

Directed Inquiry versus Guided Inquiry

An important aspect of inquiry-based learning is that activities are student-centered rather than teacher-centered. Moving beyond having the content “delivered” to them, students are presented with challenging questions, discrepant events, and seemingly conflicting ideas and then provided the tools and skills they need to successfully respond. Teachers are encouraged to allow students to use a variety of resources in their pursuit of answers. Learning how to select resources and collaborate in answering questions and solving problems are important 21st Century skills. In these lessons, most of this interaction will take place during the Explore sections. Each Explore section begins with one or more Essential Questions that students will investigate. As part of the inquiry process, students will answer these questions by reviewing the resources selected from the Explore page for that concept.

The extent to which a student independently explores these resources will depend on several factors including computer access and student preparedness to direct their own learning. To address these two factors, each Explore contains two alternate pathways for inquiry: Directed Inquiry (sometimes called structured inquiry) and Guided Inquiry. Following either pathway will enable students to answer the Essential Questions for that lesson. The crucial difference concerns the level of student independent thinking when selecting and exploring the resources.

In **Directed Inquiry**, teachers provide students with specified resources one by one, providing challenging questions and clear outcomes. As much as possible, students should still be given the opportunity to interact independently with each resource; however, the specific resources, as well as the order in which students interact with them, are prescribed by the teacher. Sometimes the teacher can rotate groups through several resources at the same time: e.g. reading passage, small group hands-on activity with the teacher, and on-line interactive resource.

In **Guided Inquiry**, students have more independence. Working from an assigned set of appropriate resources (the section titled *Exploration Resources for Student Inquiry*, located at the beginning of each Explore), students determine for themselves which resources they will Explore to answer the Essential Questions. It is important to note that each student will choose multiple resources, but no one student should try to use all the resources. Students also determine the order in which to explore these resources. In the 5E model, students bring their learning back to the group to share in the Explain section. The teacher helps to make sure their understandings are clarified. Each lesson includes suggestions to help teachers model Guided Inquiry for students who are new to the process but who nevertheless have the necessary skills to succeed.

Tips for Inquiry-Based Learning

- Encourage students to ask their own questions related to the essential questions for a particular concept; students are more likely to be engaged in the inquiry process if they are seeking to answer questions they have devised.
- Ask open-ended questions, and provide students with sufficient time to answer; use wait time so that all students have a chance to think through their response.
- Encourage students to work together to find solutions to problems rather than wait for explicit instructions from the teacher.
- Move students gradually from Directed Inquiry to Guided Inquiry, increasing their choice of resources as their skills develop. Pay particular attention to students new to the process; be ready to provide more guidance to those who are struggling.
- Use a variety of assessment strategies including on-line assessments constructed responses. Utilize student notebooks and written responses including sketches, diagrams, and organized text to monitor conceptual growth. Incorporate inquiry and science process into assessments as well so that students may demonstrate and apply their learning in more authentic ways.
- The project ideas listed at the end of each lesson are excellent opportunities to extend learning beyond the Essential Questions and to assess students' application of the concepts and skills they developed in the lesson.

Consider using one of the Virtual Labs as a means of assessing student investigative skills. After students have participated in several labs, have them complete one on their own and review their planning and data analysis to gauge how well they develop a testable question, plan the investigation, collect data, use data to support their conclusion and present their results to others.