

An Introduction to Inquiry-based Learning

An Approach to Educating and Inspiring

"Inquiry-based learning" is one of many terms used to describe educational approaches that are driven more by a learner's questions than by an instructor's lessons. Imparting the skills of "how to learn" – and encouraging students to construct new and improved meanings for themselves – is more important than any particular facts being presented. Inquiry-based learning is a style particularly well-suited for out-of-school programs like field trips because they offer a freer opportunity to complement, enhance, and expand on the work children are doing in their K-12 classes while reinforcing and imparting basic skills.

Inquiry-based learning is not a new technique, but it does stand in contrast to the more structured, curriculum-centered framework of today's schools. In the traditional framework, teachers come to class with highly structured curricula and activity plans. They act as the source of knowledge and as the person who determines which information is important. In contrast, students drive inquiry-based learning projects. Instructors act more as guides, and facilitators who help learners arrive at their "true" questions—the things they really care about. They might help students think through a problem or concept, but the focus is not to transmit knowledge. Students explore, discover, and construct meaning—with guidance! Educators must be wary of the common assumptions that children learn like adults do or that they learn best through reading and listening in quiet surroundings or "being taught".

Asking questions is at the heart of inquiry-based learning. The goal is not to ask just any questions, 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. This may feel liberating... a good leader poses good questions, but there is no pressure to be a font of knowledge! It is OK to say, "that's a good question, I really don't know the answer... does anyone have any ideas? How can we find out?"

The Art of Asking (and Encouraging) Good Questions

Good questioning skills may be the world's most unsung talent. Ask the right questions in the right way, and you'll engage people; do it differently, and you'll put them off.

Anyone who's ever worked with kids knows how hard it can be to elicit information or opinions from them when they've got a case of the "idunnos." Certainly, for an inquiry-based learning program there's no more important talent than getting children more actively involved by engaging them with good questions and discussion.

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. For example, consider the different responses you'd get to the question "Nobody here has ever tried to identify a bird, have they?" versus "Has anyone identified a bird before?" versus "What do we know about identifying birds?" The second question is at least more positive than the first, but it still will only get you yes or no answers. The third invites constructive input and validates prior knowledge.

In addition, encourage students to ask and pursue their own questions. Encourage the discussion to go further with additional questions.

To consider: Listen to how people ask you questions. How can questions invite deeper thought and response, or cut responses short?

Types of Questions

There are three main types of questions:

1. Factual questions have only one correct answer, like "What did you have for breakfast this morning?" The answer is not always simple, however; it depends on how broad the question is. "Why are there seasons?" is a factual question that can have a very complicated answer. Factual questions usually make the best inquiry-based projects, as long as they are answerable and have room for exploration.
2. Interpretive questions have more than one answer, but they still must be supported with evidence. For example, depending on their interpretations, people can have different, equally valid answers to "Why do birds migrate?" The answers are not wrong unless they have no relationship to reality at all, such as "Because aliens from outer space control them!" Encourage students to back up what they say with evidence.
3. Evaluative questions ask for some kind of opinion, belief or point of view, so they have no wrong answers. Nonetheless, the answers do depend on prior knowledge and experience, so they are good ways to lead discussions (e.g., "Is it more important to protect forest habitat or wetland habitat?")

The Structure of Questions

In general, start questions with "how," "what," "where," "why" or "when." Don't begin a discussion with "Tell me..." or "Describe for me..."? When you frame questions in that manner, you take control of the learning process because you're giving commands as well as asking for input.

Try to avoid yes/no questions because they're usually a dead end. Open-ended questions are best for most learning situations, unless you have a particular reason for leading someone to a specific conclusion or actually need a fact supplied to you. Open-ended questions:

- invite opinions, thoughts and feelings;
- encourage participation;
- establish rapport;
- stimulate discussion; and
- maintain balance between facilitator and participant.

Inquiry for All Ages

A little background on child development and an introduction to the concepts and skills of inquiry will help you plan programs and activities that are more engaging, effective, and appropriate for students of various ages. Understanding a few basic concepts can help build your rapport with the children and set the stage for learning, even during a short field trip visit.

Ages and Stages

Young students may act out if you trying to engage them in activities that do not meet their developmental needs. A beginning understanding of child development might help you think about each child's strengths, resources, and challenges; the expectations you should reasonably have; and how you can help them best.

Children, especially young children, will work hard at what adults typically call "play". However, it is also true that children can force their attention (for very short lengths of time) even when tasks are not interesting. Children will pay attention and work long at tasks that involve objects to manipulate, bodily movement, and talk. Similarly, they will avidly watch and listen to presentations that incorporate many different sounds, movements, and colors.

Children mature in three domains of growth: cognitive, physical and socio-emotional. The cognitive domain includes intellectual and academic skills, such as math, language and science; the physical domain involves factors such as dexterity; and the socio-emotional domain is the realm of emotions and social skills.

- At ages 5 to 7, skills in all domains are just emerging.
- At ages 6 to 8, kids are beginning to consolidate their growth in all domains. They're still learning fundamental communication, math and problem-solving skills, and their social and community awareness is expanding.
- At ages 9 to 11, kids are well coordinated in large and fine motor skills and they now have an increased attention span. Their developing self esteem requires positive reinforcement and it is important for them to be part of a group.
- At ages 12 to 14, kids start looking at art and music more seriously. They are more sophisticated at conceptualization and abstract thinking, and they start making the shift from learning to read to reading to learn.

The strengths (and challenges) that children have at each stage are important to consider when planning a program or activity for students. See the following for a specific example of how one naturalist considered structuring a program based on the age of the students. The topic she wanted to cover dealt with the forest as a home for plants and animals.

Age Group**Preschool/Kindergarten (6 and under)**

- concrete, one thing at a time
- repetition
- here and now
- like to use senses and body
- inquisitive, curious

Grade 1-2 (age 6-8)

- focus on patterns
- simple, consistent
- like to do tasks- find, search
- use 5 senses, body movement
- story-telling, imagination

Grade 3-5 (age 9-11)

- look for variation in patterns
- figure out problems, like to provide answers
- apply knowledge to new settings

Grade 6-8 (age 12-14)

- very social, group tasks are good
- like to collect data and make inferences, but need specific instructions
- construct own concepts
- validate and respect their contributions

Grade 9-12 (age 15-17)

- may feel “too mature” for field trips
- want to know “how does this apply to me?”
- group can debate theories
- “why” is engaging question
- like controversy, devil’s advocate

Tour Focus/ Ideas

“This forest provides a home to many plants and animals”- keep repeating this theme. Act out a tree growing or a bird hatching.

“What is it like to walk in a forest?”
What do students see, hear, smell, feel?
Based on their sensory observations, lead to “this forest provides a home to many plants and animals”

“What kinds of animal homes can we find during our hike?” “What are the differences between the leaves (bark, shape, etc.) of these two trees?” “What things might animals get from these different trees?”

“Study the flowers in this small area; how many species can you find? What adaptations can your group find within this group of plants?”
Why do you think so many/ so few plants grow here?
“How many bird species can we count in this forest?”

“As a scientist (or business person, local resident, etc.), why might you care about this place?” “What might happen if a company decided to cut down the trees in this forest?”
“Is it more important to protect forest habitat or wetland habitat?”

To consider: What age group might be easiest for you to identify with? Which group might present the most challenges? Why do you think this is so?

The Take-Home Messages...

- Knowledge cannot be given to children. It must be discovered and constructed through the learners' activities.
- Children learn best from concrete experiences.
- Consider the age and abilities of students when planning a tour.
- By nature, children are continually active. They must find out about and make sense of their world. As they do so, they remake the mental structures that permit dealing with ever more complex information.
- Opinions should always be supported with evidence. Ask follow-up questions about why the student believes what she does.
- As a leader, you are NOT responsible for answering all questions- you should encourage discussion and discovery.
- Care about each question you ask. Avoid generic questions and prepare some good questions in advance.
- Maintain a high energy level and enthusiasm. It's contagious!
- Spontaneous questions, especially those that arise from the group, are an important part of all discussions. Preparing questions in advance will often lead to better spontaneous questions and discussions as well.
- All good questions lead to more questions, and more discoveries. Be aware of practical and logistical issues, such as time limits, but never squelch enthusiasm when kids are on a roll.

Others to add...

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Lead-in Questions

1. Remember that we are working on understanding. You don't have to have **the right answer**. This is a group project. We will work together to figure things out. Who would like to start the discussion?
2. What do you see here?
3. What is this environment like?
4. What challenges would this environment put on a plant?
5. Have you ever been in a habitat like this?
6. What do you think it would be like to live here? What might the plants be like?
7. What do you notice when you look at this plant?
8. Which of these plants is most interesting to you? Why?

Positive, Affirmative Responses

1. I like the way you are thinking today.
2. Hey, that's a topic we should discuss in a moment—hold that thought.
3. Thanks for working together on that idea!
4. That is a thoughtful way of looking at the question!
5. Thanks for helping me today.

Things to Say When More/Different Information is Needed

1. Let's get a friend to add to that response.
2. What would you like to add to that?
3. This is a group project—who would like to add?
4. That's a good thought. It applies to what we are doing next/what we were talking about earlier.
5. That's a great answer to the question... (Form a question that answer would be appropriate for. Then go back to your original question.)

Inclusive Words to Use

Home not house

Outdoors not yard

Other children not siblings/brothers/sisters

Adults not parents

How you say it makes a big difference! Use an upbeat, encouraging voice.

1. Docent Orientation

Session 2: Strategies for leading groups and imparting a message

Charles Eldermire

2. Overview

•Communication Overview

- Audience
- Message
- The Role of the Docent

•Inquiry-based Learning

- Age specifics
- Questioning technique

•Strategies for Leading Groups

- Preparation
- Logistics

3. What defines our audience?

- Age
- Understanding Level
- Interest
- Mobility

• Others?

4. What could we be communicating?

- Sapsucker Woods Nat. History
- How to watch birds
- Bird IDs
- Misc. bird knowledge
- Visitors' Center Resources
- Lab-specific information
- Plants
- Politics
- ANYTHING!

5. Role of the CLO Docent

- You can't be expected to know everything
- You can't know exactly what will interest a person

• The trick:

--"INQUIRY"--Let them tell you!

6. Inquiry-based learning vs. old school: a philosophical difference

"The ability to pose questions to understand ourselves and our world is at the heart of what it means to be human.

Unfortunately, this essential human trait is distorted in many schools by an answering pedagogy: When questions arise, knowledgeable teachers ask the ignorant students questions primarily in the form of an examination."

Yoram Harpaz and Adam Lefstein: *Communities of Thinking*

7. Inquiry-based learning-

What is it?

- The skills of "how to learn" more important than information per se

- Asking questions is the core of inquiry
- They ask questions they care about
- You ask questions that increase engagement and thought

- You aren't the only source of information/direction-so are the visitors!

8. Inquiry in practice

- Facilitate questions visitors care about
- They discover and construct meaning with your guidance
- Always OK to say that you don't know the answer:

"That's a good question, I really don't know the answer...
...does anyone have any ideas?
...how might we figure it out?"

9. Question Types

- Factual
- Only have one answer
- Good starting point for a quickly answerable question
- Interpretive
- More than one answer, supported by evidence
- Answers aren't wrong so long as there is some evidence based in reality

- Evaluative

- Ask for opinions, based on prior experience and knowledge
- Good lead-in for discussions

10. Asking good questions

- Open vs. Closed, Positive vs. Negative
- You tell me:
- Nobody here ever tries to identify a bird, do they?
- Has anyone here ever tried to identify a bird?
- What do we know about identifying birds?

- Begin with question words: who, what, etc.

11. Why open questions?

- Invite deeper thought and response
- More likely that a visitor will reveal interests

- Leads to visitor-generated questions

- Visitors discover important information on their own

12. Why open questions? (pt 2)

- Open questions usually
- Invite opinions
- Encourage participation
- Establish rapport
- Simulate discussion
- Maintain balance between participant and facilitator

13. Inclusive Language

- Ideal Language is inclusive

- House
- Yard
- Brothers/Sisters
- Parents

- Use an upbeat, encouraging voice--enthusiasm is infectious!

14. Break out

- Think back to a typical day in grade-how you were typically taught. Where were you? What was the teacher doing?
- Ask a partner a question to determine something about their typical experience in school.
- How was Q&A? Were questions open/closed?
- As you thought about your school day, what role did the teacher play? (i.e. lecturer? Or were you taught in a constructivist style?)

- Now, think back to your favorite activities or teacher in grade school. Where were you? What was the teacher doing?
- Ask a partner a question to determine something about this school experience.
- What was different, if anything?

15. Inquiry for all ages

- Child development affects message
- Different levels of maturation
- Cognitive (brain)
- Physical (body)
- Socio-emotional

- Age affects strategy
- Handout chart/BirdSleuth Activity

16. Thoughts and Reflections

- Which age groups do you most identify with? Why?
- Which represents the greatest challenges? Why?

17. Strategies for leading groups

Preparation and Logistics

18. Prepare, Prepare, Prepare

- Acquaint yourself with probable themes
- “Learning objectives”
- Specific learning goals for an activity
- Birds are migrating through
- Common bird IDs, names
- How to use binoculars
- Value of wetlands

- Set goals based on audience, age

19. Prepare...

- Prior to activity
- Think about potential questions, resources
- Consider expectations
- Envision yourself leading the activity
- Imagine interactions
- Try out explanations, descriptions
- Every moment is a potential learning moment

20. Set guidelines at onset

- Visitor-generated (inquiry)
- Often good with younger audiences
- What might some expectations be?

21. When possible, “book-end”

- Bookending refers to one guide at the front and one at the back.
- Esp. useful with large groups, young groups
- Increases group cohesion, coordination, efficient use of resources
- Essential to coordinate between leaders

22. Summary

- Visitors don’t learn best, or get as engaged, “being taught”
- Age matters for setting learning objectives appropriately and delivering messages
- What you say and how you say it matter most
- Preparation is key for facilitating inquiry and learning

- Questions?

23. Homework, Part 1...

- Go on a tour
- Write down questions that the guide asks
- What did you like? What didn’t you like?
- What ages were in your group? How did the guide present the themes?
- Could you discern any learning objectives?

24. Homework, Part 2...

- Adjust the learning objectives from your tour to one of the 5 audience types in “Inquiry for all ages”
- Write down 5 questions that you would ask during such a tour.

Homework: Attend a tour in the next two weeks.

(Some examples of tour possibilities are the Sciencenter, Johnson Museum of Art, Museum of the Earth, The History Center, etc.)

- Write down questions that the guide asks

- What did you like?

- What didn't you like?

- What ages were in your group? How did the guide present the themes?

- Could you discern any learning objectives?

- Adjust (or create) the learning objectives from your tour to one of the 5 audience types in "Inquiry for all ages"

- Write down 5 questions that you would ask during such a tour.