Inquiring Minds Want to Know

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“If I had a Problem to solve and my whole life depended on it, I would spend the first Fifty-five minutes determining the question to ask, for once I know the proper question, I could solve the problem in five minutes.”

- Albert Einstein
Ask it a different way:
What two numbers add up to 10?
Now the number of solutions is infinite once you include fractions and negative numbers.

What is the sum of 5+5?
The only right answer is 10
Question

What is inquiry-based instruction and what strategies can be used to increase the level of inquiry, critical thinking, and rigor in classrooms?

ACTIVITY: Turn and Talk
It’s NOT inquiry if:

1. Students know what results they’re “supposed” to get.
2. The question and steps are predetermined for them.
3. The teacher is working harder than the students.

The Importance of Inquiry

In order for student to be college- and career-ready, they must possess the ability
✓ to solve problems
✓ make decisions
✓ think creatively

Frame of Reference: Teachers who understand how to shift the balance of questions from themselves to their students will produce learners who can meet twenty-first century workplace expectations.

Citation: eMINTS National Center
Judge a Man by his Questions rather than his answers.
- Voltaire

Bloom’s versus Costa’s

<table>
<thead>
<tr>
<th>Knowledge (Remembering) – Bloom’s</th>
<th>Comprehension (Understanding) – Bloom’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learn specific facts, ideas, vocabulary, remembering/recalling information or specific facts</td>
<td>Ability to grasp the meaning of material; communicate knowledge; understanding information without relating it to other materials.</td>
</tr>
</tbody>
</table>

Costa’s Level One - the basement

*(Bloom’s Knowledge):* Collect, copy, define, describe, examine, find, group, identify, indicate, label, list, locate, match, name, omit, observe, point, provide, quote, read, recall, recite, recognize, repeat, reproduce, say, select, sort, spell, state, tabulate, tell, touch, underline, who, when, where, what

*(Bloom’s Comprehension):* Alter, associate, calculate, communicate, convert, distinguish, expand, explain, inform, name alternatives, outline, paraphrase, rearrange, reconstruct, relate, restate (own words), summarize, tell the meaning of, translate, understand, vernalize, write
## Bloom’s versus Costa’s

### Application (Applying) – Bloom’s
Ability to use learned material in new and concrete situations; use learned knowledge and interpret previous situations.

### Analysis (Analyzing) – Bloom’s
Ability to break down material into its component parts and perceive interrelationships.

#### Costa’s Level Two – the ground floor
**Bloom’s Application:** acquire, adopt, apply, assemble, capitalize, construct, consume, demonstrate, develop, discuss, experiment, formulate, manipulate, organize, relate, report, search, show, solve novel problems, tell consequences, try, use, utilize

**Bloom’s Analysis:** analyze, arrange, break down, categorize, classify, compare, contrast, deduce, determine, diagram, differentiate, discuss causes, dissect, distinguish, give reasons, order, separate, sequence, survey, take part, test for, why

### Synthesis (Creating) – Bloom’s
Ability to put parts together to form a new whole; use elements in new patterns and relationships.

### Evaluation (Evaluating) – Bloom’s
Ability to judge the value of material (statement, novel, poem, report, etc.) for a given purpose; judgment is based on given criteria.

#### Costa’s Level Three – the penthouse
**Bloom’s Synthesis:** alter, build, combine, compose, construct, create, develop, estimate, form a new ..., generate, hypothesize, imagine, improve, infer, invent, modify, plan, predict, produce, propose, reorganize, rewrite, revise, simplify, synthesize

**Bloom’s Evaluation:** appraise, argue, assess, challenge, choose, conclude, criticize, critique, debate, decide, defend, discriminate, discuss, document, draw conclusions, editorialize, evaluate, grade, interpret, judge, justify, prioritize, rank, rate, recommend, reject, support, validate, weight
DEMONSTRATES MASTERY OF KNOWLEDGE LEARNED
(Bloom’s: Synthesis and Evaluation)

PRACTICE KNOWLEDGE LEARNED
(Bloom’s: Application and Analysis)

INTRODUCTION OF KNOWLEDGE
(Bloom’s: Knowledge and Comprehension)

If you reward the right answer on the test, people won’t try anything else.
Essential Question:

How can using inquiry and inquiry-based teaching increase rigor for all students?

ACTIVITY: Turn and Talk
Interactive Questioning Activity

DIRECTIONS:
• Write Level 1, 2, and 3 questions related to the images on cards provided to you.
Discussion

• Alternative activities:
  – Questions in a bag
  – Four Corners
  – Socratic Seminar
  – Philosophical Chairs
  – Jeopardy

Debrief

How does the previous activity facilitate student and teacher inquiry?

What are some ways the activity can be used in your classroom to practice inquiry?

Self-reflection
“Inquiry - the asking of questions - makes us wonder, driving us to seek knowledge and understanding.”
- Harriet Howell Carter, PhD.

Types of Questions
Questions that Hook

- Asked to interest learners around a new topic
- May spark curiosity, questions, or debate
- Often framed in engaging "kid language"
- Asked once or twice, but not revisited


Questions that Lead

- Asked to be answered
- Have a "correct" answer
- Support recall and information finding
- Asked once (or until the answer is given)
- Require no (or minimal) support

Questions that Guide

• Asked to encourage and guide exploration of a topic
• Point toward desired knowledge and skill (but not necessarily to a single answer)
• May be asked over time (e.g., throughout a unit)
• Generally require some explanation and support


Essential Questions

• Asked to stimulate ongoing thinking and inquiry
• Raise more questions
• Spark discussion and debate
• Asked and re-asked throughout the unit (and maybe the year)
• Demand justification and support
• "Answers" may change as understanding deepens

The quality of a leader cannot be judged by the answers he gives, but by the questions he asks.

- Simon Sinek

Are you ready to critically think about questions?
Defining characteristics of good essential questions

1. It is open ended, doesn’t have a final single “correct” answer
2. Thought provoking, intellectually engaging, sparks debate
3. Calls for higher order thinking
4. Points toward important, transferable ideas within and across disciplines
5. Raises additional questions and sparks further inquiry
6. Requires support and justification, not just an answer
7. Recurs over time, the question should be revisited again and again

What makes a question essential?

<table>
<thead>
<tr>
<th>Level 2 and 3 Questions/Statements</th>
<th>Level 1 Questions/Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In your opinion, what would happen if Jupiter switched places with Venus in our solar system? Defend your answer.</td>
<td>1. Name the planets in order from the sun.</td>
</tr>
<tr>
<td>2. In the book Charlotte’s Web, speculate on what would have happened in Charlotte was able to return to the farm with Wilbur after the county fair.</td>
<td>2. In the book, Charlotte’s Web, what was Charlotte’s relationship to Wilbur?</td>
</tr>
<tr>
<td>3. What changes to $2 + 3 &lt; 5 + 7$ would you recommend to make each side equal. Justify your answer.</td>
<td>3. Solve the number sentence $2 + 3 &lt; 5 + 7$</td>
</tr>
</tbody>
</table>
How do taxes work?

Do you think the taxes imposed on the colonists were justified? Why or why not?

Modeling the essential Question

- Provide students with a good sample question that illustrates purpose driven listening and reading
- Help them become skilled at composing essential questions themselves
- Leads to better student questions
Compare the Colonial Army’s point of view vs. the British army’s point of view. Which side would you have supported? Defend your answer.
In what ways can you generate or create an equivalent expression using properties? Justify.

What is the purpose of being able to determine if a given value makes the equation or inequality true?
Evaluate your own annotation process and determine if it’s strong enough to support your thinking.

How does marking a text based on the questions help me to determine the correct answer.

What people think of as the moment of discovery is really discovery of the question.
-Jonas Salk
Activity

Handout with questions
• identify the levels

Review
REMEMBER...
If you can Google it, it is most likely a level one question, possibly level two.

Reflection

3 - Ideas to take away from today’s session
2 - Things you plan to do with today’s information
1 - Action you will take immediately
You are now ready to knock out Essential Questions!

Thank you

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Why inquiry?

What does inquiry have to do with teaching and learning?

Socratic Questioning

• Socrates was one of the greatest educators who taught by asking questions and thus drawing out answers from his pupils ('ex duco', means to 'lead out', which is the root of 'education').

• Here are the six types of questions that Socrates asked his pupils. Probably often to their initial annoyance but more often to their ultimate delight. He was a man of remarkable integrity and his story makes for marvelous reading.

• The overall purpose of Socratic questioning, is to challenge accuracy and completeness of thinking in a way that acts to move people towards their ultimate goal.
Conceptual clarification questions

Get them to think more about what exactly they are asking or thinking about. Prove the concepts behind their argument. Use basic ‘tell me more’ questions that get them to go deeper.

– Why are you saying that?
– What exactly does this mean?
– How does this relate to what we have been talking about?
– What is the nature of ...?
– What do we already know about this?
– Can you give me an example?
– Are you saying ... or ...?
– Can you rephrase that, please?

Probing assumptions

Probing their assumptions makes them think about the presuppositions and unquestioned beliefs on which they are founding their argument. This is shaking the bedrock and should get them really going!

– What else could we assume?
– You seem to be assuming ...?
– How did you choose those assumptions?
– Please explain why/how ...?
– How can you verify or disprove that assumption?
– What would happen if ...?
– Do you agree or disagree with ...?
Probing rationale, reasons and evidence

When they give a rationale for their arguments, dig into that reasoning rather than assuming it is a given. People often use un-thought-through or weakly-understood supports for their arguments.

- Why is that happening?
- How do you know this?
- Show me...
- Can you give me an example of that?
- What do you think causes...?
- What is the nature of this?
- Are these reasons good enough?
- Would it stand up in court?
- How might it be refuted?
- How can I be sure of what you are saying?
- Why is... happening?
- Why? (keep asking it -- you’ll never get past a few times)
- What evidence is there to support what you are saying?
- On what authority are you basing your argument?

Questioning viewpoints and perspectives

Most arguments are given from a particular position. So attack the position. Show that there are other, equally valid, viewpoints.

- Another way of looking at this is..., does this seem reasonable?
- What alternative ways of looking at this are there?
- Why it is... necessary?
- Who benefits from this?
- What is the difference between... and...?
- Why is it better than...?
- What are the strengths and weaknesses of...?
- How are... and... similar?
- What would... say about it?
- What if you compared... and...?
- How could you look another way at this?
**Probe implications and consequences**

The argument that they give may have logical implications that can be forecast. Do these make sense? Are they desirable?

- *Then what would happen?*
- *What are the consequences of that assumption?*
- *How could ... be used to ... ?*
- *What are the implications of ... ?*
- *How does ... affect ... ?*
- *How does ... fit with what we learned before?*
- *Why is ... important?*
- *What is the best ... ? Why?*

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**Questions about the question**

And you can also get reflexive about the whole thing, turning the question in on itself. Use their attack against themselves. Bounce the ball back into their court, etc.

- *What was the point of asking that question?*
- *Why do you think I asked this question?*
- *Am I making sense? Why not?*
- *What else might I ask?*
- *What does that mean?*