Course: IE-05 *Intel Elements - Inquiry in the Science Classroom*

Instructor: Instructor  email address  phone number

**Course Description**

*Inquiry in the Science Classroom* is an e-learning course for teachers of students in 3rd to 8th grades (ages 8 to 14) that explains and demonstrates scientific inquiry in depth with interactive activities and locally relevant classroom examples. The course builds a foundation for inquiry and provides the rationale and research basis, common misconceptions, and specific strategies for inquiry as part of any science learning, regardless of the science discipline. It promotes best practices for improving scientific inquiry and helps the teacher with limited scientific inquiry background but it also reinforces teachers more experienced with scientific inquiry.

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<tr>
<th>Unit</th>
<th>Content Title</th>
<th>Week</th>
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<tr>
<td>Begin</td>
<td><strong>Orientation</strong></td>
<td>Week 1</td>
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<td>The orientation module for this course focuses on your understanding of online learning and the use of online delivery systems to effectively achieve learning. Included in this unit, is the beginning of understanding what scientific inquiry is. You will be asked to review articles on both online learning as well as on scientific inquiry in classrooms. You will be asked to explore the course and try out various content delivery features that we will be using throughout the course.</td>
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<td>Unit 2</td>
<td><strong>Introduction to Scientific Inquiry</strong></td>
<td>Week 2</td>
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<td>In this module, participants gain an overview of scientific inquiry and its benefits. Participants explore examples of classrooms that employ the inquiry process and look at how inquiry relates to the scientific method and to engineering. Participants are also introduced to the continuum of scientific inquiry to understand the many forms that inquiry may take. Finally, they gain an understanding of the Scientific Inquiry Phases and consider how to use the Phases in their classrooms.</td>
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<td>Unit 3</td>
<td><strong>Phases of Scientific Inquiry</strong></td>
<td>Week 3</td>
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<td>In this module, participants learn the essential elements of scientific knowledge to support scientific inquiry and how to help their students develop information literacy and research skills necessary for scientific inquiry. Participants also examine the Scientific Inquiry Phases and learn how to support habits of mind and higher levels of student-directed scientific inquiry.</td>
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<td>Unit 4</td>
<td><strong>Instructional Design for Scientific Inquiry</strong></td>
<td>Week 4</td>
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<td>In Module 4, participants look at how to design open inquiry experiences, integrate scientific inquiry into their curriculum, and assess student learning of inquiry processes and scientific concepts.</td>
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<td>Unit 5</td>
<td><strong>Science Inquiry in the Classroom</strong></td>
<td>Week 5</td>
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<td>Module 5 explores the practical concerns of teachers who wish to implement scientific inquiry experiences in their classrooms. Participants learn how to create a classroom community of learners, how to promote scientific discourse and argument, teach scientific inquiry practices, and manage classrooms where students conduct scientific inquiry.</td>
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<td>Unit 6</td>
<td><strong>Technology that Supports Science Inquiry</strong></td>
<td>Week 6</td>
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<td>In this module, participants explore how technology supports and enhances inquiry practices. They learn about specific tools that scientists currently use and how these tools can be integrated into a science classroom. In addition, participants explore how technology can be used to foster communication and collaboration while students engage in scientific inquiry.</td>
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<td>Unit 7</td>
<td><strong>Final Project Sharing</strong></td>
<td>Week 7</td>
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<td>In this final session you will be sharing your final course projects with your classmates. You will have a few preliminary readings to help you connect your project work with the overall course objectives, and your discussions will be directed toward connecting your project to your learning. All the hard work you have completed to meet the objectives of the course are reflected in your projects. Sharing this work will enable you to look at the thoughts and ideas of others to review evaluate your work and theirs with respect to the objectives and goals of the course. As you share your projects and review the projects of your classmates, you will begin to think more deeply about how data is used to encourage critical thinking. You will also gain an understanding of how collecting and using data with your students can reinforce their learning and achievement.</td>
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Outcomes

- Understand scientific inquiry and what makes it unique from other scientific approaches
- Appreciate how scientific inquiry is used in and out of the classroom
- Understand the benefits of inquiry and some misconceptions
- Explore the continuum of scientific inquiry
- Identify scientific inquiry practices and habits of mind
- Understand the underpinning beliefs of scientific knowledge and how they can apply
- 21st century thinking skills and habits of mind to further that knowledge
- Explore methods to improve student information literacy skills to support background and scientific inquiry research
- Learn the basic steps of the scientific inquiry process
- Explore ways students can use data collection to effectively support their scientific inquiry
- Review science standards to identify inquiry and concept standards appropriate for planning.
- Learn how to design an inquiry project
- Explore methods for incorporating inquiry activities into a conventional science curriculum.
- Plan formative and summative assessment of inquiry processes and science concepts
- Learn how to create a community of learners that focuses on scientific inquiry
- Explore methods for promoting constructive scientific discourse in the classroom
- Examine strategies for teaching inquiry processes
- Learn practical tips for managing a classroom where students work on scientific inquiry activities
- Explore online resources that support the collection and organization of data
- Examine methods for using technology to draw meaning from data
- Investigate online resources for presenting and discussing data conclusions
- Learn practical tips for keeping students safe and responsible online

Course Project

As a final project for this course, you will design a plan to incorporate scientific inquiry in one unit that you teach in your own classroom. All of the work for your final project is included in this document.

Once you have downloaded this document, save it to your computer with a filename that includes your last name, such as: "Inquiry_FP_Jones.doc".

You will revisit this document in each Module, adding relevant information as you explore topics in the course. For this reason, continue to use the final project document that you save to your computer; do not download a new version in each Module. You will email a completed final project to your facilitator at the end of Module Five.

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:

- Make sure you complete the readings each week and do the activities each week. Afterwards, your first posting in the discussion area should refer to the readings and activities in such a way that your instructor can tell you read the material and engaged in the activities.
- Make sure you post at least 2 message replies in the discussion area each week, and that each posting contains substantial comments (i.e., a comment like “oh, that’s interesting” is NOT substantial).
- 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.
- Make sure you post on time, not after everyone else has moved on to the next week’s discussion.
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.