California State University, San Marcos

- AUTHORIZATION TO OFFER TOPICS COURSES FOR ACADEMIC CREDIT THROUGH EXTENDED STUDIES -

(Note: Extended Studies sections of topic classes for which the appropriate form E-T is not on file in the Office of Academic Programs will be removed from BANNER as periodic audits of course offerings are performed.)

Note: Any proposed topic can only be offered two times before being converted to a non-topics course. Academic Programs will assign the appropriate suffix and edit the topic description provided.

1. College of: Education

2. Center/Program/Department:

3. Instructor ________________________________
   (If more than one instructor will be teaching the course, list full name of the "instructor of record."

4. Topic Abbreviation and Number: EDUC E592W

5. Grading Method: N (Normal)

6. Term: Summer

7. Year: 2007

8. Variable Units: 2

9. Has this topic been offered previously? Yes ___ No ___

10. Topic Title: Science and Young Children

11. Topic Description: Note: This part can be skipped if answer to part 9 is "yes." (NOTE: Please provide detailed information about the topic. Please type. You may also attach the topic description on a separate sheet if you do not have enough space.

   This course engages participants in reviewing and trying out activities in earth, life, and physical sciences for pre-K to 3rd Grades. Each week probes science concepts, presents a variety of science experiences for young children, and reviews selected pedagogical or professional growth features with additional science activities. The course presents strategies for instruction, assessment, and management that precipitate learning success for all children and optimize the science-teaching experience for teachers. As a result of this course, teachers learn more science, more about how children learn science, and more about making decisions about the science learning environment. During the course, teachers work individually or in teams to outline a standards-based science program or an instructional unit for their own use with children.

12. Does this topic have prerequisites? No

13. Does this topic have co-requisites? No

14. Does the topic require consent for enrollment? Yes ___ No ___
   Faculty ___ Credential Analyst ___ Dean ___ Program/Center/Department - Director/Chair

15. Is topic crosslisted? Yes ___ No ___
   If yes, indicate which course ___________________________ and obtain signature in #18.

16. What resources are needed to offer this topic (including technology)?

17. Justification for offering this topic.

Offering this course online gives practicing teachers a flexible option for continuing their education. As graduate credit, it will qualify as electives in their Master's degree. Online courses and alternatives to the traditional coursework for Master's Degrees have found to be in high demand as reflected in a recent survey by the College of Education.

* Enter units only if this is a variable-units topic course.
18. Does this topic impact any other disciplines? Note: This number can be skipped if answer to part 9 is “yes.”

   Yes [x] No

   If yes, obtain signature(s). Any objections should be stated in writing and attached to this form.

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19. Location (if topic not offered at main campus) **Online**

20. Is this course being offered on-line? [x] Yes No

21. Is this a contract topic? [x] Yes No

22. Enrollment Limit: 30

23. Requested Bldg/Room **N/A**

   *Please call Extended Studies first to reserve the room.*

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**SIGNATURES**

1. Program/Center/Department – Director/Chair
   
   [Signature]
   
   6-27-07

2. College Dean (or Designee)
   
   [Signature]
   
   6/26/07

The academic credentials of the instructor listed above are known to the Program/Center/Department (either regular faculty, or adjunct faculty with a curriculum vitae on file in the Program/Center/Department Office). The instructor is qualified to deliver the topic as described in part 9 (or on a previous Form T or Form E-T in the case of a topic that has already been offered).

3. Dean of Extended Studies (or Designee)
   
   [Signature]
   
   06/29/07

   Completed form received in the Office of Extended Studies

4. Associate Vice President for Academic Affairs – Academic Programs
   
   [Signature]
   
   6/29/07

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For Academic Programs Use Only: [Signature] Date

Revised 6/10/07
Karen E. Reynolds, PhD  (brief resume)
Professor Emerita, College of Education, San Jose State University
CONSULTANT and INSTRUCTOR: K-12 Science Education, Professional Development in Teacher Education, Technology in Education, Visual Literacy, Integration of Art and Science

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Address: 512 South Fifth St., San Jose CA 95112-5646
Phone: (408) 295 3892

