

EDCI 365
Teaching Science in the Elementary School

Syllabus Packet

EDCI 365

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Anita Roychoudhury (Science Education Coordinator)

Office: BRNG 4138
Office Phone: 496-3920
Office Hours: By appointment
Email: aroychou@purdue.edu

Susan Gran

Office: BRNG 4127
Office Phone: 496-3023
Office Hours: By appointment
E-mail: sgran@purdue.edu

Ashleigh Morton

Office: BRNG 4127
Office Phone: 496-3023
Office Hours: By appointment
E-mail: anmorton@purdue.edu

Introduction

How do children come to understand ideas in science? What classroom conditions facilitate children's understanding of science? What do teachers need to know and do to create such conditions? These broad questions will serve as the foundation for this science methods course. You will explore these questions through reading, writing about, and discussing ideas about science teaching and learning.

Block V Teaching and Learning Framework

As one of three courses in Block V (including EDCI 364 and EDPS 430), EDCI 365 is designed to help you think about teaching and learning in the context of elementary science. A teaching and learning cycle framework with components of *assessment, evaluation, planning, and teaching* is used across courses in Block V to facilitate an understanding of the connectedness of teaching and ongoing assessment and evaluation across all content areas represented. The *assessment component* consists of data gathering through a variety of sources including, but not limited to, classroom observations, interviews, and children's oral and written products. The *evaluation component* is targeted toward interpreting these data--looking for patterns in children's behaviors and thinking related to science. The *planning component* of the framework involves planning for instruction based on this evaluation. Planning will create opportunities to enhance, clarify, and build on children's current scientific knowledge. The final part of the framework, the *teaching component*, presents opportunities for the teacher to support children's movement towards scientific understandings.

Expected Outcomes

EDCI 365 is designed to help you continue to develop the knowledge, dispositions, and performances that address the College of Education Guiding Principles in Practice: 1) Attention to Learners; 2) Understanding Curriculum in Context; and 3) Commitment to Professional Growth. In particular, by the end of EDCI 365, we expect that you will:

- clarify and refine your beliefs about teaching and learning science;
- present and defend your beliefs about elementary science teaching and learning;
- become aware of children's ideas in science and how they influence learning;
- use questions to uncover student thinking and understanding;
- gain skill in assessing, evaluating, and responding to the needs of diverse learners (developmental level, ability, ethnicity, gender) in science;
- understand ways to assess student learning in science;
- learn, practice, and reflect upon teaching strategies commensurate with your beliefs and knowledge about how children learn science;

- plan science instruction based on inquiry and teaching for understanding for all learners;
- become aware of a variety of resources for teaching science: informal science education, the World Wide Web, science education software, published curriculum projects, and local resources;
- reflect upon your teaching, noting areas of strength and needed.

Course Format

EDCI 365 has both a campus-based and a field-based component. The campus-based component combines 2 hours of lecture and 2 hours of lab per week. In addition to the on-campus meetings of this course, students will be scheduled into a field placement during the week. The Theory Into Practice (TIP) field component is shared with EDCI 364. Each cohort section of the block is partnered with its own local school. Each team of Purdue students will be matched with one classroom throughout the semester and carry out science and mathematics activities in conjunction with the block courses during this time.

Course Readings

- Harlen, Wynne (2001). *Primary Science ... Taking the Plunge*. London:Heinemann.
- Driver, R., Guesne, E., & Tiberghien, A. (2000). *Children's Ideas in Science*. Milton Keynes: Open University
- Wenham, Martin (1995). *Understanding Primary Science Ideas, Concepts, and Explanations*. London: PCP. (On reserve at TRC: BRNG)
- EDCI 365 Teaching Science in the Elementary School Reading Packet (at CopyMat)
- EDCI 365 Teaching Science in the Elementary School Syllabus Packet (at CopyMat)
- Indiana Academic Standards Science located at: <http://doe.state.in.us/standards/welcome.html>
- National Science Education Standards located at: <http://books.nap.edu/html/nses/html/index.html>

Assignments

1. **Attendance**: Because of the interactive and field-based nature of this course, regular attendance is expected. Each absence from the campus-based or TIP class meetings may result in points being deducted from your grade.

Tardiness

Students are expected to attend each class meeting and arrive on time. Chronic tardiness will result in a lower grade. More specifically, arriving to class tardy on two or more occasions will result in a lower grade.

Absences

Excessive absences, excused or unexcused, will result in the lowering of your final grade. Students are allotted up to two excused/unexcused absences throughout the course of the semester.

2. **Participation, Quizzes and Other Assignments (10%)**: Learning to teach is, in part, a function of being a member of a community of learners that interacts to build knowledge about teaching and learning. We expect you to be a consistent and high quality contributor to class activities, discussions, and group projects. We may give quizzes to assess your learning. Assignments other than those major assignments listed below will be given in order to create a complete learning experience. These assignments are crucial to your growth as an educator and will be evaluated.
3. **Project-based Assignments (70%)**: Project assignments consist of several group or team-based assignments. These assignments are briefly described below:

Scientist Biographical Scrapbook: This activity allows you to generate a creative approach to meeting the needs of diverse learners while exposing children to the contributions of famous (and less than famous) scientists and/or inventors and their inventions.

Planning and Developing Classroom Assessments in Science: This assignment will provide you with the experience in planning and developing assessments for use in elementary classrooms.

Science Learner Profile: This activity provides the opportunity to use an important tool for determining student science understandings and abilities, the interview. You will interview students about their science understandings and abilities, and construct a profile of a science learner. You will create a paper and a PowerPoint presentation. You will use the course required books and course reading packet as a resource.

Addressing Children's Ideas: This activity helps you think about ways to address children's naïve ideas that you have read about from the book edited by Driver et al. (2000). You are expected to use the suggestions from the readings on How Children Learn Science (Harlen, 2001; Eaton, Anderson, & Smith, 1983).

Inquiry-based Science Lesson Plans (3): Students are expected to design and implement a total of three inquiry-based science lesson plans. Each lesson plan will stem from a 5E framework. Students will be required to consult with their TIP teacher to identify appropriate Indiana science standards and scientific concepts for each lesson. The following is an outline of different approaches to science lesson planning and instruction that will be emphasized in the course:

- Productive Question Lesson: The Productive Question component will teach you how to question students more effectively during science instruction and how to integrate children's science journals. The productive question lesson will be developed by TIP teams assigned to Grades K-2.
- Inquiry/Fair Test Lesson: Current education reform movements stress inquiry-based science instruction. This activity introduces you to the characteristics of inquiry learning and the complexities of carrying it out in the classroom. The fair test lesson will be developed by TIP teams assigned to Grades 3-5.

Students will teach these lessons and write reflections on their teaching experiences. Their teaching will be observed by the course instructor and the classroom teacher.

4. Science Portfolio Assignment (20%): In lieu of a final examination, you will create a portfolio to help you synthesize your ideas about elementary science teaching and learning. The portfolio will include class assignments and other artifacts that demonstrate your growth as a science educator. The portfolio serves as your e-portfolio.

Grading

Because of the interactive nature of this course, regular attendance is expected (see above). Absences, excused or unexcused, could result in the lowering of your final grade. Because this class involves reflective inquiry and field-based experiences, assignments are project-based. Detailed explanations and evaluation criteria will be provided as each assignment is to be completed. Assignments will be graded from criterion-referenced and norm-referenced viewpoints. **Scholarly work is expected and rewarded.** Scholarly work goes beyond opinion and the simple description of readings; and involves reflection and inquiry, citing readings and the literature as evidence to support your position(s). Late assignments receive a 10% reduction in grade per day and will not be accepted one week after the due date. Final grades will be based on percentages: A=90%+, B= 89-80%, C=79-70%, D=69-60%, F=59%. Grades are not given, they are earned. The course instructor may further subdivide the grades into the +/- system of Purdue University.

Dispositions

Students are expected to demonstrate appropriate dispositions that reflect: 1) a willingness to work with others fairly and equitably, 2) take responsibility for establishing a positive climate in the classroom, 3) exhibit a commitment to planning, reflection, assessment, and learning as on-going processes, 4) maintain responsible and ethical behavior, and 5) demonstrates enthusiasm for science at the elementary school level, and makes connections to everyday life. Violation of these dispositions will constitute grounds for reduction in course grade and/or failure of the course.

Elementary Education Course Completion Policy

Elementary Education majors have two opportunities to enroll in and pass required EDCI, EDPS, and EDST courses with a minimum grade of C. Withdrawal from a course (W or WF) constitutes one of the two opportunities. Failure to successfully meet these requirements will result in dismissal from the Elementary Education Program. Courses repeated to improve a grade must be taken at the West Lafayette campus.

Approved by the Elementary Teacher Education
Committee, April 20, 2007

Emergency Statement

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. You are encouraged to contact your course instructor, either by phone or email (see first page for contact information), in order to get information about changes in this course.

Adaptive Programs Statement

Students with disabilities must be registered with Adaptive Programs in the Office of the Dean of Students before classroom accommodations can be provided. If you are eligible for academic accommodations because you have a documented disability that will impact your work in this class, please schedule an appointment with me as soon as possible to discuss your needs.

Academic Dishonesty Statement

Purdue prohibits "dishonesty in connection with any University activity. Cheating, plagiarism, or knowingly furnishing false information to the University are examples of dishonesty." [Part 5, Section III-B-2-a, [University Regulations](#)] Furthermore, the University Senate has stipulated that "the commitment of acts of cheating, lying, and deceit in any of their diverse forms (such as the use of substitutes for taking examinations, the use of illegal cribs, plagiarism, and copying during examinations) is dishonest and must not be tolerated. Moreover, knowingly to aid and abet, directly or indirectly, other parties in committing dishonest acts is in itself dishonest." [University Senate Document 72-18, December 15, 1972] Violation of academic dishonesty will result in one or more of the following actions: 1) receiving a lower or failing grade on the assignment; or 2) receiving a lower or failing grade for the course. (*Purdue University, Responding to Academic Dishonesty: A Guide for Faculty, 2002*).

Professional Development

We recommend that you join one or more of the following science teacher organizations. These include the following:

- Hoosier Association of Science Teachers, Inc. (HASTI) [see: www.hasti.org]
- National Science Teachers Association (NSTA) [see: www.nsta.org]
- Council for Elementary Science International (CESI) [see: <http://www.cesiscience.org/>]

Student memberships range from \$10 to \$20 and include year long subscriptions to journals such as, *The Hoosier Science Teacher*, *Science and Children*, and *CESI Science*. HASTI hosts an annual convention in Indianapolis during February.

Note: All entries in the syllabus and calendar are tentative and subject to modification by the instructor. Any changes will be provided in class.

Students are required to visit <http://www.education.purdue.edu/ODFD/resources.html> review the response procedures for emergencies in Beering Hall. It is necessary that you review these directions within the first week of your Beering classes. If you have any questions see your instructor.