Inquiry Science is the Instructional Trend in Science Education

Inquiry is also the basis for standards-based science instruction. Doing science outdoors is an ideal setting for inquiry. Most importantly, understanding of the environment begins by being in nature. Science education has a long tradition of nature studies, including collecting, observing behavior and biodiversity, assessing biotic and abiotic conditions and conducting experiments in the out-of-doors.

There are many ways to define Inquiry in science, in science education, and in general. During the Outdoor Education course(s) you will be challenged to decide for yourself what Inquiry means in terms of:

1. Tennessee Science Standards
2. Benchmarks for Science Literacy—available online at Project2061.org
3. National Science Education Standards (NSES) - available online at nsta.org
4. The way you teach
5. The way children learn
6. How you can incorporate outdoor settings to teach science.

By far, the most important of these are the last three, although, it is important for you to understand that your ability to justify and defend the way you teach and the way children learn will be supported if you can link them to 1-3 above. You will become an advocate for children to learn science by inquiry and in the out-of-doors in direct proportion to how well you understand how the science education profession recommends that you teach by inquiry. Therefore one of your task this term is to:

1. Figure out what the science education profession is (what groups-who are we? See NSTA.org - what are our journals? who wrote the NSES, Benchmarks, and the TN Science Standards).
2. Which of these groups, and which publications, best represent you and your understanding of inquiry?
3. How you can implement inquiry, as you want to.

One Strategy for Inquiry Science we will employ on site: Immersion


Immersion is an intensive learning experience that requires time for teachers to focus on learning science in depth. They need to participate fully in the generation of compelling questions and to conduct investigations that allow them to make meaning out of inquiry activities. They also need to collect and organize data, and to develop and defend explanations based on the evidence they
collect. In short, they need to gain a deeper and broader understanding of the scientific concepts they are investigating. The goal of these experiences is to engage teachers in first-hand learning of what they are expected to practice in their classrooms – guiding students through inquiry-based science activities.

Necessary for Immersion to work: An experienced and qualified instructor who has used this technique with students. A commitment to long-term experiences. Immersion cannot be conducted in short one-time-only workshops. You are lucky because we have an abundance of instructors who are experienced in immersion inquiry going along, including some of you!

One outcome from in-depth immersion in the inquiry process is a change in teachers’ conceptions of the nature of science learning and teaching. As teachers begin to see science teaching as less a matter of knowledge transfer and more an activity in which knowledge is generated (constructed) and science content is investigated in-depth, they see their own role as teacher changing. No longer do they view themselves as a direct conveyor of knowledge; instead, they strive to become a guide helping students develop their own meaning from experience.

There are many issues to consider when implementing inquiry. Your task will be to identify those issues and come to grips with which ones you can deal with now, and when you choose to deal with the other issues, as you become more experienced and confident. The issues will vary depending upon whether or not you are a preintern, certified new teacher, experienced teacher, elementary, middle, secondary, or post-secondary teacher.
Inquiry will be done in Collaborative, small-groups.

Inquiry-based work means (loosely) student-centered. We will address the nature of collaborative groups, different than cooperative groups. How are they different? And how small is small? How can we know whom to place together in small groups? What criteria can we use to select people for small group work?

**Assessment of Inquiry – Inscriptions as evidence of doing science**

To encourage you to document your work, much of evaluation will be by the field notebooks, which should be completely filled. Your notebook should contain 20-25 inscriptions, minimum. In addition, your notebook should contain reflections of your groups’ discussions on your experiment as well as your own thoughts and opinions of the topics discussed in the field. All of your experiment will be done onsite during the field trip portion of the course. At least four hours should be devoted to written work upon your return, in order to present the experiment at the last class. A poster presentation, similar to a science fair project is requested. Written work to be turned in includes the field notebooks, which contain the experimental design and raw data (everyone), and the transformed data (tables and graphs), conclusions (one set per group for me to keep). Please also turn in the written portions of the experiment as an attached file sent to me in an email. We want to post them on the website.

Scientists spend much of their time creating ways to communicate their ideas, experiment designs, and data. They do this with actual representations on hard copy documents. Examples of these “inscriptions” are drawings, photographs, diagrams, pictures, maps, flow charts, procedural plans, tables of data, summaries of data with data averages, graphs of data, data averages, data summaries, ANYTHING they can figure out to represent and persuade others to understand their work.

Inscriptions are the products upon which you will be assessed in the absence of “concrete” objects. That is, inscriptions represent the “real thing” done in the field setting or the laboratory. You will fill your waterproof field notebooks with inscriptions and analyses for part of your course evaluation. The use of inscriptions represents Authentic Assessment and does not require testing. The rationale is that if one engages in real practices of science and discusses these practices with others, one develops an understanding of what scientists do and how to do it.

An emphasis in the use of inscriptions is improvement in making them, over time. So I would expect to see your later efforts better than your earlier ones. I will also expect that joint efforts be made in your group experiment, with transformations of your raw data for presentation at the last class.