

Increasing Critical-Thinking in the Classroom:

A Practical Guide {with Lisa Van Gemert, facilitator}



Prepare to engage today! We'll be interacting at a greater level than you may be used to at professional development, so get ready! This particular training takes everyone's contribution.



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giftedguru.com



lisa@lisavangemert.com



facebook.com/GiftedGuru



pinterest.com/lisavangemert



[@gifted_guru](https://twitter.com/gifted_guru)



slideshare.net/lisavangemert

Stats Descriptors

- Can Describe How to Teach Critical Thinking in their Discipline _____
- Claim Critical Thinking is a Primary Objective _____
- Use Critical Thinking Standards in Their Assessment Techniques _____
- Can Clearly Define "Critical Thinking" _____
- State Students Lack Critical Thinking Skills _____

How many did I get correct? _____



Defining Critical Thinking:

1. Informed _____-Making
2. Thinking About _____ & How to Improve It
3. Actively Analyzing, Synthesizing, and _____ the Thinking _____
4. A Product of Education, Training, and _____
5. Mental _____ and Power

Interact: Put an asterisk (*) next to the one you think is most important.

IDEALS Model

- I – _____ the Problem
- D – _____ the Context
- E – _____ the Choices
- A – _____ the Options
- L – _____ Reasons Explicitly
- S – _____ -Correct

SLOW CALL: Which model do I like better, IDEALS or Perfect Seven Steps, and why?

PERFECT SEVEN STEPS Model

- 1) What am I being asked to _____ or accept?
- 2) What _____ is available to support the claim?
- 3) What alternative ways are there to _____ the evidence?
- 4) Rate the evidence/alternatives on 0-10 scale based on validity/_____.
- 5) What assumptions or _____ came up when doing the above steps? (e.g., using intuition/emotion, authority, or personal experience rather than science)
- 6) What additional _____ would help us evaluate the alternatives?
- 7) What _____ are most reasonable or likely?



TECHNIQUE: MINIMUM EFFECTIVE SUPPORT

- Ask _____
- Narrow or _____ wrong thinking
- Provide the _____
- _____ context
- Is there a rule they should have _____?
- Are they _____ a step?
- Go back _____.



TECHNIQUE: QUESTIONING

Key Elements of Effective Questioning:

- R_____ the questions
- Be open-ended with no _____/_____
- Require _____ of information
- Be _____ in the discipline (meaning be arguable)
- Be age-_____
- Set the stage with _____ content and build from there
- Model active _____
- Give _____ time for thought
- Give _____, but keep momentum
- Have _____ stems at the ready

Question Stems from R.W. Paul's Six Types of Socratic questions:

1. Questions for clarification:
 - What sense do you make of this?
 - Why do you say that?
 - How does this relate to our discussion?
 - "Are you going to include diffusion in your mole balance equations?"
 - What do you notice?
2. Questions that probe assumptions:
 - What could we assume instead?
 - What questions come to mind as you think about this?
 - How can you verify or disapprove that assumption?
 - "Why are we neglecting radial diffusion and including only axial diffusion?"
3. Questions that probe reasons and evidence:
 - What would be an example?
 - What kind of pattern do you notice?
 - What part do you know for sure?
 - What is....analogous to?
 - What do you think causes to happen...? Why?:
 - "Do you think that diffusion is responsible for the lower conversion?"
4. Questions about Viewpoints and Perspectives:
 - What would be an alternative?
 - What is another way to look at it?
 - Would you explain why it is necessary or beneficial, and who benefits?
 - Why is the best?
 - What are the strengths and weaknesses of...?
 - How are...and ...similar?
 - What is a counterargument for...?
 - "With all the bends in the pipe, from an industrial/practical standpoint, do you think diffusion will affect the conversion?"
5. Questions that probe implications and consequences:
 - What generalizations can you make?
 - What do you wish were easier?
 - What are the consequences of that assumption?
 - What are you implying?
 - How does...affect...?
 - How does...tie in with what we learned before?
 - "How would our results be affected if neglected diffusion?"
6. Questions about the question:
 - What was the point of this question?
 - What do you understand the question to be?
 - If you were going to explain this to someone, what would you say?
 - Why do you think I asked this question?
 - What does...mean?
 - How does...apply to everyday life?
 - "Why do you think diffusion is important?"

COSTA'S LEVELS OF QUESTIONS

Level One questions cause students to recall information. This level of question causes students to input the data into short-term memory, but if they don't use it in some meaningful way, they may soon forget.

Level Two questions enable students to process information. They expect students to make sense of information they have gathered and retrieved from long-and short-term memory.

Level Three questions require students to go beyond the concepts or principles they have learned and to use these in novel or hypothetical situations.

