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Pathways to Inquiry

INVITATION TO INQUIRY

In *Inquire Within* (Llewellyn, 2007), I familiarized readers with several means of inviting students to inquiry-based learning through the Invitation to Inquiry Grid (see Figure 1.1). The invitations are like pathways teachers regularly use to initiate student inquiries. They include (a) demonstrated inquiries and discrepant events, (b) structured inquiries, (c) guided inquiries (also called teacher-initiated inquiries or problem-solving activities), and (d) self-directed inquiries (also called student-initiated or full inquiries). For each approach, the source of the question, the procedure, and the results differ, originating from either the teacher or the student. Whereas demonstrated inquiries and discrepant events are more teacher led, the source of the question and the procedure stems from the teacher. Self-directed and student-initiated inquiries, however, are more student led. Here, the source of the question and the procedure originates from the student. Thus, as one moves from left to right on the grid, the ownership of the question and the procedure shifts from the teacher to the student.

	Demonstrated Inquiry or Discrepant Event	Structured Inquiry	Guided Inquiry or Teacher-Initiated Inquiry	Self-Directed Inquiry or Student-Initiated Inquiry
Posing the question	Teacher	Teacher	Teacher	Student
Planning the procedure	Teacher	Teacher	Student	Student
Analyzing the results	Teacher	Student	Student	Student

Figure 1.1 Invitation to Inquiry

Source: Llewellyn, D. (2007). *Inquire Within: Implementing Inquiry-Based Science Standards in Grades 3–8,* 2nd ed. Thousand Oaks, CA: Corwin.

Why Teachers Differentiate Science Instruction

In Chapter 3, we read how Differentiated Science Instruction (DSI) strives to have multiple options available for students to learn. As a flexible form of instruction, DSI creates opportunities for students to experience various facets of learning through inquiry in response to their distinct and diverse preferences. We will now address these learning preferences in more detail.

When choosing a model for instruction, which of the following factors most influences your decision?

a. The complexity of the task

b. The amount of classroom time available

c. Your preferred teaching style

d. The students' developmental level

If you chose "d," the students' developmental level, you are on the right track for differentiated teaching. Certainly, the complexity of the task, as well as the availability of time, are influential factors to consider, but putting students first is an essential element of DSI. If you chose "c" as your preferred teaching style, you may be putting your needs ahead of your students' needs.

DSI teachers plan units of studies according to their students' individual skills and abilities, preferred learning methods, and need for direction and supervision. Like snowflakes, they know each child is uniquely different. Teachers often use terms like *readiness, interests, learning style, tiered assignments, scaffolding,* and *flexible groupings* to accommodate these differences. It becomes necessary that any teacher developing the knack to differentiate inquiry lessons be able to articulate their understanding of the meaning as

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Differentiated Earth Science Inquiries

In this chapter, you will find two examples of differentiated earth science inquiries being applied in classrooms with elementary school and high school students. These are practical "how-to" experiences that will help you envision how you can apply differentiated earth science inquiries in your own classroom.

MINERAL DETECTIVES—GRADES 3 THROUGH 5

The following vignette shows how Mr. Rob Schiller, a fifth-grade teacher at a mid-size suburban K–5 school, incorporates the varied interests of students, flexible groupings, and freedom of choice into a unit of study. Rob has been teaching for 10 years. In 2008, he enrolled in a summer science inquiry institute sponsored through a local university. Although new to science inquiry, Rob had previously developed several inquiry-based units in literacy and mathematics. He viewed the summer institute as an opportunity to extend his expertise beyond language arts and math and into science.

His district's fifth-grade science curriculum calls for a unit on "minerals." In previous years, his mineral unit centered on the school's "Rocks and Minerals" kit from Delta Science Modules. Delta is an excellent resource for elementary and middle school science teachers, especially for those interested in teaching hands-on and inquiry-based lessons.

Since Rob already had experience teaching about minerals, he thought he would apply his newly acquired inquiry-based science instruction knowledge and skills to planning the upcoming year's mineralogy unit.

Differentiated Physical Science Inquiries

In this chapter, you will find two examples of differentiated physical science inquiries being applied to elementary and middle school classrooms.

INVESTIGATING M&M'S—GRADES 3 THROUGH 5

Introduction: Johnnie Wong is a third- and fourth-grade "looping" teacher at Elmwood Elementary School. Looping is an instructional practice in which a class of children stays with a teacher for two or more grade levels. At Elmwood, the children and teacher remain together for just two years. At the end of the second year, the children move on to a new teacher while Mr. Wong returns to third grade for a new group of students.

The benefits of looping are twofold. The overwhelming research indicates that students, since they are already familiar with the teacher, display less anxiety and uneasiness at the start of the second school year cycle. Looping also promotes continuity and more personal relationships between the teacher and the students. For teachers like Mr. Wong, the benefits of looping consist of becoming more familiar with the intellectual, emotional, and social development of each child in his class. Working with students for two years helps Mr. Wong to better understand their particular learning styles, needs, and individual personalities—a prerequisite for differentiated instruction. Working with children for a second year also helps him to build a sense of community and a healthy relationship with parents and caregivers as well. Furthermore, the two-year cycle reduces time spent on "getting to know" each other. Mr. Wong need not start from