

Laboratory Work

Description Laboratory work is commonly included to provide learning of the practical aspects of science and technology.

Example 1 *Cook-Book Laboratory Work*

The conventional laboratory work is designed to be fully-structured, i.e., students follow instructions to collect data and analyse results to prove material previously discussed in the textbooks. Finally, they report their findings to the tutor.

Example 2 *Inquiry-Based Laboratory Work*

On the other hand, laboratory work can be designed in a more open-ended approach. The practical session itself can include asking students to design the procedures themselves by referring to relevant theories and principles. Students will need to adjust the procedural design to solve any problems encountered in the experiment. Throughout the whole process, they keep examining the relationship between what is observed in the experiment and the theories and principles in the books, and they are prompted to explain any discrepancies that are found.

How Active? Laboratory work by nature is task-based and engages students in a substantive learning task. However, the extent and depth of thinking that is required depend on the nature of the laboratory work. Obviously, open-ended experiments demand much more active and in-depth thinking than cook-book experiments.

How Related to Real Life? A good scientific laboratory session should provide students with hands-on experience of handling practical work by using apparatus and machines used in their future profession.

What Learning Outcomes? In both examples, students develop practical skills but there could be a big difference between the two examples in the level of understanding and professional competence. In Example 1, students mainly learn how to follow instructions, use specified items of apparatus and equipment, and process and present data. In Example 2, other than the mastery of the protocols and equipment, students also learn to actively apply theories into practice and the essential skills for a scientific investigation process such as making hypotheses, planning, designing and evaluating, etc.