Title

Fostering Cooperative Learning, Inquiry, and Critical Thinking in Elementary Science (Grades 1-4)

Target Audience

This course is intended for pre-service and in-service teachers grades 1-4.

Course Description

This course explores activities that help students organize and consolidate their thinking; communicate their ideas clearly to others; analyze and evaluate the ideas of others; and use the language of science to express ideas precisely. Learners will discover how the National Science Education Standards relate to teamwork, discussion, and critical thinking. Learners will explore technologies that can help students develop critical-thinking and collaboration skills. As a final task, learners will develop lessons that incorporate collaborative learning, inquiry, and critical thinking into their science curriculum.

Instructor/Facilitator

See instructor/facilitator sheet

Credits

To be determined by college or university

Learner Outcomes

Learners will:

- Understand how the National Science Education Standards relate to teamwork, discussion, and critical thinking.
- Be able to analyze science lessons to identify the critical-thinking skills and strategies developed.
- Be able to incorporate higher-level thinking questions into science discussions.
- Use technology to teach science lessons incorporating collaboration, inquiry, and critical thinking.
- Develop lessons incorporating collaborative learning, inquiry, and critical thinking into the science curriculum.

Outline of Content and Assignments

A summary of course content and assignments is outlined below. Details for each assignment, including locations of readings and Web resources, are in each part of the Course Content.

Session 1: Welcome to Cooperative Learning, Inquiry, and Critical Thinking!

The learners will:

- Become familiar with the content, structure, and expectations of the course.
- Become familiar with TeacherLine tools used in the course.
- Reflect upon his/her own classroom practices and science lessons incorporating cooperative learning, inquiry, and critical thinking.
- Communicate and discuss cooperative learning with online classmates after reading an article on cooperative learning.

Read
- "Cooperative Learning"
- "Cooperative Learning" from PBS Teachers

View video
- Software Tools

Write in online journal
- Reflect on expectations for this course.
- Reflect on prior knowledge.

Participate in an online discussion
- Introduce themselves to other learners.
- Respond to the following: What are the benefits and/or challenges to cooperative learning? What have your experiences been?

Complete activities

Review the following lesson plans from PBS:
- Group Stories
- Team Efforts
- Citizenship City
- Special Times

Session 2: Inquiry and Critical Thinking in the Science Classroom

The learners will:
- Identify ways that inquiry and discussion promote scientific thinking.
- Reflect upon how learning in an environment of inquiry and discussion promotes scientific thinking and in what classroom environment students learn best.
- Analyze a technology lesson or activity to determine the critical thinking skills it teaches, how it helps students develop scientific understanding, and how it can help meet different learning styles.

Read
- "Strategies for Teaching Critical Thinking"

View videos
- "Science Talk in the Classroom"
- "Meeting the Standards"

Write in online journal
- Reflect on how learning in an environment of inquiry and discussion promotes scientific thinking and in what classroom environment you think students learn best.
- How does learning in an environment of inquiry and discussion promote scientific thinking? In
- Reflect on how the reviewed lesson plan develops critical thinking through the use of collaboration and inquiry.

Participate in an online discussion
- Discuss how the skills described in the reading are integral to critical thinking and inquiry.

Complete activities

Review the following lesson plans from PBS:
- How Do Plants Drink?

- Sailing
- Ice Cream Shake
- Clean Air Detective: Investigating Air Pollution
- Review one of the following lesson plans: Water Experiment, Forensic Science, The Grass is Always Greener, and Weather Week
- Review resources related to cooperative learning, inquiry, and critical thinking in elementary science.

Session 3: Cooperative Learning and Science

The learners will:
- Reflect upon cooperative learning in their classrooms.
- Name the differences between grouping strategies and name the ways that group learning can help achieve science curriculum goals.
- Describe how a simulation could be adapted for cooperative group work.
- Name the benefits of using technology for cooperative learning to teach elementary science.

Read
- "Student Learning Groups that Really Work"
- "Facilitating Inquiry Investigations by First Graders"

Watch the video
- "Interactive Group Software: Rainforest Researchers"

Write in online journal
- Reflect on student learning group strategies.
- Reflect on the benefits of using technology to help create cooperative experiences.

Participate in an online discussion
- Discuss the integration of technology into the science curriculum.

Complete activity
- Review Web resources related to science software activities for cooperative experiences.

Session 4: Using the Web for Teamwork

The learners will:
- Analyze WebQuest, problem-based and other collaborative Internet lessons to determine the critical-thinking, cooperative, and inquiry science skills they teach.
- Write an introduction for a WebQuest and analyze the introductions written by other learners.
- Analyze and select a science Web project appropriate for developing student critical-thinking skills, collaboration, and inquiry.
- Teach a Web lesson in their classrooms.
- Write an analysis of the Web lesson.

Read
- "The Internet and the Early Childhood Classroom"
- "Why WebQuests?"
- "A Road Map for Designing WebQuests"
- **"**Connecting Students Through Collaborative Projects**"**

Watch the video
- "Weather"

Write in online journal

- Reflect on how the Web is used in the lesson plan and the video to foster critical thinking and cooperative learning skills. Reflect on how the information from the Web helps with the learning process and what guidance and support the teacher gives to help the students interpret the information gathered from the Internet.
- Reflect on WebQuests and meeting curriculum goals.

Complete activity
- Review the Exploring Endangered Species Around the Globe lesson plan
- Explore WebQuests
- Explore resources on developing WebQuests.
- Explore resources on Problem-Based Leaning and other collaborative projects

Complete assignment
- Web Project Reflection Assignment

Participate in an online discussion
- Write an introduction to a WebQuest, post it, and then review the introductions posted by other learners.

Session 5: The Next Step

The learners will:

- Create a technology lesson plan incorporating cooperative learning, Inquiry, and critical thinking to teach science standards.
- Teach and revise the lesson.
- Self-assess the lesson according to a rubric.
- Make recommendations to other learners by providing feedback about the critical-thinking skills developed in their lessons.

Complete assignment:
- Final Project: technology-integrated lesson plan.

Write in online journal
- Reflect on acquired knowledge.
- Reflect on goals and expectations.

Participate in the online discussion
- Post the critical-thinking skills or the types of critical-thinking questions described in your lesson plan.

Schedule

It will take about 30 hours to complete this course. Each session should take approximately 4-5 hours. If you find yourself spending several hours more than this in any given session, please contact your facilitator to make sure this is necessary to complete the given assignments.

Requirements

Learners are expected to:
- Complete all assignments.
- Maintain an online journal.

- Participate and actively engage in discussions with fellow learners while contributing to the social construction of knowledge.
- Be self-directed and self-motivated.
- Ask for assistance when they need it.

Materials (hardware, software, plug-ins)

Technical Requirements

- Word processor
- Internet service provider
- E-mail

Academic Dishonesty Policy

To be inserted by university institution only

Evaluation

This course is evaluated on a letter grade basis, and may be available for graduate credit. See graduate credit details pertaining to specific graduate credit institutions.

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