California State University, San Marcos

FORM X (WHITE)

- Authorization To Offer Non-Degree Extension Credit Course Through Extended Studies

1. Desired Term: Spring 2008
2. Course abbreviation and Number: EDST E1015
2b. Abbreviated Title: Structure of the Earth
   (No more than 25 characters, including spaces)
3. Year of implementation: 2008
4. Number of Units: 3
5. Billing Units: 0 ($00)

6. Allowed Student Levels: UG X GR X EE X (Default is to check all three levels)
7. Grading Method:
   - N Normal (N) (Default is Letter Grade +/-, Students may request Credit/No Credit)
   - Normal Plus Report-in-Progress (NP) (As for Normal, also allows Report-in-Progress)
   - Credit/No Credit Only (C)
   - Credit/No Credit or Report-in-Progress Only (CP)

8. Mode of Instruction:
   (See pages 17-23 at http://www.calstate.edu/cmw/data-elem-
dic/APDB-Transaction-DED-SectionX.pdf for definitions of
the Course Classification Numbers)
   Type of Instruction | Number of Credit Units | Instructional Mode (Course Classification Number)
   Lecture | 3 | C-02
   Activity
   Lab

9. Attributes: Course Requires Consent for Enrollment? Yes X No
   Faculty _____ Credential Analyst _____ Dean _____ Program/Department - Director/Chair
   Prerequisites: ____________ Co-requisites: ____________

10. Does this course impact other discipline(s)? (If there is any uncertainty as to whether a particular discipline is affected,
    check "yes" and obtain signature.) 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
    Discipline Signature Date
    ____________ Support ____________ Oppose

Important: Please Complete

1. Instructor: Kathy Norman
2. Extension Course Proposal Form (attached)

SIGNATURES: (COLLEGE LEVEL)

1. Program Director/Chair
   Kathy Norman 2/14/08

2. College Dean (or Designee)
   ____________ Date
   ____________ 2/14/08

(UNIVERSITY LEVEL)

3. Dean of Extended Studies (or Designee)
   ____________ Date
   ____________ 02/16/08

4. Vice President for Academic Affairs (or Designee)
   ____________ Date
Structure of the Earth Syllabus

Faculty Information

Faculty Name: Arlene Jurewicz Leighton

Phone: 207.763.3182

Email Address: ajl@midcoast.com

Course Title: **Structure of the Earth**

Course Description: This 6-week course, designed for middle school teachers, examines the composition of the Earth and the internal and external forces that shape it. Readings explain geological processes, offering insight into the physical composition of matter, minerals, and rocks. Students study content and perform weekly assignments, including 2 discussion board activities per week. These actions comprise approximately 45 hours of “student seat time.” Students taking the course for 3 graduate credits complete a 10-15 page Action Research Paper.

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. Structure of the Earth 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, assessments, 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 all assignments.

Course Objectives/Outcomes:

**Performance Objectives**
In this course, students will:

1. Develop a broad understanding of the most important principles of geology, including the nature of matter; the formation of minerals and crystals; the processes of erosion and deposition of sediments; and plate tectonic theory, including supporting evidence related to volcanoes, earthquakes, and the internal structure of the planet.
2. Develop a classroom action plan on a selected aspect of geology for use with students. Unit plans will have a research base reported as a rationale for instructional approaches.
3. Identify a particular state’s content standards and assessment areas focusing on the structure of Earth and the geological processes that shape the planet.
4. Learn how to conduct an effective web search of online resources dealing with various topics in geology and share results with colleagues in this course.
5. Critique other geological resources, such as articles in professional journals and books on physical geology.
6. Learn different methodologies to present geological content to students.

