



INQUIRY-BASED LEARNING: AN APPROACH TO EDUCATING AND INSPIRING KIDS

Inquiry-based learning is not a new technique—in fact, it goes back to education philosopher John Dewey—but it does stand in contrast to the more structured, curriculum-centered framework of today's schools.

Asking questions is at the heart of inquiry-based learning. The goal is not to ask just any questions, of course, but ones that kids honestly care about. Your role is to guide the kids in finding the answers themselves and encourage them to ask new questions along the way.

Inquiry-based learning is a style particularly well-suited for out-of-school programs because they have a freer hand to complement, enhance, and expand on the work children are doing in their K-12 classes. School-based teachers may not want to go so far as to make inquiry-based learning the core of their classroom approach. It does, however, offer a powerful option for occasional projects and lab activities.

This resource explains some of the key principles of inquiry-based learning and offers step-by-step information on how to create an inquiry-based project.

KEY PRINCIPLES OF INQUIRY-BASED LEARNING

“Inquiry-based learning” is one of many terms used to describe educational approaches that are driven more by a learner’s questions than by a teacher’s lessons. It is inspired by what is sometimes called a constructivist approach to education, which posits that there are many ways of constructing meaning from the building blocks of knowledge and that imparting the skills of “how to learn” is more important than any particular information being presented. Not all inquiry-based learning is constructivist, nor are all constructivist approaches inquiry-based, but the two have similarities and grow from similar philosophies.

How is inquiry-based learning different from traditional approaches? In the traditional framework, teachers come to class with highly structured curricula and activity plans, sometimes referred to as “scope and sequence.” They act as the source of knowledge and as the person who determines which information is important. There is certainly creativity and flexibility in how each teacher runs his or her class, but the topics and projects are driven and evaluated based on what a teacher, administrator, school board, or bureaucracy have decided what children should know and master.

It may be that traditional education will start becoming more and more like inquiry-based learning over time. Why? Because an inquiry-based approach is more web-like in how students pursue knowledge, as opposed to the linear, vertical and compartmentalized structure of traditional education. As the web-like Internet increasingly permeates society and education, the traditional structures will have to adapt to the forms of the new media.

In contrast, inquiry-based learning projects are driven by students. Instructors act more as coaches, guides, and facilitators who help learners arrive at their “true” questions—the things they really care about. When students choose the questions, they are motivated to learn and they develop a sense of ownership about the project.

Don’t get the wrong idea, however: Inquiry-based learning projects are not unstructured; they are differently structured. If anything, they require even more planning, preparation, and responsiveness from the educator—it’s just that the educator’s role is different.

ADVANTAGES OF INQUIRY-BASED LEARNING

Instructors who adopt an inquiry-based learning approach help students identify and refine their “real” questions into learning projects or opportunities. They then guide the subsequent research, inquiry, and reporting processes. Since one role of out-of-school programs is often to enhance, support, and expand on the core curriculum of K-12 schools, it’s a particularly good approach for giving kids an opportunity to learn with more freedom while reinforcing and imparting basic skills.

Inquiry-based learning has other advantages as well:

- An inquiry-based learning approach is flexible and works well for projects that range from the extensive to the bounded, from the research-oriented to the creative, from the laboratory to the Internet. It is essential, however, that you plan ahead so you can guide kids to suitable learning opportunities.

- You'll find that many kids who have trouble in school because they do not respond well to lectures and memorization will blossom in an inquiry-based learning setting, awakening their confidence, interest, and self-esteem.
- The traditional approach tends to be very vertical: the class studies science for a while, for example, then language arts, then math, then geography. In contrast, the inquiry-based approach is at its best when working on interdisciplinary projects that reinforce multiple skills or knowledge areas in different facets of the same project. You'll also find that although the traditional approach is sharply weighted toward the cognitive domain of growth, inquiry-based learning projects positively reinforce skills in all three domains—physical, emotional, and cognitive.
- Inquiry-based learning is particularly well-suited to collaborative learning environments and team projects. You can create activities in which the entire class works on a single question as a group (just be sure that the whole group truly cares about the question) or in teams working on the same or different questions. Of course, inquiry-based learning also works well when you've decided to let each student develop an individual project; when doing so, however, be sure to incorporate some elements of collaboration or sharing.
- An inquiry-based approach can work with any age group. Even though older students will be able to pursue much more sophisticated questioning and research projects, build a spirit of inquiry into activities wherever you can, even with the youngest, in an age-appropriate manner.
- The inquiry-based approach acknowledges that children, especially children from minority and disadvantaged communities, have what researcher Luis Moll calls "funds of knowledge" that are often ignored by traditional curricula. An inquiry-based approach validates the experience and knowledge that all kids bring to the learning process.

