Guidelines and Resources for Learning Through Inquiry

Asking the right questions to inspire curiosity, thought, and a deep dive into learning is an important skill for educators to practice in the classroom. Yet for some, posing queries that yield critical thinking or guide students to devise their own questions can seem elusive. Effective teachers, however, recognize the need to have a classroom where inquiry is a central part of the daily learning experience.

In a post-pandemic world, student apathy has become pervasive, and effective inquiry strategies may be one important ingredient in the anecdote to that apathy. Inquiry ignites students' curiosity and engagement. It helps students become more independent learners as it shifts some of the responsibilities from teachers to students, giving students more agency. Specifically, "inquiry-based learning generates such excitement in students that neurons begin to fire, curiosity is triggered, and they can't wait to become experts in answering their own questions" (Wolpert-Gawron, 2016).

There are several components to building a classroom that embraces inquiry each day. Learning through inquiry includes both inquiry-based learning and inquiry strategies, which are founded on the same desires to ignite student curiosity, to help teachers ask better questions of their students, and to help students ask better questions of themselves and one another. The following literature review includes information on the following topics:

1. What is Inquiry-Based Learning?
2. Constructing better questions leads to more meaningful inquiry.
3. Preparation leads to more thoughtful and effective questions.
4. Specific strategies create an engaging inquiry experience.
5. Text-dependent questions help students improve their literacy skills.

What is Inquiry-Based Learning?

Main Ideas	Additional Information	Resources

Inquiry-based learning *ignites students' curiosity and provides a means for students to pursue learning that they are curious about within a topic of study.*	• **Inquiry-based learning** is not just about asking students what they want to know. While it is important to solicit students' interest, often when they are asked what they want to know, they don't have an answer. Inquiry-based learning helps students find something they want to learn about as it gives students just enough interaction with new content to ignite their curiosity.
	• **Teacher practices** that help to ignite that curiosity in students include the following:
	  ○ **Present a fresh take** on content. For example, consider the hype about *Hamilton*—it's a fresh take on a story we thought we already knew.
	  ○ **Model enthusiasm and curiosity** for the content. For example, conduct a trivia quiz about weird but true facts about Australian wildlife or surprising things the Egyptians invented.
	  ○ **Share a jarring quote, graph, or image** that gets students talking. For example, share bold or even polarizing statement or aphorism from a figure in history, a graph showing the divergence in income and the cost of living, an image of something familiar viewed through a powerful microscope or telescope, or a live volcano or zoo animal watch, etc.
	• Wolpert-Gawron (2016) suggests that once teachers have triggered their own curiosity and that of their students, there are four steps that follow in inquiry-based learning:
	  ○ **"Students develop questions that they are hungry to answer.** Have them develop a problem statement that requires them to pitch their question using a constructed response, further inquiry, and citation."
	  ○ **"Research the topic using time in class.** It's crucial to have some of this be classwork so students have access to the head researcher in the room—you. You aren't going to do the work for them, but you are going to guide them and model methods of researching reliably."
		What the Heck Is Inquiry-Based Learning?
		
		4 Common Obstacles to Implementing Inquiry-Based Learning—and How to Overcome Them
		
		Direct Instruction or Inquiry-Based Learning?
		
		Using Inquiry to Channel the Natural Curiosity of All Students
		
		C3 FRAMEWORK for Social Studies

	○ **"Have students present what they've learned.** Students should create and present a culminating artifact. When I have my students present what they've learned, I use a rubric with "Able to Teach" as the acme of what to reach for. After all, many people can understand content, but can they communicate it? Students can develop a website using Weebly, or perhaps a slideshow using Google Slides." ○ **"Ask students to reflect on what worked about the process and what didn't.** Reflection is key. And it isn't just about asking them to think back on their opinion of the topic. It's about reflecting on the process itself. That's where you can work in metacognition—thinking about thinking. Have students focus on how they learned in addition to what they learned."	

Constructing better questions leads to more meaningful inquiry.		
Main Ideas	**Additional Information**	**Resources**
Constructing better questions *is critical to productive classroom discussions.*	• **Model precision and diplomacy in language**. If students are expected to ask thoughtful, diplomatic, and precise questions, then teachers need to model how this is done. • **Engage in deeper inquiry.** There are many ways to classify questions, but the predominant goal is to ask more thought-provoking questions that spark deeper inquiry and reveal students' depth of knowledge about a concept, content, or an idea: ○ More thought-provoking questions ask students to *elaborate, justify, defend, extend,* and *develop* their ideas. ○ More thought-provoking questions challenge students to *imagine, suppose, predict, and create.* ○ More thought-provoking questions ask, ■ "What if…?" ■ "If...then…?" ■ "What might the consequences be if…?" ■ "How might we…?" • **Have a balance of question types.** Sometimes teachers get so enthralled in a labyrinth of questions that the objective and purpose of the inquiry is buried, and students lose interest. Having a balance of objective and subjective, convergent and divergent, and/or closed and open-ended questions is important. Above all, monitoring student engagement and adjusting the inquiry and lesson accordingly are hallmarks of good teaching.	Types of Questions Teachers Ask Let's Switch Questioning Around--student inquiry Engaging Students Through Effective Questions Levels of Questioning--Arthur Costa Revised Bloom's Taxonomy Asking the Right Questions DOK Chart (Depth of Knowledge)

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	● **Ask questions that are at an appropriate level**. Students will become quickly discouraged by class discussions if they never have the right answers. Make certain to ask students questions that they can answer confidently and without embarrassment. Use vocabulary students can understand and keep questions short and dynamic. ● **Consider Bloom's Taxonomy** when writing questions: ○ **Remembering** asks students to recall information. For example, "What are the three branches of government?" ○ **Understanding** asks students to put information in another form as they clarify, translate, illustrate, and categorize. For example, "Which characters in the novel *To Kill a Mockingbird* are protagonists? ○ **Applying** asks students to carry out or use a procedure in a given situation or solve problems in new situations by applying acquired knowledge, facts, techniques and rules in a different way. For example, "What facts in the article on climate change relate to specific plants and animals living in a forest biome?" ○ **Analyzing** asks students to examine and break information into parts; to differentiate between relevant-irrelevant concepts; and to distinguish, focus, select, organize, outline, construct, and deconstruct information. For example, "How does a capitalist economic system compare with a socialist economic system?") ○ **Evaluating** asks students to make judgments and present and defend their opinions about the quality of work or the validity of ideas based on a set of criteria. For example, **"**After examining U.S. immigration system policies and proposals for change, which proposed change do you think would be the best solution for New Mexico? Defend your choice."	

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	○ **Creating** asks students to develop, design, produce information or to reorganize information in a different way into new patterns or alternative solutions. For example, "Write a script for a legal services television commercial highlighting the dangers of specific commonly used pesticides on human health." ● Consider questioning strategies based on **Arthur Costas'** structure for dividing intellectual functioning into three levels: ○ **Level One** (**Gathering)** questions are the lowest level of questioning, requiring students to gather information. Level one questions ask students to remember and show understanding. ■ What is the definition of photosynthesis? ■ What is the setting for Bradbury's story, "There Will Come Soft Rains"? ■ How did President Kennedy respond to the Soviet Union during the Cuban Missile Crisis? ○ **Level Two (Processing)** questions require students to process the information. Level two questions ask students to use their understanding, to examine, and to create. ■ How do the visions for the future of robotics presented in the following articles differ: "Robots to Replace White Collar Workers," "Robots Without a Conscience," "Robots and the Brave New World"? Which is the most plausible and why? ■ Where do you see evidence of efforts to address drought conditions in California? What do you see as the immediate next steps to address the drought in your community?	

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	○ **Level Three (Applying)** questions require students to apply the information they have received or gathered. Level three questions ask students to make a decision or judgment and to use supportive evidence to validate their responses. ■ How would a specific episode in a story differ if told from another character's point of view? What evidence from the story supports your portrayal of the selected character's perspective on the chosen event? ■ If your state's Senate Education Committee invited you to provide direction on future policies to govern education, what advice would you give them? Support your suggestions with valid reasons and evidence from credible sources.	