Lesson Plans

**Topic One: Crystals, Minerals, and the Atomic Structure of Matter**
This Topic provides a general introduction to the atomic structure of matter, chemical bonding, and the formation and properties of minerals.
Major Ideas:

A. Matter, Matter, Everywhere. Defines the meaning of matter, including its properties and states. This section includes an activity to determine the density of an irregular solid and discusses the concept that the surface of the Earth can be subdivided into a lithosphere, hydrosphere, and atmosphere.

B. Dividing the Indivisible. Introduces the structure of atoms and the fact that most atoms can be further subdivided into smaller particles called electrons, protons, and neutrons and discusses the relative size and scale of atoms and their components.

C. It's All Elementary. Discusses the nature of chemical elements; provides links to an interactive periodic table of elements; and introduces the concept of chemical isotopes and electron configuration within atoms.

D. Common Bonds. Introduces the process of chemical bonding; explains how compounds form from individual elements; explains the difference between ionic and covalent bonds; and provides a hands-on activity to demonstrate molecular attraction.

E. Crystals, They're Habit Forming! Explains the process of crystal formation within a rock, describes the various ways that crystals can grow, introduces the concept of crystal habit as a defining property of a mineral; and discusses the six crystal systems used by geologists.

F. Breaking Up Is Hard To Do! Explains the process whereby minerals break, including the properties of fracture and cleavage; introduces the property of mineral hardness, including Mohs' scale; and offer a classroom activity where students test and rate the hardness of minerals.

G. Mineral Color, Luster, and Streak. Discusses the use and limit of using color as a diagnostic property in identifying a mineral, explains why the powdered streak of a mineral is a far better characteristic to use; and provides detailed instructions of how to have students do their own streak test of mineral samples.

H. Silicates on Parade. Discusses the nature and composition of silicate minerals, the most common minerals found on Earth; explains the structure of the silicon tetrahedron, the basic building block of all silicate minerals; and provides instructions for conducting a student lab on silicate mineral identification.

I. Non-silicate Minerals. Explains the structure of some of the more important non-silicate minerals (including sulfates and carbonates) and discusses the overall economic importance of mineral resources.

Topic One Assignments:

a) Introduce yourself on the Teachers' Lounge Discussion Board. If you're a classroom teacher, tell us where you teach and how long you've been teaching. Also, let us know what you hope to get out of this course.

b) If you'd like, you can also create a student homepage.

c) Declare the nature of the credit sought – Graduate, CEU, or Audit.

d) Read the Course Documents for Topic One.

e) Identify the source minerals for five objects commonly used in and around your home or school. Give the name of the mineral and some of its diagnostic physical properties. For example: Pencil lead is made from the mineral graphite, which is almost pure carbon. Graphite is always black or dark gray, has a black streak, and is one of the softest minerals (a 1 on Mohs' scale of hardness). Post your assignment on the Course Assignment Discussion Board.

f) Review course syllabus and content/external resources for 10-15 page Action Research Paper

g) Respond to Forum Question One: What questions do you have about the course content atomic structure of matter? Restate in your own words concepts or theories which interest you or are new to you.

h) Respond to Forum Question Two: Consider the following: Since their earliest days, humans have learned how to exploit natural mineral resources. From making simple rock tools to extracting metal from ores, each time we've discovered a new resource, society has taken a big leap forward. Often, students don't even think about the links between the way we live our lives and the minerals we use. Pointing out some of these connections helps make Earth science “real” for them. Can you think of some specific examples where the
discovery and use of a new mineral resource has changed the way we live our lives?
i) Post your ideas to the Course Content and Application Discussion Board.

**Topic Two: The Earth beneath Our Feet—Constructive Forces**
This Topic provides an introduction to the constructive forces that shape the crust of the planet, including volcanoes, earthquakes, and tectonic uplift.

**Major Ideas:**

A. **Volcanoes: Building the Crust from Inside Out.** Explains the importance of volcanoes and the role they play in forming new crust; discusses the various types of volcanoes, their hazard potential, and their distribution on Earth's surface.