THE ART OF THE QUESTION

Because inquiry-based learning is premised on helping children ask questions, instructors themselves must learn the art of asking good questions. As the leader and guide, remember that you have to model the spirit of inquiry.

Be aware of how a question can either shut down or open up a conversation by the words you choose and the prejudices you reveal. For example, consider the different responses you'd get to the question "Nobody here has ever created a Web page, have they?" versus "Has anyone made a Web page before?" versus "What do we know about creating Web pages?" The second question is at least a more positive version than the first, but it still will only get you yes or no answers. The third invites constructive input and validates prior knowledge. Listen to how people ask you questions.

Practice your questioning and listening skills with exercises like this one: In your next staff meeting, have everyone pair off and ask each other the story of their name. How would you ask that question? The way you do it will play a role in determining the answer you get. After a few minutes, bring the group back together and share what you learned. Now try this activity with kids using all sorts of questions to help hone their questioning and listening skills.

What kinds of questions make for good inquiry-based projects? As we said, they must first be questions that the kids truly care about because they come up with them themselves. In addition, good questions share the following characteristics:

- **The questions must be answerable.** “What is the poem ‘Dream Deferred’ based on?” is answerable. “Why did Langston Hughes write it?” may be answerable if such information exists, or if the students have some relevant and defensible opinions. “Why did he choose this particular word in line six?” is not answerable because the only person likely to know such a specific answer is Hughes himself, now deceased.
- **The answer cannot be a simple fact.** “In what year was Lincoln killed?” doesn’t make for a very compelling project because you can just look it up in any number of books or websites. “What factors caused the assassination attempt?” might be a good project because it will require research, interpretation, and analysis.
- **The answer can’t already be known.** “What is hip-hop music?” is a bit too straightforward and the kids are not likely to learn much more than they know already. “What musical styles does hip-hop draw from and how?” offers more opportunity for exploration.
- **The questions must have some objective basis for an answer.** “Why is the sky blue?” can be answered through research. “Why did God make the sky blue?” cannot because it is a faith-based question. Both are meaningful, valid, real questions, but the latter isn’t appropriate for an inquiry-based project. “What have people said about why God made the sky blue?” might be appropriate. Likewise, “Why did the dinosaurs become extinct?” is ultimately unanswerable in that form because no humans were around to know for sure, but “What do scientists believe was the reason for their extinction?” or “What does the evidence suggest about the cause?” will work. Questions based on value judgments don’t work for similar reasons. You can’t objectively answer “Is Hamlet a better play than Macbeth?”
- **The questions can not be too personal.** “Why do I love the poetry of W. B. Yeats?” might inspire some level of internal exploration, but in most cases that’s not your most important goal. Get the kids to focus on external research instead.

When working with younger, shy, or alienated kids and with those unused to this sort of approach, you may have to ask leading questions or even spoon feed them questions to get started. Don’t get discouraged. Once they catch on, you’ll see their enthusiasm and curiosity grow.

THE IMPORTANCE OF PLANNING

It's impossible to project all the possible ways in which you can build inquiry into programs, projects and activities, but preparing for most projects involves three basic steps:

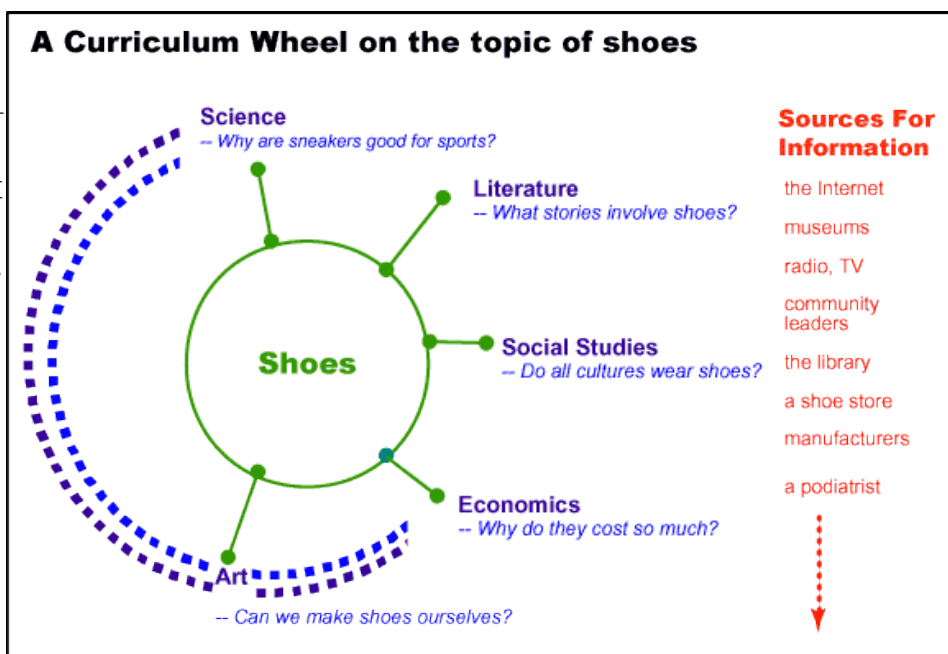
Pre-planning: Before going to the kids, determine any preliminary factors or characteristics that must be true in order to achieve your larger goals or plans. Consider factors such as scope, the amount of time you'll spend over how many sessions, relationships to other projects, topical focus, age appropriateness, skills you want to use, resources, media and collaboration techniques. Make any decisions up front that you have to, but let the kids decide as much as possible.

