New Course Request

Indiana University __South Bend__ Campus

Check Appropriate Boxes: Undergraduate credit [ ] Graduate credit [X] Professional credit [ ]

1. School/Division __Education__
2. Academic Subject Code __EDUC__
3. Course Number __E575_ (must be cleared with University Enrollment Services)
4. Instructor __C. Sprague__
5. Course Title __Teaching of Science in the Elementary School__
   Recommended Abbreviation (Optional) ______________ (Limited to 32 Characters including spaces)
6. First time this course is to be offered (Semester/Year): __Spring/2010__
7. Credit Hours: Fixed at __3__ or Variable from ____________ to ____________
8. Is this course to be graded S-F (only)? Yes _X_ No __
9. Is variable title approval being requested? Yes _X_ No __
10. Course description (not to exceed 50 words) for Bulletin publication: __Candidates will assess their roles as science teachers in elementary classrooms and acquire strategies that actively engage students in their own learning. This course emphasizes the basic and integrated science process skills that engage students in the same thinking processes as scientists who are seeking to expand human knowledge. A guided inquiry approach to teaching science is stressed and modeled.__
11. Lecture Contact Hours: Fixed at __37.5__ or Variable from ____________ to ____________
12. Non-Lecture Contact Hours: Fixed at ____________ or Variable from ____________ to ____________
13. Estimated enrollment: __20__ of which __100__ percent are expected to be graduate students.
14. Frequency of scheduling: __once/year__ Will this course be required for majors? __yes__
15. Justification for new course: __Current course for alternate route to licensing not designed for initial licensure__
16. Are the necessary reading materials currently available in the appropriate library? __yes__
17. Please append a complete outline of the proposed course, and indicate instructor (if known), textbooks, and other materials.
18. If this course overlaps with existing courses, please explain with which courses it overlaps and whether this overlap is necessary, desirable, or unimportant.
19. A copy of every new course proposal must be submitted to departments, schools, or divisions in which there may be overlap of the new course with existing courses or areas of strong concern, with instructions that they send comments directly to the originating Curriculum Committee. Please append a list of departments, schools, or divisions thus consulted.

Submitted by:__Ann W. Cress__ Department Chairman/Division Director __3-30-09__
Approved by:__Laura Clark__ Dean __4-9-09__
Dean of Graduate School (when required) __4-28-09__
Chancellor/Vice-President __Date ____________
University Enrollment Services __Date ____________

After School/Division approval, forward the last copy (without attachments) to University Enrollment Services for initial processing, and the remaining four copies and attachments to the Campus Chancellor or Vice-President.

UPS 724 University Enrollment Services Final—White; Chancellor/Vice-President—Blue; School/Division—Yellow; Department/Division—Pink; University Enrollment Services Advance—White
Teaching of Science in the Elementary School
Course Number: E575 (3 cr)
Section:

SCHOOL OF EDUCATION MISSION STATEMENT
The School of Education prepares professionals to be leaders in and beyond P-12 classrooms. In our initial programs, future teachers become classroom leaders who are competent, ethical, reflective, and ready to promote learning for a diverse student population. In our advanced programs, teachers, counselors, and principals build on these classroom leadership responsibilities to become advocates, decision-makers, researchers, and partners in school and community settings.

Instructor: Connie Sprague
Phone:
Office:
Office Hours: Associate faculty should list contact information and directions for students to make an appointment
E-mail:
Livetext name (if appropriate):

Course Description:
Candidates will assess their roles as science teachers in elementary classrooms and acquire strategies that actively engage students in their own learning. This course emphasizes the basic and integrated science process skills that engage students in the same thinking processes as scientists who are seeking to expand human knowledge. A guided inquiry approach to teaching science is stressed and modeled.

Course Prerequisites:
Admittance into an initial licensure program.

