points)
- _____ Chart of the scale you used (15 points)

Lesson 11: Learner Differences (25 points)

- _____ Activity 9.1 (15 points)
- _____ Your self-reflection (10 points)

Lesson 12: Cooperative learning (30 points)

- _____ Lesson plan (30 points)

Lesson 13: Integrating Technology (15 points)

- _____ Evaluation of an elementary science lesson from the Internet

Lesson 14: Science across the curriculum (30 points)

- _____ Graphic organizer/planning web (20 points)
- _____ Overview of unit (10 points)

Lesson 15: All those critters (30 points)

- _____ The completed lesson (20 points)
- _____ Final reflection of the class (10 points)

_____ **Examination 2 (25 points)**

Lesson 1

The Elementary Science Classroom

Lesson Objectives

The student should be able to answer the questions:

- 1-1 What does an elementary or middle school science classroom look like?
- 1-2 What is inquiry-based science?
- 1-3 How does assessment support inquiry-based instruction?
- 1-4 What are science education standards and why we need them?
- 1-5 What is the role of research in science teaching and learning?
- 1-6 What does a constructivist classroom look like?
- 1-7 How does a teacher serve the needs of diverse learners in the elementary science classroom?
- 1-8 What is the role of technology in the science classroom?

Overview

This chapter helps students develop an understanding of what happens in inquiry-based elementary and middle school science classrooms. It is designed as an entry into the culture of science and the world of science teaching. Students, through the text examples, will observe science classrooms in which teachers incorporate tasks, roles, and interactions that are consistent with inquiry-based science. As they “observe” teachers who use appropriate instructional strategies, resources, and assessments, they will learn that there is more to inquiry-based science than simply engaging in hands-on activities.

Reading Assignment

Science and Science Teaching: Science is Something that You Can Do!, Chapter 1

Writing Assignment



Please read the **Appendix** in the back of this study guide for essential Independent Study in Idaho policies and procedures, and forms you will need to successfully complete this course. You are responsible for understanding and following ISI policies and procedures. If there is anything on these pages you do not understand, contact the ISI office for clarification. Before starting the written assignment for Lesson 1, see the letters sent in your registration packet for your instructor’s contact information and requirements: **how to format and submit lessons, number of lessons you may submit at one time, and lesson guidelines.**

Outstanding work will include the following:

Typed or word processed, **double-spaced if sent via conventional mail (2 page maximum), single-spaced if sent via the e-mail, correct spelling and grammar usage**, address the topic specifically, include concise personal experience as well as information from Chapter 1 of the text and any other reference material you have been reading. You must cite references. It is essential that this is not a rote assignment.

Self Reflection

After “visiting the elementary classrooms,” reflect on the “field experiences.” What are some of the factors that shape elementary science today? Do you know what an inquiry-based classroom should look like, sound like, feel like, and think like?

For Lesson 1 send in:

- 1) One goal of teaching is to help students “know” and “understand.” What does this mean to you? How do you know when you “know” or “understand” something? Give an example.
- 2) Describe an inquiry-based, constructivist classroom.