

The Guided Inquiry

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Listen to your students. They need to have a chance to explain so be present and be comfortable in the silence as they struggle with an explanation.

—A POGIL practitioner of 10 years

As described in chapter 1, the POGIL pedagogy is an integrated combination of intentionally designed guided-inquiry activities and a focus on process skills involving the active engagement of student teams that are facilitated by an instructor. POGIL activities are structured according to the learning cycle (described in Chapter 1). The activities of a POGIL classroom frame the thinking that students will do during class. The effective implementation of guided inquiry requires the active engagement of students in constructing ideas and mastering material (Bodner, 1986; Driver, Asoko, Leach, Scott, & Mortimer, 1994). Because this approach is different from the kind of classroom that most teachers experienced as students, many do not have good models for what it might look like. For this reason, it is important to frame POGIL pedagogy by exploring how guided inquiry is situated in the larger context of active learning strategies and how the pedagogical approaches fall into the category of inquiry-based learning. This chapter provides a review of active learning and its value for supporting student learning in the classroom, with a special focus on cooperative learning that is relevant to the POGIL classroom. The implementation of the learning-cycle-based guided inquiry of POGIL, described in chapter 1, will then be situated in the larger context of the various forms of inquiry-based learning. Last, while this chapter focuses on the guided-inquiry component of the POGIL pedagogy, it is important to recognize that in the classroom implementation of POGIL, the guided-inquiry and process components are highly integrated.

What Is Active Learning?

There are many definitions for *active learning*; however, most share some common characteristics with the definition proposed by Bonwell and Eison (1991) in which *active learning* is defined as strategies that focus on “involving students in doing things and thinking about what they are doing” (p. iii). Similarly, Prince (2004) described active learning as “any instructional method that engages students in the learning process . . . [and] requires students to do meaningful learning activities and think about what they are doing. . . . The core elements of active learning are student activity and engagement in the learning process” (p. 1). Michael (2006) describes active learning as “[t]he process of having students engage in some activity that forces them to reflect upon ideas and how they are using those ideas” (p. 160). He continues by saying that active learning should require “students to regularly assess their own degree of understanding and skill at handling concepts or problems in a particular discipline . . . [and the] attainment of knowledge by participating or contributing” (p. 160). More recently, Freeman and colleagues (2014) synthesized a definition of *active learning* from written definitions collected from faculty during biology seminars on active learning. According to this definition, *active learning* “engages students in the process of learning through activities and/or discussion in class, as opposed to passively listening to an expert. It emphasizes higher-order thinking and often involves group work” (Freeman et al., 2014, p. 8414).

In an active learning class, students often work or discuss problems and concepts in small groups or pairs, where part of the process involves reflecting on or discussing the reasons behind the concepts and the solutions to the problems and activities. The inclusion of student reflection is a critical component because metacognitive strategies have been shown to improve learning (Bjork, Dunlosky, & Kornell, 2013; Donker, De Boer, Kostons, van Ewijk, & Van der Werf, 2014; Lopez, Nandagopal, Shavelson, Szu, & Penn, 2013). There are a range of techniques and approaches that have been developed to support active learning in the classroom. These techniques include easily implemented approaches that do not require much change in an instructor’s current approach, such as the pause method (Rowe, 1986), note comparisons, and short activities or questions where students discuss and work in groups. Other easy-to-implement strategies include think-pair-share (Lyman, 1981); concept tests (Crouch & Mazur, 2001; Mazur, 1997); and use of personal-response systems, which can be technology oriented using clickers, cell phones, or low-technology options such as cards or hand raising (Caldwell, 2007; Gauci, Dantas, Williams, & Kemm, 2009). Active learning techniques also include approaches in which most