Course Text:
Learning and Assessing Science Process Skills, 5th edition, Rezba, R. and Sprague, C., McDonough, J., Matkins, J., Kendall/Hunt Publishing Company, 2007. An important note about the textbook: This text serves as a laboratory manual for in-class and out-of-class exercises essential to the understanding of scientific thinking and inquiry. You will use the text to learn and practice the science process skills (basic science process skills and integrated science process skills) so you will be able to incorporate these skills into lessons you plan for children. The science process skills are strongly emphasized in the Indiana Academic Standards for Elementary Science. To assess your learning of the science process skills, you will be asked to perform the tasks clearly stated in the objectives for each chapter of the text. Your instructor reserves the right to collect and check your textbook manual exercises as a means of formative assessment. If you have purchased a used book, you will still be held accountable for responses to questions and activities.
UNIVERSITY POLICIES

Electronic Mail
Electronic mail (e-mail) is the official means of communication with students at Indiana University South Bend. A student’s failure to receive or read official university communications sent to the student’s official email address does not absolve the student from knowing and complying with the content of the official communication. It is recommended that students check email messages at least once daily. The university provides a simple mechanism for students to forward email from the official university email address to another email address of the student’s choice. However, students who choose to have email forwarded to another email address do so at their own risk.

Accommodations for Religious Observances Statement
If any student will require academic accommodations for a religious observance, please provide me with a written request to consider a reasonable modification for that observance by the end of the second week of the course. Contact me after class, during my office hours, or by individual appointment to discuss the issue. If after discussion we reach no consensus, either party or both should seek the advice of the Department Chair or the Dean, and if no consensus is reached, then the advice of the Vice Chancellor of Academic Affairs (“VCAA”). Either the instructor or the student may appeal the VCAA’s decision to the Office of Affirmative Action within ten business days of the determination.

Disabilities Statement
If you have a disability and need assistance, special arrangements can be made to accommodate most needs. Contact the Director of Disability Support Services (Administration Building, room 113, telephone number 520-4832), as soon as possible to work out the details. Once the Director has provided you with a letter attesting to your needs for modification, bring the letter to me. For more information, please visit the web site for Office of Disabilities Support Services 
http://www.iusb.edu/~sbdss/

SPECIAL STATEMENTS

Commitment to Diversity
The School of Education at IUSB is committed to preparing preservice teachers, school leaders, and school counselors to support learning for all students. Each class and learning experience helps candidates develop the knowledge, dispositions, and performances needed to meet the needs of students in today's diverse classrooms. One example from this class is the use of cooperative learning groups where every student is an active participant in hands-on activities and inquiry based lessons.

Commitment to Technology
The School of Education at IUSB is committed to preparing preservice teachers, school leaders, and school counselors who have the knowledge, dispositions, and performances needed to effectively use technology to help all students learn. Candidates are expected to incorporate technology throughout their course work and clinical experiences. Science and technology go hand-in-hand in the collection and organization of data in the search for answers to questions. You will use a wide variety of measurement tools.
One specific example from this class is the modeling of a sample inquiry lesson that incorporates
computer and other technology to enhance and extend hands-on experiences.

ACEI standards used in the course:

2.2 Science—Candidates know, understand, and use fundamental concepts of physical, life, and earth/space sciences. Candidates can design and implement age-appropriate inquiry lessons to teach science, to build student understanding for personal and social applications, and to convey the nature of science;

1.0 Development, Learning, and Motivation—Candidates know, understand, and use the major concepts, principles, theories, and research related to development of children and young adolescents to construct learning opportunities that support individual students’ development, acquisition of knowledge, and motivation.

3.1 Integrating and applying knowledge for instruction—Candidates plan and implement instruction based on knowledge of students, learning theory, connections across the curriculum, curricular goals, and community;

3.2 Adaptation to diverse students—Candidates understand how elementary students differ in their development and approaches to learning, and create instructional opportunities that are adapted to diverse students;

3.3 Development of critical thinking and problem solving—Candidates understand and use a variety of teaching strategies that encourage elementary students’ development of critical thinking and problem solving;

3.4 Active engagement in learning—Candidates use their knowledge and understanding of individual and group motivation and behavior among students at the K-6 level to foster active engagement in learning, self motivation, and positive social interaction and to create supportive learning environments;

4.0 Assessment for instruction—Candidates know, understand, and use formal and informal assessment strategies to plan, evaluate and strengthen instruction that will promote continuous intellectual, social, emotional, and physical development of each elementary student.

5.1 Professional growth, reflection, and evaluation—Candidates are aware of and reflect on their practice in light of research on teaching, professional ethics, and resources available for professional learning; they continually evaluate the effects of their professional decisions and actions on students, families and other professionals in the learning community and actively seek out opportunities to grow professionally.

5.2 Collaboration with families, colleagues, and community agencies—Candidates know the importance of establishing and maintaining a positive collaborative relationship with families, school colleagues, and agencies in the larger community to promote the intellectual, social, emotional, physical growth and well-being of children.

COURSE OBJECTIVES MATCHED TO IUSB/ACEI STANDARDS:

IUSB/ ACEI standards
<table>
<thead>
<tr>
<th>IUSB Middle Childhood Objectives</th>
<th>Performance Objectives (formative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 Content Knowledge ACEI – 2.2</td>
<td>The teacher:</td>
</tr>
<tr>
<td></td>
<td>1. Effectively uses multiple representations and explanations of disciplinary concepts that capture key ideas and link them to students’ prior understandings.</td>
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<td></td>
<td>2. Engages students in generating knowledge and testing hypotheses according to the methods of inquiry and standards of evidence used in the discipline.</td>
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<tr>
<td></td>
<td>3. Develops, evaluates, and uses interdisciplinary curricula that encourage students to see, question, and interpret ideas from diverse perspectives.</td>
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<tr>
<td>#2 Child Growth and Development ACEI 1.0</td>
<td>1. Assesses individual and group performance in order to design instruction that meets learners’ current needs in each domain (cognitive, social, emotional, moral and physical) leading to the next level of development.</td>
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<td></td>
<td>2. Stimulates student reflection on prior knowledge and links new ideas to already familiar ideas, making connections to students’ experiences, providing opportunities for active engagement, manipulation, and testing of ideas and materials, and encouraging students to assume responsibility for shaping their learning tasks.</td>
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<td></td>
<td>3. Assesses students’ thinking and experiences as a basis for instructional activities by, for example, encouraging discussion, listening and responding to group interaction, and eliciting samples of student thinking orally and in writing.</td>
</tr>
<tr>
<td>#3 Diversity ACEI 3.2</td>
<td>1. Identifies, designs, and implements instruction appropriate to the students’ stages of development, learning styles, strengths, and needs.</td>
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<td>2. Uses teaching approaches that are sensitive to the multiple experiences of learners and that address different learning and performance mode.</td>
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<td></td>
<td>6. Creates a learning community in which individual differences are respected, understood, questioned, and interpreted from diverse perspectives.</td>
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<tr>
<td></td>
<td>7. The teacher encourages students to understand, question, and interpret ideas from diverse perspectives.</td>
</tr>
<tr>
<td>#4 Instruction ACEI -3.1,3.2,3.3,3.4</td>
<td>1. Carefully evaluates how to achieve learning goals, choosing alternative teaching strategies and materials to achieve different instructional purposes and to meet students’ needs.</td>
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<td></td>
<td>2. Constantly monitors and adjusts strategies in response to learner feedback.</td>
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<td></td>
<td>3. Varies his or her role in the instructional process (e.g. instructor, facilitator, coach, audience) in relation to the instruction and the needs of students.</td>
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<tr>
<td></td>
<td>5. Uses developmentally appropriate resources and instructional strategies to engage children in active learning opportunities that develop intellectual curiosity, solve problems, make decisions, and</td>
</tr>
</tbody>
</table>
| #5 Learning Environment | 2. Applies the concepts of learning and inquiry to create learning experiences that inspire the excitement of learning and foster risk-taking and collaboration.  
3. Creates a smoothly functioning learning community in which students assume responsibility for themselves and one another, participate in decision making, work collaboratively and independently, and engage in purposeful individual and cooperative learning activities.  
4. Engages students in individual and cooperative learning activities that help them develop the motivation to achieve, by, for example, relating lessons to students’ personal interests, allowing students to have choices in their learning, and leading student to ask questions and pursue problems that are meaningful to them.  
5. Organizes, allocates, and manages the resources of time, space, activities, and attention to provide active and equitable engagement of students in productive tasks.  
7. Helps the group develop shared values and expectations for student interactions, academic discussions, and individual and group responsibility that create a positive classroom climate of openness, mutual respect, support, and inquiry. |
| --- | --- |
| #6 Communication ACEI – 5.2 | 3. Knows how to ask questions and stimulate discussion in different ways for particular purposes, for example, probing for learner understanding, helping students articulate their ideas and thinking processes, promoting risk-taking and problem-solving, facilitating factual recall, encouraging convergent and divergent thinking, stimulating curiosity, helping students to question.  
4. Communicates in ways that demonstrate sensitivity to cultural and gender differences.  
5. Uses a variety of media communication tools, including audio-visual aids and computers to enrich learning opportunities. |
| #7 Instructional Planning ACEI – 3.1,3.2,3.3,3.4 | 1. As an individual and a member of a team, selects and creates learning experiences that are appropriate for curriculum goals, relevant to learners, and based upon principles of effective instruction.  
2. Creates short-range and long-term plans that are linked to student needs and performance, and adapts the plans to ensure and capitalize on student progress and motivation. |
| #8 Assessment ACEI – 4.0 | 2. Appropriately uses and interprets a variety of formal and informal assessment techniques to enhance her or his knowledge of learners, evaluate students’ progress and performances, and modify teaching and learning strategies.  
4. Uses assessment information to enhance his/her knowledge of learners, to monitor student progress and performance, to communicate with parents, to support children in self-assessment, and to modify teaching/learning strategies. |
| #9 Professionalism | 2. Pursues ongoing professional development and seeks out |
ACEI – 5.1