TOPIC	LEVEL ONE	LEVEL TWO	LEVEL THREE
	(complete, count, match, name, define, observe, recite, describe, list, identify, recall)	(analyze, categorize, explain, classify, compare, contrast, infer, organize, sequence)	(imagine, plan, evaluate, judge, predict, extrapolate, invent, speculate, generalize)
Science	What is a gene? What is a chromosome?	Compare and contrast genes and chromosomes.	Use what you know about genes and chromosomes to predict a trait in a child.
Spanish	Conjugate the Spanish verb "ser" in the present tense.	Elaborate on the similarities and differences of the preterit and past tenses in the Spanish language.	"Invent" a new Spanish regular "ar" ending verb. Use it in 6 sentences, using different tenses and persons.
Mathematics	Evaluate this expression: $3x^2$ if $x=4$.	When, if ever, can $x^2=2x$?	Prove whether or not the operation $[Y]$ is commutative given that $a[Y]b=a^2-b$
History	Which amendment in the Constitution gives citizens the right to bear arms?	Compare and contract societal conditions in the US that impacted the inclusion of the second amendment in the US Constitution with conditions today.	If there were a Constitutional amendment that prohibited ownership of weapons by citizens, how might American society be affected?

TASK: DEVELOPING QUESTIONING SKILLS

- 1) Read the passage on the next page. Using the questioning resources we've discussed (and included in the handout above), create three questions that would be a good fit for the passage you read. You will have seven minutes to read the article and create your questions.
- 2) Break into a group of four or five (no more than five!). In your groups, take turns running a discussion, asking the questions you created and keeping in mind the key elements of effective questioning we discussed. If someone uses the question you created, think of another question *or* think of how you could take the question a slightly different way.
- 3) Each person in the group will run the discussion for four minutes.
- 4) When the discussion is concluded, the group will share feedback on strengths and opportunities. Use the space below to track your colleagues' questioning and to write down your questions.

My Questions:

- 1)
- 2)
- 3)

Notes on my Colleagues' Questioning:

_____:

_____:

_____:

_____:

_____:

READING FOR QUESTIONING PRACTICE:

Stop the Summer Slide by Nina Rees

Last Tuesday, at an event in New Hampshire, New Jersey Gov. Chris Christie stated, "There is no reason that K-12 education should be an eight-month enterprise in this country. ... We need to adjust the model." While Christie blamed teachers' unions for our antiquated academic calendar, it's more accurate to say the entire education system is largely set in its ways. Few school boards or administrators want to innovate with an extended school year.

Parents sometimes get the blame – don't ruin summer vacation plans! – but for many parents (including myself), figuring out how to occupy kids for the 10 weeks they'll be out of school has become an expensive chore. The cost of summer camps and child care continues to rise. In 2012, American Express calculated the total national cost of "summer fun," including camps, sports, day trips and child care, at \$16.6 billion. The average day camp now charges \$304 per week.

While parents foot the financial bill to keep their kids active over the summer, children pay the price in terms of lost learning. The so-called "summer slide," which occurs when kids fall behind in reading and math over the summer, is well-documented, cumulative and most damaging to children from low-income families. About two-thirds of the 9th grade achievement gap in reading has been attributed to summer learning loss. Math skills erode even more.

The National Summer Learning Association is trying to change this dynamic with Summer Learning Day, slated this year for June 19. Using the hashtag #KeepKidsLearning, the association is drawing attention to the learning gaps that develop over the summer – especially for children from lower-income families – and providing resources to help parents keep kids' brains engaged from June to September. The Summer Learning Day Map features healthy enrichment events all across the country.

Ultimately, we all need to do more to prevent the summer slide and help children maintain their academic edge. A shift to more year-round schooling would be ideal, enhancing education for both poor and well-off students and reducing the summer pressure on parents' pocketbooks. The growth of charter schools, which face fewer regulations around class time than traditional public schools, has led to more experiments in year-round education. At schools like E.L. Haynes Public Charter School in the District of Columbia; Florida's One Room School House; and Charter Day School in North Carolina, students attend for 12 months, with several short breaks throughout the year, and have more time available for tutoring or other intensive work.

But year-round learning is still very much the exception rather than the norm. As long as the big summer break exists, public and philanthropic funding is crucial to providing access to summer services, especially for children from low-income families that can't afford private camps. With more academically rich – and fun – summer activities available, we can relieve some of the stress parents experience and ensure that children's learning doesn't evaporate in the summer heat.

<http://www.usnews.com/opinion/knowledge-bank/2015/06/16/summer-slide-is-bad-for-students>

TECHNIQUE: PINWHEEL DISCUSSION

Could I use it? YES NO MAYBE

The roles are:

Notes on how I'd run it:

TECHNIQUE: WAIT TIME II

Could I use it? YES NO MAYBE

The idea is:

The benefit that struck me as most needful in my class was:

Notes on how I'd incorporate it:

TECHNIQUE: COLD CALL*

Could I use it? YES NO MAYBE

The idea is:

Notes on how I'd incorporate it:

TECHNIQUE: SHOW CALL*

Could I use it? YES NO MAYBE

The idea is:

Notes on how I'd incorporate it:

TECHNIQUE: IMAGE ANALYSIS

<http://bit.ly/nyt-image-analysis>

Could I use it? YES NO MAYBE

The idea is:

Notes on how I'd incorporate it: