

Levels of Inquiry in Process-Oriented Science Instruction*

(A functional definition for the degree of opportunity for inquiry in science instruction)

	PRE-LABORATORY Experience		LABORATORY Experience	POST-LABORATORY Experience	
	Proposes Problem or Issue to be Explored	Addresses or Plans Procedure to be Used	Carries Out Procedure	Supplies Answers or Conclusions	Laboratory Outcomes in Follow-up Dialog to Consider Applications and Implications and/or to Drive Further Instruction
Levels of Inquiry	<i>Major involvement/responsibility</i>	<i>Major involvement/responsibility</i>	<i>Major involvement/responsibility</i>	<i>Major involvement/responsibility</i>	<i>Major involvement/responsibility</i>
0	Teacher	Teacher	Teacher	Teacher	Teacher
1	Teacher	Teacher	Teacher	Teacher	Teacher & Students
2	Teacher	Teacher	Teacher	Students	Students
3	Teacher	Teacher	Students	Students	Students
4	Teacher & Students	Students	Students	Students	Students
5	Students	Students	Students	Students	Students

*Developed by the Research Team at Temple University Center for Science Laboratory Studies, 1997

Guidelines for Use of the Levels of Inquiry in Process-Oriented Science Instruction* (Teacher directed Inquiry)

	PRE-LABORATORY Experience		LABORATORY Experience	POST-LABORATORY Experience	
<i>Major responsibility demonstrated by:</i>	Proposes Problem or Issue to be Explored	Addresses or Plans Procedure to be Used	Carries Out Procedure	Supplies Answers or Conclusions	Laboratory Outcomes in Follow-up Dialog to Consider Applications and Implications and/or to Drive Further Instruction
TEACHER The instructor demonstrates primary responsibility when instruction develops primarily from:	<p>*The instructors designation of the problem or issues to be explored.</p> <p>*Limitations on written or electronic databases.</p> <p>*Specified readings from designated textbook(s).</p> <p>*Discussion designed to lead students to a problems or on issue determined by the teacher.</p>	<p>*The instructors designation of the procedure.</p> <p>*Limitations on written or electronic databases.</p> <p>*Specified procedures from designated textbook(s).</p> <p>*Limitations on the use of supplies and equipment designed to lead students to a procedure determined by the instructor.</p>	<p>*Direct and continuing help to the students beyond the clarification of procedure.</p> <p>*Answers to all procedural questions asked by students.</p>	<p>*Instructor supplied answers and conclusions.</p> <p>*Discussion designed to lead students to specific answers determined by the instructor, designated textbook(s), curriculum, or source other than the students.</p>	<p>*The applications and implications supplied by the instructor, designated textbook(s), the curriculum, or any other source other than the students.</p> <p>*Further instruction by the instructor, designated textbook(s), the curriculum, or any source other than the students.</p>

*Designed by William Smith & F. Sutman for use in research.

Guidelines for Use of the Levels of Inquiry in Process-Oriented Science Instruction*
(Teacher and Student directed Inquiry)

	PRE-LABORATORY Experience		LABORATORY Experience	POST-LABORATORY Experience	
<i>Major responsibility demonstrated by:</i>	Proposes Problem or Issue to be Explored	Addresses or Plans Procedure to be Used	Carries Out Procedure	Supplies Answers or Conclusions	Laboratory Outcomes in Follow-up Dialog to Consider Applications and Implications and/or to Drive Further Instruction
TEACHER & STUDENTS Both the instructor and the students demonstrate primary responsibility when the instruction is:	*Open ended and there is cooperation between the instructor and students to propose a problem or issue to be explored. (Level 4 Only)				*Open ended cooperation between the instructor and students to consider applications and implications and/or further instruction. (Level 1 Only)

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Guidelines for Use of the Levels of Inquiry in Process-Oriented Science Instruction* (Student directed Inquiry)

	PRE-LABORATORY Experience		LABORATORY Experience	POST-LABORATORY Experience	
<i>Major responsibility demonstrated by:</i>	Proposes Problem or Issue to be Explored	Addresses or Plans Procedure to be Used	Carries Out Procedure	Supplies Answers or Conclusions	Laboratory Outcomes in Follow-up Dialog to Consider Applications and Implications and/or to Drive Further Instruction
STUDENTS Students demonstrate the primary responsibility when instruction develops primarily from their:	<ul style="list-style-type: none"> * Prior personal experiences and/or laboratory outcomes. *Access to written or electronic databases (search is not conducted or limited by the instructor) *Open ended discussion is not designed to lead students to a problem or issue determined by the instructor. 	<ul style="list-style-type: none"> *Personal experiences. *Search of written or electronic databases (search is not conducted or limited by the instructor) *Open ended discussion not designed to lead students to a procedure specified by the instructor. 	<ul style="list-style-type: none"> *Involvement in carrying out the procedure individually, in pairs, in groups with minimal support from the instructor in answering questions. 	<ul style="list-style-type: none"> *Own answers and conclusions in any form. *Open ended discussion of the answers and conclusions not designed to lead the students to specific answers determined by the teacher, designated textbook(s), the curriculum, or sources other than the students. 	<ul style="list-style-type: none"> *Proposal of applications and implications and/or ideas for further instruction. *Open ended discussion of application and implications and/or ideas for further instruction not designed to lead the students to specific answers determined by the instructor, designated textbook(s), curriculum, or source other than the students.

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