critical
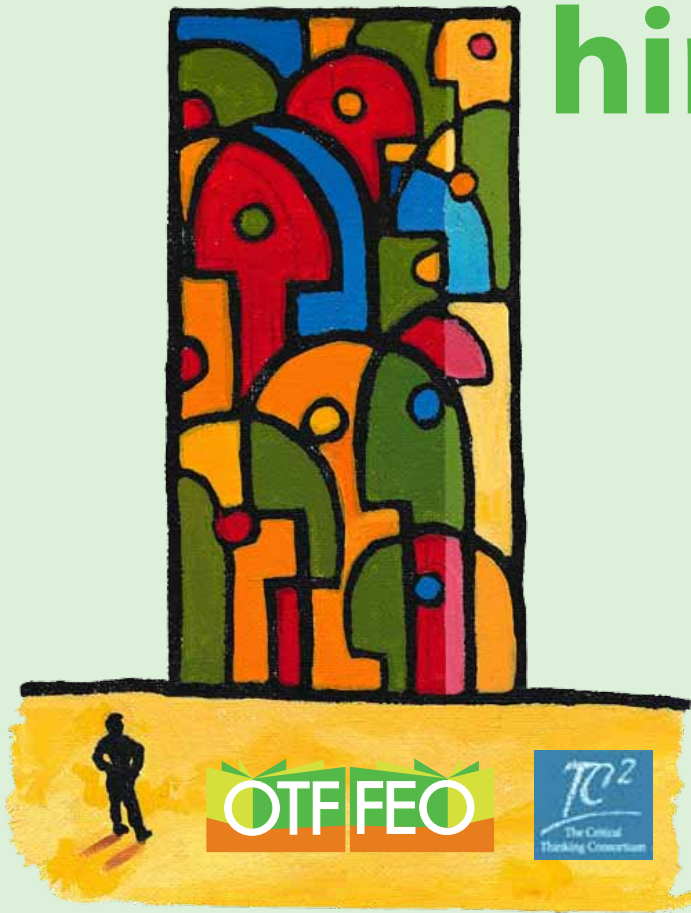# hinking

Developing Curriculum
to Nurture Critically
Thoughtful Learners

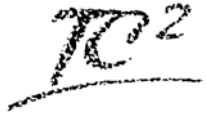# Critical Thinking as a Vehicle to Promote Transformative Teaching

Table of Contents   Page

Resources

The Critical
Thinking Consortium

CRITICAL THINKING AS A VEHICLE TO PROMOTE TRANSFORMATIVE TEACHING

Garfield Gini-Newman
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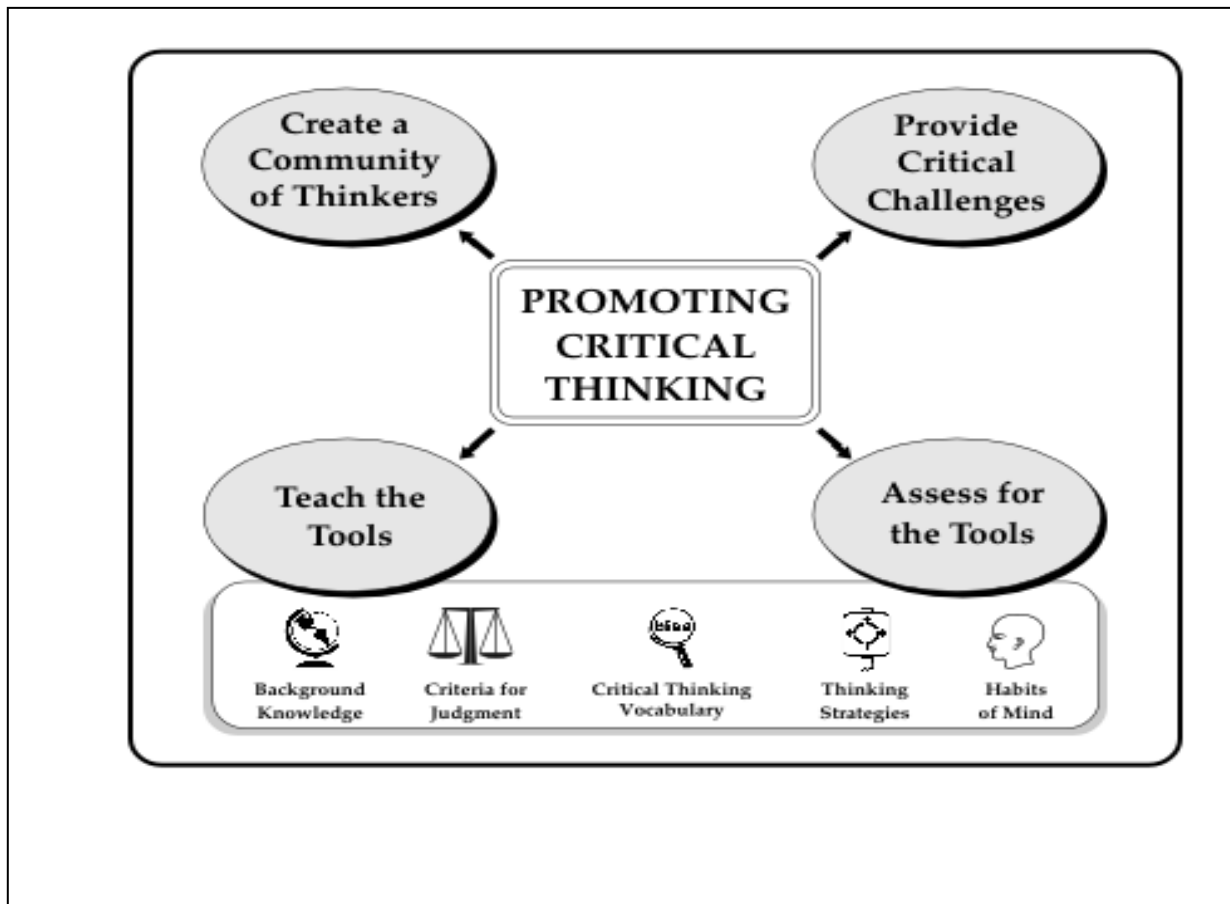
"If the mind of the child when learning, remains merely passive, merely receiving knowledge as a vessel receives water which is poured into it, little good can be expected to accrue. It is as if food were introduced into the stomach which there is no room to digest or assimilate, and which will therefore be rejected from the system, or [sit] like a useless and oppressive load upon its energies."

Edgerton Ryerson, 1847

OBSERVATION, INFERENCE AND CONCLUSION CHART

5 W's	Directly observable evidence (What do you see in the drawing?)	Inferences (What can you infer from what you see and your background knowledge?)
Who is in the drawing?		
What is happening in the drawing?		
Where is depicted in the drawing?		
When was the drawing completed?		
Why did the artist draw the picture? (purpose)		

Conclusion: What can you conclude about when (month, day, time of day) is depicted by the drawing?
 	
    •
    •   **Evidence**
    •
    •		

CONTRASTING KINDS OF QUESTIONS

Key task	#1 Locating facts	#2 Describing feelings	#3 Making assessment
Key task	Find out or remember	Offer a personal statement or preference	Render an assessment
Typical question frame	5W is/does . . . ?	Do you like . . . ? How would you feel . . . ?	Should we . . . ? What is the most plausible . . . ?
Locus of inquiry	The answer exists somewhere in a text, notes, memory (direct answer)	The answer lies within the individual (individual answer)	The answer must be thought through
Correct answers	Typically a single correct answer	Typically no wrong answers	Typically more than one plausible answer and some answers are implausible or wrong
Thinking expecta-tions	Primarily requires retrieval or recollection	May require some introspection into personal feelings	Requires judging merits in light of criteria
Why response	Why did Fred do this? Why do you believe this? (Reports on source of evidence)	Why do you feel this way? (offers a explanation for feelings or though pro	Why do you think this option is more plausible? (*Justifies* the merits of the selected choice

CREATE A GREAT HEADLINE

Identify the tools to create a great newspaper headline

Category of tools	*Specific tools used in working through this challenge*
Criteria	
Background Knowledge	
Thinking strategies	
Concepts/vocabulary	
Habits of mind	

Your "great" headline: _____

Two people were seriously hurt and dozens of pigs roamed free after an accident this morning that closed the eastbound lanes of Hwy. 401 near Winston Churchill Blvd. Ontario Provincial Police Sgt. Cam Woolley said a tractor-trailer hauling pigs struck a pickup truck, a car and a van before rolling onto its side at about 8 a.m.

When it tipped over, between 50 and 60 pigs escaped onto the highway. The cab of the tractor-trailer caught fire, but the driver was able to escape the flames and responding fire crews doused the blaze.

Woolley said the force of the impact destroyed the pickup truck. "The cargo area was absolutely crushed by the force," he said, adding that the crash "would have been unsurvivable for anyone in the back seat."

Police initially closed all lanes of the highway in both directions because debris had been strewn across a wide swath of roadway. The westbound lanes were reopened late this morning and the eastbound lanes were reopened this afternoon.

Woolley said several pigs died in the crash, including two that had to be "dispatched" by officers for humane reasons.

The uninjured pigs were either corralled by emergency personnel or simply wandered over to a grass ditch on the south side of the road to graze.

Woolley said a few pigs that remained trapped in the trailer would be removed only after the truck has been moved to a safer location.

There was no immediate word from the OPP on whether the truck driver would be charged.

The OPP had to deal with livestock of another variety nearly a month ago when cattle escaped from an overturned truck on the Queen Elizabeth Way at Highway 427.

In that accident, three steers were corralled but a forth was shot by police after charging an officer and three other people in a nearby residential area.

"Pigs are easier to handle because they don't panic," Woolley said.

<div align="right">

— The Toronto Star, 2008

</div>

CRITICAL CHALLENGE IN MATHEMATICS

How 'critical' are many word problems? How are often are they "Show us what you know" (1A)?

1	1A	2	3
Factual questions	**Show us what you know**	**What do you prefer**	**Make reasoned judgments**
What is the formula for area?	Calculate the area of the roof in the picture.	How would you like to solve the problem?	Which is the best method of calculating the area of the roof?
What is 'profit'?	Figure out the profit made from selling 6 units at $5.00 where the cost is $3.00 for 2 and $1.50 for the rest.	Which method would you use: calculate the profit on each sets of units and multiply or calculate total cost and subtract?	Develop a formula for calculating profit that simply and accurately represents all factors in the situations provided.
How much does a loaf of bread cost?	How much wasted bread would the store experience under option A?	Which option would you prefer?	What is the optimal plan for purchase of bread that would maximize profit and customer satisfaction and operate within tolerable risk levels.

Methods for framing critical challenges in mathematics

1. **Assess one or more methods of solving a problem** in terms of efficiency, reliability/accuracy and appropriateness to conditions. [Critique the piece or Judge the better or best]
   - Which of the three methods of estimating the number of leaves on a tree is the most efficient, reliable and accurate within acceptable levels.
   - Assess the appropriateness of the solutions given to mathematical problems introduced in the book, "Jayden's Rescue."

2. **Generate a formulae or hypothesis to explain a body of data**. [Decode the puzzle]
   - Determine how much money students in each of the three scenarios made and develop a formula for calculating profit that represents all the variables accurately and simply.

3. **Use mathematical algorithms to assist in generating information needed to solve a problem requiring judgment.** [Judge better or best or Design to specs]
   - Which diameter of water pipe will best meet the city's needs in terms of cost, efficiency, peak capacity, future growth?
   - Use the data provided, design a plan to have your assigned country attract the most business from foreign investors while maintaining peace and stability in your work force.
   - Plan a schedule for your flag football league, so that each team plays every other team in their pool exactly once, no team plays on any one field more than twice, no team plays back-to-back games, and there are no down times on any of the fields.

4. **Teach or represent mathematical concepts** in a thoughtful manner. [Design to specs]
   - Develop a powerful visual representation to teach very large numbers (e.g., the distance between the sun and the Earth).
   - Design and conduct an experiment using scatter plots and lines of best fit to powerfully illustrate comparing two variables.
   - Write a mathematical story or word problem that is challenging and engaging.

CRITICAL THINKING IN EARLY PRIMARY

Develop students' ability to answer a question that requires a choice among two (or three) options based on one or two criteria. (Perhaps use extreme options for very young children—Which is a better classroom pet: an elephant or hamster?) Critical thinking is *criterial* or *evaluative* thinking. Other "forms of thinking" that are not critical thinking include remembering, guessing, recognizing, and imagining.

Teach a handful of basic tools
- Criteria for judgment (very basic considerations: fair, safe, friendly, needed to work, doable by students)
- Critical thinking vocabulary
- Problem and solution
- Guess and clue
- Evidence or reason
- Consequences (What would happen if . . .)
- Thinking strategies
- Thinking yes and thinking no (pro/con)
- What does it look like? Sound like?
- Habit of mind
- Making up one's own mind (Deciding what I believe)

Build a community of thinkers
- Help students feel safe to express opinion
- Regularly ask students to express opinions (informally in individual and small group situations)
- Encourage students to offer a reason/explain their thinking.
- When appropriate, turn student requests back onto them (Answering student questions with a question—But what do you think? Do you think it would be better to do X or Y?)

Form of representation
As much a possible, begin with the concrete modes of representations and proceed towards more abstract forms:

	Real events and actual objects	**Physical representations and role play**	**Visual**	**Verbal**
Present critical challenges	On location sites Genuine artifacts	Toys or replicas	Photographs and picture books	Stories and words
Representing answers *Which is the best all-season bird's nest*	Build actual objects Perform real action *Build real nest out of real materials (grass*	Build scale model Re-enact realistic situation *Build mini-nest out of simulated materials*	Draw pictures Circle correct image *Draw or point at pictures of nests*	Point to answers Orally offer answers *Use words to describe features of nest*

THE MANY FACES OF INQUIRY

Research vs. inquiry

RESEARCH (OED)	INQUIRY (OED)
▪ *the act of searching (closely or carefully)* **for** *or* **after** *a specified thing or person* ▪ *pursuit of a subject* ▪ *to search again or repeatedly*	▪ *to search* **into** *examine* ▪ *to seek knowledge by putting a question* ▪ *ask questions or interrogate* ▪ *to seek information by questioning*

Researching is more a matter of locating details, whereas inquiring is more a matter of probing, uncovering and reaching conclusions. Notice the difference: *To research a person's death or to inquire into a person death.*

Focus	Range of objects of the inquiry (PYP typology)[1]: • form (What would it be like to like in space?) • function (How do birds fly?) • causation (What causes war? earthquakes?) • etc.
Levels of formality	Scale and scope of the inquiry: • very formal (highly structured, multi-layered research model) • informal (spontaneous, casual, short-term)
Locus of motivation and control	Initiative and direction for the inquiry: • teacher ▪ entire class • individual students
Intellectual nature of the challenge	Inquiry can be resolved: • locating correct information (research) • identifying or discovering a personal preference (introspection) • reaching a fresh conclusion (reasoned judgment)

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[1] The Primary Years Programme (2002, p. 9) states that "Eight fundamental concepts, expressed as key questions, propel the process of inquiry and help to encourage a transdisciplinary perspective. These concepts [described as "What do we want students to *understand*?"] drive the research units—called units of inquiry—which teachers and students design and which lie at the heart of the curriculum model."
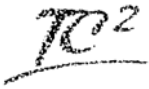
TC²
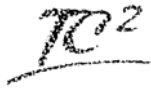
Critiquing Critical Challenges - Elementary

Assess the following expectations in the Ontario curriculum in light of EACH criterion. Suggest how the expectation might be improved as a critical challenge.

