

Science Curriculum Development for Teachers

Course Syllabus

Science Teacher Education Program (STEP)

Course Information:

Title: Science Curriculum Development for Teachers

Course Number: ED 595/GEOS 595

Credits: 3

Prerequisites: Participating educators must be from schools involved in the Science Teacher Education Program administered by the Geophysical Institute. Approved districts include: Alaska Gateway, Delta Greely, Fairbanks North Star Borough, Lower Kuskokwim, Northwest Arctic Borough, Tanana City, Yukon Flats, and Yukon-Koyukuk. Concurrent enrollment in STEP's Earth Science for Science Teachers is required.

Location: IARC 401

Dates: Monday-Friday, Session 1: July 7 – 18, 2008; Session 2: July 21-August 1, 2008

Meeting Time: 1 PM – 5 PM

Instructors:

Session 1: Lead Instructor Diane McBee; Cheryl Cooper; Sandi Schultz

Session 2: Lead Instructor Cheryl Cooper; Diane McBee; Gary Cooper

Course materials/textbooks: TBD

Course Description:

Science Curriculum Development for Educators is a special topics course designed to guide K-12 science teachers in developing Learning Cycle Model lessons and assessment based on the Alaska Grade Level Expectations (GLE) for science and best practice skills. The backward design of the Learning Cycle Model requires participants to identify the GLE and write assessment prior to writing the lesson plan. This ensures that assessment and scoring tools are solid and focused on lesson content. All Learning Cycle Model lessons also must incorporate science process skills. After being introduced to the Learning Cycle Model course participants work with instructors and peers in three "Translation Groups" (one per instructor) to translate science content learning from STEP's Earth Science for Science Teachers course. Translation groups are organized by instructors and broken into grade level. Participants who teach K-3 grade work with an instructor in one translation group, those who teach grades 4-6 in another, while participants who teach 7-12 grade work in the third translation group. This allows participants to focus on the science content most applicable in their classroom.

Course Goals and Student Learning Outcomes:

The goal of this course is to guide participants in developing Earth Science lessons and assessment for K-12 students that demonstrate and include: scientific process skills; Alaska Grade Level Expectations; best practice teaching skills; and the AK Science Consortium Learning Cycle Model for science education. Each participant will write two Learning Cycle Model lessons to use in the classroom and share with peers. One will be done as a grade level group; the other will be done individually.

Instructional Methods:

This course utilizes a variety of instructional methods including:

- Lecture-delivered by ASC instructors and/or guest lecturers
- Large group discussion led by ASC instructors
- Small “Translation group” discussion led by a single ASC instructor
- Instructor-modeled Learning Cycle Model activities
- On-site lecture and discussion at research facilities or field sites

Tentative Course Calendar:Week 1:

Day 1: Introductions of class members and GI and ASC staff, assessment of GLE and science content knowledge, process skills introduction and activities, introduction of course requirement, daily schedule, and logistics. Participants will keep a daily reflective journal of each day’s events.

Day 2: GLE review, introduction to best practice teaching skills and the ASC Learning Cycle Model (informal loop activity), building assessments, self, peer, and instructor assessments, review scientist content. Discrepant Event

Day 3: Translation Groups: Participants work as grade level groups to discuss ways of translating earth science content, scientific explorations and activities presented by the scientists, into lessons for K-12 students. Begin work on Group Lesson Plan #1 (due Day 6). Discrepant Event

Day 4: Introduction of the LCM formal loop. Translation Groups: Work on group lesson #1. Turn in reflective journal. Discrepant Event

Day 5: Field Trip to Denali Park. Begin work on individual lesson #2.

Week 2:

Day 6: Translation Groups: Work on individual lesson #2. Discrepant Event. Turn in group lesson #1

Day 7: Translation Groups: Work on individual lesson #2. Discrepant Event. Do self and peer review.

Day 8: Translation Groups: Work on individual lesson #2. Discrepant Event. Turn in lesson #2

Day 9: Participate in professional opportunities session. Review and revise LCM lessons. Discrepant Event. Review resource materials. Prepare for group lesson #1 presentations on Day 10. Turn in reflective journal.

Day 10: Share Earth Science Learning Cycle Model Group Lesson Plans. Discrepant Event. Final versions of all lesson plans for a grade are due at noon.

Assignments:

Each participant must complete two Earth Science Lesson Plans: one prepared by a grade-level group and one prepared individually, for K-12 students. Lesson Plans will target a specific grade level or range. The instructor will evaluate each 3-5 page Lesson Plan for the following:

- Adherence to the Learning Cycle Model format and LCM scoring guide
- Alignment with and clear identification of Alaska Science Grade Level Expectations
- Clear rubric for assessment
- Inclusion of scientific process skills and scientific content
- Incorporation of best practice teaching skills

Each participant must help present their group Earth Science Lesson Plan #1 to the instructor and Translation Group on Day 10.

Learning Cycle Model Group Lesson Plan #1 will be due on Day 6.

Learning Cycle Model Individual Lesson Plan #2 will be due on Day 8.

Course Policies:

Attendance is essential due to the condensed nature of the course. Make up assignments will be arranged as necessary. Participation in class and translation group discussions is required. Transportation for trips beyond UAF will be provided.

Evaluation:

Grades will be based on the following:

1. Class attendance: 20%
2. Participation in class: 20%
3. Earth Science Lesson Plan #1: 20%
4. Earth Science Lesson Plan #2: 30%
5. Journal: 10%

A grade of **A** will be given for an overall score of 90% or better. A grade of **B** will be given for 80-89%, **C** for 70-79%, **D** for 60-69% and **F** for <60%.

Disabilities Services:

The Office of Disability Services implements the Americans with Disabilities Act (ADA), and ensures that UAF students have equal access to the campus and course materials. We will work with the Office of Disability Services (203 WHIT, 474-7043) to provide reasonable accommodations to students with disabilities.