professional literature, colleagues, and other resources to support his/her own development as a learner and a teacher
3. Draws upon professional colleagues within the school and other professional arenas as supports for reflection, problem-solving and new ideas, actively sharing experiences and seeking and giving feedback

#10 Collaboration
ACEI – 5.2
1. Can identify and use community resources to foster student learning

**Performance Objectives:** The student should use course content and experiences to develop the following understandings and abilities:

1. Describe recent trends in science education policy and goals. (#1, ACEI 2.2)
2. Define “scientific literacy” and describe practices that promote scientific literacy. (#1, ACEI 2.2)
3. Describe the role of the national (NSTA) and state (HASTI) science teachers associations, then describe the purpose of the journals they publish, and the opportunities they offer for professional growth. (#9, ACEI 5.1)
4. Summarize and reflect on professional journal articles and use periodical literature to stay current with new ideas and trends in science education. (#9, ACEI 5.1)
5. Describe what is considered to be “best practice” in science education, how it relates to constructivist learning theory and practices that promote science literacy. (#4, ACEI 3.1-3.4)
6. Perform all of the Basic and Integrated Science Process Skills which serve as tools during the inquiry process. Practice these skills in a cooperative learning setting. (#4, ACEI 3.1-3.4) (See the laboratory objectives in the text.)
7. Critique, revise and enhance elementary science activities in order to make them more effective tools for building inquiry skills. (#4, ACEI 3.1-3.4)
8. Describe ways to continuously build one’s own content knowledge using a wide variety of resources from elementary, middle, high school and college level materials. (#1, ACEI 2.2)
9. Display dispositions appropriate for science educators. (#9, ACEI 5.1)
10. Model the inquiry process: Ask an operational (testable) question about a concept and state a hypothesis about that question. Design and conduct an investigation to test the hypothesis, collect and organize data. Write a statement describing relationships found among the variables and report additional findings. (#1, ACEI 2.2)
11. Use a variety of curricular approaches available to elementary science educators, including environmental, STS, inquiry, and interdisciplinary curricula. (#4, ACEI 3.1-3.4)
12. Design science lessons and units that meet standards and that are developmentally appropriate and sensitive to the needs, values, and interests of a diverse group of students. (#2, ACEI 1.0)
13. Design science lessons using the Learning Cycle model (or 5-E or Conceptual Change Model) [This model is formatted to get children engaged and exploring with a concept before being formally presented with vocabulary and basic concept ideas. It then requires students to apply what they have learned.] (#4, #7, ACEI 3.1-3.4)
14. Design assessment strategies and tools that match lesson objectives, design and apply scoring rubrics to aid in assessment. (#8, ACEI 4.0)
14. Design science lessons using a full Inquiry format. This format engages children in asking a
testable question, designing and conducting an investigation to answer their own question. Design an assessment strategy and rubrics for this type of lesson. (#4, #7, ACEI 3.1-3.4)

15. Incorporate appropriate "hands-on, minds-on activities" in lessons (#4, #7, ACEI 3.1-3.4).

16. Construct assessment plans (pre-assessment, formative assessment, post assessment) that match lesson objectives derived from standards and use methods that allow for multiple ways of representing knowledge. (#8, ACEI 4.0)

17. Use diagnostic observation skills, instructional strategies, and classroom management techniques to promote science learning in small group or whole-class settings. (#5)

18. Use multimedia and technologies to support meaningful learning of science concepts. (#4, #5, #7, ACEI 3.1-3.4)

19. Establish rules and procedures that ensure the physical safety of children. (#5)

20. Use careful reflection as a dynamic tool in professional development and lifelong learning. (#9, ACEI 5.1)

Course Assignments: All assignments for this class will be submitted in hard copy. Using Live Text, however, is the preferred method of generating lesson plans. Look for the Learning Cycle Lesson Planning Template and the Inquiry Lesson Planning Template in Live Text.

University and School of Education policies (required)

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ACADEMIC HONESTY STATEMENT: It is the responsibility of the student to know of the
prohibited actions such as cheating, fabrication, plagiarism, academic, and personal misconduct, and thus, to avoid them. All students are held to the standards outlined in the code. Please reference the entire code for a complete listing (http://www.dsa.indiana.edu/Code/). Any violation may result in serious academic penalty, including receiving a warning, failing the assignment, failing the course, or expulsion from the University.

Field Experience Note: You may be required to provide a criminal history check to school corporations before participating in field placements and/or student teaching. School corporations may deny a field placement or student teaching assignment based on a misdemeanor or felony conviction. The application process for a teaching license in Indiana requires a current criminal history check. Convicted felons may not hold a teaching license in Indiana.

Please Note: (required statement)

Students in the School of Education are required to post select artifacts (assignments) on LiveText or in Oncourse. Therefore, students may be required to purchase and utilize LiveText at any time during this course. The instructor will notify you if you are required to post assignments on LiveText.

STUDENT EVALUATION: Students must attain a grade of C or better in all required education courses.

E328 Grading:

<table>
<thead>
<tr>
<th></th>
<th>Points</th>
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<tbody>
<tr>
<td>Attendance</td>
<td>30 pts.</td>
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<tr>
<td>Articles 20x2</td>
<td>40 pts.</td>
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<tr>
<td>Quiz 1</td>
<td>20 pts.</td>
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<tr>
<td>Quiz 2</td>
<td>50 pts.</td>
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<tr>
<td>Concept map</td>
<td>20 pts.</td>
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<tr>
<td>Science exper.</td>
<td>50 pts.</td>
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<tr>
<td>Science unit –</td>
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<tr>
<td>Lesson 1 plan</td>
<td>80 pts.</td>
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<tr>
<td>Assessment</td>
<td>25 pts.</td>
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<tr>
<td>Rubric</td>
<td>15 pts.</td>
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<tr>
<td>Lesson 2 plan</td>
<td>50 pts.</td>
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<tr>
<td>Content rubric</td>
<td>20 pts.</td>
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<tr>
<td>Process skill rubric</td>
<td>20 pts.</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>435</strong></td>
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<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
<th>Points</th>
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</thead>
<tbody>
<tr>
<td>A-</td>
<td>90% - 92%</td>
<td>392</td>
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<tr>
<td>B-</td>
<td>80% - 82%</td>
<td>348</td>
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<tr>
<td>C-</td>
<td>70% - 72%</td>
<td>304</td>
</tr>
<tr>
<td>D-</td>
<td>60% - 62%</td>
<td>261</td>
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</table>
**Attendance and participation are part of your grade:**