Grade 1 Math *Overall Expectation:* solve problems involving the addition and subtraction of single-digit whole numbers, using a variety of strategies	☐ requires reasoned judgment? ☐ likely to be perceived meaningful? ☐ fosters significant curricular understanding? ☐ limits required background knowledge?
Grade 1 Social Studies *Specific Expectation:* state in simple terms what "relationships", "rules", and "responsibilities" are	☐ requires reasoned judgment? ☐ likely to be perceived meaningful? ☐ fosters significant curricular understanding? ☐ limits required background knowledge?
Grade 4 Social Studies *Overall Expectation*: name and locate the various physical regions, provinces, and territories of Canada and identify the chief natural resources of each	☐ requires reasoned judgment? ☐ likely to be perceived meaningful? ☐ fosters significant curricular understanding? ☐ limits required background knowledge?
Grade 3 Math *Overall Expectation*: identify and describe, through investigation, number patterns involving addition, subtraction, and multiplication, represented on a number line, on a calendar, and on a hundreds chart (e.g., the multiples of 9 appear diagonally in a hundreds chart)	☐ requires reasoned judgment? ☐ likely to be perceived meaningful? ☐ fosters significant curricular understanding? ☐ limits required background knowledge?
Grade 7 History *Specific Expectation:* explain the historical impact of key events on the settlement of British North America (e.g., the Treaty of Paris, the Quebec Act, the American Revolution)	☐ requires reasoned judgment? ☐ likely to be perceived meaningful? ☐ fosters significant curricular understanding? ☐ limits required background knowledge?
Grade 4 Language *Specific Expectation:* identify conventions and techniques appropriate to the form chosen for a media text they plan to create (e.g., a board game related to a unit of study from a curriculum subject area could include a list of game rules; a board showing the game name, movement path, obstacles, and finish line; and visual details that will appeal to the intended audience) Teacher prompt: "What are the essential	☐ requires reasoned judgment? ☐ likely to be perceived meaningful? ☐ fosters significant curricular understanding? ☐ limits required background knowledge?

components of this form? Have you included them all?"	
Grade 6 Language *Specific expectation:* identify the point of view presented in oral texts, determine whether they agree with the point of view, and suggest other possible perspectives (e.g., ask questions about the values that are stated and implied by the perspective taken and those that are ignored; use role play or drama to express alternative views)	☐ requires reasoned judgment? ☐ likely to be perceived meaningful? ☐ fosters significant curricular understanding? ☐ limits required background knowledge?
Grade 2 Science *Specific expectation:* identify ways in which animals are helpful to, and ways in which they meet the needs of, living things, including humans, to explain why humans should protect animals and the places where they live (e.g., bats control mosquito populations; birds and wildlife provide pleasurable viewing experiences; the buffalo provided some Aboriginal people with everything they needed to survive: food, shelter, clothing, tools, ornamentation, and weapons; horses can be used for labour; cats and dogs provide companionship for humans; animals, including humans, disperse plant seeds)	☐ requires reasoned judgment? ☐ likely to be perceived meaningful? ☐ fosters significant curricular understanding? ☐ limits required background knowledge?
Grade 8 Science *Specific expectation:* `assess the` impact on individuals, society, and the environment of alternative ways of meeting needs that are currently met by existing systems, taking different points of view into consideration Sample issues: (a) A large city decides that it will put in more bicycle lanes and bikeways instead of expanding its existing public transit system. 　(b) A school system decides to have students and teachers in school year-round, instead of having everyone on vacation in July and August.	☐ requires reasoned judgment? ☐ likely to be perceived meaningful? ☐ fosters significant curricular understanding? ☐ limits required background knowledge?

Critiquing Critical Challenges - Secondary

Assess the following expectations in the Ontario curriculum in light of EACH criterion. Suggest how the expectation might be improved as a critical challenge.

Grade 9 Academic Geography *Overall Expectation:* Predict how current or anticipated changes in the geography of Canada will affect the country's future economic, social and environmental well-being.	❐ requires reasoned judgment? ❐ likely to be perceived meaningful? ❐ fosters significant curricular understanding? ❐ limits required background knowledge?
Grade 9 Applied Geography *Specific Expectation:* Compare and contrast two ecozones to illustrate physical and cultural diversity.	❐ requires reasoned judgment? ❐ likely to be perceived meaningful? ❐ fosters significant curricular understanding? ❐ limits required background knowledge?
Grade 9 Applied Geography *Specific Expectation*: Identify costs and benefits to selected groups in Canada of recent aboriginal land claims.	❐ requires reasoned judgment? ❐ likely to be perceived meaningful? ❐ fosters significant curricular understanding? ❐ limits required background knowledge?
Grade 10 Applied History *Overall Expectation*: Explain the significance of some key individuals and events in the evolution of French-English relations in Canada since 1914.	❐ requires reasoned judgment? ❐ likely to be perceived meaningful? ❐ fosters significant curricular understanding? ❐ limits required background knowledge?
Grade 10 Academic History *Specific Expectation:* Demonstrate an understanding of the relationship between invention and the economy.	❐ requires reasoned judgment? ❐ likely to be perceived meaningful? ❐ fosters significant curricular understanding? ❐ limits required background knowledge?
Grade 11 English College *Identify elements of style in a variety of texts, with a focus on how the elements contribute to clear and effective communication*	❐ requires reasoned judgment? ❐ likely to be perceived meaningful? ❐ fosters significant curricular understanding? ❐ limits required background knowledge?
Grade 11 English College *Explain how authors and editors use design elements to organize content and communicate ideas*	❐ requires reasoned judgment? ❐ likely to be perceived meaningful? ❐ fosters significant curricular understanding? ❐ limits required background knowledge?
Grade 12 Earth and Space Science University *Describe and explain how observations of the Earth and other objects in the solar system, made both from Earth and from space, are used to study and better understand the natural and the human-made environments of the Earth.*	❐ requires reasoned judgment? ❐ likely to be perceived meaningful? ❐ fosters significant curricular understanding? ❐ limits required background knowledge?

Grade 12 Earth and Space Science University *Visualize and describe the size, shape, and motions of the solar system, and compare the Earth with other planets and objects within it, on the basis of information gathered through research*	❒ requires reasoned judgment? ❒ likely to be perceived meaningful? ❒ fosters significant curricular understanding? ❒ limits required background knowledge?
Family Studies *What do families do to cut costs in their grocery budget?*	❒ requires reasoned judgment? ❒ likely to be perceived meaningful? ❒ fosters significant curricular understanding? ❒ limits required background knowledge?
Family Studies *Who are some leading social scientists from the past?*	❒ requires reasoned judgment? ❒ likely to be perceived meaningful? ❒ fosters significant curricular understanding? ❒ limits required background knowledge
Family Studies How does the fashion industry create a line of garments from concept to creation?	

DESIGNING MINI-CHALLENGES

Identify Key Learning/Broad Understanding
Freedoms enjoyed by many today are the result of heroic struggles in the past and must be vigilantly protected.

What is the Challenge? Frame Critical Challenge (Question or Task)
Select the most powerful image to teach young teens about the role of the Underground Railroad in securing freedom for slaves in the U.S. and write a fair-minded caption to accompany.

Set Context for the Critical Challenge to Engage Students
A publisher is preparing a new text and needs your assistance. They have only enough space for one more visual. Should they use the painting or the map?
They also need you to prepare a fair-minded caption for the image chosen.

What evidence of learning would you gather?
- observation of student discourse in small and large group discussions
  - draft and final versions of the caption

Which of the intellectual tools would you use to support student learning?

Background Knowledge:	Criteria for Judgment:	Critical Thinking Vocabulary	Thinking Strategies	Habits of Mind

13

DESIGNING MINI-CHALLENGES

Identify Key Learning/Broad Understanding

↓

What is the Challenge? Frame Critical Challenge (Question or Task)

↓

Set Context for the Critical Challenge to Engage Students

↓

What evidence of learning would you gather?

↓

Which of the intellectual tools would you use to support student learning?

Background Knowledge:	Criteria for Judgment:	Critical Thinking Vocabulary	Thinking Strategies	Habits of Mind

14

Prompts	Critique the piece Students assess the merits/ shortcomings of a person, product or performance (which may be teacher-provided or student-produced).	Judge the better or best Students judge from among two or more options (teacher-provided or student-generated) which best meets the identified criteria.	Rework the piece Students transform a product or performance in light of additional information or an assigned focus, perspective, genre, etc.	Decode the puzzle Students suggest and justify a proposed solution, explanation or interpretation to a confusing or enigmatic situation.	Design to specs Students develop a product that meets a given set of criteria/conditions.	Perform to specs Students perform or undertake a course of action that meets a given set of criteria/conditions.
English/ language arts	• Determine the appropriate punctuation for this "stripped-down" version of the song *Galileo*. • Is *My Left Foot* an appropriate choice of novel for study in high school?	• In *Hamlet*, who is the more noble character: Laertes or Hamlet? • Is the Wolf in *The True Story of the Three Little Pigs* good or bad? • Which of the student developed interpretations of the poem is the most compelling?	• Write two editorials—one supporting, another refuting—that the charge of the Light Brigade was "That glorious blunder of which all Englishmen are justifiably proud.	• Deconstruct the message embedded in the ads. • Using corroborating references from elsewhere in the story, explain the author's message in this section.	• Prepare briefing notes for the premier on today's news, that are relevant, comprehensive and succinct. • Create an anti-smoking poster using four persuasive techniques.	• Develop and implement a realistic action plan to pursue your writing priorities for this term. • Perform the assigned role expressing at least three feelings
Science	• Are the results of this experiment to be trusted? • Is the information on this web site credible? • Are the special effects in the clip from Armageddon based on sound physics?	• Who has the greatest mind: da Vinci, Newton or Einstein? • The earth is overdue to be struck by a heavenly object. Which should we fear the most—being hit by a meteor, an asteroid or a comet?	• Given data on the behaviour of an object in earth's gravity, reconstruct the results if this object was on Mars.	• Based on the findings from the simulated dig of dinosaur remains, write a short account explaining what occurred on this site.	• Build a structure using the materials provided that will achieve the specified results. • Design a habitat for a classroom pet that meets all of the animal's needs.	• Conduct an experiment with paper airplanes to establish which design variations (nose weight, pager size, stiffness, shape) result in the farthest flight.

	Social Studies	Mathematics
• How powerful are our proposed questions of the WWII guest? • Does the textbook provide a fair and adequate account of what actually happened?	• Are the Ministry of Education's conclusions about student performance warranted by the data presented in the table?
• Which is the more effective form of transportation in the Arctic: the dog sled or the snowmobile? • Should your family move to Weyburn or Prince George? • Which of the nominees is the most impressive legacy of ancient Egypt?	• Think of three methods of estimating the sum of money in a stack of dollars bills. Which would be the most efficient and yet still be highly accurate?
• Rewrite an historical account using the "**R**ole-**A**udience-**F**ormat-**T**opic-**S**trong verb" framework. • Given the information, provided, write a letter of reference for Thomas More.	• Convert the following patterns into an algebraic expression.
• Find a powerful metaphor that characterizes an aspect of Canadian life. • Identify and support with evidence the R-A-F-T-S in a fellow student's writing.	• A hemispherical bowl with radius of 20 cm contains water to a depth of 4 cm. To what angle must the bowl be titled before water spills?
• Create six questions for an end-of-unit exam that are clear, non-trivial, manageable and require more than mere recall of information.	• Design a four-panel cartoon that explains in a humourous but effective manner key features of an assigned mathematical concept (e.g., numerator).
• Make a lasting contribution to someone else's life. • Mount an information campaign to boycott products of companies that exploit their workers.	• Lead a small group through an activity to help them understand the concept of one million.

Music					
Developed by Nancy Olfert, Bob Rice, Sharon Reynolds, Luanne Schlueter					
• Does Beethoven's Für Elise deserve to be one of the most famous piano pieces? Would you rate it as 4-star piece, 3-star or less? • Is Bartk's Concerto For Orchestra an appropriate choice for detailed study in Grade 12 Music?	• Considering the duet of Pavarotti and Sting performing Schubert's Ave Maria, which performance is the better example of a Romantic song performance? • As a Canadian Idol judge, create your own persona and performance criteria. Analyse two performances and pronounce your judgment. • Would your family's musical needs be better met by moving to Havana or Vienna?	• Transform the binary piece, (a piece they can play), you have learned into a ternary piece, keeping the general characteristics of the A section. • Write your own permutation of an assigned tone row (inverted, transposed, retrograde).	• Find a powerful metaphor to describe the period in music history that is currently being studied. • For each of the following musical examples, identify the musical era to which each belongs. • Find the second statement tone row in the first movement of Webern's Five Pieces for Orchestra.	• Write a limerick where the first line contains a composer's name and the remaining lines describe the composer's style and attributes. • Build an instrument according to the details and criteria provided. • Create a radio script to introduce two contrasting genres of music to a listening audience of non-musicians.	• Perform the assigned piece, expressing at least three feelings. • Practice the assigned piece, expressing at least four feelings. Choose two feelings to use in your performance for the class. • Launch a school-wide media campaign to extol the virtues of school music programs.

Prompts	Critique the piece	Judge the better or best	Rework the piece	Decode the puzzle	Design to specs	Perform to specs
	Students assess the merits/ shortcomings of a person, product or performance (which may be teacher-provided or student-produced).	Students judge from among two or more options (teacher-provided or student-generated) which best meets the identified criteria.	Students transform a product or performance in light of additional information or an assigned focus, perspective, genre, etc.	Students suggest and justify a proposed solution, explanation or interpretation to a confusing or enigmatic situation.	Students develop a product that meets a given set of criteria/conditions.	Students perform or undertake a course of action that meets a given set of criteria/conditions.
Subject						

LOOKING FOR EVIDENCE

-2	-1	0	+1	+2
Factor is almost completely missing	Factor is missing to some extent	No indication either way/ factor seems irrelevant	Factor is present to some extent	Factor is fully present

Person Profiled: _____

Factor	Evidence that factor is *missing*	Evidence that factor is *present*	Score
			-2 -1 0 +1 +2
			-2 -1 0 +1 +2
			-2 -1 0 +1 +2
			-2 -1 0 +1 +2
			-2 -1 0 +1 +2

COMPARING QUALITY OF LIFE

	Positive factors	Negative factors
Mario's life		
Usha's life		

MARIO

Mario runs a successful business in downtown Toronto. He lives with his family in Caledon on a small hobby farm. The commute to his office in Toronto takes between one and one and a half hours depending on traffic. He generally leaves home by 7:00 and arrives home at about 6:00 in the evening. He tries to squeeze in a couple of squash or tennis games each week at a club near his office. When he is able to do so, it often means getting to the court just in time for his game with little or no time to warm up. The games usually take place during his lunch hour that requires that he grab a quick bite on the go or not have lunch.

Mario's business takes him on the road about 8 days per month. He does his best to keep in touch with his family while he is away. With the business thriving but keeping him very busy, he finds little time to pursue his passions of cooking and photography. In fact, the family tends to share meals together when they eat out a couple of times per week, more so than around the dinner table in the home. The hobby farm provides peace and tranquility when Mario has the down time to enjoy it, but recently he has had to hire help to care for the gardens and the land is rented out to local farmers.

Mario and his family enjoy at least two vacations a year at least one of which is outside of the country. The family has the financial resources to be well dressed and to be able to afford a variety of family outings when time permits. They eat well despite the hectic pace of life.

When Mario gets home from work he spends many of his evenings shuttling his children to various activities including sports and piano lessons that require considerable driving.

Mario has considered reducing the size of his business but is concerned that the loss of income would hurt the family's quality of life. Although he would be able to work four days a week and shorter hours each day, the family would have to travel less, eat out less and make some choices about the activities they are involved in.

USHA

Usha is a single mother who teaches at a school in Toronto. She lives with her two children in a townhouse in Etobicoke. She is able to see her children off to school before going to her school to teach because both schools are close to their home. Usha and her children generally arrive home at about the same time after school and are able to sit down together to complete their homework. Looking after her children, keeping up with her marking, and preparing new lessons leaves Usha little time to devote to a fitness routine and living on a single teacher's income does not provide her the luxury of a fitness club membership – but walking to and from school and walking most places she needs to go provides considerable opportunities for exercise.

Usha generally spends her lunch period providing extra help to her students or working on her lessons for the next day. She nibbles on a variety of fruits and vegetables while she provides the help or does her work. As a teacher, Usha is able to spend summers and other holidays with her children, but their travel is generally limited to short trips around Ontario, camping adventures, or cross-country skiing outings during the winter.

Raising two children on her own while teaching full time leaves Usha little time to pursue her interests in painting or pottery and she finds she is not able to volunteer in her community as much as she would like to. Although she has a comfortable income, the family can afford to eat out only a couple of times per month. To save money and ensure the best quality of food for her family, Usha shops at either Kensington Market or the St. Lawrence Market. Most meals are freshly prepared by Usha as she tries to avoid pre-packaged meals.

Usha has been offered the opportunity to teach night school and summer but she has turned down the offers preferring to spend the time with her children. This decision was difficult as the extra money would have allowed the family a few more luxuries.

Usha has found the demands of her family and job make it difficult for her to considering dating or meeting new people. Despite being a young, attractive woman, Usha finds herself too busy and too tired to have an active social life.

RECOGNIZING BIASED AND FAIR-MINDED PERSPECTIVES

The terms "bias" and "perspective" are often used interchangeably and yet they are not synonymous terms. Using a Venn diagram can help students to see the relationship between the two terms. While a bias is a perspective not all perspectives are biased. When examining sources of information we should invite students to consider the degree to which the stated position reflects a "biased" or "impartial perspective". To assist students in making this judgment, provide them with the criteria for a biased and impartial perspective as suggested below. It is also helpful to remind students that we can only determine the degree of bias if we know the process of deliberation taken to arrive at the position taken.

Criteria for an Impartial Perspective:	Criteria for a Biased Perspective:
• **open-minded** –willing to accept new ideas and alter opinion based on new evidence • **full-minded** – is well informed, considers all the available evidence • **fair-minded** – tries to the best of her ability to impartially weigh the competing evidence when reaching a conclusion	• **closed-minded** –**incomplete information** – bases conclusions on inadequate or partial evidence • **unfair** –prejudges the result because of personal affiliations in favour of or against one group or view

Important to Note: We cannot determine whether a perspective is biased simply by identifying the point of view from which the person approaches the issue nor from the conclusion reached. Bias is determined by the quality and nature of deliberation through which the conclusion is reached. A wife's conclusion about her husband's cooking may or may not be biased—it depends upon how impartial she is in gathering, accepting and weighing the evidence.

U-SHAPED DISCUSSION REFLECTIONS

Initial position. Where along the continuum did you first place yourself?

Explain the reasons for your initial choice

Most important subject

Least important subject

Interesting arguments: Describe the reasons given by two students whose position in the U-shaped discussion was different from yours but caused you to wonder about or rethink your position.