Preparation leads to more thoughtful and effective questions.		
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Prepare questions ahead of time and sequence questions that build on each other. *There are several ways to prepare and organize questions.*	• **Prepare thoughtful questions ahead of time** to ensure a more focused and productive class discussion. Note that many textbooks and teaching materials often have teacher editions that include questions that align with standards. These types of questions may be useful or serve as models for questions you hope to pose to your students. • **Write it down.** Preparing and writing out a sequence of specific questions prior to the class meeting helps teachers plan for deeper and more direct questions that engage students and allow for a sequence of more exploratory and interpretive questions. • Use the following **criteria when creating questions**: ○ Consider first what you want students to learn. What are the standards or objectives of the lesson? What concepts should students glean? What skills should students demonstrate? ○ What background knowledge might the students need to understand in order to answer this question? ○ Does this question draw the focus to the key concepts of the lesson? ○ Is this question clearly stated? • **Prepare follow-up questions**. Consider what answers students might offer as responses and prepare follow up questions to deepen the inquiry, rather than allow the discussion to dead-end. • **Be flexible with follow-up questions**. Allow time for a full exploration of the inquiry. It is impossible to predict all that might emerge in a discussion so be prepared to respond with	Question Stems for Revised Bloom's Taxonomy High Level Thinking and Questioning Strategies Differentiator (Goal setting based on Bloom's taxonomy- can be used to understand how to sequence questions based on the taxonomy) Using Effective Questions | Center for Teaching Innovation Asking Questions to Improve Learning - Center for Teaching and Learning Research-based Questioning Techniques (includes links to other resources and videos)

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	extemporaneous questions as well. Always keep the objective in mind as you facilitate this exploration. ● **Make it visual.** To further engage students both visually and auditorily in the discussion, project the prepared questions on a screen for all students to see. Consider showing one question at a time or a series of questions depending on the aim of the discussion. Having visually prepared questions helps to refocus a wayward discussion, keeps the teacher and students on task, and provides a reference for clarification. ● **Sequence questions.** Note how the following questions build on each other. All are good questions that serve a purpose. In fact, they build upon one another in a sequence. Yet, the first two will eventually dead-end with clear-cut responses. They are more typical of what teachers might ask and then end the discussion. The last allows for deeper critical and creative thinking to determine possible answers. The goal is to get students to this level of thinking through questioning. ○ What were the popular beliefs or tenets that characterized the Enlightenment period in American history? ○ How did those same tenets lead to the American colonists' desire for freedom from British rule? ○ What would a country absent of the tenets of the Enlightenment look like? ● **Extending and Lifting** (Taba, 1971) occurs when teachers ask a series of questions at the same cognitive level where the students "extend" what they know to provide answers. Those questions act as preparatory thinking for the "lift" that follows where the teacher moves the questioning to the	Using Effective Questions Developing Questioning Skills Variables in Evidence Based Questioning

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	next cognitive level. An example from a Geometry class shows how Extending and Lifting works with the last question functioning as the lift: ○ What is a square? ○ What is a cube? ○ How are a cube and square similar and different? ○ What is a circle? ○ What is a sphere? ○ How are a circle and sphere similar and different? ○ Which objects in this classroom could be represented by each of these two-dimensional and three-dimensional shapes? ○ How do the shapes and dimensions of these objects relate to their purpose? ● The **Circular Path** is a type of questioning where the answer eventually comes back to the initial position or idea: ○ "Were Hitler's actions against the Jews a manipulation of—or a reaction to—people's prejudice? Explain." (Vogler, 2008)	

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	○ Is the role of the artist to guide a culture's perceptions or to respond to events and perceptions within a culture? ● The **Narrow to Broad** pattern is characterized by asking several specific cognitively lower-level questions followed by broader higher-level questions. Consider this example of narrow to broad sequencing from a history class where the topic is events that led up to the American Civil War: ○ What is ethnocentrism? ○ In what ways do Americans behave ethnocentrically? ○ How is ethnocentrism embedded in our patriotism? ○ How would people from a country without cultural ethnocentrism behave toward people from other cultures? ● Conversely, **Funneling** or the **Broad to Narrow** questioning technique begins with broader lower-level questions and narrows down to specific higher-level questions. Consider this example: ○ What is prejudice? ○ What motivates people to be prejudiced? ○ How do people overcome prejudice? ○ How was prejudice evident in the aftermath of the attack on Pearl Harbor in the United States?	

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	○ How does Julie Otsuka's *When the Emperor Was Divine* inform a deeper understanding about the effects of widespread prejudice on the individual? ● **Avoid ineffective questions** as they will frustrate the discussion and disenchant the students. ○ Questions that are too vague or unclear serve to confuse students rather than invite them to answer. ○ Questions that are loaded leave students guessing at what you want them to say rather than encouraging them to share what they really think. ○ Questions such as "Does that make sense?" or "Do you all understand?" generally won't elicit a negative response from students who do not want to admit their confusion in front of an audience. Rather, ask students to show a thumbs up, middle, or down to convey their level of understanding of a concept. Invite questions then. ○ "Do you have any questions?" likewise does not encourage much of a response from students who may think that having a question is problematic or embarrassing. Rather, assume that students have questions and ask, "What questions do you have?" If students are too shy to share them in the whole group have students write down questions or post them in some anonymous way.	

Specific strategies create an engaging inquiry experience.		
Main Ideas	**Additional Information**	**Resources**
Using specific and direct strategies to facilitate *discussion will keep students engaged in a line of inquiry.*	• **Establish a climate of respect and civility.** Effective and productive classroom inquiry and discussions will only occur in classrooms where there is a culture of respect and acceptance. Posting and reminding students of discussion rules will yield more peaceable and constructive inquiries. Students need to be allowed to struggle with an answer or even have the wrong idea about something without ridicule. • **Arrange the classroom so that everyone can hear one another and participate in the discussion**. Desks or tables facing each other, U shapes, or circles all work to include everyone. • **Provide sentence stems.** For asking and answering questions in student-led **academic discourse** in whole, small group, or paired discussions, students benefit greatly from sentence stems to promote academic discourse and inquiry. Cannata (2023) provides this example: ○ "Encourage [students] to listen carefully as others share their point of view and then either agree, and add on to it: "*I agree! Another example that supports this opinion is . . .*" ○ Challenge it politely:"*I understand what you mean about X, but have you considered . . .*", or ○ Change their opinion: *"Originally, I thought X. However, Zoe changed my thinking because . . ."* • **Use academic discourse** to ask questions in such a way that everyone in the classroom is included.	Asking Questions that Encourage Inquiry-Based Learning The Art of Questioning includes transcripts of effective inquiries as they played out in the classroom. Inquiry: Leading Your Students to Ask Questions Video Using Effective Questions A Good Question is Worth a Thousand Thoughts Asking Questions to Improve Learning Questioning Strategies for Teaching Cognitively Rigorous Curricula

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	○ Consider using a "no hands up rule"-as soon as a few students raise their hands, the rest of the class tends to check out because they figure the other students will answer the questions. If no hands are raised and students are called on randomly, more students will be engaged. ○ Ask open-ended questions that may have a variety of responses so that many students can contribute answers. This approach lends value to all of their contributions and gets students thinking critically. ■ "What do you notice here?" ■ "Why do you suppose…?" ■ "How would you define or explain this in your own words?" ■ "What does this remind you of?" ■ "What problems can you identify here?" ■ "What similarities (or differences) can you see here?" ● **Call on a variety of students**. It is easy to call on the same students for responses because they are always engaged. If, however, from the beginning of class, all students are accustomed to the possibility of being asked to respond to a question, they stay more engaged.	Authentic Group Discussions with the Real Talk Strategy Introducing Upper Elementary Students to Academic Discourse The Right Way to Ask Questions in the Classroom Teaching Students to Disagree Productively Think, Pair, Share Four Corners Human Likert Scale

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	● **Vary the way students respond**. Variety keeps students engaged. ○ Ask them to **raise their hands** if they know the answer to a question, i.e. "Raise your hands if you remember the definition of ethnocentrism." This provides a quick assessment of what they know or have retained. It gets them thinking and keeps them on their toes, especially if they think you might ask them to actually answer the question. ○ **Four corners** or **human Likert scales** help students physically move around the room to provide responses to questions and discuss their answers with their peers. ● Ask the students to **think of an answer** before you call on them, ie. "I am going to ask you a question and I want you all to think of an answer before I call on someone." ● Likewise, use **Think-Pair-Share** and ask students to discuss their answers with a peer. Give them 10 seconds to think of an answer and then another 30 to discuss it with a classmate. Students who process verbally will benefit from having a chance to work out their ideas with one person rather than the entire class. ● Instead of a direct verbal response, ask students to **write down their answer** before responding. The simple act of writing ignites thinking and can clarify ideas for print-oriented learners. ● Avoid always answering the students' questions, but rather encourage **students** to **answer each other's questions** in academic discourse. ○ "Who has an answer to that question?" ○ "Do you agree with Josie's idea?"	

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	○ "Is there another way to look at this?" ○ "What would an opposing idea be to Jamal's response?" ● Encourage students to **ask the teacher or each other** follow up questions. This creates an inquiry-friendly climate. ● **Respond thoughtfully and encouragingly to all student inquiries and responses**, even if they don't know exactly how to answer a question. Consider using statements such as, ○ "You're on the right track. Let's see what others can contribute here." ○ "You're nearly there. Let's think about this some more." ○ "I see why you might think that. There may be another way of looking at it." ● Rather than just saying, "Good job" or "Well done", **more specific praise** avoids judgment. When students hear a teacher say "Good job" to a peer's response, they may determine that their answer may not have been good because it wasn't the same as the answer that was just praised. Saying something such as, "Thank you for that response. That was insightful. What ideas do the rest of you have?" allows space for other good responses. ● **Ask students follow-up questions that prompt deeper thinking.** ○ "What do you mean by that?"	

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	○ "Can you explain that further?" ○ "So, what would that look like in practice?" ○ "What if you looked at it from another perspective?" ○ "Is that the only answer? What could another solution be?" ○ "Do you agree (or disagree) with this idea? Why?" ○ "What happens if…?" ● **Use an appropriate wait time (think time)**. Students need some time to formulate answers. Research supports the fact that increased wait time generates more thoughtful and accurate responses. ○ Recognize that students must not only make sure they hear and understand the question being asked, but also search their memory for the information and then evaluate it for acceptability before they even respond. ○ Consider even talking to students about the value of wait time (think time) and encourage them to think a bit before responding.	

Thoughtful, higher-level text-dependent questions help students improve their literacy skills.		
Main Ideas	**Additional Information**	**Resources**
Ask text-dependent questions *to help students practice substantiating their claims with evidence.*	• Text dependent questions **require that students have read the text**. They are not just recall questions, although they may require that students remember facts from the text to answer them. Instead, they are questions that ask students to think beyond the basic facts: ○ Would you tell the police the truth about why Jay Gatsby was murdered at the end of *The Great Gatsby*? Would it have mattered? Explain your reasoning using evidence from the text. ○ Toward the end of the novel *The Great Gatsby*, Nick Carraway, the narrator, labeled several of the principal characters as careless people. Why did Nick use this label? What evidence from the novel supports Nick's perception? • Text-dependent questions **demand that the reader understand what the author is conveying** through the text, rather than imposing their own ideas upon it (this is also called text literacy). Students need to understand thoroughly what the author is saying so that they can challenge the text with their own evidence or extend the ideas in the text further in an exploration of its implications. Therefore, for students to answer text-dependent questions well, they must be taught the skills for close-reading (See table on Anchor Texts and Text Sets). • Text-dependent questions are **derived from a variety of explorations about a text** including, but not limited to the following: ○ General information about a section of the text or the whole text ■ What is this about? ■ Why does the author state this important idea?	Guide to Creating Text Dependent Questions Text-dependent Questions from Achieve the Core Asking Questions That Prompt Discussion How to Teach "Text Literacy" with Different Kinds of Printed Material

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	○ The author's purpose ■ Why did the author write this piece of literature/article? ■ What in the article tells you the author's purpose? ○ The audience for whom the text was intended ■ For whom was this written? ■ What in the text reveals the intended audience? ○ Key details related to the purpose of the argument ■ How does the author support her claim? ■ What evidence does she include? ○ Diction ■ Why did the author use this word? ■ What is its connotation? Denotation? ■ How is it related to the purpose of the text? ■ How would the meaning of the sentence change if the word were different? ○ Syntax ■ Why is the sentence written this way? ■ What would happen if the words were reordered? ○ Inferences ■ Considering its title and the text features, what can the reader infer about the article? ■ How does the concluding idea relate to an earlier argument or counter argument?	

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	○ Opinions & intertextual connections ■ How are the ideas in this text similar to the text we studied earlier? ■ How do the authors' points of view differ?	

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