Brainstorming: Assuming the widest range of possibilities, start a discussion in class to find out what the kids are interested in. Ask some broad questions about their interests. Try some simple mapping activities to record the ideas they suggest and to begin winnowing them down to one or a few.

Remember, your role is to guide them toward achieving learning objectives and mastery of skills that they need. If they pick the questions that start the inquiry, they'll have no end of such questions, even if you subtly limit the parameters. In most cases, you'll be better off having the whole class work on a single concept or breaking up into teams to work on particular questions, aspects or executions of that theme or idea. Just make sure that they feel ownership of the topic and truly care about it.

Questioning: Almost any topic can become the foundation for an inquiry-based project, even something as mundane as shoes, if that's what the kids are interested in. Suppose you've decided on that topic. Ask the kids what they would like to know about shoes, and map the questions to areas of study as shown in the curriculum wheel.

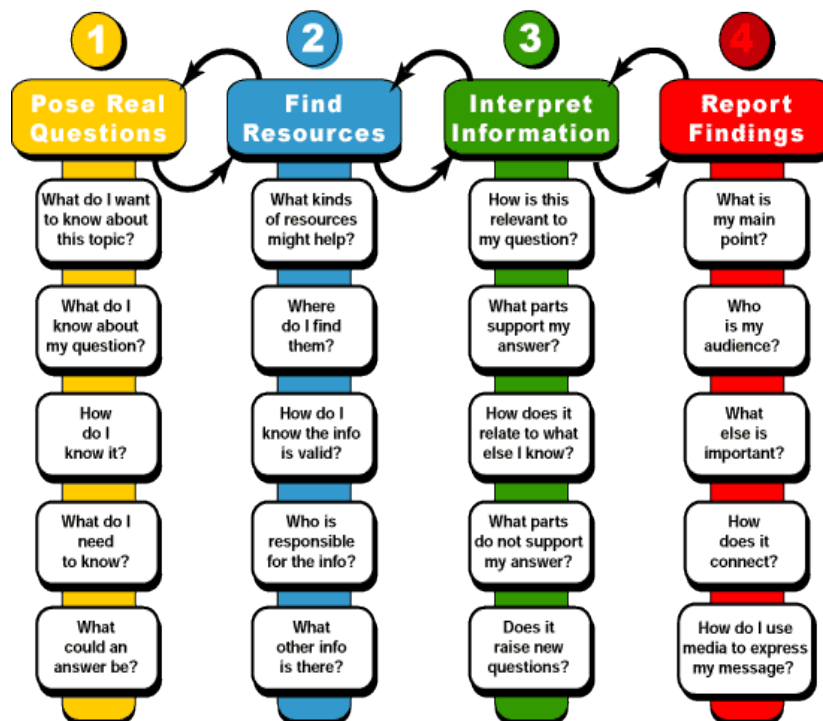
Ask questions such as "Where could you find resources to answer your questions?" Incorporate visual mapping techniques to select and refine questions and associated projects or activities. Remember, your job is to guide the kids as they navigate the learning process for themselves.



STEP-BY-STEP THROUGH THE TECHNIQUES

The essence of inquiry-based learning is that children participate in the planning, development and evaluation of projects and activities. Teachers can take many approaches to crafting an inquiry-based project, but Dr. Cornelia Brunner of the Center for Children and Technology breaks it into four main parts: Posing Real Questions, Finding Relevant Resources, Interpreting Information and Reporting Findings.

The Inquiry Process



Step 1: Posing Real Questions

Your ability to help students arrive at their “real” questions is the central technique of inquiry-based learning. It involves examining issues such as

- What do I want to know about this topic?
- What do I need to know?
- What do I know already and how do I know it?
- What might a possible answer be?

How you encourage students to explore those questions will depend on their age and sophistication, but two things must happen for a successful activity:

- The inquiry must relate to a student’s real question; it should not be a bait-and-switch in which the student actually pursues the teacher’s interests. Helping students find their real question can sometimes be no easy matter because they may not know the real question themselves. For example, kids of a certain age might tell you that they are interested in studying modern music, but what they might really be interested in is learning how to dance because they feel socially awkward. Through modeling and skillful questioning, your

job is to help them get to the thing they really want to learn. This situation can be particularly true with young students, who do not have fully developed reasoning techniques.

- The questions must ultimately be answerable. Questions like “What color is God?” or “Can I become a national leader?” are valid questions, but they are belief-based and not subject to the scientific and quasi-scientific methods that are at the root of inquiry-based learning. Similarly, questions that are highly personal, are based on opinion, or do not lend themselves to a practical source or experiment won’t work either.

You must help students identify and refine their questions for exploration and help them realize when a question is not appropriate for a given project. The process of refining questions includes helping students identify what they know and don’t know about the subject, identifying subquestions that may be part of the larger question and, most important, formulating hypotheses about what the answer might be. This last step can be a powerful tool in determining whether a question is answerable.

Cornelia Brunner has developed a series of simple planning templates you can use to help kids identify and refine their questions:

Getting started, by identifying preliminary questions and information

QUESTIONS 1

 I want to know:	 I think maybe:
 I already know:	 I don't know:

Planning, by specifying unknowns and hypotheses

[illegible]

Focusing, by refining the primary question

QUESTIONS 3	
? My main question:	★ Another question:
★ Another question:	★ Another question:
★ Another question:	★ Another question:

Step 2: Finding Relevant Resources

Between the question and the answer are sources of information. What kinds of sources might help? Where do you find them? How do you know the information is valid and who is responsible for it? What other information is there? Answering questions like these begins the process of assembling and then assessing evidence to ultimately answer the inquiry. The key distinction in this phase is that the learner must be kept focused not on finding the answer but on finding sources that might have information that could lead to the answer.

Sources of information include books, people, experiments, Web pages and discussion groups on the Internet. Although finding source material can sometimes be the easiest part of the process, assessing the information is trickier. Because real inquiries are rarely about objective facts, it is probable that no one has ever posed the inquiry in exactly the same way before, and finding a swift, pointed answer is not likely to occur.

One technique that helps information navigation is to have learners record all the information bits they find for future interpretation. Again, Brunner has templates to help with this process:

RESOURCES 1

[illegible]

RESOURCES 2

	What I learned:		New questions:
	Where I learned it:		How good the info is:

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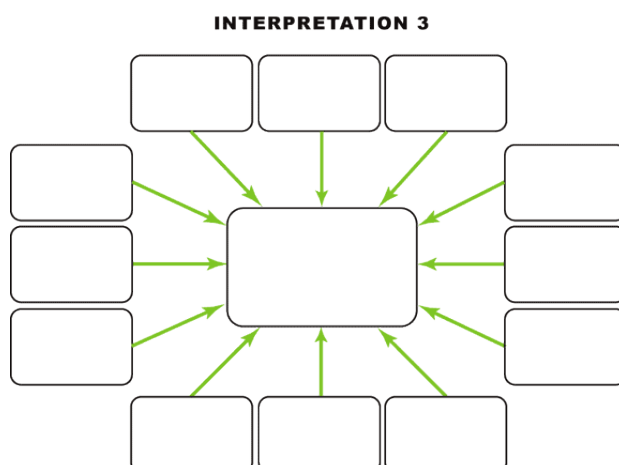
Closely related to evaluating the quality of information is the next step: evaluating its applicability to the original inquiry question. How is this information relevant? How does it relate to what else we know? What parts support the hypothesis and what parts do not? Does it raise any new questions?

Again, Brunner has forms to help make sense of all the data:

[illegible]

INTERPRETATION 2	
My question:	My answer:
My next question:	Maybe:

Making Sense of multiple pieces of information.



Step 4: Reporting Findings

During the validation and interpretation processes, students continue to refine their real question and, one hopes, find an answer, although that answer may not be as simple as they originally thought. It may even contradict their original hypothesis, but that should not be a discouraging experience if it is handled properly. Think about video games: Instead of being discouraged when they hit an obstacle, kids see it as a challenge to overcome and will go to great lengths to find the answer. Instructors should emphasize at each stage of the inquiry that the investigation is a journey and that finding new information is exciting, especially when unexpected.

Even the reporting stage in an inquiry activity contrasts with traditional education methods. The emphasis should be on telling a particular audience the personal story of the “learning journey,” rather than just recounting the facts as in a traditional paper. The objective is not to state the answer but to tell how this student arrived at this answer.

Brunner’s Reporting Template is a good tool for organizing their ideas, but the finished product could appear in any number of forms—a paper, a Web page, a collage or a slide show, just for starters.

When is it time to report? Since learners are dealing with self-directed questions that have highly personal value, they should report when they are satisfied with the answer.

REPORTING 1	
 My main point:	 My audience:
 Another point:	 Another point:
 Another point:	 Another point: