California State University, San Marcos FORM E-T

• 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 E592M** 5. Grading Method **N (Normal)**

6. Term **Summer** 7. Year **2007** 8. Variable Units* **2**

9. Has this topic been offered previously? ____Yes **X** No If yes, indicate term(s)_____Year_____

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 **X** No
_____Faculty _____Credential Analyst _____Dean_____Program/Center/Department - Director/Chair

15. Is topic crosslisted:_____Yes **X** 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.

Discipline	Signature	Date		
			_____Support	_____Oppose
			_____Support	_____Oppose

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.

Please note: A separate Form E-T must be submitted for each section offered.

SIGNATURES

1. Program/Center/Department – Director/Chair — Date: 6-27-07

2. College Dean (or Designee) — Date: 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) — Date: 06/29/07

Completed form received in the Office of Extended Studies

4. Associate Vice President for Academic Affairs – Academic Programs — Date: 6/29/07

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

CONTACT e-mail: kereynolds@aol.com
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
A. B. in Life Science Sacramento State College. 1964.
MA Art (concentration in Art education) anticipated Dec 2005.
BFA Illustration, SJSU, 2003.
Teaching Credentials: State of California:
Standard Secondary (Life): Biology, Anthropology, General Science
Elementary Multiple Subject

PROFESSIONAL EXPERIENCE
Professional teaching experience in science and science education spans 41 years and includes Peace Corps service, junior high school classroom teaching, pre-service methods instruction and supervision, in-service professional development, and graduate level instruction and advising. Particularly valued are work with students and teachers from diverse cultural backgrounds and the persuit of interests in technology integration, visual literacy and integration of art and science. Currently Dr. Reynolds, Professor Emerita, is a consultant and part time instructor in science education and is developing proficiency in fine arts (painting). A brief chronology of her career follows:
2000 to present JasonAcademy faculty and course author. Instructor and author of three courses: Aquatic Ecology, Teaching Project-Based Science, and Science and Young Children
2003-05 Instructor, Cambridge College summer session, MA in Education program. Week 1, Attaining Science Literacy.
1985 to 2004: San Jose State University, College of Education, Elementary Education Department and Teacher Education Division: Science methods instruction and preservice teacher supervision; graduate level advising and instruction in research methods, integration of technology, advanced issues in curriculum and instruction.
1985-1986 University of California, Berkeley, Extension: Instr,Computer Certificate Program.
1982-1987 NSTA Science Scope Field Editor
1981-1985 University of California, Berkeley, Education Research and Applications (ERA) Teacher Preparation Program: K-12 science supervision, K-12 science methods
1967-1981. Havenscourt Junior High School, Oakland Unified School District, Oakland, CA: Science Department Chair (1969-1981). Subjects taught: 7th, 8th, 9th grade general science
1975 to present. Instructor, K-college professional development and in-service teacher workshops and courses in science teaching, and technology
1972-1976. SCUBA instructor, Aqua Tutus Diving Club, San Lorenzo, CA.
1964-1966. U. S. Peace Corps. Women's Teacher Training College, Kabba, Nigeria. Classes taught: Science for West African primary schools (K-6), physical education, mathematics.

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
1999 since 1977 **More than 85 articles** involving curriculum approaches and ideas for teaching. *CSTA Journal. NSTA Science Teacher. NSTA MS/JH Science Bulletin. NSTA Science Scope* (regular column: "Reynolds Rap"). *Instructor. Learning.*
1997 Granner, C., Reynolds, K., and Carter, A. "Animation with Warner Bros.: Reflections on Interactive Distance Education." unpublished paper submitted for ITL Research award.
1996. Reynolds, K.E. and Barba, R.H. Technology for Teaching and Learning in Science. Allyn and Bacon, with accompanying web site. http://www.abacon.com/reynolds supplementing the text.
1997 (Chapter in Book) Barba, R.H. and Reynolds, K. E. 1997. Equitable Teaching and Curriculum for Hispanic Students. In B.J. Fraser (Ed.). International Handbook of Science Education. Bingham, MA: Kluwer Academic Publications.
1997 contributions to Rakow, S.. (ed) Pathways to the National Science Standards. NSTA.
1993 Parsons, S. and Reynolds, K. Establishing an Action Research Agenda for Preservice and Inser vice elementary Teacher Collaboration on Self-Empowerment in Science. Paper presented at the Annual Meeting of the National Association for Research in Science Teaching (San Franciso, Apr 22-25, 1995) ERIC ED 382 4751993. Technology in the Service of Science Education Reform. San Francisco State University School of Education Review, 5(Special Issue: Reforms in Science Education , K-12), 96-101.
1992. Integrating Technology in Science Instruction: Model Units. with Judy Wright Update for Technology in the Curriculum, California Dept. of Education.
1992. Integrating Multimedia with FOSS, a supplement for Britannica Science Systems, Encyclopedia Britannica Education Corp.
1991. Middle School Curriculum in Action. with Rosemary Messick. Longman, Inc. 260 pp
1991. "Teaching Physical Science with Toys," American-Soviet Science Education Convention, Moscow State University, Moscow, USSR, Aug. 26-29.
1990-95 Video-based Assessment, presentations on pictorial based assessment strategies, various conventions and workshops
1988. Science Alive! VideoDiscovery. Elementary Activities for the BioSci Videodisc. 60pp.
1987. "Multiple Benefits from Engaging Student Teachers in Science Education Research" Contributed Paper presented at NSTA National Convention, Washington, D.C.
1987. "Support Systems for Teachers Who Form Partnerships to Help Others Improve Teaching" with Ned Flanders, and Richard Ponzio in theme issue of *Teacher Education Quarterly*
1985. Unlocking Science Skills: Life Science . Globe Book Company, Inc., N. Y.
1985. "Activating the Processes in the Science Curriculum." Curr.Product Review. Feb.

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.

JASON ACADEMY

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

Carin, A. and Bass, J. E. (2000) *Teaching Science As Inquiry.* Ninth Ed. Prentice Hall.

Harlan, J.D., and Rivkin, M.S.(2003) *Science Experiences for the Early Childhood Years: An Integrated Affective Approach.* Eighth Edition. Prentice Hall.

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

COURSE OUTLINE

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.

MAJOR IDEAS

Experiences involving the nature of matter and energy, forces and motion, and other aspects of physical science provide a foundation for understanding advanced ideas in all sciences, including Earth and life sciences. Substances have distinct characteristics that can be described and understood through inquiry. Matter can change from one phase to another and back again. We can learn about different kinds of energy by observing effects. Mechanical things are constructed from interacting parts.

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.

COURSE OUTLINE

WEEK 2· *Earth Science*

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.

MAJOR IDEAS

Landforms change because of weather, volcanoes, earthquakes, and other phenomena. We can find out about what is underground directly and indirectly. Weather can be observed in many ways. Sunlight and shadows change during the day. Earth sciences incorporate physical science concepts. Many things come from the Earth, and these resources can be recycled.

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.

COURSE OUTLINE

WEEK 3· *Life Sciences*

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

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.

Topics include:

A. **Living Things.** Examples of local living things. Characteristics of all living things. Issues related to distinguishing between living and nonliving, dead and extinct, and differences in time.
B. **Growth and Change.** Evidence for plants and animals. Drawing records and journals.
C. **Life Cycles.** Examples for common groups of animals and plants. Misconceptions. Sources of classroom-friendly materials.
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.
F. **Diversity.** Why kids like dinosaurs. Advantages of diversity among living things. Conservation issues.
G. **Our Bodies.** Emphasis on observable parts and their names, functions, compensations, and special abilities.

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.

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.

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.

MAJOR IDEAS

Most science endeavors, in authentic contexts, involve activities that are interdisciplinary. Integrated science themes provide opportunities for projects, diverse solutions to problems, transfer of knowledge to a variety of contexts, and invention.

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.
D. **Problem Solving.** Strategies for identifying problems and finding solutions, short-term and long-term. Examples for various and integrated sciences.
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.

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.

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.

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.

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.

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.** STS 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.

Week Five's pedagogical topics include the following, with additional illustrative science activities: self-reporting by children, the importance of clear communication, representing data, managing time, technology around the world, home connections, and planning professional development.

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.

GRADING PROCEDURES

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%).

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

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.

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.