B. **The Inside Story: Intrusive Igneous Rocks.** Explains the difference between intrusive igneous rocks and volcanic igneous rocks; discusses how textural difference can be used to determine the environment of an igneous rock's origin; and includes a demonstration on how to make a simulated igneous rock.

C. **Making Mountains Out of Molehills.** Describes the process of mountain building, explains the different ways that Earth's crust gets uplifted; and includes a demonstration to simulate crustal uplift due to converging tectonic plates.

D. **Earthquakes and Seismology.** Explains the origins of earthquakes; describes the generation and propagation of different types of earthquake waves; includes a discussion on earthquake damage/measurement scales; and presents an activity on measuring seismic waves.

E. **We All Have Our Faults!** Describes the different types of faults; identifies the forces responsible for motion along them; and includes an activity for locating local seismic zones near a school.

F. **The Big Squeeze: Metamorphic Processes in Action.** Explains the differences between contact and regional metamorphism; describes how metamorphic textures can be used to determine the origin of a particular rock sample; and includes a simulation of how a solid state change can occur in a rock if the pressure is great enough.

**Topic Two Assignments:**

a) Read the Course Documents for Topic Two.

b) Identify three additional web sites not mentioned in the course documents that provide current information on seismic and/or volcanic activity around the world.

c) Find out if there has been any recent earthquake activity in your local region or state by logging onto one of these web sites.

d) Identify the date and Richter magnitude of the last event.

e) Post your answers to the Course Assignment Discussion Board.

f) Choose a topic for the Action Research Paper and develop a list of resources to consult with the Instructor.

g) Respond to Forum Question One: What questions do you have about constructive forces that shape the crust of the planet? Restate in your own words concepts or theories which interest you or are new to you.

h) Respond to Forum Question Two: Consider the following: Earthquake prediction has always been a tricky business. Just when scientists think that they have found a key indicator that will unlock the process, things don't work out as they planned. The question is, are there any truly effective means for predicting earthquakes and should we continue to spend money in trying to solve the problem, or should we just chalk it up to fate? Post your ideas to the Course Forum Discussion Board.

**Topic Three: Tearing Down the Earth—Destructive Forces**
This Topic provides a general introduction into the destructive forces that shape the Earth's crust, including weathering, and erosion by streams, wind and ice. It also introduces sedimentary processes and the rock cycle.

**Major Ideas:**
A. Weathering of Rocks. Explains the processes of chemical, physical, and biological weathering of rocks; discusses how these agents of change help to create sediment; and includes a classroom activity on rock weathering.

B. Mass Movements and Gravity. Explains how gravity acts as the driving force behind erosion, providing sediments with the potential energy they need to move down hill; describes the different types of "mass wasting" events; and outlines an activity dealing with the angle of repose of different sediments.

C. Stream Erosion. Explains the role that running water plays in shaping the landscape; the types of erosion and sediment transport that occur in streams; and includes information on the water cycle as the driving force behind stream erosion.

D. A River Runs Deep: The Development of Stream Systems. Describes the development of different types of stream systems; explains how drainage patterns are controlled by many factors, including the underlying structure of the bedrock; and includes a lab activity using stream tables in the classroom.

E. Glaciers in Action. Explains the mechanics of glacial flow; describes how glaciers can be agents of erosion, transport, and deposition; discusses evidence for past ice ages on Earth; and explains how glaciers can be used to identify climatic change.

F. Wind Erosion and Transport. Explains how wind is often overlooked as an agent of sediment erosion and transport; discusses the origin and migration of dunes in an arid environment; and describes a student activity used to demonstrate wind erosion.

G. Reach the Beach—Coastal Erosion and Deposition. Explains the dynamic interplay of wind, waves, and current action in the erosion and transport of sediment in coastal zones; discusses the development of coastal landforms; and highlights the significance of global warming in accelerating global sea-level rise.

H. Deposition and the Formation of Sedimentary Rocks. Discusses the different types of sedimentary rocks; illustrates the importance of sedimentary structures in identifying a historical sequence of depositional environments; and describes a lab activity in which students can observe the formation of graded beds.

I. The Rock Cycle. Summarizes the components of the rock cycle; describes the processes by which minerals can be recycled into different rocks; and explains the importance of the principles of superposition and uniformitarianism and how they allow geologists to unravel past geological events by "reading the rocks."

**Topic Three Assignments:**

a) Read the Course Documents for Topic Three.

b) Using local resources, books, and/or web sites, determine what general rock types (igneous, sedimentary, or metamorphic) are found in your local community. Based on these rock types, describe how the general environment of your region has changed over time.

c) Post your assignment to the Course Assignment Discussion Board.

d) Conduct research on the Action Research Paper using approved resources and submit your findings to the Instructor.

e) Respond to Forum Question One: What questions do you have about destructive forces that shape the crust of the planet? Restate in your own words concepts or theories which interest you or are new to you.

f) Respond to Forum Question Two: Offer your evaluative comments to two other students' geological area assignments with questions and comments about what you have learned from their assignment.

**Topic Four: The Development of Plate Tectonic Theory**

This Topic provides a general introduction to modern plate tectonic theory and discusses the various lines of evidence used to support it.

**Major Ideas:**

A. Mapping Earth's Surface. Explains the importance of maps in determining both the surface features and internal structure of the Earth; discusses the use of scales in calculating the true sizes of geographic and geologic features; and provides a classroom activity on how to convert one scale to another.
B. Continental Drift: The Birth of an Idea. Discusses the work of Alfred Wegener and his early theories of continental drift; and describes a classroom activity for reuniting Pangaea.

C. The Ocean Floor: What a Relief! Explains how topographic measurements of the ocean floor helped to provide key evidence in support of the idea that Earth's crust is a dynamic entity; and discusses how evolving technology has helped to increase our overall scientific knowledge.

D. Sea Floor Spreading. Explains how sampling and age-dating rocks from the ocean crust led scientists to an understanding that the distribution of the sea floor changed over time, ultimately providing a mechanism for continental drift.

E. Wandering Poles and Magnetic Stripes. Describes the phenomena of remnant magnetism in rocks; explains how periodic changes in the direction of Earth's magnetic field helped geologists unravel the motion of crustal plates; and provides an activity using either sensors or compasses to simulate how detection of magnetic shifts in rocks helps to trace past plate motions.

F. Ring around the Ocean. Explains how the plotting of earthquakes and volcanic activity around the Earth helped to confirm the idea that sections of the crust were free to move over time; and describes the mechanics of a subduction zone along with the importance of the Pacific "Ring of Fire."

G. Plate Tectonic Theory: Wegener's Revenge. Explains how modern plate tectonic theory helped to pull all the pieces together; and how it serves as a unifying principle in geology today.

Topic Four Assignments:
   a) Read the Course Documents for Topic Four.
   b) Use the Topic Readings and/or external web sites to develop a timeline for the development of plate tectonic theory. Post your timeline to the Course Assignment Discussion Board.
   c) Submit a draft of the Action Project Paper to the Instructor for review. If appropriate, seek peer reviews in on-line forums.
   d) Respond to Forum Question One: What questions do you have about plate tectonic theory? Restate in your own words concepts or theories which interest you or are new to you.
   e) Respond to Forum Question Two: Consider the following: Today, plate tectonic theory is treated almost as a fact of life. It's used to explain everything from locations of earthquakes and volcanoes to the distribution of animal and plant species around the globe. It's hard to imagine a time when plate tectonic theory wasn't accepted by the geological community, but some of us older geology types do recall when the idea of drifting continents and shifting plates was considered more science fiction than science fact. Eighty years ago Alfred Wegener was ostracized for his outlandish ideas of continental drift. Less than 50 years ago, people like Harry Hess and J. Tuzo Wilson were still fighting uphill battles trying to get the geologic community to "see the light." One of the most important things you can instill in your students is the idea that science itself is dynamic, and just like the Earth is constantly changing, so is the way we interpret it. Remember, less than 500 years ago most people believed that the Earth was the center of the universe and the world was flat! Currently there are a number of controversial geologic theories that are being proposed to explain a number of different geologic phenomena. One involves the cause of the mass extinction that wiped out the dinosaurs at the end of the Cretaceous Period. The other has to do with the possibility that there is a large natural nuclear reaction going on at the center of our planet, which may be the cause of Earth's magnetic field. How might you use the struggle of scientists who fought for acceptance of plate tectonic theory as a way of introducing some of these new ideas to your classes? Do a web search to see what you can find about these two theories and share your thoughts. Here are two names to search: Walter Alvarez, for the dinosaur extinction, and J. Marvin Herndon, for the "nuclear planet" theory. Posted are sites on the External Links tool. Post your ideas to the Course Forum Discussion Board.

