

Goals of Online Science Lab Experiences - “Points to Consider”

<i>Goals of Laboratory Experiences</i>	<i>Meets Goal</i> <i>A student...</i>	<i>Does not Meet Goal</i> <i>A student...</i>
1. Enhancing mastery of subject matter	<ul style="list-style-type: none"> Experiences investigative activities integrated with content. Manipulates ideas, not just materials and procedures. Understands the instructional purpose. Repeats labs to build understanding or confirm findings. Confers with classmates on results and receive focused teacher feedback. 	<ul style="list-style-type: none"> Experiences investigative activities isolated from content instruction. Follows set processes that confirm what has already been taught. Executes single trials. Spends little or no time conferring with classmates on results or receiving focused teacher feedback.
2. Developing scientific reasoning	<ul style="list-style-type: none"> Thinks like a scientist—performs integrated inquiry-based activities. <ul style="list-style-type: none"> Identifies questions and how to ask them Designs investigations Develops and revises explanations Recognizes and analyzes alternatives Makes and defends a scientific argument using scientific language Experiences a blend of investigation with small group discussion. 	<ul style="list-style-type: none"> Follows specified procedures. Spends little or no time planning investigations or interpreting results. Spends little or no time discussing results or interpretations.
3. Understanding the complexity and ambiguity of empirical work	<ul style="list-style-type: none"> Is prepared for ambiguous outcomes. <ul style="list-style-type: none"> Troubleshoots equipment Rechecks data Examines assumptions and contradictions Performs follow-up investigations Engages in collaborative work to analyze and account for discrepancies. 	<ul style="list-style-type: none"> Encounters minimized complexities and ambiguities. Is not expected to analyze or account for experimental errors.
4. Developing practical skills	<ul style="list-style-type: none"> Learns scientific ideas rather than particular laboratory techniques. Understands procedures, not just following them. Executes simulations and remote labs that model scientific practice in modern laboratories. 	<ul style="list-style-type: none"> Lab content that is focused upon safety procedures and proper use of scientific equipment. (High school laboratories may not have the tools and equipment presently used in colleges and professional labs.)
5. Understanding the nature of science	<ul style="list-style-type: none"> Performs model building, experimentation, and an ongoing process of testing and revision. Experiences instructional support for the inquiry cycle. <ul style="list-style-type: none"> Questions & Theorizes Hypothesizes Investigates Analyzes Synthesizes Extends and Applies 	<ul style="list-style-type: none"> Carefully predetermined procedures. Science as a collection of laws and facts to be memorized.
6. Cultivating interest in science and interest in learning science	<ul style="list-style-type: none"> Does the work that scientists do. Makes a connection to the world beyond the classroom. Finds relevance to everyday life. 	<ul style="list-style-type: none"> Lab experiences isolated from content instruction. Unclear communication about the purpose and procedure.
7. Developing teamwork abilities	<ul style="list-style-type: none"> Works collaboratively in a team--commonplace in the scientific community. Is instructed on teamwork skills. Is given opportunities for substantive conversation—raises questions, shares ideas, builds on ideas. 	<ul style="list-style-type: none"> Lack of collaborative activities. Teamwork limited to taking turns performing lab procedures. Expectation of teamwork without skills instruction.

Prepared by Washington OSPI Digital Learning and Science Departments. Derived from:

Jona, Kemi, and Adsit, John with Allison Powell and the NACOL Committee on Online Science. (2008, Updated August 2010). *Goals, Guidelines, and Standards for Student Scientific Investigations*. http://www.inacol.org/research/docs/NACOL_ScienceStandards_web.pdf [accessed April 2012].