Get in the habit of signing the attendance sheet as you enter the classroom. You must sign the attendance sheet in the first ten minutes of class in order to be counted present for each class. Please note that you are automatically given 30 points, which count in the total points, for attendance and active participation. By not missing any classes you will retain these 30 attendance points. For each class missed, though, 10 points will be deducted from the total points. The point system is designed so that if you are already doing well in the class, one or two misses will not dramatically affect your grade. Please talk to your instructor if major problems arise. Any student missing 5 or more classes for a course meeting twice/week, or 3 classes for a course meeting once/week will be required to withdraw from the course. Please be responsible for keeping your own record of the number of classes you have missed.

To assure success:

- Get organized.
- Set a routine for working on assignments outside-of-class.
- Attend every class.
- Be on time to class and settle down quickly.
- Participate actively with materials and with others in your cooperative learning group.
- Help keep your cooperative learning group on task
- Become familiar with the dispositions appropriate for teachers of science and display them in class and in the field.
- Be an inquirer and a model learner.
<table>
<thead>
<tr>
<th>Course Criterion Areas</th>
<th>Possible Points</th>
<th>Rubric provided</th>
<th>Date due</th>
<th>My Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Attendance and active and collaborative participation in cooperative learning teams</em></td>
<td>30 points</td>
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<td>10 points lost per absence up to 4 absences</td>
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<td>3 absences = must withdraw from the class</td>
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<td>Write a summary/reflection on 2 Science and Children articles related to grades 4-6.</td>
<td>40 points (20 pts ea)</td>
<td>Yes</td>
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<td>Quiz on the NSTA position statement on science and the teaching of science.</td>
<td>20 points</td>
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<td>Quiz on Basic Science Process Skills: This is an in-class, hands-on assessment on the objectives in chapters 1-7 of the text</td>
<td>50 points</td>
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<td>Research the science concept assigned to you by the instructor. Construct a concept map showing the attributes of the concept. Locate and present to your team a 10-15 minute (max) a hands-on science demo that helps to make the concept visual and concrete. <strong>Demonstrate your ability to give an accurate explanation of the science concept and use the scientific vocabulary associated with the concept.</strong></td>
<td>20 points</td>
<td>Yes</td>
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<td>Submit to the instructor (see the rubric): - a written copy of the demo (see format)</td>
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<tr>
<td>- the concept map</td>
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<td>- a 1 page (double spaced) reflection</td>
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<tr>
<td>Conduct a Scientific Experiment of your own and submit an Experiment Report (see textbook chapter 17 example) on your experiment.</td>
<td>50</td>
<td>Yes</td>
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<tr>
<td>Construct a Science Unit that includes at least 2 fully developed science lesson plans. In addition to the requirements listed below each plan must include: - a list of materials used, - a plan for preparing and managing materials, - a plan for establishing and managing cooperative learning groups, One lesson must use the Learning Cycle format: Include a student-ready summative assessment, a set of model answers to the assessment, and a rubric (matched to the lesson objectives) for scoring student responses to the assessment. One lesson must use the Inquiry Lesson Plan format. Be sure to include an experiment report form that serves as both formative and summative assessment. Include 2 rubrics (one matched to the</td>
<td>80 (lesson)</td>
<td>Yes</td>
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<td>25 (assessment and model answers)</td>
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<td>15 (rubric)</td>
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<tr>
<td>50 (lesson)</td>
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<td>15 (exp. report form)</td>
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<td>20 (content rubric)</td>
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<tr>
<td>20 (process rubric)</td>
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A TENTATIVE CLASS SCHEDULE

**An overview:** During January - February, you’ll learn what “Science” really is and become acquainted with some organizations, journals and documents with which every teacher of science should be well acquainted. You’ll learn that there are some basic skills you’ll need to teach children so they can actively do science, but first you must learn these basic skills yourself. During March, you’ll integrate some additional skills into your repertoire of basic skills. These integrated skills lead to real investigating and experimenting. So that you can get children involved in experimenting, you’ll need to learn how to conduct scientific experiments yourself.

During March and April, you’ll be designing lesson plans using planning formats that are perhaps new to you but that are particularly useful in teaching science. These particular formats encourage inquiry, constructivism, hands-on experiences, laboratory investigation, conceptual understanding, and problem solving.

Hopefully you will have opportunities to apply and practice what you have been learning in class in your field experience throughout the semester.

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<th>Date</th>
<th>Tentative Calendar of Events</th>
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| Week 1| So, you are going to be an elementary teacher. Does that mean you will be a science teacher? Absolutely! What science should you teach? How should you teach it? Where will you get the stuff you need to teach it? Are there national and state standards you must follow? How will you know students have learned what they are supposed to learn? What if you don’t have a strong knowledge base in science? Where do you begin?  
**Assignments:**  
1. Read the article, NSTA Position Statement: Beyond 2000 –Teachers of Science Speak Out. Be prepared to be quizzed on the important aspects of this article, specifically on what recent research shows regarding science teaching.  
2. In the textbook, Learning and Assessing Science Process Skills, read the “Introduction”, “Organization”, “How to Use this Book”, and “A Challenge”.  
3. Read, summarize and reflect on 2 Science and Children articles. (see the rubric)  

Begin Chapter 1: Building a Foundation for Teaching Science Process Skills  
**What is Science?**  
- Science is a way of thinking (science process skills)  
- Science is a body of knowledge (content)  
- Science is a way of investigating (experimenting) |
- **Science is an inquiry** (active curiosity)
  How will you learn the *science content* you need to know to teach science to kids? How will you learn the *scientific processes* you need to teach kids so they inquire and investigate on their own?

**What are the National Science Education Standards?**
**What are the Indiana Academic Standards for Science for Middle Childhood?**
- Examining Standards and Indicators
- Examining appropriate dispositions of a science teacher

*Assignment: Everyone will plan and present a science demonstration. See the handout materials on finding, preparing and presenting demos. A Science demonstration is a dynamic teaching tool!*

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**Week 2**

**Using Cooperative Learning Teams; Assigning roles**

**Getting started with your team learning and applying the Science Process Skills:** What are the science process skills you need to know? How will you learn them? What is your assigned role in your cooperative learning group? How will you learn the basic skill of observing? How will you teach kids to make good observations? Text Ch. 2

**Lab:** How will you learn the basic skill of *communicating*? How will you teach kids to communicate in a scientific way? Text Ch. 3

**Week 3**

*Assignment due: 2 Science and Children article summary/reflections due*

**Lab:** How can you learn the basic skill of *classifying*? How will you teach kids to classify? Why is this important? Ch 4

**Week 4**

**Quiz over NSTA article**

**Lab:** How can you learn the basic skill of *measuring*? How will you teach kids to measure using the *metric system*? Why is this important? Ch 5

**Week 5**

**Lab:** How will you learn the skill of making *inferences*? How will you teach kids to make logical inferences based on what they know and what they observe? Ch 6

**Lab:** How will you learn the basic skill of predicting? How will you teach kids to make predictions based on observations and inferences? Why is it important for children to make predictions about things and events? Ch 7

How can you prepare for the **Basic Science Process Skills Assessment**?

**Week 6**

**Basic Science Process Skills Assessment** – this is an example of an authentic assessment; note that it exactly matches the performance tasks stated in the chapter objectives.

*Using Science Activities in the classroom:* Where can you find science activities to use in your lessons? How can you make a "hands-on science"
activity a “hands-on and minds-on science” activity so that kids are thinking, not just doing activities? (See the examples shown in Decision Making I section of your textbook.)

Week 7

**Lab:** Overview of the **Integrated Science Process Skills** leading to Experimenting. What should an experiment include? How do I get started learning how to design and conduct an experiment on my own? How do I identify and manipulate variables? Ch 8-17

See the sample experiment and experiment report forms and rubrics in the text.

**Using the Learning Cycle Model for planning Science Lessons**

Identifying and writing measurable learning outcomes for science lessons:
- Content objectives
- Process skill objectives
- Social objectives

Constructing a summative assessment tool, model response sheet and rubric for scoring student responses.

Week 8

**Science Demo Day!**

Present to your team a hands-on science demonstration and brief explanation of the science concept being demonstrated.

**Lab:** designing and conducting experiments

Week 9

**Th Mar 6**  
Using a Full (true) Inquiry Model for planning science lessons

How can I use the **Inquiry Lesson Plan Model** to plan for high levels of inquiry? (See the textbook section called Decision Making II for an example of a science activity serving as a springboard into inquiry.)

**Lab:** 8-17 designing and conducting experiments

Week 10

**Lab:** Ch 8-17 designing and conducting experiments

Week 11

**Lab:** Ch 8-17 designing and conducting experiments

Week 12

**Your own experiment is Due**

You must have your experiment report completed and ready to share in an in-class peer review.
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<th>Week 13</th>
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<td><strong>Discussion on the science unit due next week.</strong></td>
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<th>Week 14</th>
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<td><strong>Science Unit including both lesson plans, assessments and rubrics due on this date or before.</strong></td>
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<td>How can I use computer technology to enhance and extend hands-on science learning experiences? (A sample Inquiry Lesson: “Herman the Worm”)</td>
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<td>Can I be held <strong>legally liable</strong> if one of my students is injured in my science class or on a field trip? How can I prevent this from happening? What other safety issues do I need to be aware of?</td>
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<td><strong>Last class: Bring your textbook to class.</strong></td>
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<td><strong>Revisit Chapter 1: Your vision for science teaching.</strong></td>
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<td>How can you continue to grow professionally?</td>
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**Note:**
- IUSB’s **Educational Resource Center**, located in Greenlawn Hall, is an excellent source for science demonstrations and science activities.

**Bibliography of Appropriate sources of information for this class. Links lead to web based information as well as more traditional forms of reference.**
- **Science and Children** is a professional journal publication for elementary teachers published by the National Science Teachers Association. Copies are available in the Schurz Library. A few NSTA journal articles are online at the NSTA Website. See the web site listed below.
- **NATIONAL SCIENCE EDUCATION STANDARDS**, National Research Council. This is the landmark resource written to provide a coherent vision of what it means to be scientifically literate. It describes exemplary teaching practices, key criteria for assessing and analyzing achievement in science as well as showing teachers how to develop the physical and support resources needed for developing high quality science programs.

- **Some Other Useful Web resources:**

  National Science Teachers Association (NSTA): www.nsta.org

  Indiana Academic Standards: www.doe.state.in.us/
  The Exploratorium Institute for Inquiry: www.exploratorium.com/IFI/
  Frank Potter’s Science Gems: http://www.sciencegems.com/
  Pitsco’s Launch to Asking an Expert: http://www.enc.org/resources/
  Activities Integrating Math and Science: http://www.aimsedu.org/
  The Science Learning Network: www.sln.org
  Project 2061: www.project2061.org
  The National Science Resources Center: www.si.edu/nsrc
  The Eisenhower National Clearinghouse Center: www.enc.org
  The Northwest Regional Educational Laboratory (NWREL):
    www.nwrel.org/msec/index.html
  The Full Option Science System (FOSS): www.fossweb.com
  Instructional Materials in Science Education: www.ncsu.edu/imse
  The Thinking Fountain: www.sci.mus.mn.us/sln/