

INQUIRY-BASED LEARNING

INTRODUCTION

Do you have a desire to have your students move beyond asking the simple Who, What, Where, and When questions when working on assignments? Would you also like to spark their curiosity and tap into their interests? If you answered yes to one or both of these questions, then consider Inquiry-Based Learning. Inquiry-Based Learning is a form of constructivist learning in which a learner researches ideas and gains information and insight on a chosen topic. Because of this, curiosity and interest are often stimulated, enabling the learner to develop a deeper understanding of the concept and material.

A CLOSER LOOK

With Inquiry-Based Learning, the learner selects a topic of interest, formulates questions, gathers information and resources, sifts through for useful and relevant content, and synthesizes information. The process often cumulates when the learner writes a report and/or delivers a presentation.

To implement Inquiry-Based Learning in courses, it can be broken down into the following four levels:

Level 1: Confirmation Inquiry

- This level is the most familiar and the easiest to do. At this level, you will develop both the questions and a procedure that will guide students through an activity with known results.
- **Example:** You design an experiment where students determine how stopping distance is related to the slope of a surface.

Level 2: Structured Inquiry

- This level is similar to Level 1, but now involves developing a foundation for inquiry and critical thinking skills. You provide an initial question and an outlined procedure for students to follow. Important, however, is that the results are unknown.
- **Example:** You direct students to take soil samples from several different locations (e.g. home, school, park) and analyze the composition for differences.

Figure 1.
The four levels of inquiry and the information given to the student in each one.

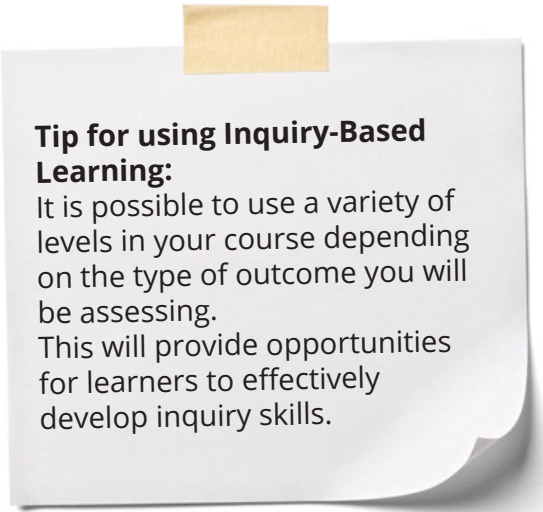
| Inquiry Level | Question | Procedure | Solution |
|---|----------|-----------|----------|
| 1—Confirmation Inquiry <i>Students confirm a principle through an activity when the results are known in advance.</i> | ✓ | ✓ | ✓ |
| 2—Structured Inquiry <i>Students investigate a teacher-presented question through a prescribed procedure.</i> | ✓ | ✓ | |
| 3—Guided Inquiry <i>Students investigate a teacher-presented question using student designed/selected procedures.</i> | ✓ | | |
| 4—Open Inquiry <i>Students investigate questions that are student formulated through student designed/selected procedures.</i> | | | |

Image source of Banchi, H., & Bell R. (2008). The many levels of inquiry. *Science and Children*, 46(2), 26-29. <https://engage.intel.com/docs/DOC-30979>

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Level 3: Guided Inquiry

- This level allows students to take more ownership for the experiment and findings. They are responsible for designing the procedure and following it to answer the question that you provided. Learners build upon skills gained from earlier levels, as well as incorporate more problem-solving and critical thinking skills. Because learners now have more freedom in developing the procedure and finding useful content, it is important for you to provide guidance and feedback where necessary.
- **Example:** You ask students how the materials used in traditional and contemporary buildings in specific climates compare in terms of energy efficiency and minimization of resource usage.



Tip for using Inquiry-Based Learning:

It is possible to use a variety of levels in your course depending on the type of outcome you will be assessing. This will provide opportunities for learners to effectively develop inquiry skills.

Level 4: Open Inquiry

- At the highest level of Inquiry-Based Learning, within broad parameters, learners establish ownership of the experiment and findings. They are allowed to choose a topic or idea that is of interest and begin to formulate their own research question(s) and design a procedure to conduct the study. Once the study is complete, you may have them prepare a report or presentation detailing the findings and results.
- **Example:** You direct students to choose an edible substance and analyze how it chemically interacts with the human body.

WORTH NOTING

Here are a few considerations to be aware of before implementing Inquiry-Based Learning into the course:

- Inquiry-Based Learning requires more interaction with students. This is because you need to spend more time and effort providing more feedback, guidance, expertise, and resources in order to create a successful learning experience.
- It can be challenging to assess adequately the learning that takes place. In addition to the content output, students will be using and learning research and analytical skills that are challenging to assess.
- Level 4 inquiry requires more time and extensive planning. Therefore, it is important to ensure the time frame of the project will allow enough time for students to determine and execute a procedure, gather information and resources, properly summarize information, and present findings and ideas.
- Despite the challenges, **Inquiry-based learning offers the development of habits of mind that can last a lifetime and guide learning and creative thinking.**

ADDITIONAL RESOURCES

- Banchi, H., & Bell R. (2008). The many levels of inquiry. *Science and Children*, 46(2), 26-29. <https://engage.intel.com/docs/DOC-30979>
- Kirschner, P. A., Sweller, J., & Clark, R. E. (2006). Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching. *Educational Psychologist*, 41(2), 75-86. http://projects.ict.usc.edu/itw/vtt/Constructivism_Kirschner_Sweller_Clark_EP_06.pdf
- Owens, R. F., Hester, J. L., & Teale, W. H. (2002). Where do you want to go today? Inquiry-based learning and technology integration. *The Reading Teacher*, 55(7), 616-625. http://www.jstor.org/stable/20205108?seq=1#page_scan_tab_contents