EDUCATION
Ph, D. in Education University of California, Berkeley. 1984.
M, A. in Biology San Francisco State University. 1976
MA Art (concentration in Art education) anticipated Dec 2005.
Teaching Credentials: State of California:
    Standard Secondary (Life): Biology, Anthropology, General Science
    Elementary Multiple Subject

PROFESSIONAL EXPERIENCE

Selected PUBLICATIONS and PRESENTATIONS
Professional productivity includes developing online courses; authoring textbooks, handbooks, and articles; presenting for professional conferences and teacher workshops; and preparing materials associated with teaching K-College. The following are selected examples:
2001-present: JASON Academy online course development: Aquatic Ecology, Teaching Project-based Science, Science and Young Children.
2004 Interactive Activity Manual (Life Science) for JASON Expedition: Wetlands
1997 contributions to Rakow, S., (ed) Pathways to the National Science Standards. NSTA.
1992. Integrating Technology in Science Instruction: Model Units, with Judy Wright Update for Technology in the Curriculum, California Dept. of Education.
1990-95 Video-based Assessment. presentations on pictorial based assessment strategies, various conventions and workshops

ORGANIZATIONS include National Science Teachers Association (NSTA) Life Member; California Science Teachers Association (CSTA); Elementary School Science Association (ESSA); National Association for Research in Science Teaching (NARST); Computer Using Educators (CUE); Association for Research in Education (AERA); Association for Teacher Education (ATE); International Interactive Communications Society (IICS); Association for Supervision and Curriculum Development (ASCD), National Marine Science Education Association (NMSEA)

AWARDS received for research, meritorious performance, and professional service.
Science & Young Children
SYLLABUS

This course probes the exploratory nature of science experiences for preK–3 children; presents a variety of activities in Earth, life, and physical sciences; and reviews selected pedagogical strategies that promote success in teaching and learning in science in the early grades. Students in the course engage in focused online discussions that expand and deepen weekly content, collaborate in building an individual and class bank of annotated resources, plan standards-based instruction, and submit a formal paper.

About the Instructor
Karen Reynolds is a Professor of Elementary Education at San Jose State University, San Jose, CA. Her academic base includes a PhD in science education as well as AB and MA degrees in biology. Her professional energies focus on K–12 science education; teacher education integrating technology in instruction and assessment, and visual literacy.

Performance Objectives
In this course, students will:
1. Describe strategies for inquiry and exploration in science for young children, including the use of materials, planning time, asking questions, posing challenges, and encouraging thinking, and linking to other subject areas and to language and literacy development.
2. Describe, including specific examples, how experiences for young children provide a foundation for developing an understanding of the nature of science and the ability to understand and act on science-and-society issues in their futures. Explain the role of the National Science Education Standards in supporting and promoting science education for young children.
3. Observe young children carrying out science activities. Report on their behaviors, making a distinction among cognitive, social, and affective domains as well as verbal and nonverbal evidence of thinking and concept processing.

Course Delivery
Critical to the professional-development experience of teachers today is learning to function effectively in an online learning environment, one that is destined to expand in the future. Science and Young Children is an online course completed in five weeks, with an additional one-week grace period for submitting assignments. Although students may work on assignments offline, all course content, links to supplementary information, interaction among students in the class, class discussions, quizzes, submission of assignments, and interaction with the instructor are carried out online, through email and the course site. This online format is designed for educators who need access to professional development on a flexible schedule and who are in different locations worldwide. Not all participants in this course will earn college credit; some are earning CEUs or auditing. Students earning college credit are required to participate in advanced discussions and complete the assignments outlined in this document.

Recommended Reading

Course readings include extensive links to academic and professional level web sites associated with each topic addressed in the course content documents.
WEEK 1 • Physical Science

The course begins with examples and a rationale for providing foundational experiences in physical sciences early in a child's education.

Topics Include:

A. **What Are Physical Sciences?** Introduces major concepts of matter and energy and other physical science content. Identifies activities for children that provide an important experiential background.

B. **About Gravity: Falling or Not.** Why things fall and how to support things so they don't.

C. **What Water Can Do.** Characteristics of water that make it flow, evaporate, freeze, form droplets, mix with other things, and make things wet.

