

AFTERSCHOOL TRAINING TOOLKIT

Investigating Science Through Inquiry

Essential Features of Classroom Inquiry and Their Variations

Inquiry-based teaching and learning occurs when students' experiences are described by the essential features, listed in the left-hand column. However, students rarely have the abilities to begin here. They first have to learn to ask and evaluate questions that can be investigated, what the difference is between evidence and opinion, how to develop a defensible explanation, and so on. A more structured type of teaching develops students' abilities to inquire. It helps them learn how to determine what counts. The degree to which teachers structure what students do is sometimes referred to as "guided" versus "open" inquiry.

- Consider your own students and your goals for enhancing inquiry in your afterschool program.
- How can you enhance inquiry in science learning?
- How can you guide students to a more independent inquiry practice?

Essential Features	Variations			
	More ←----- Amount of Learner Self-Direction -----> Less Less ←----- Amount of Direction from Teacher or Material -----> More			
1. Learner engages in scientifically oriented questions	Learner poses a question	Learner selects among questions, poses new questions	Learner sharpens or clarifies question provided by teacher, materials, or other source	Learner engages in question provided by teacher, materials, or other source
2. Learner gives priority to evidence in responding to questions	Learner determines what constitutes evidence and collects it	Learner directed to collect certain data	Learner given data and asked to analyze	Learner given data and told how to analyze
3. Learner formulates explanations from evidence	Learner formulates explanation after summarizing evidence	Learner guided in process of formulating explanations from evidence	Learner given possible ways to use evidence to formulate explanation	Learner provided with evidence
4. Learner connects explanations to scientific knowledge	Learner independently examines other resources and forms the links to explanations	Learner directed toward areas and sources of scientific knowledge	Learner given possible connections	Learner given all connections
5. Learner communicates and justifies explanations	Learner forms reasonable and logical argument to communicate explanations	Learner coached in development of communication	Learner provided with broad guidelines to use to sharpen communication	Learner given steps and procedures for communication

National Research Council (2000). *Inquiry and the National Science Education Standards: A Guide for Teaching and Learning*. Table 2-6. p 29.