Title

Teaching Reading in Science

Target Audience

This course is intended for pre-service and in-service science teachers, grades 3-12.

Prerequisites

To successfully participate in this course, you should be familiar with taking an online course or have gone through the TeacherLine Practice Learning Online Course. You should also be familiar with elementary, middle or high school science content. **Note: Learners must have access to a science textbook and have had experience teaching or observing a science classroom. Concurrent teaching is not required.**

Course Description

This course will examine ways of teaching reading in science, as well as elements of reading and the premises that guide reading in science. This course centers on strategies for teaching the reading of science text in new ways so students can engage with texts to further their reading comprehension and understanding of science content. With the right tools to improve their reading skills, students will be better prepared to construct meaning from their science textbooks. Online facilitators equip learners with strategies to help struggling students with organizing ideas, understanding text organization, setting purpose for reading, making meaningful connections, and persevering through reading materials. Learners will collaborate with others in an online forum, comparing ideas and drawing from personal professional experiences. As part of the assignments, learners will test course materials and ideas in a classroom setting, working with students and assessing the effectiveness of the teaching strategies.

Instructor/Facilitator

See instructor/facilitator sheet

Credits

To be determined by college or university.

Goals

The goal is for teachers to apply numerous reading strategies as they plan lessons in order to provide more support for students as they interact with science texts Through out this course the learner will encounter methods to engage students with science texts, through the means of reading, interacting, journaling, discussing, and applying a range of strategies. The result will be teachers who are better equipped to assist students in learning science concepts thereby improving student achievement.

At the end of this course, learners will:

- Understand the critical need for helping students learn to read in science.
- Read about reading theory and research.
- Explore and implement specific strategies to support students.

- Develop skills to help students confront the unique challenges of constructing meaning from science textbooks.

Learner Outcomes

Students completing Teaching Reading in Science will:

- Describe a rationale for using reading strategies to enhance science instruction.
- Compare three interactive elements of reading and explain how these three elements must overlap in order for reading to be effective.
- Review and apply reading strategies for: a) motivating the reader, b) teaching vocabulary content, and c) reflecting upon and constructing knowledge.
- Design a student learning experience that utilizes the reading strategies to improve student understanding of science concepts.

Outline of Content and Assignments

After previewing the course introductory information, learners will proceed to the Assignments section to complete the following six Sessions, working through each Session in order. Essential information pertaining to the topic is presented at various points within the course. Throughout the Sessions, learners are asked to articulate their ideas in various forms. They are encouraged to reflect on their ideas and experiences in their online journals. The weekly discussions are designed to allow learners to glean information from other learners' experiences with strategies both prior to and following the completion of the weekly assignments. Learners are given a final project to apply reading in science strategies to a student learning experience.

This course is designed to address the National Research Council's (NRC's) NSES (1996). The NSES reflect some of the most current research on science teaching and learning, and present a vision of instruction that should enable all students to successfully interact with the natural world.

In Session 1 of this course, learners will read a portion of the NSES related to principles and definitions used in the NRC's vision of science education. These principles include, (1) Science is for all students, (2) Learning science is an active process, (3) School science reflects the intellectual and cultural traditions that characterize the practice of contemporary science, and (4) Improving science education is part of systemic education reform. The NSES describes these principles and the associated tensions that may result as they are implemented into science programs.

Session 1: Why Teach Reading in Science?

Learners will:

- Define their professional goals and expectations for this course in their online journal.
- Explain previous knowledge about teaching reading in mathematics.
- Describe how difficult texts are approached from his or her viewpoint.
- Compare and contrast individual beliefs with the principles of the *National Science Education Standards* using an Anticipation Guide.
- Explain the importance of teaching reading strategies in the science classroom using an Anticipation Guide.
- Explain some of the theories about how people learn using the K-W-L strategy.
- Self-assess practice based on a survey and an online discussion.

Read

- "Chapter Two: National Science Education Standards"
- "Rationale for Learning to Read in Science"

- "Six Assumptions About Learning"

Write in online journal
- Reflect on professional goals and expectations.
- Reflect on prior knowledge.
- Reflect on insights gained thus far in the course and questions they still have.

Participate in an online discussion
- Introduce themselves to other learners.
- Discuss the survey results.

Complete activities and assignments
- Complete an Anticipation Guide for "Chapter Two: National Science Education Standards."
- Complete a Rationale Anticipation Guide.
- Complete a K-W-L Chart for "Six Assumptions About Learning."
- Survey students on how they approach reading in science.

Session 2: The Interactive Elements of Reading

Learners will:
- Analyze teaching situations and describe their important reader and climate features.
- Analyze science texts and describe their important text elements.
- Propose specific revisions to instruction for each of the three interactive elements of reading: reader, climate, and text features.

Write in online journal
- Reflect on concerns about classroom climate that may be adversely affecting students.
- Reflect on concerns with text style or structure in reading materials.

Participate in an online discussion
- Discuss prior lessons and identify strategies that seem promising to help readers succeed.

Session 3: Removing Barriers in Text Materials

Learners will:
- Select an appropriate pre-reading strategy and incorporate it into a lesson to help motivate students to read.
- Select an appropriate reading strategy and incorporate it into a lesson to help students in reading science text materials.

Read
- Getting Oriented and Motivated Strategies: "K-W-L Chart," "Problematic Situation," "Graphic Organizer," and "Assessment Rubric."
- Starting to Read Strategies: "Recognizing Text Organization Patterns," "Think Aloud," "Pairs Read," and "PLAN: Predict - Locate - Add – Note."

Write in online journal
- Reflect on strategies shared by the other learners.

Participate in an online discussion
- Choose one of the "Getting Oriented and Motivated" strategies and post suggestions for teaching the strategy.

- Choose one of the "Starting to Read" strategies and post suggestions for teaching the strategy.

Session 4: Vocabulary in Science

Learners will:

- Describe how vocabulary instruction is critical for students' ability to understand science concepts;
- Plan and implement one vocabulary strategy to help students learn the vocabulary that is used to understand a science concept; and
- Explain how vocabulary strategies might be incorporated into the science classroom.

Read

- Enhance Science Vocabulary Instruction Strategies: "Concept Definition Mapping," "Frayer Model," "Semantic Feature Analysis," "Word Sorts," and "Insert Note Taking."
- Five Steps for Better Vocabulary Instruction

Participate in an online discussion

- Discuss which vocabulary strategies seemed the most useful and share ways to incorporate them into the classroom.

Complete

- Science Vocabulary Quiz
- Enhance Science Vocabulary Instruction Assignment

Session 5: Reflection, Constructing Meaning, and Applying Information from Text

Learners will:

- Describe how reflection strategies are useful for students after they engage in science content or process;
- Plan and implement a reflection strategy to help students use prior knowledge for a decision making process;
- Plan and implement one strategy that helps students construct meaning or apply knowledge that has been learned in science; and
- Explain how the chosen strategies could be used to improve a current unit of study.

Read

- Five E Learning Cycle
- Constructing Meaning and Initiating a Debate in Science strategies: "Discussion Web," "Role/Audience/Format/Topic (RAFT)" "Proposition/Support Online," and "Decision Making Matrix."

Participate in an online discussion

- Discuss types of prompts that are useful to get students to write in their science journals.
- Discuss strategies and how to incorporate them into science lessons.

Complete activities and assignments

- Create a Learning Log Assignment (Not Required)
- Complete the Constructing Meaning and Initiating Debate Strategy assignment

Session 6: Putting it all Together

Learners will:

- Create or revise a lesson plan to incorporate appropriate reading strategies in science; and
- Assist colleagues in reflecting on the choice of strategies to assist readers in science.

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

Complete assignments and activities
- Complete Final Project: To apply some of the strategies learned in the course to their own curriculum, students, and teaching style, each learner will select a lesson plan to revise, or create a new one. In order for others to understand and participate in reviewing the final projects, the author will need to explain his intentions and describe the learning environment and activities.
- Complete a Peer Review of at least two other learner' lesson plans.

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 can be taken for graduate credit for a letter grade and graduate credit. See graduate credit details pertaining to specific graduate credit institutions.

Last Update: October 14, 2005