



University of Hawai'i at West O'ahu Department of Education  
Spring 2012

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**COURSE Information**

EDEE 434 Science Methods  
Building D 102  
Wednesday 3:45 – 5:15

**INSTRUCTOR**            **Dr. Richard M. Jones    rmjones7@hawaii.edu**

**PHONE & OFFICE**        (808) 454-4811, Building E 108B

**OFFICE HOURS**            Tuesday & Thursday 1:30 - 2:30    Other hours by appointment.

**COURSE DESCRIPTION**        Elementary school science methods focus upon teaching and learning science inquiry skills, content and attitudes, for the K-6 elementary classroom. The purpose is to provide teacher candidates with deep understanding of how children learn regarding K-6 science curricula and give them the skills needed to address curriculum adaptations to meet the needs of all students. This course also provides opportunities for teacher candidates to become thoughtful, creative, and effective teachers.

**PREREQUISITES** Admission to Professional Teacher Education Component and completion of Block 1

Co-requisite: EDEE 432 Mathematics Methods and EDEE 436 Block 2 Practicum.

**TEXT(S)**

Hawaii Content & Performance Standards: <http://165.248.30.40/hcpsv3/> select science content area, grade levels K through 6 and all strands using drop down menus and print for each grade.

Recommended Resources: *The National Science Education Standards* ([http://www.nap.edu/openbook.php?record\\_id=4962](http://www.nap.edu/openbook.php?record_id=4962))  
You may download the PDF of this document or read online.

*Inquiry and the National Science Education Standards* ([http://www.nap.edu/openbook.php?record\\_id=9596](http://www.nap.edu/openbook.php?record_id=9596)) You may download the PDF of this document or read online.

*Taking Science to School: Learning and Teaching Science in Grades K-8.*  
([http://books.nap.edu/catalog.php?record\\_id=11625](http://books.nap.edu/catalog.php?record_id=11625)) You may download the PDF of this document or read online.

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**UHWO TEACHER EDUCATION MISSION STATEMENT**

The University of Hawai'i West O'ahu Teacher Education program is dedicated to its vision of providing innovative teacher preparation programs and public service activities in support of the continuing development of West O'ahu communities. To realize this vision, the mission of the program is to provide teacher candidates with the knowledge, skills, and dispositions necessary to become outstanding educators, especially in the elementary schools located in Central and Leeward O'ahu communities.

**NOTES:**

1. Periodically you will participate in groups to facilitate study and to implement cooperative activities. The structure of these groups will vary during the course to provide opportunities for you to work with a variety of individuals in the class. Several of the group projects will include a peer evaluation as part of the overall assessment of the group activity. An evaluation rubric specific to the project will be provided at the conclusion of activities including peer evaluation.

2. **Regular participation in, and completion of class activities is required.** You are entitled to one (1) excused absence. Additional absences (**without adequate medical documentation**) will result in 7% reduction per absence of your total grade.  
Attendance is a disposition issue. Professionalism requires that you plan ahead for personal/family occurrences that might upset your schedule. It is important to note that simply telling the instructor that you will be absent does not excuse you from this grade reduction.
3. Penalties will be imposed for assigned work, which is submitted late at **10% per day** after the class session. Again, timeliness is a professional disposition.
4. **This syllabus is a living document and the instructor reserves the right to alter, edit, or modify activities and/or assignments based on the learning needs of the individuals in the course.**

## COURSE GOALS

01. Ability to analyze and the use web based resources in science instruction.
02. Utilize scientific methodology as a problem solving technique.
03. Ability to plan inquiry-based science classroom activities using a variety of resource materials.
04. Ability to develop science instructional materials appropriate to specific grade levels.
05. Develop skills in using science manipulative materials.
06. Develop a repertoire of strategies for making science content more accessible for **all** students.
07. Articulate an understanding of Science concepts as well as, how science can be integrated into other subjects.
08. Understand standards-based instruction and use current national and state standards for planning science curriculum.
09. Ability to identify scientific misconceptions and design appropriate activities to correct those misconceptions.
10. Understand the learner.

## COURSE POLICIES:

**Student Conduct:** For information on what is expected of UH-West O`ahu students, please refer to the student Academic Responsibilities and Student Code of Conduct please refer to sections (pp. 29-30) of the UHWO 2011 – 2012 Catalog (<http://westoahu.hawaii.edu/pdfs/UHWOCatalog1112.pdf>).

**Accommodations:** Students with disabilities, whether physical, learning, or psychological, who believe that they may need accommodations in this class are encouraged to contact a counselor in Student Services or your instructor as soon as possible to ensure that accommodations can be arranged for you to fully participate in all components of this course. If you question the appropriateness of an accommodation or wish to discuss the nature of a disability directly or exclusively a counselor in Student Services is available to answer any questions and to consult on access, disability and universal design. The instructor strongly encourages you to seek any help that might be needed to support your success.

## ASSIGNMENTS/LAB REQUIREMENTS

### **A. Homework/Daily Activities/Professionalism: (15%)**

Each class period you will be involved in many varied activities and will be assigned some homework. These activities will include peer teaching for which you will be expected to prepare simple a lesson plans using a format of your choice. Required work is part of your professional preparation and is consistent with the Standards. Certain dispositions are required of all professionals. Teachers should demonstrate all those attributes of a professional; being prepared, being on time, and being able to collaborate with individuals inside and outside the classroom. **7% for each absence in addition to the one ‘freebie’, 1% for each tardy will be deducted.** Please **turn off all cell phones** prior to entry into the classroom. If there is an emergency in your family and you need to have your cell phone on, please notify the instructor in advance and put your cell on vibrate. **Texting, gaming, and/or engaging in online activities not directly related to the class are considered unprofessional and as such have a negative bearing on your grade.**

### **B. Signature Assignment: Diagnosing Children’s Science Understandings/Misunderstanding of Science: (15%)**

As a teacher of science it is essential to know what our students really think and understand. As the first step in preparing to create instructional activities that will improve learning opportunities for all students, you must get to know your learners. One of the most important ways to assess children is to talk with them about their way of explaining a science phenomenon. You will select a science topic from the Hawaii Content and Performance Standards in grades K-6 and then you will design a verbal assessment question guide. You will then conduct interviews with three students (or children in this grade group). One student’s interview will be transcribed verbatim forming the basis of a practice letter that you will write as if you are going to send it to the child’s parent/guardian. The letter will explain your analysis of the child’s science understanding and any

preconceptions/misconceptions they may have based on actual quotes from the interview as well as include suggestions that the parent/guardian can do with the child to help strengthen science concept understanding.

**C. Design Challenge: (15%)**

In order to develop your problem solving skills and to better understand the challenge of project based teaching, you and your team will design, build and race a solar (electric car). Each team will be provided with an electric motor, solar panel, and battery (for use if it is cloudy, raining, or nighttime).

**D. Science Challenge Center: (10%)**

The science centers are designed with the intention of them being used independently by students, to help them build skills, enhance conceptual understanding or extend learning. For this assignment you will create one science challenge center. Your center can either be geared toward students who need additional help with a science concept or skill or as enrichment for students who have attained mastery and who would benefit from extended learning opportunities.

**E. Children’s Literature for Science Instruction: (10%)**

The purpose of this assignment is to help you increase your ability to select children’s literature books that are good for teaching science concepts while also reinforcing language and literacy skills. You will select a standard within one of the strands for grades 4-6 found in the Hawaii Content & Performance Standards and then select a children’s literature book that addresses that strand and standard. You will present the book, discuss your findings with the class, and provide a written critique that addresses how well the book met the objective of integration of science and literature.

**F. In Class Science Engagement Activity (10%)**

The aim of this assignment is for you to begin finding activities that can be used as lesson “hooks” similar to the Ice Breakers we do at the start of each teaching session. The idea is to **Engage** students in learning elementary school science in fun and active ways. Each of you will be responsible to develop one of these activities. Look to your mentor teacher for suggestions and ideas for activities that they use. If you need further help the course instructor has multiple resources. These activities should take no longer than 10 minutes, and should not only be fun and engaging, but also *relevant* and useful for facilitating scientific connections and deeper conceptual understanding. This demonstration/activity can be incorporated into a lesson that you are presenting within your EDEE 436 practicum setting or it may be a stand-alone presentation only done in your EDEE 434 class. **As part of this assignment you will be required to present this demonstration/activity to your peers.**

**G. Understanding Student Misconceptions/Preconceptions: (15%)**

As a teacher of science it is essential to know what our students really think and understand. As the first step in preparing to create instructional activities that will improve learning opportunities for all students, you must get to know your learners. In collaboration with the members in your grade-level group, you will research a “typical student misconception/preconception” within the content typically taught at your assigned grade level, and create a Power Point or similar presentation to share this information with your classmates.

**H. Assessments: (10%)**

Quizzes and other assessments (including Flinn Science Safety) will be periodically given throughout the semester and may cover content from previous classes, extensions of activities, and/or materials from assigned readings.

<b><u>GRADING</u></b>		<b>%</b>
A.	Homework /Daily Activities/Professionalism	<b>15</b>
B.	Diagnosing Children’s Science Understandings/Misunderstandings ( <b>Sig. Assignment</b> )	<b>15</b>
C.	Design Challenge	<b>15</b>
D.	Science Challenge Center	<b>10</b>
E.	Children’s Literature for Science Instruction	<b>10</b>
F.	In Class Science Engagement Activity	<b>10</b>
G.	Understanding Student Misconceptions/Preconceptions	<b>15</b>
H.	Assessments	<b>10</b>
	<b>Total</b>	<b>100</b>

The course grade is based on the sum of the scores obtained on the above requirements.

*Note that late assignments will not be accepted for full credit.*

A: 90-100	B: 80-89	C: 70-79	D: 60-69	F: 0-59
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## **UHWO TEACHER EDUCATION CONCEPTUAL FRAMEWORK**

The Conceptual Framework (CF) serves as a guide to fulfilling the UHWO Teacher Education Program vision of preparing highly qualified teachers for entry into the skilled workforce. The program recognizes the contributions of general education, content area studies, and professional studies to the preparation of educators. Three goals underlie the professional studies philosophy and objectives. Candidates for the Bachelor of Education degree in elementary education are committed to the following:

- delivering high quality instruction that addresses the needs of the whole child
- embracing social justice and equity for all
- becoming reflective practitioners and life-long learners.

## **STANDARDS COVERED IN THIS COURSE**

### **This course meets UHWO ILO 3 Quantitative Literacy and ILO 5 Critical Thinking**

#### **HTSB Standard 1: Focuses on the Learner**

##### **ACEI Standard 1: Development, learning, and motivation**

The effective teacher consistently engages students in appropriate experiences that support their development as independent learners. (A, B, C, D, E, F, G)

#### **HTSB Standard 2: Creates and maintains a safe and positive learning environment**

##### **ACEI Standard 3.4: Active engagement in learning**

The effective teacher consistently creates a safe and positive learning environment that encourages social interaction, civic responsibility, active engagement in learning and self-motivation. (A, B, C, D, E, F, G)

#### **HTSB Standard 3: Adapts to learner diversity**

##### **ACEI Standard 3.2: Adaptation to diverse students**

The effective teacher consistently provides opportunities that are inclusive and adapted to diverse learners. (B, D, E, F, G)

#### **HTSB Standard 4: Fosters effective communication in the learning environment**

##### **ACEI Standard 3.5: Communication to foster collaboration**

The effective teacher consistently enriches communication in the learning environment. (A, B, C, D, E, F, G)

#### **HTSB Standard 5: Demonstrates knowledge of content**

##### **ACEI Standard 2.2: Science Content**

The effective teacher consistently demonstrates competency in content area(s) to develop student knowledge and performance. (A, B, C, D, E, F, G, H)

#### **HTSB Standard 6: Designs and provides meaningful learning experiences**

##### **ACEI Standard 3.1: Integrating and applying knowledge of instruction**

The effective teacher consistently plans and implements, meaningful learning experiences for students. (A, B, D, E, F, G)

#### **HTSB Standard 7: Uses active learning strategies**

##### **ACEI Standard 3.3: Development of critical thinking and problems solving**

The effective teacher consistently uses a variety of active learning strategies to develop students' thinking, problem-solving and learning skills. (A, B, C, D, E, F, G)

#### **HTSB Standard 8: Uses assessment strategies**

##### **ACEI Standard 4: Assessment for instruction**

The effective teacher consistently applies appropriate assessment strategies to evaluate and ensure the continuous intellectual,

social, physical and emotional development of the learner. (B, D, F, G, H)

**HTSB Standard 9: Demonstrates professionalism**

**AECI Standard 5.1: Professional growth, reflection, and evaluation**

The effective teacher continually evaluates the effects of his or her choices and actions and actively seeks opportunities to grow professionally. (A, B, E, F, G, H)

**HTSB Standard 10: Fosters parent and school community relationships**

**AECI Standard 5.2: Collaboration with families, colleagues, and community agencies**

The effective teacher establishes and maintains strong working relationships with parents and members of the school community to support student learning. (B)

**TaskStream**

To aid in the assessment of our program and provide you with a venue for demonstrating your attainment of the standards and showcasing your work, the UHWO Teacher Preparation Program has adopted an electronic portfolio system that is being implemented in TaskStream (<http://www.taskstream.com>). TaskStream is an electronic portfolio, assessment management and performance based instruction tool. As part of the UHWO Teacher Preparation Program, you must submit work from each of your education courses into your electronic portfolio. The assignment you submit from each course will be assessed according to the course-specific rubric in TaskStream.

In addition to the course-specific portfolio you will create based on the standards, your TaskStream account will also allow you to create a separate Presentation portfolio that you can share with potential employers or others to whom you wish to showcase your work. Training opportunities for creating such a portfolio will be offered on campus through the Education Club and are frequently offered online through TaskStream. You are encouraged to save electronic or hard copies of all notable assignments or other work you complete for possible inclusion in a presentation portfolio.

**EXTRA CREDIT**

Science and Children Magazine (National Science Teachers Association). As part of this class and your professional growth during student teaching, Science and Children magazine can keep you connected to science teaching ideas long after you leave UHWO. This publication provides you with regular articles and ideas for teaching science in elementary school with 8 issues during each school year. If you join the National Science Teachers Association (NSTA) as a student member and show me either your membership card or the first issue of the magazine that is sent to you I will give you a bonus of 5% on your total grade in this course. (Visit: <http://www.nsta.org/membership/student.aspx?lid=tnavhp> )

**Tentative Schedule EDEE 434 Science Methods**

- Week 1: Getting to know you, Observation Lab One, What is Inquiry?
- Week 2: Classification as a process, Introduction to Children's Literature for Science Instruction
- Week 3: Misconceptions/Preconceptions in science, Introduction to Misconceptions/Preconceptions Project
- Week 4: Presentations Children's Literature for Science Instruction, Measurement in Science Lab, Introduction to Challenge Centers
- Week 5: Presentations Children's Literature for Science Instruction, Understanding Seasons (5-E) Activity
- Week 6: The Learning Pyramid of Teaching Practice, Introduction to Static Lab
- Week 7: Assessing Learning in Science, Static Part 2
- Week 8: Misconceptions/Preconceptions Project Presentations, Intro to Genetics Lab
- Week 9: Misconceptions/Preconceptions Project Presentations, Battery and Bulb (Learning Cycle) Lab
- Week 10: Construction a Periodic Table, Introduction to the Electric Car Challenge
- Week 11: Share Challenge Centers
- Week 12: Consumer Testing and Persuasive Writing in the Science Classroom (Paper Towel Challenge)
- Week 13: Presentation of Results for Paper Towel Challenge, Continuing Education in Science Education.
- Week 14: The Standards and teaching Science with Toys, Examples of Free PD for Teachers
- Week 15: Safety in the Science Classroom
- Week 16: The Electric Car Challenge and Race