D. **Making Things Move.** About rolling, sliding, leveraging, and changing direction.

E. **Energy We See.** How light travels, is blocked to make shadows, and is sensed by living things.

F. **Energy We Hear.** How sounds are produced, how sound travels, how we hear, and what we can learn by listening.

G. **The Science Carnival.** Participatory, kid-centered physical science events in a carnival or country-fair format that can engage the broader community in fun and science.

Week One reviews the following pedagogical ideas, with additional illustrative science activities: why we teach physical science to young children, discrepant events, reading number lines, observing children at a fix-it center, promoting divergent thinking, acquiring and storing materials, and verbal and nonverbal evidence of learning.

**Assignments**

During the first week, students establish an individual homepage that can be accessed by others taking the course, choose a course project if receiving graduate credit, and contribute to the class resource bank of annotated physical science web sites. Online discussions this week address observations of children carrying out activities in physical science and the potential for teaching physical science through toys.
During the second week, we consider selected activities in the Earth sciences that contribute to understanding basic concepts in geology, meteorology, astronomy, and Earth resources.

Topics include:

A. **The Sand Box.** Manipulating a model environment to make landforms and observe erosion and other geologic processes. Explaining associated physical forces.

B. **Mountains, Rocks, and Dirt.** Reviewing the rock cycle. Exploring composition and properties of sand, clay, and loam.

C. **Weather Watchers.** Learning causes of selected weather phenomena. Making and using instruments to aid observations.

D. **Sunlight and Shadows.** Exploring properties of light. Observing changes in shadows due to relation of Sun to object on Earth’s surface.

E. **Underground.** What goes on beneath the surface, both naturally and through human activities. Safety and conservation issues.

F. **Waterways.** Natural and artificial rivers and lakes. Effect of flow on sedimentation and transport of materials.

G. **Resources and Recycling.** Selected examples of how materials are found and extracted from the Earth. Benefits of recycling.

Week Two pedagogical features include the following topics, with additional illustrative science activities: helping parents help children, asking questions that expand thinking, using models, why weather isn’t easy, portfolios, the prepared mind, and working with volunteers.

**Assignments**

During week two, students post reactions to discussion questions related to the week’s focus and respond to other students’ postings. Students evaluate Earth science web sites in terms of cognitive demand and focus particularly on visuals that help explain concepts that are challenging because of scale, indirect evidence, and understanding of time. Advanced discussions and optional activities are based on Weeks One and Two content.
WEEK 3: Life Sciences

The third week addresses selected content related to life sciences, with an emphasis on direct observation.

Topics include:


B. Growth and Change. Evidence for plants and animals. Drawing records and journals.


D. Moving Around. Motion and mobility among animals. Tracking migrations. Dispersion among plants.

E. Sensing Things. Investigations of advantages and limitations of our main senses. Special senses among nonhuman living things.


G. Our Bodies. Emphasis on observable parts and their names, functions, compensations, and special abilities.

Assignments

During the third week, students interact with other students around at least one of the discussion questions posted to address extensions of the week's content. Alternatively, students may carry out an optional probe activity and post results on the discussion board. Students contribute annotated web sites that support life sciences for the class resource bank, and continue to make progress on their individual projects. Results of an offline assignment are posted with analysis; it should involve drawing or photographing an example of a change in nature over time. An advanced task requires the analysis of children's drawings for evidence of knowledge of science content or processes.

MAJOR IDEAS

- Living things have specific needs.
- Growth and change can be observed and measured; life stages are cyclic.
- Living things are sensitive to their surroundings in different ways; animals are adapted for movement; human mobility involves the skeleton, muscles, balance, and practice. The human body has many parts that work together.

Week Three considers the following pedagogical topics, with additional illustrative science activities: wait time, drawing to see, motivators, using a video camera to reflect on teaching, rubrics, role models, and distinguishing between fantasy and reality.
COURSE OUTLINE

WEEK 4: Integrating the Sciences

The fourth week focuses on integrating Earth, life, and physical sciences through problem-solving, inquiry in the contexts of interesting topics, and thematic teaching.

Topics include:

A. Multi-science Experiences.
B. Really Listening. The importance of gathering and interpreting data through listening carefully to sounds around you.
C. Changing Contexts. Connecting specific science concepts to examples from different contexts. Helping children make connections to aid transfer of knowledge to new situations and daily life.
E. Improvising, Innovating, Inventing. Fostering environments that encourage improvising and invention. Examples for young children.
F. Projects. Examples and guidelines for individual, small group, and whole class projects in science.
G. Big Events. Adapting science fairs, science open houses, science quests, competitions, and project presentations for young children. Pros and cons of big events.

Assignments

By the end of this week, students post drafts or progress reports of their projects for peer feedback. Students also interact in "public debates," which relate to the course content and educational applications and are posted on the discussion board. Advanced discussions and optional activities are based on Week Four content. An optional probe activity is available this week.

Week Four reviews the following pedagogical ideas, with additional illustrative science activities: integrated themes, using checklists for assessment, why scientists repeat experiments, inquiry stations, constructive fantasizing, promoting student self-sufficiency, and peer help.
COURSE OUTLINE

WEEK 5: Science and Other Subjects

The course concludes by addressing opportunities to consider science in the service of other subjects and opportunities for engaging in science-related experiences through other subjects.

Topics Include:

A. Language and Literacy. Acquiring vocabulary and developing skills in "technical" writing through science activities. Science as motivation for language development. Building a capacity for asking critical questions as well as communicating logical thinking.

B. Reasons to Read. Reading in the content area is especially motivating when it involves science books for children. Preparing children to become critical consumers of information.

C. Add the Math. Science activities can be enhanced by including the use of math skills. Certain math concepts become clear during science time. We consider examples as well as when to add math and when to leave it out.

D. Science and the Arts. Being aware of science-related experiences during art activities without interfering with the art.

E. History Lessons. The importance of science and technology during selected times and events in history. Includes some "what-if's.'

F. Science, Technology, Society. SST issues that affect young children. Building a foundation for addressing urban, environmental, local, and global problems.

G. Daily Decisions. Examples of daily decisions made by young children and adults that are made with the help of scientific thinking and/or science knowledge. The importance of considering multiple perspectives.

Assignments

Graduate credit students post their projects and respond to at least two projects posted by their colleagues. These can be presented as word-processed documents, web pages, or multimedia, e.g., PowerPoint presentations. Advanced discussion and optional activities are based on Week Five content. Student discussions are based on this week's content. Advanced discussions address next steps and issues in science education for young children.

MAJOR IDEAS

Science content can serve as a vehicle for teaching and learning in other subject areas. Experiences in other subject areas often support the development of understandings about the natural world and have transfer value in learning science concepts.
The final grade for this course is based on
- completion of the course assignments (50%),
- substantive participation in weekly discussions (25%),
- and performance on assessments (25%).

Student participation and demonstrated knowledge are evaluated weekly. Postings on the discussion boards should be guided by the following rubric:

- **Level 4:** High-quality professional discourse that invites inquiry. The message creates an inviting framework by sharing a personal reflection; presenting an interesting and well-articulated dilemma, challenge, or issue; or raising a thought-provoking question.
- **Level 3:** Thoughtful professional discourse. The message shares information, an issue, or a question in a thoughtful way, which might focus on specific details, explore the “why’s” as well as the “what’s,” or explore others’ beliefs and practices.
- **Level 2:** Collegial discussion and/or “shop talk.” Message could be a response to a previous message; a request; a description of classroom practice; or an issue, dilemma, or challenge that reflects the beliefs or practice of the author but lacks self-reflection and/or an invitation to others to respond.
- **Level 1:** Factual statements or informational. Message is usually a question, a brief statement of fact or opinion, or an announcement that does not tend to stimulate ongoing professional discussion, thoughtful reflection, or examination of beliefs and/or practice.

Accumulated points of 100 possible points during the course determine CEU credit and letter grades for ONE graduate unit as follows:
- 90–100 = grade of A
- 80–89 = grade of B
- 70–79 = grade of C
- 70–100 = credit for 5 CEU’s

Students earning graduate credit will complete an academic assignment in consultation with the instructor consisting of a research paper or action research paper in a scholarly format, supported by appropriate references. Students earning a second graduate credit will complete an additional project, also in consultation with the course instructor. An additional maximum of 100 points may be earned for the second project.