

CHAPTER 10

Identifying Inquiry in the K–5 Classroom by Doris Ash and Barry Kluger-Bell

What does an inquiry classroom look like? How does it work? How can you tell if genuine inquiry is happening in the classroom? This chapter offers three practical guides to help educators who are trying to identify and support the specialized characteristics of the inquiry environment.

The elementary classroom is a complex social environment in which people talk, write, laugh, learn, and interact with one another. Teachers are asked to implement a variety of policies and standards in multiple content areas. They are expected to meet a variety of goals and needs and to respond to administrators, parents, policymakers, and the community. But first and foremost, teachers are expected to meet the needs of children.

As Karen Worth suggested in Chapter 4, inquiry is an excellent way to help foster children's learning. School districts around the country have begun requiring their administrators, teachers, and professional developers to better understand the nature of inquiry and how to implement it in the classroom. They also have a pressing need to help their teachers create inquiry in the elementary classroom.

Teachers, administrators, and others who experience inquiry as adult learners still wonder about the nature of inquiry in the classroom: What does it look like? What would the children be doing? What would the teacher be doing? How would the classroom environment feel? Over the past few years, professional developers have been developing "markers" designed to help teachers recognize when inquiry is occurring in the classroom. These indicators are shown below, in three guides that look at the special characteristics of the inquiry classroom.

INQUIRY INDICATORS: WHAT ARE THE STUDENTS DOING?

On-the-Run Reference Guide to the Nature of Elementary Science

Imagine yourself in an inquiry classroom. What would you expect to see? These guidelines from the Vermont Elementary School/Continuous Assessment Project were created by observing students as they did “hands-on, minds-on” exploration in the classroom. “The intent is not to use the guide as a checklist,” they said, “but to use it as a statement of what we value in the areas of science process, science dispositions, and science content development.”

When students are doing inquiry-based science, an observer will see that:

Students View Themselves as Active Participants in the Process of Learning

1. They look forward to doing science.
2. They demonstrate a desire to learn more.
3. They seek to collaborate and work cooperatively with their peers.
4. They are confident in doing science; they demonstrate a willingness to modify ideas, take risks, and display healthy skepticism.
5. They respect individuals and differing points of view.

Students Accept an “Invitation to Learn” and Readily Engage in the Exploration Process

1. They exhibit curiosity and ponder observations.
2. They take the opportunity and time to try out and persevere with their own ideas.

Students Plan and Carry Out Investigations

1. They design a fair test as a way to try out their ideas, not expecting to be told what to do.
2. They plan ways to verify, extend, or discard ideas.
3. They carry out investigations by handling materials with care, observing, measuring, and recording data.

Students Communicate Using a Variety of Methods

1. They express ideas in a variety of ways: journals, reporting out, drawing, graphing, charting, etc.

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2. They listen, speak, and write about science with parents, teachers, and peers.
3. They use the language of the processes of science.
4. They communicate their level of understanding of concepts that they have developed to date.

Students Propose Explanations and Solutions and Build a Store of Concepts

1. They offer explanations both from a “store” of previous experience and from knowledge gained as a result of ongoing investigation.
2. They use investigations to satisfy their own questions.
3. They sort out information and decide what is important (what does and doesn’t work).
4. They are willing to revise explanations and consider new ideas as they gain knowledge (build understanding).

Students Raise Questions

1. They ask questions—verbally or through actions.
2. They use questions that lead them to investigations that generate or redefine further questions and ideas.
3. They value and enjoy asking questions as an important part of science.

Students Use Observations

1. They observe carefully, as opposed to just looking.
2. They see details, seek patterns, detect sequences and events; they notice changes, similarities, and differences.
3. They make connections to previously held ideas.

Students Critique Their Science Practices

1. They create and use quality indicators to assess their own work.
2. They report and celebrate their strengths and identify what they’d like to improve upon.
3. They reflect with adults and their peers.

Adapted from materials created by the Vermont Elementary Science Project and the Continuous Assessment in Science Project, ©1995. Courtesy of Gregg Humphrey.

INQUIRY INDICATORS: WHAT IS THE TEACHER DOING?

