A New Hampshire e-Learning for Educators Online Professional Development Course

Course: SC-11 Teaching Electricity and Circuits Through Inquiry

Instructor: Instructor email address phone number

Course Description
Participants in this course will learn about the science behind electric circuits and how this content can be taught through inquiry. The course will help teachers gain a better understanding of electricity and circuits, including conducting and insulating materials, open and closed circuits, and series and parallel circuits. You will learn numerous inquiry-based teaching strategies throughout the course. You will also consider inquiry-based methods to introduce the content to your students, and you will enhance your questioning techniques to help your students make predictions about the content. Participants will also learn strategies for managing inquiry-based lessons in the classroom and tools for assessing students' understanding of the content. Through completion of a final project, you will demonstrate much of what you learned about the content and teaching methods described above.

Unit 1 | Orientation: Making Yourself at Home in an Online Course | Week 1

This introduction to the online environment involves a short series of assignments designed to familiarize you with the OPEN NH discussion based online course model, as well as the Moodle learning management system. You will explore the course, introduce yourself to your classmates, email the course instructor, have a short discussion about your understanding of electric circuits and how you might use them in class. You will also set a goal or goals for your growth in the course.

Unit 2 | Fundamentals of electricity, circuits and inquiry in the elementary science classroom | Week 2

In this unit, participants will read about electricity, circuits and inquiry, view video segments on inquiry-based learning in the classroom, and engage in hands-on science activities with physical and virtual circuit building. In the discussion forum, they will share their thoughts about the potential challenges of implementing inquiry-based lessons in the classroom and brainstorm possible solutions for meeting these challenges with their colleagues. Some of the ideas will also be included in a reflection about changes participants could make to provide more opportunities for inquiry into their classrooms. This reflection will be a part of the Final Project, which is also described in this session.

Unit 3 | Introducing students to electricity and circuits | Week 3

In this unit, participants will consider several strategies for introducing electricity and circuits to their students. The readings will address inquiry-based teaching techniques and helpful tips for managing inquiry-based lessons. Using state or local science standards as a starting point, participants will modify or create an engaging activity to introduce electricity and circuits to their students. They will also be asked to review important safety information that will help keep students safe as they explore electricity in the classroom and beyond.

Unit 4 | Making predictions and asking questions about electricity | Week 4

In this unit, participants will hone their questioning skills and learn how to integrate activities that encourage students to make predictions as they think through electricity content. The readings and activities will focus on important pre-activity exercises in the inquiry classroom and the categories and characteristics of “good” questions. The discussion gives participants an opportunity to share and expand upon what they have learned with your colleagues in this session.

Unit 5 | Using technology resources and to encourage thinking about electricity | Week 5

Participants are introduced to resources on the web that they may be able to use with their students when teaching electricity and circuits. These resources vary from lesson plans to games, videos of activities, applets, and more. In this session, participants will learn how some of these technology tools and resources can be used to enhance students’ understanding of the content. Participants will also have time to find and share online resources that could make their lessons more inquiry-based for students.

Unit 6 | Designing and building circuits through inquiry | Week 6
Transitioning from an activity-based classroom to one that is more focused on inquiry can take time and practice. During this session, participants will consider how to make hands-on activities on circuits more inquiry-based and consider how to apply what they've learned to their own classrooms. Participants will also develop a new lesson or modify an existing lesson to incorporate more inquiry-based learning for their students. A video of students building circuits will also provide insight into how students can respond to inquiry-based lessons.

| Unit 7 | Assessing inquiry-based lessons | Week 7 |

In every well-designed lesson, there must be some way of assessing what students have learned. In this session, participants will learn effective strategies for assessing an inquiry-based lesson. The readings will detail a variety of assessment approaches, including formative (ongoing) assessment, performance-based assessments, and portfolio assessments, while the activities will introduce participants to several resources for creating rubrics. They will also develop or modify an assessment for the lesson that they have included in their Final Projects.

**Course Goals**

This workshop will enable participants to:

- gain the skills, knowledge, and confidence they need to create an engaging classroom that encourages students to learn the fundamentals of electricity through inquiry;
- develop a greater understanding of inquiry-based teaching strategies and how they differ from standard hands-on activities;
- learn classroom management and safety strategies associated with teaching electricity to elementary students; and
- become acquainted with assessment strategies and tools for evaluating students’ gains in inquiry-based lessons.

**Course Project**

Participants will complete a Final Project that demonstrates what they have learned about using inquiry to teach students about electricity and circuits and help them plan how to apply some of the concepts to their classrooms.

Components of the project include:

- Reflection on changes that you could make to integrate inquiry into your classroom effectively.
- List of state standards for electricity and circuits for your grade level.
- Description of classroom management and/or safety tips specific to inquiry-based lessons on electricity and circuits.
- Development of higher-order thinking questions that encourage students to think and make predictions about electricity and circuits.
- Complete lesson plan with a method for assessment.

**Course Expectations**

This course is divided into seven one-week sessions beginning with an orientation week. Each session includes readings, activities, and an online discussion among workshop participants. The time for completing each session is estimated to be five to six hours.

Your instructor will review and assess your progress throughout the course. At the conclusion of each session, your instructor will update your course Gradebook. It is important to review the assessment criteria in the course rubric that will be used to determine your grades. In short, if you pay attention to the following, you will do just fine:

1. Make sure you complete the readings each week and do the activities each week. Afterwards, your first posting in the discussion area should make reference to the readings and activities in such a way that your instructor can tell you read the material and engaged in the activities.
2. Make sure you post at least 2 message replies in the discussion area each week, and that each posting contains substantial comments that also refer to the readings and materials to support your ideas (i.e., a comment like “oh, that's interesting” is NOT substantial).
3. Choose at least 2 different days each week when you will participate in the discussions. We suggest posting at least once within the first few days of the week, with your second post at least two days before the next week begins. If you only post on one day each week, you will not receive full credit because one posting a week does not help the group develop rich ongoing discussions.
4. Review the Discussion Guidelines in the course for more information on substantial posts and engaging dialogue.
5. Stay with your classmates in the unit discussions. Make sure you post on time, not after everyone else has moved on to the next week's discussion.
6. Work on your final project as directed in the course. Don’t wait until the end of the course to put it together.
In order to be eligible to receive a **Certificate of Completion**, you must participate in all of the weekly discussions and complete all assigned tasks. Participants will be evaluated on the frequency and quality of their participation in class discussions. Participants are required to post a minimum of three substantial comments for each discussion, including one that addresses the discussion starter and demonstrates understanding of the course/unit concepts, citing examples from the readings. Additional postings should provide substantive comments to other participants, which are thoughtful, relevant, and serve to extend the discussion.

Progress will be reviewed and assessed throughout the course. At the conclusion of each unit, the course Gradebook will be updated to reflect the quality of your participation in the course. In order to receive a **Certificate of Completion** at the end of the course, you must earn a passing grade of 60% or more in the course requirements, earning at least 150 out of 250 points.

**Graduate Credit**

If you choose to take the course for graduate credit, there is an additional requirement to complete a **Reflection Paper**, which is worth an additional 50 points. The guidelines and rubric for this paper are posted in each course. You will need to (a) send your tuition registration form with payment directly to the university graduate studies office no later than the start of Unit 7 of your course and (b) notify your instructor that you have registered for graduate credit. If taking the course for graduate credit, a passing grade is 70% or more, earning at least 170 out of 300 points.