Position in the U-shaped discussion:	Position in the U-shaped discussion:
Reasons	**Reasons**

Final position. If you changed corners during the discussion, to which corner did you shift? What caused you to make this change? If you did not change corners, what additional arguments or evidence reinforced your position, causing you to stay in your original position? Please explain the change(s) or continuity in your position during the discussion.

	Reasons for remaining in the same or for changing my position
✓ I changed my position to _____ _____ ✓ I did NOT change my position	

Justification for your final position. List the four most powerful reasons that support your final position on the issue.

Reason 1

Reason 2

Reason 3

Reason 4

PLACEMAT ACTIVITY

A Placemat activity is an excellent co-operative learning strategy to use early in the school year as you work to build collaborative skills and a collaborative learning environment. It blends several simple co-operative learning structures with an easy-to-use graphic organizer, and allows students to share ideas and draw conclusions in a safe manner.

Steps in Carrying Out a Placemat Activity:
1. Arrange students in groups of three to five.
2. Letter/number students (A,B,C,D,E or 1,2,3,4,5)
3. Randomly select a letter/number and ask that person from each table to pick up supplies.
4. Randomly select a letter/number and ask that person from each table to create the place mat on the large sheets of paper supplied.
5. Pose a question and ask all students to record their thoughts/ideas in their personal space. Allow 1-2 minutes.
6. Conduct a Round-Robin by ask each person to share their ideas/thoughts. Note: No critiquing , etc. This is a sharing of ideas/thoughts only. Randomly select who will start using a letter/number or other means such as shortest hair, closest birthday etc. Allow 6-8 minutes.
7. Once each group member have had a chance to share, randomly select someone to create a ranking ladder or columns in the centre.
8. The group should be given 5 – 7 minutes to select (and perhaps rank) the top five ideas from the group. They should look for common responses, discuss and clarify ideas. Teachers must carefully monitor the discussion to ensure everyone has an opportunity to participate and that there are no put-downs.
9. Have each student sign their area of the place-mat and either collect or post place-mats around the room.

WRITING BASED ON A PERSPECTIVE

R-A-F-T-S Framework

The R-A-F-T-S framework helps students write a profile of an event, based on a particular perspective. The framework identifies five variables, which may be altered for any piece of fiction or nonfiction:

R – a **role** from which to do the writing; e.g., themselves, an inanimate object, a historical figure

A – an **audience** for whom the writing is intended; e.g., themselves, one's pets or peers, the general public

F – a **format** in which to write; e.g., e-mail, formal essay, post card

T – a **topic** about which to write, related to the selected or assigned role and audience

S – a **strong verb** that sets the tone or overall purpose of the writing, e.g., to plead, to persuade, to complain, and guide students in selecting vocabulary to use in their writing.

When using R-A-F-T-S to create a historical account (e.g., diary, journal), caution students about assessing an historical event from a modern day perspective. Suggest that people in the past acted and behaved as they did in the spirit of the times; therefore, judgments should be made on available evidence about the values and beliefs of the times rather than trying to project motives, values and beliefs of the characters.

The quality of the account will depend on the information students have available to them. Encourage students to pay attention to detail when researching assigned characters and events, to check that their information is accurate and, where possible, to corroborate with other evidence.

An assessment rubric—*Assessing the Interpretation*—is available for this strategy.

R-A-F-T-S FRAMEWORK

The following structure can be used to generate a R-A-F-T-S assignment:

As a | *role* |, write a | *format* | to an | *audience* |, using a | *strong verb* | about | *topic* |.

Here are some examples:

As a ***crew member***, write a ***letter*** to ***your family***, ***complaining*** about ***conditions aboard Cartier's ship.***

As an ***explorer***, write an ***advertisement*** to the ***general public***, ***persuading*** them to ***sign up as crew members for your voyage of discovery***.

Sample R-A-F-T-S Options

Role/audience	Format	Topic	Strong verb
member of a group monarch crew member fur trader voyageur King's advisor specific family member explorer warrior missionary shaman soldier chief or elder	letter poem pamphlet telegram obituary script post card speech song interview story note in a bottle newspaper article advertisement dialogue fax announcement poster last will and testament epitaph opinionnaire invitation survey letter to the editor e-mail	any concept, topic or issue related to studies of history	complain encourage persuade define compare restate survey contrast predict critique justify recommend evaluate inquire warn question plead beg invite apologize brag announce advertise

19 HABITS OF MIND

Habits of mind are "mindsets" that are part of the typical or habitual way in which a person approaches a situation or task. Habits of mind may be articulated in different ways. The following characterization captures most of the intellectual virtues important in thinking critically.

Thinking for one's self

- **Inquiring mind** (curious): Does not take everything at face value—is inclined to inquire into matters and to take up a challenge.

- **Critically minded**: Is willing to evaluate information when it is important to do so.

- **Open-minded**: Is open to view other than one's own, especially to contrary positions.

- **Fair-minded**: Will judge ideas on their merits and not simply enforce personal interests and bias.

- **Independent-minded**: Resists the pressures to adopt and espouse opinions merely because they are popular.

- **Persistence/perseverant**: Persists in thinking through problems in a thorough and careful manner.

- **Circumspect**: Is tentative in one's belief until there is sufficient evidence or complexity to warrant a more definitive position.

- **Empathic**: Is able to empathize with those in situations different from one's own and in different historical contexts.

- **Tolerant of ambiguity:** Is willing to live with ambiguity—doesn't require black-or-white answers.

- **Self-reflective**: Is continually monitoring that one's beliefs and actions are well grounded.

- **Takes initiative:** Is inclined to think without prompting—does not wait to be told everything.

- **Humble:** Does not take self too seriously (i.e., can laugh at one's self).

- **Attentive to detail**: Is careful in attending to detail.

- **Flexible**: Is willing to change tactics or approach and adjust behaviour to the situation.

Thinking with others

- **Respectful**: Is willing to engage respectfully in discussion with others.

- **Constructive**: Is willing to take and give constructive feedback.

- **Inclusive**: Seeks to include all participants.

- **Accommodating**: Is willing to compromise and to adjust thinking and behaviour to the situation.

- **Consultative**: Is inclined to seek several sources of information, solicit expert opinion and confer with others.

Teaching the "global" habits of mind

	Key traits	Sample teaching strategies
open-mindedness a habit or willingness to entertain new or different ideas and alternative ways of looking at people, places and events (opposite: closed-minded or rigid)	recognizes differences in points of view entertains contrary positions	RAFTS (Role-Audience-Format-Topic-Strong verb) Justifying my decision Thinking "yes" /Thinking "no" The "believing game"
full-mindedness a habit or inclination to make up one's mind on the basis of adequate understanding of the whole story (opposite: simple-minded or simplistic)	anticipates complexity recognizes stereotyping suspends judgment when warranted	Going to the movie Web of effects Believe it or not (Inuit) The Snaidanac
fair-mindedness a habit or inclination to give a fair hearing to alternative points of view—to judge on the basis of merit and not simply on personal interests or preferences (opposite: narrow-minded or prejudiced)	empathizes with others overcomes bias (ethno-centrism, national fanaticism, presentism)	"Smarties" Is it fair? Examining education in Japan Totally different/Totally similar

PROMOTING HABITS OF MIND

Our mind is a parachute. It works best when open.
Author Unknown

Volumes have been written on nurturing attitudes. Three broad approaches provide a helpful way of envisioning what teachers can do in this regard:

1   **create classroom and school environments** that reinforce desired habits of mind

2   **facilitate direct experiences** that powerfully evoke the desired habits of mind

3   **engage students in thoughtful deliberation** about their habits of mind.

Creating classroom and school environments

Attitudes do not develop in a vacuum. In fact, they are more likely to be nurtured by the subtle, yet pervasive, influences operating within a social environment than they are by short-lived instructional techniques. The literature on the hidden curriculum attests to the power of environmental conditions in supporting or inhibiting the acquisition of attitudes. For example, the tone or atmosphere in a classroom is overwhelmingly cited as a primary factor in developing social attitudes. Some studies report that the particular content of the curriculum is less influential in developing students' political attitudes than is establishing a classroom climate where students feel free and have opportunities to express their opinions. For these reasons, efforts at nurturing habits of mind must not be occasional add-ons, but rather they should pervade teacher behaviour, expectations and activities in the classroom and the school.

Nurturing a climate that reinforces the desired habits of mind is not a one-time activity or even a short-term project, but an orientation that pervades all of our actions. We can transform our classrooms into communities of thinkers by working in four ways.

• **set appropriate classroom expectations**

sample expectations

• students are assume onus for thinking about what is expected or required of them—not simply want to be told what to do;
  Two kind of questions
  What is asked of me?
 	
• students and teacher are expected as a matter of course to provide reasons or examples in support of their observations, conclusions and actions;
  Tell me why?" It goes without saying
  Opinions based in evidence/literature, not mere speculation

SAMPLE CRITICAL THINKING VOCABULARY

Accuracy	Striving to be free from errors or mistakes
Ambiguity	A sentence having two or more meanings. Good critical thinking strives to avoid ambiguity and to ensure clarity.
Analysis	Involves looking more deeply at an issue by breaking it up into its parts and examining in detail.
Argument	To give reasons for or against a proposal or an idea. The use of logic and evidence to support or refute a point.
Assumption	To take for granted. A statement that is accepted as true without proof.
Bias	Favouring one view over another, noticing some things rather than others. Also can be a blindness to weaknesses in our own point of view.
Concept	An idea or thought; the generalized idea of a class of things.
Conclusion	A decision made by reasoning. A judgment, decision or belief reached after investigation. A firm answer based on several pieces of evidence.
Consistency	To say and act in a similar manner; to avoid hypocrisy; To act in a manner similar to past actions or beliefs.
Criteria	A set of factors, rules or tests by which something can be measured or judged.
Critique	The objective judging or evaluating of something. Recognizing both strengths and weaknesses for the purpose of revising or recreating.
Egocentric	The habit of viewing everything in relationship to oneself. Using one's own beliefs , values, and desires as the norm for all judgments.
Empathy	The ability to imagine oneself in anther's place and understand the other's feelings, desires, ideas, and actions.
Evaluation	To judge or determine quality or worth.
Evidence	The data used to make a judgment or draw a conclusion.
Empirical evidence	Based on direction observation, experiment or experience.
Explicit	Clearly stated leaving no doubt. Being exact, definite and specific.

Fact	What actually happened or what is true and verifiable. Factual claims need to be assessed for their accuracy and relevance to an issue and not blindly accepted.
Fair	Treating all sides in a similar fashion without preference for one's own feelings or interests. Impartial or unbiased.
Hypothesis	A possible answer based on some evidence.
Imply	A claim or a truth which results from others claims or truths. A claim or truth which is suggested by other claims or truths but is not self-evident.
Inference	A conclusion one draws based on assumptions. Inferences can be weak or strong, justified or unjustified and need to be examined.
Interpretation	To explain one's own conception of an idea or issue in light of one's own experience, perspective or situation. All learning involves personal interpretation of evidence.
Judgment	The act of deciding or weighing options based on reasons, evidence and explicit criteria.
Justify	Being able to show beliefs or actions are in line with reason and evidence and are ethically acceptable.
Opinion	A belief usually open to debate.
Perspective	A point of view. A way of seeing a situation based on your experience.
Prejudice	A judgment, belief or point of view formed before the facts are known or in disregard of facts which contradict.
Problem	A question or situation which is difficult to solve or figure out. Often problems cannot be clearly understood without analysis and gathering of evidence place.
Proof	Evidence or reasoning so strong that the truth of a conclusion is beyond doubt.
Reasoned Judgment	A belief or conclusion arrived at through careful thought, reflection and consideration of evidence in light of criteria.
Relevant	Relating to the matter at hand – a close and logical relationship to the matter being considered.
Specific	To define or describe in detail.

CREATING A CLASSROOM OF CRITICAL INQUIRY

Garfield Gini-Newman
Laura Gini-Newman

From Piaget to the present, educational research suggests that students learn best when they are actively engaged: arithmetic is mastered through the use of manipulatives, science through experimentation, and physical education through participation in sport. So, how do we engage students in the study of far off lands or long ago events? The answer, we believe, lies in critical inquiry. Teachers can activate students in learning about social studies by involving them in shaping questions to guide their study, giving them ownership over the directions of these investigations and requiring that students critical analyze and not merely retrieve information. In these ways, we shift classrooms from places where teachers cover curriculum to places where students uncover the curriculum.

The uncovering of curriculum occurs only when students investigate purposeful questions which present meaningful problems or challenges to address. We use the term 'critical' inquiry to signal that inquiry is not essentially the retrieval of information but a process of reaching conclusions, making decisions and solving problems. Although some students may enjoy gathering information, students' depth of learning and engagement are greatly enhanced when tasks require students to think critically at each step of the way. This point is illustrated by the typical "research project" scenario described in the inset.

Researching a topic

Students in Grade 2 are asked to select any topic they wish provided it deals with animals and to prepare a short presentation supported with a display board summarizing their research. Samantha chooses the topic of 'cats.' On the day of the presentation, she relays to her classmates the information she found on cats. Soon her classmates begin to ask questions. "Do you have a cat"?, asks one student. "No", replies Samantha. "Do you want to have a cat"? asks another classmate. "No", replies Samantha. "Do you like cats"? queries another. "No!" exclaims Samantha, becoming somewhat frustrated by the questions. "Why is there a dog on your display"? comes a final question. "Let's move on to the next presentation", interjects the teacher.

So, what went wrong with this task? The absence of purposeful inquiry put Samantha in a situation where she selected a topic and prepared a report without needing to think critically about the choices she was making or about the significance of the information she was gathering. Had Samantha been invited to and supported in asking a more purposeful question and processing the information critically, she may have selected a topic of genuine interest to her and would have had to think more deeply about her findings. Instead of gathering information to satisfy the requirements of an assignment, Samantha's exploration might have been more purposeful if she was asked to consider which pet would make the best addition to her family. She could then have generated criteria for a suitable choice, including personal preference, cost to purchase and maintain, amount of care required, habitant requirements, and diet. Using these criteria, Samantha might then research several animals to see which would make the most suitable family pet. And finally she would need to reach a conclusion and explain her thinking. Clearly, in this scenario, Samantha would have been more involved—cognitively and emotionally—in her inquiry. She may well have learned about animals and their care.

If we expect students to become critical thinkers and problem solvers then we must be sure that our classrooms challenge them to solve problems and embark on personally relevant journeys of inquiry. This is unlikely if students are fed mounds of information with little opportunity to pose their own questions

and challenge their emerging conclusions. Even well planned, interesting, colourful and relevant lessons can fail to involve students in thinking meaningfully about the ideas. Active involvement requires that students digest and make personal sense of the ideas, and not simply listen and recite or read and record.

Building motivation to learn is an important reason for encouraging critical inquiry (McGaugh 2003). Linking social studies to issues which are meaningful to students is crucial if we expect to engage students (McMahon and Portelli 2004, Armstrong and McMahon, 2002). Where there is no engagement, students are not paying attention, and consequently are unlikely to learn. We are more likely to engage students when our curriculum is built around meaningful questions (at times formulated by students themselves), stimulating challenges and relevant projects. In a classroom of critical inquiry, unsolved problems, intriguing mysteries and purposeful questions are used to excite students to learn.

While recognizing the need to challenge students, teachers also provide the necessary scaffolding for student success. Building on prior learning, providing concrete experiences, arranging many opportunities for students to engage in focused dialogue with their peers help anchor students' learning and develop the knowledge and skills necessary to direct their research, analyse their findings and draw their own conclusions. Also important is creating a safe environment where risk taking is encouraged and students are not being marked down for their mistakes. Instead, students should be allowed to "fail forward" by having opportunities to practice, revise, edit, and polish their work before submitting it for marking.

In this article we explore the dynamics elements and suggest teaching strategies for creating a classroom built around critical inquiry.

The dynamics of critical inquiry

Critical inquiry is an attempt to infuse a spirit of exploration throughout the curriculum. At the heart of critical inquiry is a provocative question or challenge, which arises out of the interplay of asking, investigating, reflecting, creating and sharing. With these multiple entry points into inquiry, teachers are better able to differentiate instruction to meet the varied needs of their learners. For example, students may respond to a challenge by first reflecting on what they know, sharing initial thoughts and ideas with peers and then carrying out an investigation. Others may choose to investigate, share their preliminary findings, reflect on what they know and do not know, and then return to further investigation. Similarly, once students have completed their investigation, opportunities to share and reflect are integral parts of any creative process. The diagram below outlines the dynamic nature of critical inquiry.