The Role of the Teacher in the Inquiry Classroom

In the inquiry classroom, the teacher's role becomes less involved with direct teaching and more involved with modeling, guiding, facilitating, and continually assessing student work. Teachers in inquiry classrooms must constantly adjust levels of instruction to the information gathered by that assessment.

The teacher's role is more complex, including greater responsibility for creating and maintaining conditions in which children can build understanding. In this capacity, the teacher is responsible for developing student ideas and maintaining the learning environment.

Besides the process skills that the student must hone in the inquiry classroom, there are also skills a teacher must develop in order to support student learning of scientific ideas. When you enter an inquiry classroom, you may see that the:

Teachers Model Behaviors and Skills

1. They show children how to use new tools or materials.
2. They guide students in taking more and more responsibility in investigations.
3. They help students design and carry out skills of recording, documenting, and drawing conclusions.

Teachers Support Content Learning

1. They help students form tentative explanations while moving toward content understanding.
2. They introduce tools and materials and scientific ideas appropriate to content learning.
3. They use appropriate content terminology, as well as scientific and mathematical language.

Teachers Use Multiple Means of Assessment

1. They are sensitive to what children are thinking and learning, and identify areas in which children are struggling.
2. They talk to children, ask questions, make suggestions, share, and interact.

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3. They move around and make themselves available to all students.
4. They help children go to the next stage of learning with appropriate clues and prompts.

Teachers Act as Facilitators

1. They use open-ended questions that encourage investigation, observation, and thinking.
2. They carefully listen to students' ideas, comments, and questions, in order to help them develop their skills and thought processes.
3. They suggest new things to look at and try, and encourage further experimentation and thinking.
4. They orchestrate and encourage student dialogue.

Adapted from materials created by the Exploratorium Institute for Inquiry.

INQUIRY INDICATORS: HOW DOES THE ENVIRONMENT SUPPORT INQUIRY?

The Social and Emotional Environment of the Inquiry Classroom

Creating the proper environment is a necessary condition for maintaining an inquiry classroom, but it is not sufficient in itself. The environment of an inquiry classroom can look quite different from our "standard" picture of a typical classroom. An inquiry classroom may be very active and filled with materials. It may be filled with children having conversations about scientific phenomena, or it may be filled with evidence of independent investigations.

There are three major areas of development in any inquiry endeavor. These are:

- Content and conceptual understanding and development
- The skills and the activities of doing science
- Attitudes and habits of mind

It takes a very special classroom environment to support all these elements for children engaged in the inquiry experience. In addition to the guidelines expressed in the "On-the-Run Reference Guide to the Nature of Elementary Science" above, an inquiry classroom must

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make it possible, on a social and practical level, for students to pursue their investigations.

Walking into an inquiry classroom, an observer may see that:

Students Work in an Appropriate and Supportive Physical Environment

1. The room is set up to support small-group interaction and investigation.
2. Lists of student questions are prominent and available for all to see.
3. A variety of general supplies are available, both at desks and in easily accessed cabinets.
4. A variety of materials specific to the area being explored are easily accessible.
5. Student work is displayed in a variety of ways in order to reflect their investigations.

Students Work in an Appropriate and Supportive Emotional Environment

1. Their thinking is solicited and honored.
2. They are comfortable expressing ideas and opinions and speaking up.
3. They are comfortable interacting with one another, and with the teacher.
4. They are encouraged to share information and ideas with each other—as individuals or in groups.
5. They know what they are doing and why.

Students Work in a Variety of Configurations to Encourage Communication

1. Work may be done in student pairs, small or large groups, or in whole-class situations.
2. Students have many opportunities to respond to feedback and learn from one another.
3. Students become part of a “community of learning,” supporting and affecting each other’s thinking.

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Not every inquiry classroom will look and feel the same, but the major elements identified in these three guides will be manifested in some form.

It's not the form that makes an inquiry environment successful, however, but the underlying substance. There are many different ways to encourage communication, just as there are many different ways to support continued learning. Inquiry classrooms always involve engaging children's intellect in exploring and investigating interesting phenomena. The emphasis is on allowing and assisting children to find their own best pathway to learning. The indicators listed here are meant to be one way to begin to determine if genuinely exciting inquiry learning is occurring.