

Applying Inquiry in Science

What the Teacher Does

Aspects of Inquiry	Contrary to Inquiry
<ul style="list-style-type: none"> • Creates interest • Generates curiosity • Raises questions • Elicits responses that uncover misconceptions , beliefs, and background knowledge 	<ul style="list-style-type: none"> • Explains concepts • Provides definitions and answers • States conclusions • Provides closure • Lectures
<ul style="list-style-type: none"> • Encourages student collaboration without teacher directed instruction • Observes and listens to students as they interact • Asks probing questions to redirect students' investigations when necessary • Acts as a consultant for students 	<ul style="list-style-type: none"> • Provides answers • Tells or explains how to work through the problem provided • Tells students when they are wrong • Gives information or facts that solve the problem • Leads the students step-by step- to a solution
<ul style="list-style-type: none"> • Encourages students to explain concepts and definitions in their own words • Asks for justification (evidence) and clarification from students • Formally provides definitions, explanations and new labels • Uses students' previous experiences as the base of explaining concepts 	<ul style="list-style-type: none"> • Accepts explanations that have no justification • Neglects to solicit students' explanations
<ul style="list-style-type: none"> • Expects students to use formal labels, definitions, and explanations provided previously • Encourages students to apply or extend the concepts and skills in new situations • Reminds students of alternative explanations • Refers students to existing data and evidence and asks: "What do you already know?" Why do you think...?" (strategies from explore stage also apply here) 	<ul style="list-style-type: none"> • Provides definitive answers • Tells students they are incorrect • Lectures • Leads students step-by-step to a solution • Explains how to work through the problem
<ul style="list-style-type: none"> • Observes students as they apply new concepts and skills • Assesses students' knowledge and/or skills • Looks for evidence that students have changed their thinking or behaviors • Allows students to asses their own learning and group-processing skills • Asks open-ended questions, such as : "Why do you think...? "What evidence do you have?" What do you know about x?" "How would you explain x?" 	<ul style="list-style-type: none"> • Tests vocabulary words, terms and isolated facts • Introduces new idea or concepts • Creates ambiguity • Promotes open-ended discussion unrelated to the concept or skills

What the Student Does

Aspects of Inquiry	Contrary to Inquiry
<ul style="list-style-type: none"> • Asks questions such as: “ Why did this happen?” What do I already know about this?” What can I find out about this”? • Shows interest in the topic 	<ul style="list-style-type: none"> • Asks for the “right” answer • Offers the “right” answer • Insists on answers or explanations • Seeks one solution
<ul style="list-style-type: none"> • Thinks freely, but within the limits of the activity • Tests predictions and hypotheses • Forms new predictions and hypotheses • Tries alternatives and discusses them with others • Records observations and ideas • Suspends judgment 	<ul style="list-style-type: none"> • Lets others do the thinking and exploring (passive involvement) • Works quietly with little or no interaction with others (only appropriate when exploring ideas or feelings) • Plays around indiscriminately with no goal in mind • Stops with one solution
<ul style="list-style-type: none"> • Explains possible solutions or answers to others • Listens critically to one another’s explanations • Questions one another’s explanations • Listens to and tries to comprehend explanations offered by the teacher • Refers to previous activities • Uses recorded observations in explanations 	<ul style="list-style-type: none"> • Proposes explanations from thin air with no relationship to previous experiences • Brings up irrelevant experiences and examples • Accepts explanations without justifications • Does not attend to other plausible explanations
<ul style="list-style-type: none"> • Applies new labels, definitions, explanations, and skills in new, but similar situations • Uses previous information to task questions, propose solutions, make decisions, and design experiments. • Draws reasonable conclusions from evidence • Records observations and explanations • Checks for understanding among peers 	<ul style="list-style-type: none"> • Plays around with no goal in mind • Ignores previous information or evidence • Draws conclusions from thin air • Uses in discussions only those labels that the teacher provided.
<ul style="list-style-type: none"> • Answers open-ended questions by using observations, evidence, and previously accepted explanations • Demonstrates an understanding or knowledge of the concept or skill • Evaluates his or her own progress and knowledge • Asks related questions that would encourage future investigations 	<ul style="list-style-type: none"> • Draws conclusions, not using evidence or previously accepted explanations • Offers only yes-or-no answers, memorized definitions, or explanations and answers. • Fails to express satisfactory explanations in own words • Introduces new, irrelevant topics