Elements of Critical Inquiry

Share

Create

Ask
Engaging, Relevant Questions

Investigate

Reflect
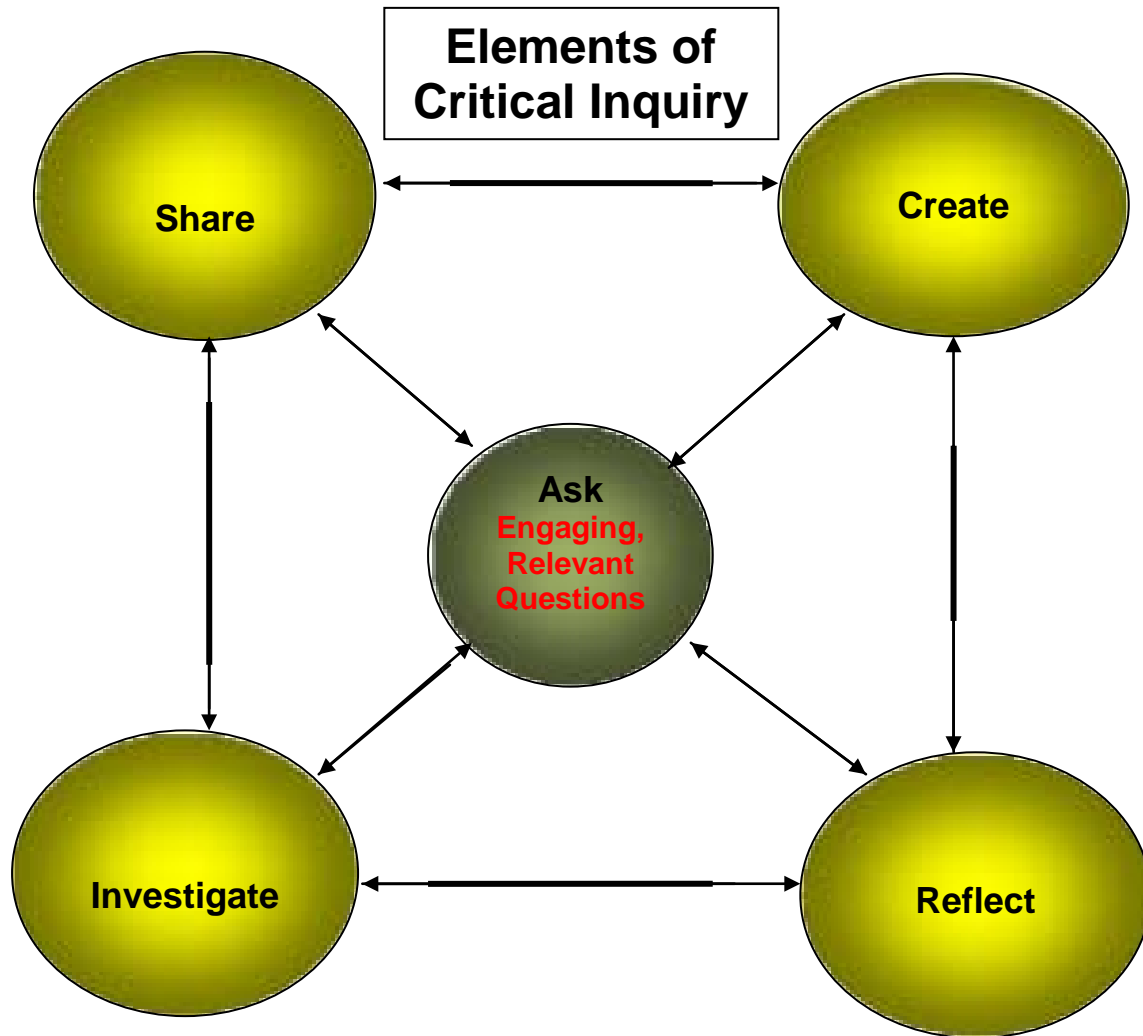
The dynamic elements of inquiry

Ask
Inquiry begins with meaningful questions which connect to the world around us and builds on prior knowledge and excites curiosity.

Create
The invitation to create a product or other representation of learning provides an opportunity to link new ideas with prior knowledge. This coalescence of ideas leads to the generation of additional thoughts and theories.

Reflect
Reflection on the path taken and on conclusions formed is an integral part of the dynamic of inquiry as it assists in the consolidation of learning. Reflection my lead to revisions in the investigation, affirm conclusions or open new lines of inquiry.

Investigate
Investigation puts curiosity into action. As they gather information, students are likely to refine or re-direct their questions, clarify ideas and begin to make connections.

Asking questions

As suggested by the scenario described at the opening of this article, too often students are detached from their research projects which usually guarantees that learning will be limited and of little lasting value. Framing effective inquiry questions is an important first step in any research.

Building on prior knowledge and asking questions of broad significance are vital to the success of social studies curricula. Working from a question of more universal than particular importance, students are more likely to become engaged. Also, critical to the success of an inquiry based classroom is the open-ended nature of the questions asked. Questions which send students to textbooks and other sources seeking the anticipated "correct answer" or which encourage them merely to prepare lists for their response, do little to develop their critical thinking or create a genuine interest in social studies. Consider for example, the following questions. "When and why did each province and territory join confederation?" This question requires that students locate information and prepare a list of dates and reasons. Revised to read, "Considering the interests and needs of your assigned province or territory, would you have supported entry into confederation at the time each joined?" This is a more thought provoking question and addresses the historical reality that not everyone supported confederation.

Inquiry Questions as Unit Organizers

A powerful and engaging method of curriculum development is to build the entire year around provocative questions which challenge students to explore and apply their learning. When a course has a central inquiry question at its heart, it assists students in looking for the "big ideas" or the "enduring understandings" to use the term of Grant Wiggins and Jay McTighe (1998), Overarching questions reduce the likelihood of bogging students down in the details of history and geography. A provocative inquiry question provides students with a central reference point to reflect upon as the year unfolds. These central questions serve as excellent summative assessment questions which students. For example, a central question such as: *"Is Canada a country we can be proud of?"* provides a focus for student learning about the history of the country. Around this central question more specific critical inquiry questions addressing particular aspects of the curriculum might be framed:

- Was the deportation of the Acadians justifiable?
- Were French Canadians treated fairly and respectively following the conquest of New France?
- Have Canada's aboriginal people been treated with dignity and respect?
- Does Canada act more responsibly towards the environment today than in the past?
- Have science/technology improved the lives of all Canadians?

SAMPLE "BIG" INQUIRY QUESTIONS

Rules and Responsibilities
- What are the three most important rules you must follow each day, at home, at school and in your community. How might your day change if there were no rules and no one had any responsibilities?
- What are the biggest differences between the rules and responsibilities in your life and those that your parents, grandparents, or teachers had to follow?

The Medieval World
- When people of the future study us they will learn that tall office buildings and huge stadiums were built in most cities. When we study the medieval world we see that cathedrals and castles were often the most important buildings. What can we learn about a society by the buildings they built?
- Would you like the opportunity to live in medieval Europe if you could be taken back in time? Would you change your mind if you found out you would be a peasant? A member of the clergy? Nobility? Who do you believe had a better life in medieval Europe, men or women?

Early Civilizations
- In some areas such as Egypt, China and India, early civilizations developed along river valleys. In other areas such as Mexico, Chile and Japan, they did not. How important was the role of geography in shaping early civilizations?
- How should we measure the greatness of past civilizations? Which of the early civilizations did the best job at meeting the needs of the people who lived in it?

Twentieth Century Canadian History
- At the beginning of the 20th century, Prime Minister Sir Wilfrid Laurier commented that "as the nineteenth century belonged to Canada, so shall the twentieth century belong to Canada." If Laurier were alive today would he believe that his prophetic words have come true or would he be disappointed?
- More elusive than the sasquatch is the search for Canadian identity. Have the events of the past century forged a unique Canadian identity and how have those events defined who we are as a country?

World History
- Historian E.H. Carr and others of the liberal tradition portray history as the steady march forward. In stark contrast, Felipe Fernandez-Armesto claims the very thought of history as progress is Eurocentric and repugnant. History merely lurches chaotically from event to event. Do the trends of the past five hundred years offer more support for Carr's view of steady historical progress or for Fernandez-Armesto's view of random chaos?
- What effect would it have on our textbooks if we changed how we measure the greatness of past civilizations (e.g., lasting monuments they have built, size of the empire they established, degree to which they extended basic rights to all who lived in their society, respect for the environment)? What are the hallmarks of a truly great civilization? Which past civilization best embodies these attributes?

Effective Questions for Critical Inquiry

Not all questions are created equal. Care must be taken to differentiate between questions of factual recall, questions of preference, and questions of critical inquiry. While each have value when used correctly, inappropriate use can become a barrier in meeting the intended learning objectives. If critical thinking is considered an integral part of a social studies program, then questions of critical inquiry are vital to the program's success.

Three kinds of questions

Factual retrieval	Personal preference	Critical inquiry
• Ask students to locate information. • The answers are often "right there." • Have a single correct answer. • Useful to assess comprehension of key facts.	• Ask students to express a personal. opinion or preference. • Are not grounded in careful reasoning, but invite an emotional or "gut" response. • There are not wrong answers; depends entirely on how each of use feels towards the topic.	• Ask students to reach a conclusion or solve a problem. • Requires thoughtful consideration of evidence in light of a set of relevant factors or criteria. • Are typically open-ended and there are a often several reasonable answers.

Factual recall questions, with a single correct answer or a limited range of responses, are useful as checks for understanding. When the purpose is to assess students' comprehension of key facts and processes, narrowly focused questions are useful; however, if the purpose of posing a question is to prompt student thinking, then open-ended questions of critical inquiry are necessary. Critical inquiry questions require thoughtful consideration of evidence gathered against a set of criteria. Although answers will often vary, a question such as "What is your favourite flavour of ice cream?" is not an inquiry question but rather a question of preference. A question such as this does not build on human curiosity; require investigation, the convergence of new learning with prior understandings, or the application of criteria. (For more about framing questions that invite critical thinking, see "Beyond Inert Facts: Teaching for Understanding" in this collection.)

Supporting Students in Asking Questions

Equally important to the quality of questions posed by teachers is the ability of students to ask powerful questions. In genuine critical inquiry, provocative questions, which form the basis of the inquiry, should emanate from students as well as the teacher. And yet, all too often, students are either unaccustomed to asking critical questions or are ill-equipped to do so. Beginning in the primary grades, students are presented with research projects which often follow a similar process: students select a topic on which to do research, reflect on what they already know about the topic, consider what they would like to know more about the topic and, following their research, summarize what they have learned. The intent of this type of exercise is commendable, however it often has a glaring flaw; rarely are students taught how to frame meaningful, critical inquiry questions so their questions are typically limited to factual retrieval. Consequently, there is often little purpose to their research and no expectation to draw conclusions, merely to gather information.

If students are to become effective critical thinkers, they must learn to ask as well as respond to powerful questions. Throughout the school year, teachers should encourage students to ask critical inquiry

questions on important issues, including events in the news, at school or issues related to their community. Explicit teaching of the three types of questions accompanied by opportunities to practice are vital if students are to move from asking questions of factual recall to critical inquiry questions. Teachers may wish to consider beginning a unit with factual recall questions and invite students to work in small groups to tweak the questions into critical inquiry questions. For example, students might moving from considering "What three challenges did Aboriginal peoples encounter?" (factual retrieval) to "What was the most significant challenge that Aboriginal peoples encountered?" (critical inquiry questions). As well, students could review questions from a chapter in their textbook and group the questions into the three types. Then, students could select several of the factual recall questions for which to suggest a re-wording so that they become questions of critical inquiry. Activities such as these, support students in learning to frame effective questions while deepening their understanding of the subject matter and developing their capacity for critical thinking.
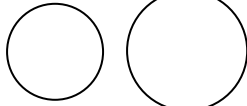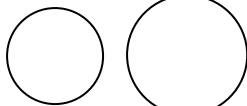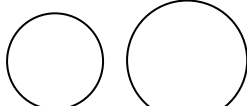
Throughout the process, encourage students to sustain their focus on critical inquiry by continuous self-monitoring and reflection on the quality and relevance of their questions. This helps to create self-directed, self-motivated students as their research empowers their thinking, leading to the creation of new knowledge, rather than merely inviting regurgitation and organization of a body of information culled from other sources.

Reflecting on ideas and strategies

Metacognition is a vital part of learning. Throughout the inquiry, students should be encouraged to take the time to reflect on their beliefs, how the new information they uncover either challenges or affirms their beliefs, and the validity of their conclusions in light of the evidence. Also important is self-reflection about the choices students make in conducing their research. Careful reflection occurs as students consider the nature of the questions they pose, assess the sources they are using, generate the criteria to be used in guiding their decision making or judgments, weigh the evidence gathered in light of criteria, consider the process by which they arrived at their conclusions and the validity of their conclusions, and finally, consider how purpose and audience will inform the presentation of their conclusions.

Instead of simply noting similarities and differences between people, places or things (e.g. in one community people make houses out of wood and in another houses are made of ice), a chart such as the one depicted in the insert can be used to invite young students to reflect on the significance of the differences they notice. On their own or as a class, students might record or draw the features being compared in the left-hand column (e.g. types of houses, modes of travel, health conditions). Students would circle the words that best represent their assessment of the amount of difference between the compared features, and explain their thinking. After comparing the individual features, students might offer an overall assessment of the degree of difference, and then share their summary conclusions with the class.

HOW MUCH ALIKE?

Features we are comparing	How big a difference?	Why I think this
	Nearly the same	
	Some difference	
	A big difference	
	Nearly the same	
	Some difference	
	A big difference	
	Nearly the same	
	Some difference	
	A big difference	

When I think of all these features . . .

They are nearly all the same   There are some differences   They are very different

I think this because _____

Earlier we saw how provocative questions can be an effective means to frame a unit of study. These same questions can be used to prompt student reflection on their prior knowledge and beliefs at the beginning of a unit. Posing questions as an anticipation guide (see insert for an example) can be a useful tool for raising important questions and garnering a sense of student prior knowledge and attitudes before delving into a unit of study. Anticipation guides are generally used as a literacy strategy to prepare students to read a piece of text. Adapted, they become an excellent framework for a unit and a diagnostic activity. After responding to the anticipation guide questions, the teacher might debrief with students and explain that these are the essential questions for the unit. In fact, the questions can became focus questions for individual lessons and serve as the basis for an end of unit assessment.

ANTICIPATION GUIDE

Circle the answer that best describes your opinion.

---

1. Considering the causes of the War of 1812, it is difficult to assign blame to one country.
    Strongly Agree Agree   Don't Know   Disagree   Strongly Disagree

My Explanation

---

2. There were several heroic figures in the War of 1812.

    Strongly Agree Agree   Don't Know   Disagree   Strongly Disagree

My Explanation

---

3. The outcome of the war was determined by several key battles.

    Strongly Agree Agree   Don't Know   Disagree   Strongly Disagree

My Explanation

---

4. Considering the causes and outcome of the War of 1812, Canada was the winner of the war

    Strongly Agree Agree   Don't Know   Disagree   Strongly Disagree

My Explanation

Investigation
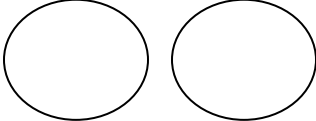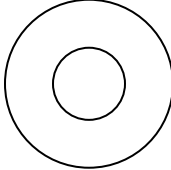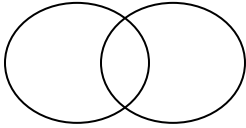
Being engaged by provocative questions primes the pump for learning, but providing support to meet the varying students' needs is vital if all students are to experience success. Before setting students free to conduct research, teachers need to lay some foundations. Once such support are graphic organizers which can help students structure and make sense of the information they uncover in their investigations.

A teacher presentation roadmap can be a useful tool to help students learn from short lectures. Essentially, the roadmap chunks the teacher's presentation into meaningful pieces much like the outlines which are often put on the board before a talk begins. When using a roadmap, encourage students to record 3-4 key points in point form in each box. Remembering that students can only pay attention for 10 – 15 minutes

before needing to process what it has taken in, teachers should employ a think-pair-share strategy after addressing a couple of points on their presentation roadmap. This allows students to review what they have heard, share and support each other, and consolidate their learning by explaining their notes to their peers.

Another strategy to support students is collaborative note-taking (see insert box). Collaborative note-taking encourages students to make point form notes from a reading or during a presentation and then to exchange notes with a peer. Each student reviews a fellow students' the and adds information that was missed and asks reflective questions. Afterwards, students jointly discuss and make notes on how the noted information connects with their world or with the central question(s) of the unit.

Students most often encounter Venn diagrams in mathematics classes. But consider their power when used to invite students to draw conclusions about the relationships between people, places and things. For example, students might be asked to determine which of the Venn diagrams in the insert best represents the relationship between the role of women in ancient Egypt and in contemporary Canadian society. In responding to this question, students would search a variety of sources including textbooks, websites, scrapbooks, to locate words, phrases or visuals which they can place within each circle to support their conclusion. It would be helpful for students to explain their conclusion in small groups and to adjust their findings based on the discussion.

Comparing the role of women in ancient Egypt and contemporary Canada

Figure 1	Figure 2	Figure 3
This graphic suggests that the role women played in the two societies was completely different and that there was no overlap or continuity	This graphic suggests that the role of women expanded from ancient times(centre) so that by the present day in Canada they were continuing to fulfill all the roles they had in ancient Egypt and had added several more roles.	This graphic suggests that while there were some roles they played in both societies, there were also roles unique to each society.

COLLABORATIVE NOTE-TAKING

Reflective questions:	My point form notes on key facts, terms, ideas and concepts:	Fellow students' additional notes:
	•	
	•	
	•	
Reflective questions:		
	•	
	•	
	•	
Reflective questions:		
	•	
	•	

Connections with other topics or the contemporary world:

- Students need to search broadly for evidence and to consider multiple perspectives. To do this they should consult a variety of sources to gather as many views as possible. Students should be encouraged to gather information from a variety of text and non-text sources (books and magazines, electronic sources, field visits to museums and other sites, visuals, interviews) and need to be taught how to read various text forms including a wide range of primary source material. Teachers need to explicitly teach students how to read and decode visual text forms such as cartoons, art, and maps.