Topic Five: The Inside Story
This Topic provides an introduction to Earth's internal structure and discusses the origin of the planet based on the overall geologic evidence.

Structure of the Earth Syllabus Edited 2007
Major Ideas:
A. Earth’s Internal Structure. Explains the current model of Earth’s internal structure, including the distribution of crust, mantle, and outer and inner cores.
B. Density: That Sinking Feeling. Explains how density differences between the rocks of the crust and mantle help to drive plate tectonic action; describes a classroom demonstration that simulates how the crust "floats" on denser material below; and discusses how density settling allows subduction to take place.
C. Convection Currents and Geothermal Energy. Explains how the differential heating of material in the mantle helps to generate large-scale convection currents, which provide the motor for plate tectonic action.
D. Earth’s Magnetic Field: The Dynamo Effect. Discusses the origins of Earth’s magnetic field; describes the so-called dynamo effect; and provides a student activity on measuring the intensity of a magnetic field.
E. Earthquake Shadow Zones. Explains how seismic data has been used to identify different layers inside the Earth; and discusses the discovery of the "Mono."
F. Origins of the Earth. Discusses current theories on the origins of the Earth and explains how the geophysical data supports the "proto-planetary" hypothesis.

Topic Five Assignments:
(a) Read the Course Documents for Topic Five
(b) Use the readings along with external web sites to discuss the ways that geologists’ views regarding the internal structure of the Earth have changed over the last 100 years. Post your findings to the Assignment Discussion Board
(c) Submit the final Action Research Paper to the Instructor. If appropriate, seek input from your peers in online forums.
(d) Complete the JASON Course Survey
(e) Respond to Forum Question One: What questions do you have about the internal structure of the earth? Restate in your own words concepts or theories which interest you or are new to you.
(f) Respond to Forum Question Two: Consider the following: Over the last few years, astronomers have identified more than 80 new planets orbiting other stars in our galaxy, but none of them appear to have the same physical characteristics of Earth. In fact, the more scientists discover, the more it appears that Earth is a very unique place when it comes to its ability to support higher life forms. Despite this fact, the human population of our planet continues to act as if the natural systems of the Earth have an unlimited capacity to absorb pollutants and provide resources. Throughout this class, the underlying focus has been the idea that Earth is dynamic and in a state of continuous change. Today we are faced with problems concerning global climate change, stratospheric ozone depletion, and sea-level rise, just to name a few. How might you tie some of these global environmental issues to a unit on the dynamic Earth? Post your ideas to the Course Forum Discussion Board.

Texts (required readings): Course Content found in Blackboard

Bibliography (required and optional readings):
(a) Selected websites from: Digital Science Library of Earth Science www.dsles.org
(b) Project Earth Science: Geology. Brent A. Ford, NSTA Press.
(c) Rocks & Minerals: Hands-On Science Series. Barry Fried and Michael McDonnell
Student Evaluation Process:

Students are assessed through weekly on-line discussions, a series of forum questions, quizzes, a final exam, and the Action Research Project. Not all students seek college credit; some earn CEUs or audit. Students taking the course for 3 graduate credits will complete a 10 - 15 page Action Research Paper. Students may earn 30 points through substantive participation in weekly forum discussions; 20 points through assignments, 10 points on quizzes, 20 points on the final exam, and 20 points on the completed Action Research Paper. The assessment scheme is in percentage of total points, assuming the final scale is based on 100 points. Points reported here are percentages.

* **Students not taking the course for graduate credit do not have to complete the Research Paper and must obtain at least 70 points to pass the course**

* **Students taking the course for graduate credit will be graded according to the Plus/Minus Grading Scale:**

  * A+ 97-100
  * A  94 - 96.99
  * A-  90 - 93.99
  * B+  87 - 89.99
  * B  84 - 86.99
  * B-  80 - 83.99
  * C+  77 - 79.99
  * C  74 - 76.99
  * C-  70 - 73.99
  * D  50 - 69.99
  * F  50 >
Resume of Arlene Jurewicz Leighton

Arlene Jurewicz-Leighton
560 Youngtown Rd
Lincolnville, Maine 04859
(207) 763-3182
ajl@midcoast.com

Online Community of Learners

"From my experience teaching online for the Jason Academy, I think developing credibility and benevolence is key. For me it takes great deal of thoughtful organization to develop a virtual learning environment for the participants (a sense of place in virtual space) I work with in our courses. I ask participants to visualize a virtual round table around which we are all sitting. I ask them to consider that we come with different experiences and understanding of the science content and pedagogy. We come with different abilities to work with the technology of the course. Together we can increase each others competencies in these areas. My role is to help facilitate that process."

Online Teaching
http://www.jason.org

• Jason Academy Online Science Courses 1/02 to present

Participant In Jason Academy courses 1/02-6/02
Facilitator in training through Maine Math and Science Alliance
Facilitator Aquatic Ecology 7/02 MMSA funding

Facilitator Transfer of Energy 7/02
Facilitator and Instructor Transfer of Energy 11/02 to present
Updated course content 9/023
Revised discussion board misconceptions and science standards
Revised course using Universal Design for Learning Principles
TERC Best Practices Science Online Study 10/4, 2/05

Facilitator and Instructor 3/04 to present
Earth in the Solar System Course
Revised course using Universal Design for Learning Principles
Revised discussion questions and forums to reflect new discoveries.
Revised course content packets new information and discoveries
TERC Best Practices Science Online Study 10/4, 2/05

Facilitator and Instructor 6/04 to present
Structure of Earth Course
Revised course using Universal Design for Learning Principles
Revised course content packet new information and discoveries continuous
Revised discussion questions and forums to reflect course update
SRI International Jason Academy Evaluation 6/04 10/04
TERC Best Practices Science Online Study 10/04 2/05

Online Trainer and Course Structural Support 2/05 to present
Provided training and support new instructors
Resume of Arlene Jurewicz Leighton

Workshop Presentations Online and Learning

- ‘Collaborative Learning Online’
  National Science Education Research Conference
  June 23rd 2006
  University of Maine
  http://www.umaine.edu/center/CONFERENC2006.htm#S53

- “Developing Facilitation Skills for the Online Learning Environment
  Jason Academy Facilitation Training
  January 17th to 20th, 2003
  Washington, DC

- International Laptop Conference
  Laptop, Learners and Powerful Ideas
  University of Maine
  Topic: Using Universal Design for Learning
  http://www.agent.maine.edu/LLPI/2003/presentations.html

- “Using Universal Design and Learners’ Strengths to Access
  Science Curriculum for all Students” and
  “The Jason Academy and the Online Science Course Experience”
  Maine Science Teachers Association
  Fall Conference 2002
  Lewiston, ME

*AAAS and MMSA 2005 to present
PRISMS
Consultant/analyst for web based phenomenon and representations
using Benchmarks for Science Literacy and National Science Standards criteria

- Maine Association for Charter Schools 2002-present
  Grant writer, web designer and conference organizer
  Virtual education research
  http://www.mainechartersschools.org
Resume of Arlene Jurewicz Leighton

- **Energy Curriculum Reviewer Maine Math and Science Alliance 2002**
  Reviewed major curriculums on topic of energy for curriculum development by Maine Public Utility Commission. Analyzed and rated curriculums using Maine Learning Results and National Science Standards rubrics.

- **Global System Science 2002**
  Lawrence Hall of Science/University of California
  Reviewed curriculum on Energy Flows and Energy Uses as part of pilot program

- **Access Earth University of Southern Maine Spurwink Foundation 2002-2003**
  Developing lessons in Earth Systems Science incorporating Universal Design for Learning in an Online Format

  This project incorporates Universal Design for Learning in Earth System Science. In this approach, all environments—learning, social, and physical—are designed so that individuals with a wide range of abilities can have access to and participate in general education. Universal design of education involves flexibility in tools, materials, strategies, approaches, assessments, and technology.
  [http://research.usm.maine.edu/earth/index.asp](http://research.usm.maine.edu/earth/index.asp)

1998-2002  Lincolnville Central School Middle Level Science Teacher

*Earth Science and Physical Sciences*

  **Highlights**

  - Developed science curriculum which utilized Internet resources and multimedia to meet learning styles and needs of divergent population of students
  
  - Utilized community resources and science experts to familiarize students with working scientists and fields of geology and environmental studies
  
  - Developed ten week unit on alternative transportation including 42 teams building solar cars, in house race and participation in state competition. Developed school wide alternative transportation day including hybrid car exhibits, electrahton car, 3 Tour de Sol solar vehicles, and bike exhibit.
  
  - Researched science/community based Internet projects for use within the classroom via attendance at conferences and workshops and
Resume of Arlene Jurewicz Leighton

contacts with organizations

• Obtained training and researched assistive technology and its uses with diverse groups of students.

Special education, consulting, technological art and gifted and talented 90-98 Schools through out Maine

Education

• BS State University of New York
  Science Education
• MS Adelphi University, Garden City, New York
  Special Education/Learning Theories

Post Graduate level courses
• Research on Online Learning SLOAN-C August 2004
• Earth Science Systems GMA online course January-June 2001
• Universal Design for Learning CAST/CITE Training U.S.M. August 1998 - ongoing
• Internet Technology Leadership U. S. M. 1997
• Use of Multimedia in the Classroom CAST Training 1996
• Physics in the Classroom UM

Conferences/workshops
• Virtual Reality for Online Educator Sloan C April 2005
• NSTA Online presentations Feb 2005 to present
• Science Education and Research Maine Math and Science Alliance June 2004
• Earth and Space Science Maine Math and Science Alliance Updates from NASA April 2004
• Crosswalk through National Standards and Maine Learning Results Workshop on viewing macro to micro understanding science standards MMSA March 2002
• Governors Academy workshop on Professional Development in Science MMSA April 2002
• Century of the Environment Omega Institute Rhinebeck, N.Y., September 2001
• Maine Educational Symposium attendee Summit Hotel, Sugarloaf, August 2001
• Maine Stewardship Conference participant Camp Kieve August 2001
• Clean and Green/Living without Gasoline MEEP/NESEA April 2001
• Sprint Solar Cars MEEP March 2001
• Camden Technology Conferences POP TECH (volunteer/participant) 1997-2004

• Developing Standards Based Science Curriculum -
  Maine Math and Science Alliance March 2000

• Symposium on Technology, Disabilities, and Literacy North Carolina February 1999
• Sea and Shore Conference Samoset, Rockport, Maine October 98
• GIS workshop TTRCD -MCRPC Rockport October 1998
• GIS workshop Educators and Community Planners Together
  National Planners Convention Boston April 1998

References
Resume of Arlene Jurewicz Leighton

Yetta Lewis
VP Curriculum and Professional Development
Jason Project/ National Geographic

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Jason Academy Former Director
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John N. Papadonis
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Resume of Arlene Jurewicz Leighton

May 2, 2005

To Whom It May Concern:

The purpose of this letter is to recommend Arlene Jurewicz Leighton for a professional development position. I worked with Arlene for three years, 2003-2005, in my capacity as Director of the JASON Academy. Arlene serves as instructor for several of the Academy’s online courses which include “Structure of the Earth,” “Transfer of Energy” and “Earth in the Solar System.” These graduate-level courses, designed to enhance the science background of teachers and give them new strategies to teach science, allow teachers to receive academic credit from a variety of institutions that have accredited the courses. These include the University of Wisconsin, Colorado State University, and Leslie University. The courses are also part of a Master’s Degree program in education offered by Cambridge College.

Arlene is an excellent online instructor, consistently receiving high ratings from students in her courses. During her tenure, the JASON Academy received the prestigious EdNet Pioneer Award for excellence in technology innovation. In addition, SRI International, the official evaluator of the JASON Academy, used Arlene’s course, “Structure of the Earth,” as part of its summative evaluation. The data resulting from differences in pre- and post-test scores showed that students’ content knowledge substantially improved as a result of taking the course.

Arlene has assisted JASON Academy staff with training new online facilitators. She has particular expertise in the area of effective online discussion moderation techniques. She has also served as a mentor to new, less-experienced Academy instructors and has shared her innovations with successful discussion interaction strategies with all faculty members. She is very knowledgeable in Earth and physical science content and frequently revises her courses to reflect new scientific breakthroughs and theories.

It is without reservation that I would recommend Arlene for any position involving professional development for teachers and online teaching and learning. If you would like to discuss her qualifications in more detail, please contact me at mdewall@cx.net or 703-795-0454.

Sincerely,

Marilyn DeWall
Science Education Consultant
Resume of Arlene Jurewicz Leighton

Letter of Recommendation for Arlene Jurewicz Leighton

May 11, 2005

To Whom It May Concern:

I have worked with Ms. Leighton for a period of 2 years, 2003-05. Arlene has served as an adjunct faculty member at Cambridge College/ Cambridge, MA. She has taught as part of a collaborative between Cambridge College and Jason Academy. The online courses she has instructed include; Earth in the Solar System, Structure of the Earth and Transfer of Energy. These graduate level courses are required as part of the Cambridge College Middle School General Science Master's Degree Program, leading to Initial Massachusetts Licensure for Teaching.

Ms. Leighton has proven to be one of our most valuable online instructors. She has received reviews from our students that can be described as “exemplary”. Arlene demands high standards for science content knowledge and has developed exciting methods of transferring the learning to hands-on classroom activities. Having “pecked in” on some of her online sessions, I have seen comments posted by students sharing their excitement over learning about new science standards. Comments such as, “Wow, I didn’t know that” show up constantly. She also promotes intriguing discussions between her at-distance students. Many of the topic threads have been most thought provoking.

Arlene has many diverse students in her Jason online courses. Some students enter the program with strong science backgrounds and are currently actively teaching middle school science. Others join our program as second career learners with hopes of becoming first class middle school science teachers. Ms. Leighton has demonstrated patience and understanding with all multi-leveled learners. She completely understands the trials and tribulations associated with the “adult learner”. We are honored to have her as a faculty member at Cambridge College.

In closing, I would highly recommend Arlene as an Instructor for both Professional Development Science Education and Graduate Level Science Coursework.

Respectfully,

John N. Papadonis
Coordinator of Science Education
Graduate School of Education
Cambridge College