

Scientific Discovery Instructional Strategy

Scientific discovery learning is a typical form of constructive learning based on problem solving activities involving the design and implementation of scientific experiments. SDL is a knowledge construction approach that is based on scientific discovery activities. Discovery (guided-inquiry) learning differs from inquiry (open-inquiry) learning with respect to the outcome of the instruction and to the procedure followed. Whereas in true inquiry instruction the outcome is unknown to both the instructor and the students, in a discovery learning environment the instructor guides the students toward discovering the desired outcome. This is accomplished by giving the students directions for what they are expected to do.

The following table illustrates the design of an experiment with the discovery instructional strategy. In order to design your own experiment with the Discovery Instructional Strategy please use the template available in the online SDVice tool at the link - http://vlabs.iitb.ac.in/vlab_tool_beta/

Steps	Description	Guidelines	Questions to be asked
Initiation Phase			
1	The Initiation Phase is the first phase in all levels of inquiry. It is primarily designed to stimulate and motivate students' curiosity through questioning.	In this phase provide students with an opportunity to experience a phenomenon or something new that challenges a previous belief or assumption. The students need to activate their prior knowledge and map that onto the problem being addressed to help representing the problem and generating appropriate hypotheses and understandings.	Have you ever seen...? Did you notice...? What did you observe...?
Exploration Phase			
2	The Exploration Phase is the second phase of inquiry. In this phase, questions are eliminated or narrowed down to those types of questions students can actually physically answer through experimentation or research.	In this phase the students should give proper scientific reasoning and systematic manipulations of the variables. Assign tasks to the students to identify the relevant variables. Students can be asked to identify controlled and uncontrolled variables. Assign tasks in which students will design the procedure or reduce the procedure to the essential parts. If the procedure cannot be	What happened when...? What did you...? What could we do to find out...?

		designed safely, then the students might be asked to explain why certain steps in the procedure are done in a certain way. Assign tasks where students make predictions and explain them before the lab. Having students make predictions creates interest in the outcome. In addition, have students explain the basis for their predictions using their present ideas. Ideally, the problem presented will be one, which creates dissatisfaction with their present understanding. Challenge students to come up with alternative hypotheses.	What questions do you have...?
Experimentation Phase			
3	The third phase of inquiry is the Experimentation Phase. This is where students form into groups to conduct an experiment. Students collect data and information, and then formulate a method of presentation.	In this phase the students should design suitable experiments and carry out proper implementations. Make the students come up with tasks and corresponding assessment questions for data collection and tabulation, data analysis, reporting the results, analysis of the obtained results, drawing conclusions from the obtained analysis of results. Ask relevant questions and provide hints so that the students are guided towards the solution.	What did you find out about...? How is it the same as or different from...? What do you know about the characteristics of...?
Presentation Phase			
4	The last phase of inquiry is the Presentation Phase. Groups or individuals take the information gathered in the experiment and put it into some form of presentation. PowerPoint presentations or project	In this phase the students should reflect on the results obtained and construct knowledge. Make the group or student to share the data with an audience and allow time for questions concerning procedures, data, information,	Can you explain why...? Why do you think...? What other factors may

	display boards are types of presentations that may be used.	results obtained, inferences drawn from the results, etc.	be included in...? Can you find a way to...? How did you arrive at a solution to...?
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