Sharing of ideas

The opportunity to seek assistance, receive feedback and hear responses from peers, parents, and teachers is a vital part of the process of critical inquiry. As the previous examples suggests, graphic representations of ideas and conclusions are excellent vehicles for students to share their thoughts, and conclusions prior to completing a summative task. Similarly, various forms of in-class debates and discussions, such as the "Academic Controversy" strategy described below, provide a forum for the exchange of ideas, which, when combined with reflection, extend student learning and challenge their thinking. Infusing opportunities to share throughout inquiry provides students with feedback that will enrich their understanding of the curriculum.

Academic Controversy

Academic Controversy is a strategy created by David and Roger Johnson (described in Bennett and Carol Rolheiser 2001) which establishes small cooperative groups of four to six students to explore both sides of a designated issue. Each group is subdivided into A and B teams. The controversy is then identified in the positive (e.g., *"Canada should work with the United States to provide direct and indirect military to eradicate terrorism"*). The A students prepare the "pro" side and the B students prepare the "con" side. Once students have prepared their opening arguments, each team shares its ideas with the opposing students in their group. To encourage students to present ideas concisely, each team is allowed no more than 90 seconds. While each team presents its points, the opposing team practices active listening and takes notes. There should be no interruptions. Once both sides have presented their views, the A and B teams gather to plan a rebuttal. In planning their rebuttal, the teams should consider the flaws in the opposing team's arguments. Each team has approximately 60 to 90 seconds to present its response. Once both sides have presented their rebuttal, the teams switch sides and repeat the process outlined above. The final step in the academic controversy, after students have presented opening points and rebuttals from both sides of the issue, is to hold a Round Robin. During the Round Robin, students individually explain where they stand on the issue.

Creating

Students' opportunities to create new knowledge through the fusion of prior knowledge and current learning are largely dependent on the nature of the tasks assigned by teachers. Tasks which are narrowly focused on recall of pre-determined bodies of information preclude critical inquiry and present fewer opportunities for students to take ownership over their learning. Conversely, assessment tasks that invite students to engage in critical inquiry encourage students to apply their learning in ways meaningful and relevant to the learner.

In effective classrooms, assessment drives instruction. Knowing what students are to achieve and how they will demonstrate it should be the basis upon which daily instruction is planned. Differentiated assessment ensures that students with varying learning styles, interests and aptitudes are given opportunities to demonstrate their learning. The key to differentiated assessment is establishing clear

targets and not confusing methods with targets. For example, assessment targets might include student understanding of the "big ideas and concepts" being studied, an ability to conduct research, to think critically and to communicate their findings and conclusions effectively considering purpose and audience. If these were the assessment targets (or objectives) then a variety of methods could be used to assess student learning. Students could write a report, prepare a visual essay, create a bulletin board display with relevant images and captions, or deliver an oral presentation, and so on. Encouraging students to select the best method to demonstrate their learning is yet another way to shift the focus of learning from teacher to student directed.

Assessment tasks can further student learning and not simply measure it when clear targets are provided from the outset, students receive frequent feedback, and they have opportunities to improve their work through revision, editing and polishing. Throughout these tasks, students need appropriate scaffolding to ensure success, and to encourage reflection on what they are learning (Earl, 2003). At some time this may require allowing students to "fail forward". Learning from their mistakes can often provide very powerful and lasting learning. But to have the confidence to fail forward students need to know that their teacher is available to support them as needed and that failed attempts will not negatively affect their final grade. This requires that teachers embrace the concept of "*assessment as learning*" and that they provide feedback and guidance but do not grade students on the process of learning. Of course, at some point, students will need to demonstrate their learning through some kind of performance; and teachers do need to grade students on performances.

The following authentic assessment task, built around critical inquiry, challenges students to create and explain a replica of a ancient landmark.

The Great Sand Castles/Snow Sculptures Competition[1]

The Challenge
Throughout the ages, people have created lasting landmarks. From the Great Pyramids of Egypt to the Great Wall of China, from the soaring cathedrals of Mediaeval Europe to the grace and perfection of the Parthenon, architecture tells us much about the people who created the buildings.
The Great Sand Castle/Snow Sculpture Competition invites you to build an accurate scale model of an ancient site at a local beach or in the snow. To prepare for the challenge, you will need to find books with pictures and information about the site, as well as the society which constructed the architecture. You will need to look carefully at the pictures and take research notes. Once you are very familiar with the structure, its purpose and the sponsoring society, you should prepare a detailed plan including a sketch, required tools, and any extra materials needed to construct the model out of sand or snow. As well, you are to prepare an informative viewers' guide in the form of a brochure which provides details of the original structure and explains why this structure best represents the early civilization from which it came. Information you might include in the brochure**:**

- Who built it?
- What was its purpose?
- Where was it built?
- When was it built?
- How was it built?
- Why is it an important site?

In meeting this challenge, you will work in groups of three to complete the steps outlined below:

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[1] Details of *The Great Sandcastle Competition* can be found in Newman (2001).

Each *student's* responsibilities:
- prepare a bibliography of between four and seven sources.
- prepare 2-3 pages of research notes and gather four or five visuals related to the society and the structure.
- prepare a sketch of the structure
- write a 250 to 300 word summary explaining the purpose of the structure, its method of construction, and how the structure was reflective of various aspects of the society which built it, including:
  a) the influence of religion on the social and/or political structure of the society,
  b) social divisions within the society,
  c) the relationship between those in positions of authority and the general population)
- actively participate in the construction of the scale model
- be able to explain the structure, its purpose and its relationship to the civilization which built it to observers

Each *group's* responsibilities:
- establish deadlines for each of the steps relative to the date established by the teacher for the building of the structure
- assign responsibility to individuals for preparing the final sketch and gathering the tools and materials needed (one students), and preparing a viewer's guide (two students) and produce a group agreement which clearly lists the agreed due dates and individual responsibilities
- collaboratively scan sources to select a suitable structure
- prepare a detailed plan for the construction of the scale model drawing on the sketches and notes of group members
- gather necessary tools and resources in preparation for the construction of the model
- construct the scale model in sand or snow

Concluding Comments

Organizing the social studies curriculum around critical inquiry ensures a focus on key curricular ideas and concepts while allowing students to explore topics and issues of personal interest and relevance. In addition to engaging students, critical inquiry contributes to students' cognitive development by challenging them make decisions, solve problem, and draw connections. The ability to conduct focused research and to critically analyze are crucial life skills.

There is no question that the most efficient means to "cover" an over built curriculum is to teach from a teacher-focused, lectured-based approach. Teaching students the skills they need to be successful takes time. Putting the proper scaffolding in place to assist students in meeting the expectations of the curriculum requires time spent on teaching critical thinking skills. And so, the age old debate rages on. Should teachers take the time to teach effectively, or make sure they cover the entire curriculum? Upon closer inspection, however, it is evident that this debate exists only when curriculum is viewed through the eyes of the teacher. When viewed through the eyes of the learner, can there really be any debate? Should we quickly cover curriculum knowing little of what is taught is retained beyond the final exam or should we develop students' ability to learn independently and to think critically about the world around them, thus preparing them for the challenges they will face for a lifetime? Perhaps we need to consider the success of our classes based on what students retain in the years to come rather than on ephemeral results of tests.

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MOVING CRITICAL THINKING TO THE MAIN STAGE

Roland Case

Every curriculum document mentioned critical thinking, and there is universal agreement about the need to make thoughtful judgments in virtually every aspect of our lives—from who and what to believe to when and how to act. Despite this long-standing and widespread recognition, the extent and manner of teaching for critical thinking in schools is disheartening. As I have argued elsewhere, the rhetoric greatly outstrips practice.[1] As Walter Parker puts it, the teaching of thinking remains "more wish than practice."[2]

Although numerous factors contribute to this regrettable state of affairs, three reasons are especially influential in relegating critical thinking to a sideshow on the educational agenda:

- *Proliferation of thinking 'skills.'* There is a plethora of so-called thinking skills. For example, an ASCD publication identifies eight thinking processes (including problem solving, decision making and research) involving 21 core thinking skills (including defining goals, setting goals, inferring, and predicting).[3] As long as critical thinking remains but one type among many forms of thinking, there will never be adequate time devoted to it.

- *The ranking of thinking skills.* The proliferation deficit is compounded by the designation of critical thinking as 'higher order thinking,' which presumably requires mastery of 'lower order thinking' before it can be introduced to students. In the Ontario curriculum, for example, the applied courses intended for non-academic students are distinguished from academic courses not by the content addressed, but by the level of thinking expected of students. As one report noted, the applied curriculum writers use "lower order verbs," changing student expectations from "interpret" to "describe" or from "explore" to "record." Curriculum writers apparently presume that "[a]pplied students cannot think … [and] are, therefore, relegated to simple tasks like reading and repeating."[4] Not only are many thinking skills vying for classroom attention but critical thinking appears to be at the end of the list, reserved for the best students.

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[1] Roland Case and Ian Wright, "Taking seriously the teaching of critical thinking," *Canadian Social Studies*, 32, 1 (1997): 12-19.

[2] Walter Parker, "Achieving thinking and decision-making objectives in social studies" in *Handbook of research on social studies teaching and learning,* ed. J. Shaver (Toronto: Collier Macmillan, 1991) 345-356.

[3] R.J. Marzano, R.S. Brandt, C.S. Hughes, B.F. Jones, B.Z. Pressisen, S.C. Rankin and C. Suhor, *Dimensions of thinking: A framework for curriculum and instruction* (Alexandria, VA: Association for Supervisions and Curriculum Development, 1988).

- *Separation of 'skills' from content*. The teaching of critical thinking is generally divorced from the teaching of subject matter. In many classrooms, especially in high schools, curriculum content is the priority. Thinking skills are addressed only after the subject matter has been taught. Only at the end of a unit are students invited to reflect on the ideas they have encountered. Because of the heavy course load and the content focus of high stakes tests, many teachers find themselves with little time to involve students in thinking about this content. Even when critical thinking is addressed in classrooms, it is typically separated from subject matter and taught as a generic skill that students are expected (on their own) to apply to their schooling and everyday life.

Our work with thousands of Canadian teachers through The Critical Thinking Consortium[5] – or TC[2] for short – has convinced us that critical teaching can assume a rightfully central place on the main stage of classroom activity. We start from the premise that it is a powerful method of teaching all other aspects of the curriculum – both content and skill. We help teachers see how inviting students to think critically about subject matter is effective at promoting both understanding of the content and mastery of the skills. Students who passively receive information are far less likely to understand what they have heard or read about than are students who have critically scrutinized, interpreted, applied or tested this information. Rather than compete with the teaching of subject matter and other thinking skills, critical thinking supports their development.

The two distinguishing features of our conception are a *curriculum embedded* approach and an emphasis on *teaching the intellectual tools* required for critical thinking. [6]

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[4] Fabrizio Antonelli, *From applied to applause* (Toronto: Ontario Secondary School Teachers' Federation, November 2004) 33, 35.

[5] TC[2] was founded in 1993 in British Columbia to provide long-term sustained support for critical thinking. Since that time, TC[2] worked with over 25,000 educators and its institutional membership has grown to 42 school districts, faculties of education and other educational organizations in Ontario, Manitoba, Alberta, and BC. It supports an affiliate network of schools in India and has begun working with schools in the United States.

[6] This conception was developed initially in collaboration with Jerrold Coombs, LeRoi Daniels and Sharon Bailin. See S. Bailin, *et al., A conception of critical thinking for curriculum, instruction and assessment* (Victoria, BC: Examinations Branch, Ministry of Education, September 1993) and S. Bailin, *et al.,* "Conceptualizing critical thinking," *Journal of Curriculum Studies* 31, 3 (1999): 285-302.

A curriculum-embedded approach

We dispute the view that critical thinking is a generic set of skills or processes to be developed independent of content and context. Nor do we believe that critical thinking can adequately be addressed as an add-on to the curriculum. Rather, if it is to take a central place in the curriculum, critical thinking must be seen as a *way of teaching the curriculum*. The traditional "content-process" division is based upon a false dichotomy; in fact, thinking without content is vacuous and content acquired without thought is mindless and inert. As Richard Paul notes, "one gains knowledge *only* through thinking."[7]

Teachers can help students understand content, as opposed to merely recall it, by "problematizing" the subject matter. As John Dewey wrote in *How we Think*, only when a routine is disrupted by the intrusion of a difficult obstacle or challenge are we forced to think about what to do. If a situation is *not* problematic (i.e., there is only one plausible option or a correct answer is obvious) then it does not call for critical thinking. We use the term "critical challenge" to describe a problematic situation that invites students to think critically. Without altering the resources used or changing their classroom structure, teachers are encouraged to challenge students. For example, instead of asking students to locate information to answer the factual question, what did the Inuit traditionally use to make tools?, the teacher might ask students to decide which animal—the seal or the caribou—contributed more to traditional Inuit life? Similarly, instead of writing a report on a famous scientist, students might assess whether da Vinci, Newton or Einstein, had the greatest scientific mind. Instead of simply picking a title that students would like for their paragraph, students might decide which of several options was the most informative and engaging.

In all these cases, students go beyond locating facts or espousing a personal preference. They are not merely reporting what they know or like but are judging or assessing possible options. In making thoughtful assessments or reasoned judgments, we must inevitably resort to criteria – some basis other than our own preferences and whims for selecting one option over another. For example, in deciding whether or not ice cream ought to be part of our diet, we would want to go beyond whether we personally liked the food and consider whether it was nutritious, affordable, readily available, and easy to keep. This larger set of factors forms the criteria involved in making a reasoned judgment on the merits of including ice cream in our diet.

The close relationship between the term "critical" thinking and "criteria" is instructive. Mathew Lipman suggests that the word 'critical' should be seen as a synonym for 'criterial'—to think critically is to think in light of or using criteria.[8] In helping students think critically, we invite them to consider a reasonably complete and appropriate set of criteria. Left on their own, they may use very narrow and dubious criteria, such as whether a course of action is easy and in their immediate self-interest, neglecting criteria such as long-term benefit, fairness to others, consistency with life goals, and safety.

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[7] Richard Paul, "The logic of creative and critical thinking" in R. Paul, *Critical thinking: How to prepare students for a rapidly changing world*, (Santa Rosa, CA: Foundation for Critical Thinking, 1993) 277.

[8] M. Lipman, "Critical thinking: What can it be?" *Educational Leadership* 45, (1988).

As suggested above, many professional and academic writers contrast critical thinking with a variety of other "forms" of thinking, such as decision making or problem solving. According to this view, only certain tasks – those typically referred to as "higher-order" operations – are the domain of critical thinking. It is thought that if students perform "higher-order" operations such as analyzing or synthesizing, they are necessarily thinking critically, and if they perform so-called "lower-order" operations, such as comprehending or remembering, they cannot be thinking critically. This tendency to equate critical thinking with particular mental operations suggests, on one hand, that teachers are supporting critical thinking merely by asking students to carry out tasks involving "higher-order" operations, and, on the other hand, that there is no role for critical thinking in the so-called "lower-order" operations.

Whether or not students are thinking critically depends more on the qualities that characterize their thinking than on the specific nature or type of mental operation. The mere fact that students are analyzing does not mean they are doing it critically. If they blindly accept dubious assumptions, leap to fallacious conclusions, and rely on inaccurate statements, we would be hard pressed to describe their "analysis" as critical thinking. Conversely, so-called "lower-order" operations, such as comprehending or remembering, can be occasions for critical thinking. Trying to understand a difficult text or lecture may involve elaborate and thoughtful recourse to decoding strategies, habits of mind, and background knowledge. So too, with remembering; many of us with poor memories have experimented with various strategies – mnemonics, lists, mental notes, repetition. If we assessed these strategies, however informally, for their reliability, ease of use, and broad application, we would be thinking critically about remembering. As these examples suggest, "higher order" operations can be done in a rote and thoughtless way, and "lower order" operations can be done in a critically thoughtfully manner.

Teachers can engage students in thinking critically in any intellectual task involving judgment or choice among options. They can make even such a seemingly rote task as note-taking become an occasion to think critically by introducing students to the criteria for good notes and by suggesting various strategies – circling key words, webbing of ideas, paraphrasing – and, perhaps also, by nurturing an intellectual works ethic—that is, a commitment to carrying out relevant thinking tasks in a competent manner. In teaching the criteria for good note-taking, teachers might ask students to imagine that a local politician has approached them to prepare concise briefing notes on the day's front-page news. In one-half page, they should accurately summarize all the important points, but only for those topics of use to the politician. Students are thinking critically about their note taking as they judge whether or not their suggested entries are accurate, relevant, comprehensive and concise.

As one elementary teacher who had begun working with our approach remarked in her journal: "As I reflect on critical thinking and what I am learning, I am realizing more and more that critical thinking is a form of teaching, embedded in every aspect of life in the classroom. It doesn't happen in isolation, or in specific subjects, but it permeates the curriculum." Who would want their students to write an essay, paint a picture or, for that matter, take notes in a critically thoughtless way? Of course, success in the particular endeavor will depend on the possession of the tools of good thinking.

Teaching the tools

We offer the notion of intellectual resources or "tools" to explain the development of good thinking Much of the frustration teachers experience when attempting to engage students in thinking critically stems from the fact that students often lack the required concepts, attitudes, knowledge, criteria or strategies – in short, they lack the tools needed to do a reasonably competent job. It is often assumed that mere repetition will improve students' reflective competence. No doubt some will improve by repeatedly trying to figure things out for themselves, but most will be more successful if they are taught the requisite tools for the task.

Although the specific tools depend on the nature of the challenge facing the thinker, promoting critical thinking is largely a matter of helping students master an ever broadening repertoire of five types of intellectual resources:

- *Background knowledge:* knowledge of relevant information about a topic that is required for thoughtful reflection. Although it should be obvious that we cannot think critically about a topic if we know little or nothing about it, many accounts of critical thinking are based on a presumption that thinking skills or operations are independent of the content areas to which they are to be applied. Properly understood, relevant background knowledge is not separate from any skill, but part of what is required to be skilled. For this reason, individuals need to acquire information relevant to the range of topics that we want them to be able to think critically about. Presumably this range of topics is (or should be) found in the subject matter of the curriculum. This point speaks strongly for embedding the teaching of critical thinking with the teaching of curricular content.

- *Criteria for judgment:* knowledge of the appropriate criteria or grounds for judging the reasonableness or merits of the options presented by a thinking challenge. To think critically is essentially to engage in deliberations with the intention of making a reasoned judgment. And judgments inevitably are made on the basis of criteria. For this reason, an important category of tool is the range of context-sensitive criteria spanning the diverse intellectual tasks found in the curriculum, from what makes for a good argumentative essay, a sound solution to a business problem or a thoughtful question, to the qualities of a reliable scientific experiment, an accomplished artistic performance, or effective lecture notes.

- *Critical thinking vocabulary*: knowledge of the concepts and distinctions that are needed to think about the challenge. Although other tools also refer to concepts, 'critical thinking vocabulary' refers to concepts that expressly address distinctions foundational to thinking critically—for example, knowledge of the difference between 'conclusion' and 'premise', 'cause' and 'correlation,' or 'cause' and 'effect,' and knowledge of various informal fallacies.

- *Thinking strategies*: knowledge of procedures, heuristics, organizing devices, algorithms and models that may be useful when thinking through a challenge. Good critical thinkers draw upon a great variety of strategies to work their way through the challenges facing them. This category of tools is most closely aligned with what others call skills, although we believe they are more responsibly viewed as strategies. Thinking strategies may be very elaborate, such as following a comprehensive decision-making model, or they may be very focused, addressing a specific task, such as paraphrasing a statement to improve

understanding. There are literally thousands of strategies that guide individuals in working through the challenges they encounter.

- *Habits of mind:* commitments to the range of values and principles of a careful and conscientious thinker. Although more commonly described as dispositions, we prefer the term 'habits of mind' to refer to the intellectual ideals or virtues that orient and motivate thinkers in ways that are conducive to good thinking, such as being open-minded, fair-minded, tolerant of ambiguity, self-reflective and attentive to detail.

It is significant that our five categories draw support from within the diverse body of literature on thinking. There are "schools" of thinking that focus on each of the five tools we identify, suggesting that our categories represent a more complete synthesis of the range of critical thinking building blocks than is otherwise found in any single account.

An important function of the tools approach is to help teachers identify what students need to be taught in order to undertake a given task in a critically thoughtful manner. To illustrate the instructional value of our model, consider the following example of teaching primary students the tools needed to ask effective questions.

Developing powerful questions[9]

As part of their social studies curriculum, Tami McDiarmid's kindergarten to grade three class was to learn about the significance of Remembrance Day (November 11). In fostering appreciation of this event, Tami invited her students to think of questions they might ask of a classroom guest who was to speak about his World War II experiences. Left to their own devices, many students would likely have asked rather trivial or irrelevant questions. Tami sought to support her students in thinking critically about the questions they might ask by focusing their attention on four tools: critical thinking vocabulary, criteria for judgment, a thinking strategy, and background knowledge.

A few days prior to the visit, Tami re-introduced key vocabulary by reminding her students that they had previously talked about two kinds of questions: "weak" questions and "powerful" questions. Armed with this distinction, the class discussed what powerful questions "look like or sound like"—or, to use our terminology, they discussed the criteria for judging powerful questions.

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[9] This example is based on a lesson described in T. McDiarmid, R. Manzo and T. Musselle, *Critical challenges for primary students* (Richmond, BC: The Critical Thinking Consortium, 1999) 57-59.

Tami recorded on chart paper the following student-generated criteria:

Powerful questions . . .

- *give you lots of information*
- *are specific to the person or situation*
- *are open-ended—can't be answered by yes or no*
- *may be unexpected*
- *are usually not easy to answer*

Next, Tami made use of a thinking strategy – brainstorming – which her students had already learned to use. Brainstorming is a useful strategy to help with the generation of ideas. In itself, it does not invoke critical thinking. In fact, while brainstorming, individuals are discouraged from making judgments about the proffered ideas—the point is simply to generate as many ideas as possible. The critical thinking began in earnest when students, working in pairs, began to assess the brainstormed questions. Using the agreed-upon criteria as their guide, students discussed whether or not their proposed questions were likely to elicit lots of information, were obvious or predictable, and so on. Some "weak" questions were rejected; others were modified to make them more powerful.

Tami had developed a fourth tool – relevant background knowledge – during the three weeks preceding the guest's visit by reading and discussing various children's stories involving the war. Without the knowledge acquired from these stories, many students would have been incapable of asking a thoughtful question.

Here is a sampling of the student-generated questions asked of the World War II veteran:

- *Why did you fight in the war?*
- *Do you remember some of your friends from the war?*
- *Which countries did you fight over?*
- *Where did you live during the war?*
- *Were there any women in World War II? If so, what were their jobs?*
- *What started the fighting?*
- *Why was Canada involved?*
- *What was your safe place?*

In this example, Tami systematically aided her primary students in thoughtfully constructing questions by teaching four tools. Notice, *teaching* the tools is not the same as giving students the answers or doing the thinking for them. Tami did not indicate to students the questions they might ask; rather she helped them develop the intellectual resources they needed to thoughtfully complete the task for themselves. Not only was these students' ability to pose powerful questions aided by the tools their teacher helped them acquire, their understanding of the subject matter—in this case the significance of Remembrance Day—was also enhanced by the experience.

As this example suggests, embedding critical thinking in the teaching of subject matter and skills has a double-edged benefit: students are more likely to master the curriculum outcomes that we want them to learn, and critical thinking will finally occupy the prominent role in elementary and secondary classrooms that it deserves.

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U-SHAPED DISCUSSION

The *U-shaped Discussion* strategy offers an alternative to the traditional two-sided debate. Instead of an adversarial debating format, this strategy encourages students to see the merits of all sides and to recast binary options as positions along a continuum. The goal is to encourage students to endorse positions provisionally while listening to others in an attempt to figure out the most defensible personal stance along a continuum of possibilities. Stress that students are not to try to convince others, but merely to explain why the position they are sitting in is the most defensible one for them. There is no need to reach consensus on the issue.

To use this approach with older students:
- arrange the class in a U-shape
- ask students with polar views (i.e., either strongly agreeing or strongly disagreeing with the proposition) to seat themselves at either tip of the U; ask students with mixed opinions to sit at appropriate spots along the rounded part
- ask students at each tip of the U to state their position and offer a few reasons only (if there is an imbalance in strong support for one side or the other, locate yourself temporarily in a polar position to get the discussion going)
- alternate from side to side, as students from all parts of the U offer their views
- encourage students to physically move along the spectrum if they have heard reasons that cause them to want to shift their intellectual position on the issue.

To use this approach with younger students:
- invite students to individually decide which of three answers best represents their thinking: No, Yes or Maybe
- ask the Maybe group to stand in line across the front of the class and invite several spokespersons to explain their reasoning; when they are done, ask if any students in the audience have changed their mind and, if so, invite them to join the Maybe group
- ask the No students to form a line along the side of the classroom perpendicular to the Maybe group and invite a few spokespersons to present their reasons; when they are done, ask if any students have changed their mind and invite them to join one of the groups
- ask the Yes students to line up on the other side of the classroom facing the No side (the three lines should form a U shape) and invite several spokespersons to present their reasons; when they are done, ask if any students have changed their mind and invite them to join one of the groups
- encourage students who are in the Yes or No line to move closer to the Maybe line, if they are so inclined; conversely, invite students in the Maybe line to move to one end or the other, if they are attracted to that position
- invite further discussion, encouraging students to change their minds when they hear reasons that cause them to question their current position.

Invite students to use the rubric *Self-assessment of discussion* to help them assess their preparedness for the discussion. You can use the rating scale found in *Assessing U-shaped discussion* to assess student performance while listening to the discussion.

SELF-ASSESSMENT OF DISCUSSION

	Exemplary	Good	Satisfactory	Developing	Remedial
Background knowledge • accurate use of relevant facts	• I am able to refer to many relevant facts, always with accuracy	• I am able to refer to relevant facts, most often with accuracy	• I am able to refer to some relevant facts, usually with accuracy	• I am able to refer to a limited number of relevant facts with little accuracy	• I am able to refer to few or no relevant and accurate facts
Open-mindedness • open to consider a variety of views • willing to re-think position based on new evidence or arguments	• I always carefully consider all viewpoints presented • I am always willing to reconsider my position when evidence or arguments warrant	• I usually consider most viewpoints presented • I am usually willing to reconsider my position when evidence or arguments warrant	• I occasionally consider a variety of viewpoints presented • I am sometimes willing to reconsider my position when evidence or arguments warrant	• I seldom consider other viewpoints • I am rarely willing to reconsider my position even when evidence or arguments warrant	• I rarely or never consider other viewpoints • I am always reluctant to reconsider my position when evidence or arguments warrant
Reasoned judgment • uses evidence to reach an informed decision • considers criteria when making a decision	• My decisions are always based on available evidence • I always consider the range of criteria when arriving at a decision	• My decisions are usually based on available evidence • I usually most of the criteria when arriving at a decision	• My decisions are sometimes based on available evidence • I sometimes consider criteria when arriving at a decision	• My decisions are seldom based on available evidence • I seldom consider criteria when arriving at a decision	• My decisions are rarely or never based on available evidence • I rarely or never consider criteria when arriving at a decision

ASSESSING U-SHAPED DISCUSSION

Use the following scale to score student performances: 4= Exemplary   3 = Good   2 = Satisfactory   1= Developing   R= Remedial

Student names	Background knowledge • accurate use of relevant facts	Open-mindedness • open to consider a variety of views • willing to re-think view and position based on new evidence or arguments	Reasoned judgment • uses evidence to reach an informed decisions • considers criteria when making a decision
	4 3 2 1 R Comment:	4 3 2 1 R Comment:	4 3 2 1 R Comment:
	4 3 2 1 R Comment:	4 3 2 1 R Comment:	4 3 2 1 R Comment:
	4 3 2 1 R Comment:	4 3 2 1 R Comment:	4 3 2 1 R Comment:
	4 3 2 1 R Comment:	4 3 2 1 R Comment:	4 3 2 1 R Comment:
	4 3 2 1 R Comment:	4 3 2 1 R Comment:	4 3 2 1 R Comment:
	4 3 2 1 R Comment:	4 3 2 1 R Comment:	4 3 2 1 R Comment:
	4 3 2 1 R Comment:	4 3 2 1 R Comment:	4 3 2 1 R Comment:
	4 3 2 1 R Comment:	4 3 2 1 R Comment:	4 3 2 1 R Comment:
	4 3 2 1 R Comment:	4 3 2 1 R Comment:	4 3 2 1 R Comment:

U-shaped discussion reflections

Initial position. Where along the continuum did you first place yourself?

Explain the reasons for your initial choice

Most important subject

Least important subject

Interesting arguments: Describe the reasons given by two students whose position in the U-shaped discussion was different from yours but caused you to wonder about or rethink your position.

Position in the U-shaped discussion:	Position in the U-shaped discussion:
Reasons	**Reasons**

Final position. If you changed corners during the discussion, to which corner did you shift? What caused you to make this change? If you did not change corners, what additional arguments or evidence reinforced your position, causing you to stay in your original position? Please explain the change(s) or continuity in your position during the discussion.

✓ I changed my position to _____ _____ ✓ I did NOT change my position	Reasons for remaining in the same or for changing my position

Justification for your final position. List the four most powerful reasons that support your final position on the issue.

Reason 1

Reason 2

Reason 3

Reason 4

ASSESSING WEBSITE CREDIBILITY[1]

Overview
In this challenge, students learn to judge the authority and credibility of information posted on the Internet. There are two format suggested: a comparative assessment of two sites (one of which is bogus) in light of nine criteria, and a pro and con assessment of individual sites in light of four criteria. Either format can be used as an independent activity or integrated into a research project. Students begin by discussing under what conditions an author is an authority on a topic and briefly apply these criteria to simple examples. Students are then introduced to the selected format and directed to assess the credibility of sites that you provide or that students identify themselves.

Pre-planning

Select credibility rating format
- Included in this challenge are two formats for assessing the credibility of Internet sites:
    - A two-page comparative chart, *Comparing credibility*, invites students to assess two sites on a similar topic in light of nine criteria. Below, we list various pairs of sites, one of which is a bogus site. If these topics do not match your curriculum focus, locate or create your own pair of suitable sites. This lesson works best if one site is plausible looking, but bogus. (You can download and modify a legitimate site to create a bogus site.)
    - A single-page pro and con chart, *Exploring credibility*, invites students to look for the merits and shortcomings of a single site in light of four criteria. These four criteria do not presuppose that students have much background on the topic. This lesson works best if the site is plausible looking, but bogus. (You can download and modify a legitimate site to create a bogus site.)
  Either format can be used as a stand alone activity. If working with students in the context of a specific research project, it may be preferable for students to assess a common sample site (or pair of sites) and then assess several additional sites identified through their own Internet search.

Select suitable websites
- Depending on the format selected, either one or two demonstration websites are need. As stated above, we recommend using a plausible-looking bogus site. Below is a list of paired websites, one of which is reliable and the other is not. (Only the bogus site would be used with *Exploring credibility*). DO NOT imply to students that there is anything wrong with the site(s). Also, if student are accessing these sites by computer, give only the URL as the title might influence students. Notice whether or not students carefully read the titles when they get to the site.

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[1] This lesson is from *Using Electronic Information and Resources,* edited by Liz Austrom *et al*. Vancouver BC: The Critical Thinking Consortium, in press). Permission granted by The Critical Thinking Consortium for use by Alberta teachers.

WEBSITE PAIRS

Unreliable sites	Reliable sites
California's velcro crop under challenge http://wneo.org/24hours/ethicselemvelcro.htm	Velcro Companies http://www.velcro.com/
Dream Technologies (Clones R US) http://www.d-b.net/dti/	News on Human Cloning http://www.hawaii.edu/ur/News_Releases/NR_July98/cloning.html
Facts about growth hormone http://www.cosmicdome.com/health/	Human Growth Hormone and children http://www.bmj.com/cgi/content/full/315/7110/692
The true but little-known facts about women with AIDS, with documentation. http://147.129.1.10/library/research/AIDSFACTS.htm	American Foundation for AIDS Research http://www.amfar.org/
Feline Reactions to Bearded Men http://www.improbable.com/airchives/classical/cat/cat.html	Cat behaviour http://www.peteducation.com/whypet/older_cat_irritable.htm
Mankato, Minnesota home page http://www.lme.mankato.msus.edu/mankato/mankato.html	Elephant Butte Chamber of Commerce http://www.zianet.com/elephantbutte/index.htm

SESSION ONE

Introduce concept of authority
- Lead a class discussion on the relationship between 'author' and 'authority' by considering the following questions:
    - What does it mean to say that someone is an author?
    - What does it mean to say that someone is an authority on a topic?
    - Are all authors authorities on their topic? Why not?
    - Under what conditions would an author be an authority?

  Record student-suggested conditions on the board under the title "Criteria for credible authorities."

Practice assessing credibility
- Invite students to extend and apply criteria for credible authorities by assessing several fictitious Internet sites. Make an overheard of *Credible authorities?* and discuss each example as a class. Alternatively, distribute a copy to each student (or pair of students). If completing the activity orally, after reading each example ask students to indicate their rating using the "Fist of five" technique. Students hold up any number of fingers from five (which is the highest rating) to a closed fist (which represents a zero, or the lowest rating). Ask students to provide reasons for their rating and, if they decide the source is not very credible, to suggest a more appropriate source of information for researching the topic. Add any newly-suggested factors to the list of "Criteria for credible authorities."

Introduce the critical challenge
- When students understand some of the relevant factors for assessing credibility, introduce the critical challenge:

    Assess the credibility of Internet sites on a current research topic.

Explain the assignment
- The precise details of this assignment depend on the format you have selected, but the common elements are as follows:
    - Distribute the appropriate data chart to each student (or pair of students): either *Comparing credibility* or *Exploring credibility*. For ease of student use, you may want to enlarge these Blackline Maters to ledge size (11 x 17).
    - Referring to the left-hand column of the appropriate Blackline Master, explain each of the criteria that students should consider.
    - Explain the procedures for completing each chart. For *Comparing credibility*, students should collect specific evidence relevant to each criterion for both sites. They should then rate each site using the scale provided. For *Exploring credibility*, students should identify positive and negative features of the site relevant to each criterion and then indicate the implications of each feature for for or against the believability of the site. Illustrate the difference between a feature (e.g., the site is sponsored by Block University) and the implications of that feature (e.g., a university

might normally be a credible sponsor; Block University could be a "fly-by-night" operation and may not be at all credible).

- Provide students with the website(s) to assess, either by distributing hard copies or by providing the URL(s) for students to access on a computer. The availability of terminals may determine whether students have to work in partners or small teams.

SESSION TWO

Debrief the activity
- Once students have evaluated their site(s), invite them to present their findings to the class. Encourage students to appreciate that careful examination of the details of a bogus site is needed if errors are to be detected. Arrange for students to discuss the following questions in writing, orally as a class or in conversation with another student:
  - When did you discover the bogus site? What was your reaction?
  - What have you learned about using the Internet from this activity?
  - Will this activity change the way you will research in the future?

Extend to research project
- OPTIONAL: If students are about to reach a topic, direct them to use the selected format to assess at least four sites and select the most credible site. In addition to gathering evidence on each site using copies of either rating scale, you may want students to justify their final choice on *Overall assessment*. Prior to this, provide students with feedback on the demonstration assignment using the assessment rubric found either in *Assessing the ratings* or in *Assessing strengths and weaknesses*.

Assessment
Assess credibility ratings
- Assess student rating of the credibility of the two sites as recorded on *Comparing credibility* using the rubric found in *Assessing the ratings*. According to this rubric, the assignment is based on three criteria:
  - identifies relevant evidence;
  - includes important points;
  - justifies ratings.

Assess strengths and weaknesses
- Assess students identification of the sites strengths and weaknesses as recorded on *Exploring credibility* using the rubric found in *Assessing strengths and weaknesses*. According to this rubric, the assignment is based on four criteria:
  - identifies relevant features;
  - offers plausible implications;
  - includes important points;
  - justifies ratings.

Assess the final selection
- Assess students justification of the more/most credible site as recorded on *Overall assessment* using the rubric found in *Assessing the final selection*. According to this rubric, the assignment is based on two criteria:
  - identifies strengths of preferred site;
  - identifies strengths of weaker site(s).

References
For more paired sites see Winter, Ken (1998). *Compare these sites*. [online]. http://www.vmi.edu/library/kw/compare.htm. Preview this site before giving it to students.

CREDIBLE AUTHORITIES

How credible is each source for the research topic?

	Credibility rating	Reasons for rating
Research topic: lung cancer **Source of information**: a website created by the tobacco industry	No credibility High credibility 0 1 2 3 4 5	
Research topic: requirements for attending University of Toronto next fall **Source of information**: a University of Toronto website created in 1994	No credibility High credibility 0 1 2 3 4 5	
Research topic: Canada's Olympians **Source of information**: a website created by the Canadian Olympic Association	No credibility High credibility 0 1 2 3 4 5	
Research topic: global warming (for a Science project) **Source of information**: a website created by a Grade 7 class	No credibility High credibility 0 1 2 3 4 5	
Research topic: what type of car to purchase **Source of information**: a website created by Nissan	No credibility High credibility 0 1 2 3 4 5	

COMPARING CREDIBILITY

In the appropriate boxes, record specific evidence relative to each criterion and then use the following scale to rate each site.

1	2	3	4	5
Very clearly fails to meet criterion	**Mostly fails to meet criterion**	**No clear evidence either way**	**Mostly meets criterion**	**Very clearly meets criterion**

BELIVEABILITY	Website #1:_____ Address:_____	Website #2: _____ Address:_____
Author's credentials The author appears to be knowledgeable, reliable and truthful including solid education, training and experience; provides contact information; has good reputation among peers and belongs to a known and respectable organization.	1 2 3 4 5	1 2 3 4 5
Quality checks The writing is polished, and free from grammatical errors or misspelled words. Website is sponsored by an organizational or has been reviewed or edited others. Has been recommended, received positive reviews	1 2 3 4 5	1 2 3 4 5
Believability score	**/10**	**/10**

SUITABILITY

Currency The ideas are up-to-date and there is clear indication that the site has been recently updated or reviewed; or the ideas are unlikely to become outdated.	1 2 3 4 5	1 2 3 4 5
Match with audience and purpose The site matches the intended audience and purpose—it is not too simple or too complex.	1 2 3 4 5	1 2 3 4 5
Suitability score	**/10**	**/10**

69

REASONABLENESS

Consistency within the text Statements in the text do not contradict each other.											
	1	2	3	4	5	1	2	3	4	5
Balance arguments Is not heavily one-sided relying largely on emotional appeals? Offers a balanced presentation. Provides clear and abundant argument to support opinions. Does not make sweeping statements and excessive claims.	1	2	3	4	5	1	2	3	4	5
Reasonableness score	**/10**					**/10**					

SUPPORT FOR IDEAS

Consistency with personal knowledge The information is consistent with your own background knowledge on the subject.											
	1	2	3	4	5	1	2	3	4	5
Consistency with experts Refers to other evidence and research. The information matches with other expert sources on the subject.											
	1	2	3	4	5	1	2	3	4	5
Documentation of sources Provides details about the sources of information (especially for statistics) and sources of graphics (including pictures and photographs).											
	1	2	3	4	5	1	2	3	4	5
Support for ideas score	**/15**					**/15**					

TOTAL SCORE	**/45**	**/45**

Adapted from the CARS framework for analysis found in Harris, Robert (1997). Evaluating Internet research sources. [Online]. Available http://www.sccu.edu/faculty/R_harris/evalu8it.htm

EXPLORING CREDIBILITY

Name of site: _____

	Reasons for confidence		Reasons for Doubting	
	Evidence from site	*Implications for believability*	*Evidence from site*	*Implications for believability*
Authorship What do we know of the creators of the site that might affect the believability of its contents?				
Sponsorship What do we know of the individual(s) or group(s) who sponsored the site that might affect the believability of its contents?				
Sources of ideas What do we know about how information was obtained and verified that might affect the believability of its contents?				
Indicators of care Does the site's presentation style, tone and format provide clues about the believability of its contents?				

Overall, the site has ☐ very high credibility ☐ good credibility ☐ some credibility ☐ no credibility because

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71

OVERALL ASSESSMENT

I believe that the web site_____ is more/most credible

My most important reasons, with specific evidence, are as follows:

1.

2.

3.

4.

5.

I recognize that the other web site(s) has some strength relative to the one I have selected. In particular, the important strengths, with specific evidence, are as follows:

1.

2.

3.

4.

5.

Nevertheless, I believe these are not as significant as the strengths of the web site I have judged more/most credible for the following reasons:

ASSESSING THE RATINGS

	Underdeveloped	Competent	Well developed
Relevant evidence	Few ideas are related to the criteria where they are placed.	Many ideas are relevant to the criteria where they are placed.	All ideas are related to the criteria where they are placed.
Important points	Virtually no important points for judging credibility are identified for each criterion.	Approximately one important point for judging credibility is identified for each criterion.	Two or more important points for judging credibility are identified for each criterion.
Justified ratings	The rating for each criterion is not justified by the available evidence.	The rating for each criterion is generally somewhat justified by the available evidence.	The rating for each criterion seems completely justified by the available evidence.

Comments

ASSESSING STRENGTHS AND WEAKNESSES

	Underdeveloped	Competent	Well developed
Relevant features	Few identified features are relevant to the criteria where they are placed.	Many identified features are relevant to the criteria where they are placed.	All identified features are relevant to the criteria where they are placed.
Plausible implications	The implications drawn from the identified features are not plausible.	The implications drawn from the identified features are often plausible.	The implications drawn from the identified features are consistently very plausible.
Important points	Virtually no important points for or against credibility are identified for each criterion.	One important point for and against credibility is identified for each criterion, but others are missed.	The most important points for and against credibility are identified for each criterion.
Justified conclusion	The conclusion is not justified by the available evidence.	The conclusion is somewhat justified by the available evidence.	The conclusion seems completely justified by the available evidence.

Comments

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ASSESSING THE FINAL SELECTION

	Underdeveloped	Competent	Well developed
Strengths of preferred site	Provides relatively minor or implausible strengths of the preferred site.	Provides at most three strengths of the preferred site that are both plausible and important.	Provides five or more important and plausible strengths of the preferred site.
Strengths of weaker site(s)	Provides relatively minor or implausible strengths of the other site(s).	Provides at most three strengths of the other site(s) that are both plausible and important.	Provides five or more important and plausible strengths of the other site(s).

Comments

Teaching for Conceptual Understanding

Everyday, everywhere we look, we are surrounded by concepts. It is our understanding of these concepts that permit us to make effective decisions and take appropriate actions. The central objective of teaching for conceptual understanding is to deepen the understanding of the names and labels that humans have given to almost everything that exists in the world around us. Once these mental constructs are deeply understood, they become not only powerful but necessary tools for making sense of our world and the interconnectedness within it. Conceptual understanding allows students to break down the inherent complexity of their learning about the world into manageable pieces by classifying, and making meaning, of the elements within it.

Fundamentally, as the human mind naturally makes sense of the world by recognizing and classifying elements within it, most strategies that serve to deepen conceptual understanding revolve around the sorting of examples that contain the essential attributes of a concept and examples that do not. Consider a child learning relatively early in life the subtle differences between a cat and dog. While observing examples of each, they learn to recognize with relative ease that both cats and dogs possess and walk on 4 limbs, have hair, eyes, and ears and are kept as pets yet cats meow while dogs bark. The child develops an understanding of the concepts of 'dog' and 'cat' by considering and sorting the attributes of each as they hear, touch, and see a wide range of examples of each. This idea of sorting "yes" examples and "no" examples is foundational to most instructional strategies that support the teaching of conceptual understanding. Most importantly, by ensuring that students sort these examples by explicitly considering the evidence in the attributes that differentiate one from the others, they systematically arrive at a deepened, justifiable conceptual understanding. Through critical inquiry students capitalize on their natural tendency to conceptualize allowing them to make meaning and create new knowledge about the world in which they live.

Although conceptualizing is a natural human tendency, doing so effectively and efficiently requires some learning scaffolds to be in place for the students. There are three supports that assist students in becoming proficient conceptualizers; focus, conceptual control and skill (see Bruce Joyce). Focus allows students to work on a specific domain of inquiry that does not at the same time remove the opportunity to generate ideas. Students explore more specific concepts within a broader one such as letters within the alphabet. Conceptual control allows students to explore the relationships between examples in a specific domain, for example, how are some letters different or the same as others. The third, skill, addresses the need for students to justify their classifications or hypothesis with supporting evidence from the examples of the concept. As students become more comfortable with the processes involved in developing conceptual understanding, a gradual release of responsibility for the processes from the teacher to the student naturally occurs.

Strategies Supporting the Teaching of Conceptual Understanding

Concept Attainment

Concept attainment invites students to examine a set of examples including those that embody the essential elements of the concept being explored as well as those that do not. Students compare the 'yes' examples and contrast these with the 'no' examples looking for patterns in the characteristics common to the 'yes' examples; these characteristics effectively serve to define the concept in the students' own words.

There are three basic steps involved in the effective use of the strategy of concept attainment: first, a set of yes and no examples of a concept are shared with the students (either one by one or simultaneously); second, students hypothesize about the essential elements of the concept, providing evidence from the data set of examples to support their conjectures; third, students apply and extend their conceptual understanding in further inquiry possibly in the form of a critical challenge. Concept attainment is considered an inductive thinking strategy as students move from the specific attributes embodied in the examples of a concept to a more general understanding of the nature of the concept.

This inductive model encourages students to look at the evidence in the examples with a critical eye, paying close attention to detail, organizing that evidence to form broader conceptual understandings that they can justify, and learn to manipulate this understanding from a wide range of perspectives to continuously inquire into the interconnected nature of their world.

Concept Formation

Similar to other instructional strategies used to teach conceptual understanding, concept formation also invites students to examine a data set of examples. Students may either be presented with or generate their own list of data. The source of these data may take on a variety of forms including written, oral or visual. These data are then grouped into categories defined by the common or critical attributes or properties they possess (much like Sesame Street's "one of these things belongs with the other). Students articulate a set of criteria that must be satisfied to allow items to be place together, each criteria supported by evidence from the data set to justify the classification. The open-ended nature of the sorting of examples in this strategy allows classifications to be creative and divergent in nature.

Once examples have been classified, students label or name the groupings. To assess the appropriateness of their labels, the criteria developed by the students to define each grouping are applied to the names or labels. Having constructed meaning of the concepts they have explored, student may now be invited to consider other examples of the concepts, the relationships that exist between concepts, and further inquiry that requires the application of the concepts.

Concept Recognition

Unlike concept attainment and concept formation, this strategy is a deductive thinking strategy in which students are provided the names of the concept and a list of their essential attributes. Using these attributes as criteria for judging the degree to which an example represents the concept, students are asked to sort examples and non-examples into those belonging to the concept grouping and those that do not. As

a community of thinkers, students and the teachers assess the viability of each sorted example and then extend apply their conceptual understanding in further inquiry.

Conceptual Similes/Metaphors

The power of the strategy of conceptual similes or metaphors lies in its flexibility as it may be used either deductively or inductively to teach conceptual understanding. As a deductive thinking strategy, students are invited to complete a prompt in the form of a metaphor or simile drawing from a set of examples and non- examples. Although these examples may take on a visual, written or oral form, students are required to sort through each of the examples to determine which ones work in the metaphor or simile and which do not. As in the strategy of concept recognition, students are provided the essential attributes of the concept in the prompt. Using evidence from the examples and the essential attributes as criteria, students justify their completion of the prompt. A possible extension to this strategy would be to ask the students to select the most effective example for use in the metaphor or simile along with a supporting justification for their choice.

As an inductive thinking strategy, a concept is introduced using a series of metaphors or similes all developed around the same concept. Students study these metaphors or similes as yes examples of the concept to uncover its essential attributes. A number of additional examples are then explored, including both yes and no examples of the concept. Students identify to what degree each metaphor or simile accurately depicts the concept and which does not, each time justifying their conclusion using evidence from the examples and the list of essential attributes previously developed. As this process continues, this list of attributes would naturally be modified to align with the deepened understanding of the concept. As a check for understanding, student may try their own hand at created in metaphor or simile for the concept, accompanied by an assessment of how well their response meets the criteria of attributes.

*This strategy is especially useful when exploring challenging abstract concepts as it helps students relate abstract to concrete notions in their brains. It's also a way of increasing engagement since teachers can choose metaphors and similes that generate interest. (*Stefan)

Examples: Canada gaining autonomy from Britain is like a child growing up and becoming independent. Capitalism is like the African Savannah.

For the later example, the teacher could show a brief video that shows competition and survival of the fittest on the African Savannah and then connect this to capitalism initially focusing on the ways in which the simile works and eventually pointing out ways that it doesn't work.

Word Sorts

Word Sorts are used primarily as a literacy strategy either before or after reading. Words sorts encourage students to think critically as they explore relationships between words in relation to the text they are preparing to read or have read. As a pre-reading strategy students use their background knowledge to predict and set a purpose/context for reading. As a post-reading strategy, students reflect on, and process, their learning from the reading.

There are two types of word sorts: open and closed. In closed word sorts, students receive the category titles they are to sort and classify the words under. In an open word sort, students categorize words and name the resulting groupings. In both types of sorts, students provide a justification for why they have sorted the way they have (Vacca & Vacca, 1999).

In both types of word sorts, students may be provided with a set of words or they may be asked to select the words. This selection of words should align to a particular objective. For example, if the objective of the sort is to have students predict prior to reading, the words should be taken directly from the text. In addition, if exploring new vocabulary is also part of the objective, students may be ask to select words they are unfamiliar with.

Word sorts, like the strategy of conceptual similes and metaphors, are quite flexible in their design, and may serve as either a deductive or an inductive thinking strategy.

Conceptual Walk-About

One of the best ways to develop a conceptual understanding is to actually experience a concept, using our human senses of sight, sound, smell, touch and taste to examine the concept in action. This experience may be either authentic or simulated, but either way, examining a concept as it relates to other concepts in its natural setting provides all of the necessary details to identify its essential elements.

In a conceptual walk about, students physically take a walk and observe the concept in its natural setting, such as on a field trip. Of course it is not always possible to provide such experiences to students every time they learn a new concept. A simulated walk about, in which students are provided with as close an experience to that which is real may be used. This may include a video of an actual walk about or the use of artefacts in the classroom to simulate the experience. In all cases, the same processes used in either concept attainment, concept formation or concept recognition may be used to develop conceptual understanding.

Deconstructing the Name of the Concept

Often a wide range of vocabulary strategies may help students identify the essential attributes of a concept, after all concept names are simply labels used to describe the function, purpose and attributes of a concept. By studying the definitions, etymology, derivative words as well as the synonyms and antonyms of a concept's name, students may arrive at a fairly good sense of the critical attributes of a concept. Taking this one step further by inviting students to compare and contrast these with the definitions, etymology, etc. of similar concepts will help to further refine this understanding. Although this is not the most authentic manner to engage students in the development of conceptual understanding, it provides a means of differentiation for students who are highly linguistic.
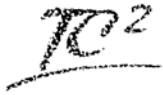
ASKING POWERFUL QUESTIONS

Overview

The detailed suggestions that follow help students learn to frame effective questions. In preparation for a visit by a classroom guest, students brainstorm criteria for a powerful question and then use these criteria to assess generated questions. Each student selects a powerful question to ask of the guest.

Pre-Planning

Build background knowledge.

- In the days and weeks leading up to a visit by a guest, build students' background knowledge about the topic that will be the focus of the guest's visit. This may mean reading stories or sharing pictures.

SESSION ONE

Introduce the upcoming guest.

- Explain that a guest will be coming in the near future to talk about a topic that the class has been studying. Provide background about the guest and invite students to consider what they would like to learn form this guest. Ask students to think about what would be a really good question–a really powerful question–to ask.

Discuss the concept of criteria.

- If the class has not previously worked with the concept of criteria, provide a definition (e.g., criteria are how we recognize whether something is what we say it is) and invite students to provide examples of criteria for familiar things; e.g., What does a nice person look like? Do? Sound like? What would a mean person look like? Do? Sound like?

Explore criteria for a powerful question.

- As a class, brainstorm criteria for a powerful question. From the brainstormed list, ask students to select up to five criteria that they think are most important in recognizing a powerful question (see sample criteria below). You may want to cluster similar criteria into a more encompassing term.

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Criteria for Powerful Questions

- give you lots of information
- are specific to the person or situation
- are open-ended; i.e., can't be answered by yes or no
- may be unexpected
- are usually not easy to answer

This list of criteria was generated by a multi-aged class of K to Grade 3 students at Charles Dickens Annex in Vancouver, British Columbia.

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Brainstorm possible questions.
- Ask students to think of questions they would like to ask of the guest. Encourage students to use the criteria in formulating their questions. Record questions generated during the class brainstorming.

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Powerful Questions Asked of a World War II Veteran

- *Why did you fight in the war?*
- *Do you remember some of your friends from the war?*
- *Which countries did you fight over?*
- *Where did you live during the war?*
- Were there any women in World War II? If so, what were their jobs?
- *What started the fighting?*
- *Why was Canada involved?*
- *What was your safe place?*

These questions were generated, using the criteria listed above, by a multi-aged class of K to Grade 3 students at Charles Dickens Annex in Vancouver, British Columbia.

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Identify powerful questions.
- Model how to use the **Student Checklist** to evaluate the quality of the questions provided during the brainstorming. Point out the criteria in the LH column of the checklist. Involve the students in providing evidence of how the question meets the criteria for a powerful question as well as providing suggestions for improving questions that do not yet meet the criteria for a powerful question.

Sample #1

Student Checklist: Are my questions powerful?

This is one of my questions:

Why did you fight in the war?

Is the question:	Yes, because . . .	No, but here's how I can make it better:
• open ended? Will it give me more than a yes-no answer?	My question is a **why** question. The guest will have to explain his reasons.	
• specific to the person or situation? Will it give me important information?	The question asks him to tell why **he** fought so it is specific to him.	
• not too easy to answer? Will it give me interesting information?	I think it will give me interesting information. I don't know anyone who fought in the war. I want to know why he wanted to go and be in the war.	

Sample #2
Student Checklist: Are my questions powerful?

This is one of my questions:

Do you remember some of your friends from the war?

Is the question:	Yes, because . . .	No, but here's how I can make it better:
• open ended? Will it give me more than a yes-no answer?		Who were some of your friends from the war? Do you still see any of them?
• specific to the person or situation? Will it give me important information?	The new question will give me specific information about **his** friends.	
• not too easy to answer? Will it give me interesting information?	The new question will give me interesting information. I think it will be fun to hear stories about our guest's friends.	

- Ask each student to write out two or more powerful questions they would like to ask of their guest. Make it clear that students will NOT be required to ask their questions orally if they do not wish to do so.
- Involve the students in self reflection or peer coaching using the Student Checklist to evaluate the quality of their questions. Adjust the criteria on the Student Checklist to align with the criteria generated by the class. Encourage students to make adjustments to their questions based on the evidence identified in the checklist.

SESSION TWO

- On the day of the guest's visit, invite students ask one of their questions, if they wish to do so. If more questions are desired than are volunteered orally by the students, the teacher could make the handwritten questions available to the guest.

Debrief the visit.
- After the guest has gone, discuss what students learned. Ask students which questions they thought generated the most interesting responses. Revisit the previously developed list of criteria, adding or modifying items to reflect the lessons learned from this experience. Post the revised list in the classroom for future reference.

EVALUATION

Criteria for Evaluation

Students provide evidence of their learning as they:
- ask powerful questions.

The above criterion is based on the following social studies grade level outcomes:

SKILLS AND PROCESSES

▶ RESEARCH FOR DELIBERATIVE INQUIRY

K.S.7   •   ask questions to make meaning of a topic
1.S.7   •   ask questions to make meaning of a topic
2.S.7   •   develop questions that reflect a personal information need
3.S.7   •   develop questions that reflect a personal information need
7.S.7   •   formulate new questions as research progresses

Cross-Curricular Links

Cross-curricular links for the skill of asking questions are found within English Language Arts General Outcome 3 for grades Kindergarten through Grade 5:

> *3.1 Plan and Focus*
> **Determine information needs**

Assessment for Learning (formative)
The **Student Checklist** evaluation tool provides a structure for formative assessment. Although designed for students to use independently or with peers, teachers can also use the tool in personal conferencing contexts with students. Over time, students gain experience in using criteria to evaluate their questions. As students internalize the criteria for powerful questions, they may not need to use this checklist in a formal way each time.

Assessment of Learning (summative)
Summative assessment takes place after students have had the opportunity to practice, receive feedback and adjust the quality of their questions. Summative assessment is not recommended during students' first experience with the skill of asking powerful questions, but will be more appropriate when applied in a new learning context.

When appropriate, the evaluation tool, **Rubric for Asking Powerful Questions** can be used by teachers to evaluate the quality of the questions generated by students. Note that this rubric requires teachers to make a holistic professional judgement about the quality of the questions each student has created and anticipate the ability of the questions to generate a quality response.

The formative tool (Student Checklist) works hand in hand with the summative tool (Rubric). As students work to improve the quality of their questions and compile more evidence in the 'yes' column of the checklist, their position on the rubric moves towards the higher levels. Exemplars of student work can provide another source of support for students in helping them understand what quality responses look like.

Student Checklist: Are my questions powerful?

This is one of my questions:

| |
| |

Is the question:	Yes, because . . .	No, but here's how I can make it better:
• open ended? Will it give me more than a yes-no answer?		
• specific to the person or situation? Will it give me important information?		
• not too easy to answer? Will it give me interesting information?		

Rubric for Asking Powerful Questions

Level Criteria	4 **Excellent**	3 **Proficient**	2 **Adequate**	1 **Limited** *	**Insufficient / Blank** *
Asks powerful questions	Asks **perceptive** questions that would encourage a **comprehensive** response.	Asks **focused** questions that would encourage a **substantial** response.	Asks **reasonable** questions that would encourage a **basic** response.	Asks **imprecise** questions that would likely result in a **sketchy** response.	No score is awarded because there is insufficient evidence of student performance based on the requirements of the assessment task.

Extension

Apply the procedure in other contexts.

- Repeat this activity as other guests visit the class or when students frame questions in preparation for studying a topic or when engaged in inquiry projects.
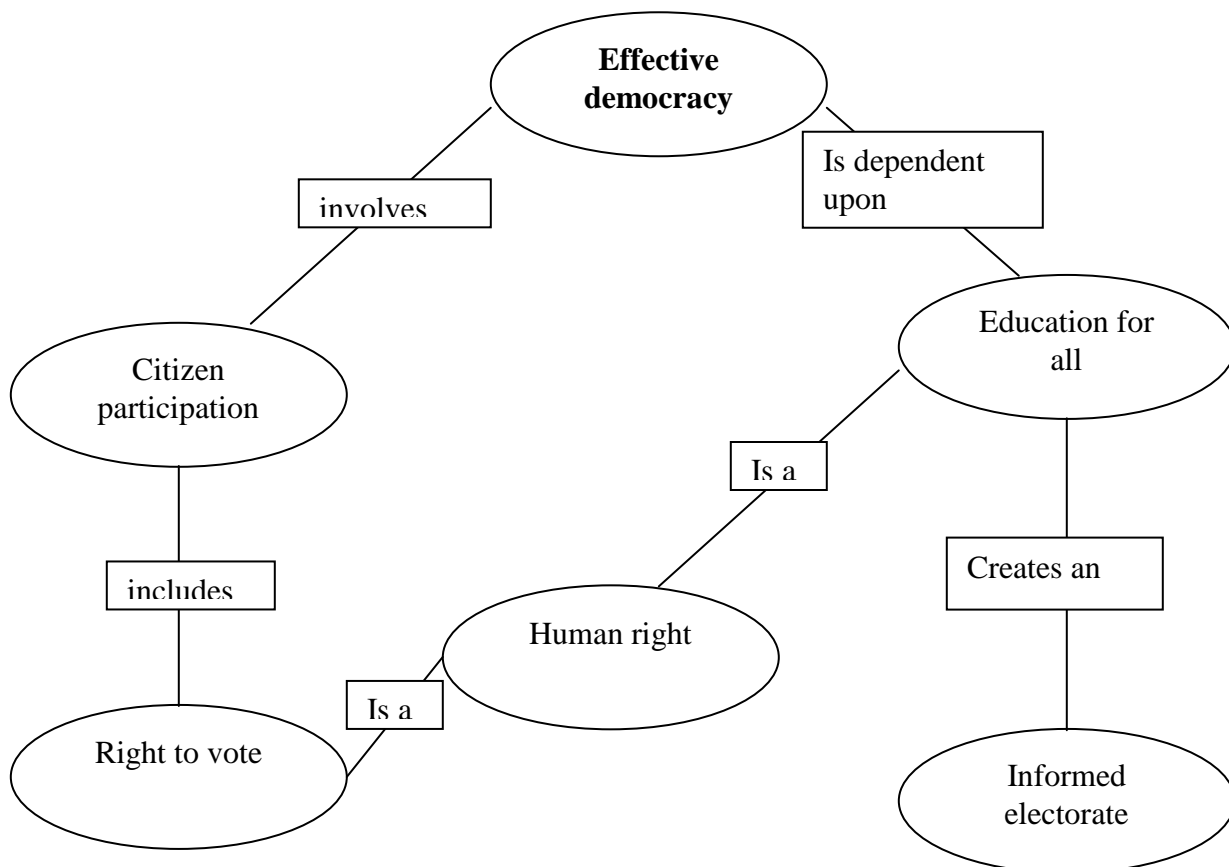
Credits

Adapted from *Critical Challenges Across the Curriculum* series. Permission granted by The Critical Thinking
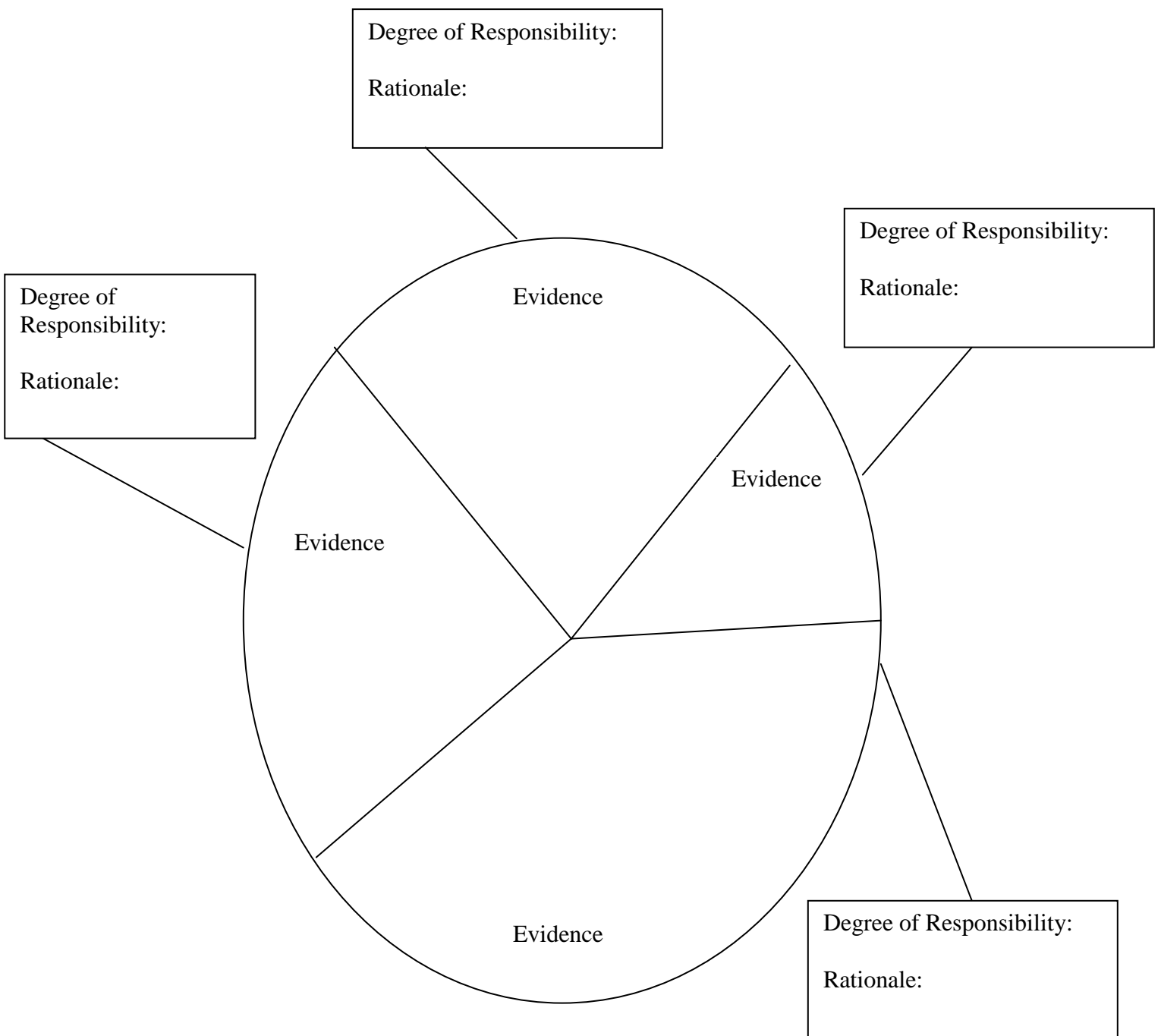
Concept Mapping

Concept mapping provides students with a strategy that helps them to establish relationships between ideas and concepts and to make causal connections. Typically, concepts maps begin with the central concept at the top of the page and flow downwards. Students make connections beginning with the central concept and related concepts. The essential difference between a mind map and a concept map is that whereas a mind map clusters related ideas together, concept maps establish relationships between concepts. The connections are made through verbs or verb phrases placed on the linking lines. Note, the intent of a concept map is not to create a flow but rather to establish the relationships between terms and concepts. When properly constructed, a concept map clearly establishes the relationship between terms allowing the viewer to see the connections between any two terms/concepts. As students become comfortable with creating concept maps, you may want to invite them to integrate relevant pictures or symbols to support their thinking.

Sample Concept Map

Creating a Pie Chart

A pie chart is an effective tool for students to use when asked to determine the degree of responsibility or culpability – to what degree should person/group x be held accountable or be given credit for a particular action. Students would visually represent the degree of responsibility or accountability by dividing the pie chart into representative pieces. Inside each piece (or off to the side if the piece is too small) students should list in point form the most compelling evidence that explains why the level of responsibility was assigned. It is important students consider both why less and why more responsibility was not assigned. Using the pie chart helps students to see a) events often have multiple causes and agents, and; b) there are both direct and indirect causes to events. Someone may be assigned a portion of responsibility despite playing only a peripheral role in the event.

Degree of Responsibility:

Rationale:

Degree of Responsibility:

Rationale:

Degree of
Responsibility:

Rationale:

Evidence

Evidence

Evidence

Evidence

Evidence

Degree of Responsibility:

Rationale:

Productive peer critique

Just as there are criteria for judging the merits of a presentation or making a choice between plausible alternatives, productive critiques have criteria for success. Consider the following:

- *respectful*: comments should not be mean-spirited, insulting or condescending
- *warranted*: comments – whether positive or negative- should not be trivial, exaggerated or unfounded,
- *specific*: comments should identify particular aspects, as opposed to very vague remarks (using an example, illustrate the value of the specific item rather than vague general comments),
- *constructive*: the primary purpose of critique is to improve our work – not to belittle or criticize; therefore, advice on how to improve is preferable to comments that merely note areas of strength or weakness.

The terms of a critique

Lead with positives: comment in an *unqualified* manner on strengths. The purpose of starting from this perspective is to reduce the anxiety all of us feel when putting our work forward. Our goal is always to help make our work the best it can possibly be.
Suggest areas for improvement: only after much positive feedback has been shared, offer specific suggestions fro improvement.

Advice for hearing critiques of your work

Assume an active listening role by limiting comments to:

- asking for clarification or elaboration,
- checking for understanding and,
- determining whether or not the ideas held by the commentator are widely held.

Remember…

You do not have to defend what you have done, only to hear what others say.

You get to decide for yourself which, if any, of the comments are worth acting upon.

It requires courage to volunteer to subject your work to public scrutiny. