Monday 21 Sept:
Essay 1
Quiz

Read the Dewey book, *Experience and Education*.
Excerpts on website from Pritchard's *Ways of Learning* 2009
p. 19, 117, Chs 4, 5, 8

Peruse ASDM and Evolution links
http://www.desertmuseum.org/center/
http://evolution.berkeley.edu/evolibrary/home.php

Choose a Sonoran Desert topic (not a species) and find a scientific
paper about it.
Bring the abstract of the paper and be ready to say a few words about
the topic and the paper. Email the citation to Tiffany before class.

Who to pair with? Topic?
Essay Tips

Title

Citations (Smith et al. 2009)

Plagiarism

Pronouns (there, this, it, …)

Proofread

Data vs. Datum

Species vs. Species

Sonoran Desert Discovery:
Biosphere 1 at Biosphere 2
ECOL 464/54 (5 credits)

Schedule for Fall 2009:
We will meet on most Mondays from 1:30-5:00 in 5774 Tantau. Four Saturday events are mandatory. The first (10 Sept) will be an all-day, 12 hour excursion. The others will be approximately 6am-4:30pm leaving UA for SD and then returning to UA. Additionally, you will spend two hours sometime during the hour and a half, working on class visits in your lab. Authorization for travel is required. Each student will hand in a travel authorization form regarding your topic. Meetings and preparation with your peers will also take place outside of scheduled class time.

See schedule posted as course website for changes as semester progresses.

Week 1
Monday 24 Aug – Introduction, Syllabus
Saturday 29 Sept – no meeting

Week 2
Monday 31 Aug – Sonoran Desert Introduction, Theme & Topic Discussion, Discussion of Readings (assignments on course website from required texts and other posted PDF files)
Saturday 29 Sept – no meeting

Week 3
Monday 7 Sept – Labor Day, no meeting
Saturday 12 Sept – 10am – 12pm – All Day Field Trip Orientation (all students attend), Mt Lemmon Highway, Biosphere 2
See website for readings, handouts, and assignments. Continue to discuss topics. Choose workshop pairs/groups. (Essay 1 Due – hardcopy)

Week 4
Monday 14 Sept – How to teach science. Further discuss workshop topics. See website for readings & assignments.
Saturday 19 Sept – no meeting

Week 5
Monday 21 Sept – Finalize workshop topics, Discussion, See website for readings & assignments.
Saturday 26 Sept – no meeting

Week 6
Monday 28 Sept – Workshop preparation, Discussion, See website for readings & assignments.
(Survey 4 Due – via email)
Saturday 2 Oct – no meeting

Week 7
Monday 5 Oct. – Workshop preparation, Discussion.

Field Trip

Saturday 10 Oct. – 8am-10:30am – SD Mock Workshop Day (all students attend)
See website for readings & assignments.

Week 8
Monday 12 Oct – Workshop reflection, Discussion See website for readings & assignments.
Saturday 17 Oct – no meeting

Week 9
Monday 19 Oct – Workshop preparation, Discussion See website for readings & assignments.
Saturday 24 Oct – SD Workshop Day 2 (8am-6pm) See website for readings & assignments. New students will go this Saturday. You will be expected to get there once these two meetings, two different workshops will be held each Saturday. Sign-up earlier in the semester. 

Week 10
Monday 26 Oct – Workshop feedback, Discussion See website for readings & assignments.
Saturday 31 Oct. – SD Workshop Day 3 (Via email)

Week 11
Monday 2 Nov. – no meeting
Saturday 7 Nov. – SD Workshop Day 4 (Via email)

Week 12
Monday 9 Nov. – no meeting
Saturday 14 Nov. – SD Workshop Day 5 (Via email)

Week 13
Monday 16 Nov. – Workshop feedback, Discussion See website for readings & assignments.
Saturday 21 Nov. – SD Workshop Day 6 (Via email)

Week 14
Monday 23 Nov. – Semester Summary Discussion See website for readings & assignments.
(Survey 5 Due – hardcopy)
Saturday 28 Nov. – no meeting (Thanksgiving Weekends)

Week 15
Monday 30 Nov. – no meeting
Saturday 5 Dec. – no meeting

Week 16
Monday 7 Dec. – Celebrate with faculty, scientific councilor and academic dean. Location TBA

This course has no Final Exam, but if you are getting honors or graduate credit your supplemental work is due by 4:00pm Wed 16 December to your instructor.
Due dates (sometimes electronically):

Workshop Topic (developed in concert with classmates and instructors) (a-c in template; 25 points) – via email 25 Sept to both instructors

Introduction and Background (e in template; 75 points) – Friday 02 Oct (email)

Outreach Goals (who will you teach what at Biosphere 2?) (h in template; 25 points) – Hardcopy 10 Oct (w/ next)

Tools and Approach to achieve educational goals (what will your workshop comprise?) (j-n in template; 75 points) – Hardcopy 10 Oct (w/ ‘Outreach Goals’)

Workshop in lesson-plan format (see below), including modifications for two different audiences and improvements based on feedback (completed template to be posted on our course website; 150 points – peer grading to be included) – bring to class 19 Oct

Assessment (did your workshop achieve your educational goals?) (written results from o in template after your first public presentation; 50 pts) – within 10 days of 1st presentation (email)

Refinement of workshop (after assessment and feedback from your first public interaction) (what did you change in the template and why?; 50 points) – >48 hrs before 2nd presentation

Summary Evaluation and Recommendations (what worked and didn’t work in your workshop? what would you keep, what would you change?; 50 points) – 23 Nov in class (to discuss)

Please turn in all previous work with each new submission so that improvement and progress can be noted.

Some excellent examples of outreach modules are available at Dr. Katrina Mangin’s UA Marine Discovery website (http://marinediscovery.arizona.edu/lessons.html).

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2009-2010 BioME Graduate Fellows and Teacher Partners

**Kathi Borgmann, School of Natural Resources**
- Liberty Elementary School
- Cithel Orozco (4th Grade)
- * Geniece Baer (4th Grade)

**Tuan Cao, Department of Ecology and Evolutionary Biology**
- Dunham Elementary School
- Marguerite Samples (2nd Grade)
- Martha West (2nd Grade)
- * Bryan Helm, Department of Ecology and Evolutionary Biology
- Palo Verde Magnet High School
- Kevin Kehl (Biology, Biotechnology)
- * Ming Huang, Department of Entomology
- Hendricks Elementary School
- Liu Prohaska (4th-6th Grade Gifted Science)

**Luisa Ikner, Department of Soil, Water and Environmental Science**
- Flowing Wells Junior High School
- Janet Slingerland (7th Grade Science)
- Julie Stapleton (7th Grade Science)

**Stuti Jaiswal, Neuroscience (MD/PhD)**
- Tucson High Magnet School
- * Margaret Wilch (Biotechnology, Research Methods)

**Victoria Miranda, Department of Entomology**
- Miles Middle School
- Rebecca Lipsen (6th - 8th Grade Science)

**Aletris Neils, School of Natural Resources**
- Hermosa Montessor K-8 School
- Patricia DuMont (4th-6th Grade Science)

**Randy Vasquez, Department of Nutritional Sciences**
- Manfield Middle School
- * Darnell Hernandez (8th Grade Science)
- * Patricia Robles-Medina (6th Grade Science)

*** Rachel Zenuk, School of Public Health**
- Flowing Wells High School
- * Anna Heyer (Biology, Biotechnology)
Teaching and Learning

*Experience and Education*
John Dewey, 1938

-isms

Progressive education?
  v.
Traditional education

Experience v. Content
Experience v. Imposition
Present v. Past
Authority v. Anarchy
Experience

Quality and Effect

Experiential Continuum

Civilization v. Savagery

“Preparation”, Learning, Unlearning

Collateral and Life-long Learning

Interaction and Continuity

Individual Freedom vs. Social Control

Teacher as leader of group activities

Self control

Purpose

Social Context

Experience
The theory of multiple intelligences was developed in 1983 by Dr. Howard Gardner, professor of education at Harvard University. It suggests that the traditional notion of intelligence, based on I.Q. testing, is far too limited. Instead, Dr. Gardner proposes eight different intelligences to account for a broader range of human potential in children and adults. These intelligences are:

- **Linguistic intelligence** ("word smart")
- **Logical-mathematical intelligence** ("number/reasoning smart")
- **Spatial/Visual intelligence** ("picture smart")
- **Bodily-Kinesthetic intelligence** ("body smart")
- **Musical intelligence** ("music smart")
- **Interpersonal intelligence** ("people smart")
- **Intrapersonal intelligence** ("self smart")
- **Naturalist intelligence** ("nature smart")
- **Existential intelligence** ("philosophy smart")
How to Teach or Learn Anything 8 Different Ways

One of the most remarkable features of the theory of multiple intelligences is how it provides **eight different potential pathways** to learning. If a teacher is having difficulty reaching a student in the more traditional linguistic or logical ways of instruction, the theory of multiple intelligences suggests several other ways in which the material might be presented to facilitate effective learning. Whether you are a kindergarten teacher, a graduate school instructor, or an adult learner seeking better ways of pursuing self-study on any subject of interest, the same basic guidelines apply. Whatever you are teaching or learning, see how you might connect it with

- words (linguistic intelligence)
- numbers or logic (logical-mathematical intelligence)
- pictures (spatial intelligence)
- music (musical intelligence)
- self-reflection (intrapersonal intelligence)
- a physical experience (bodily-kinesthetic intelligence)
- a social experience (interpersonal intelligence), and/or
- an experience in the natural world. (naturalist intelligence)

~Pritchard Ch. 5

**K-W-L grid**

Pritchard Ch 8

<table>
<thead>
<tr>
<th>What do I know about this topic?</th>
<th>What do I want to know about it?</th>
<th>What have I learned about it?</th>
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<tbody>
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Lesson Checklist
Pritchard Ch. 8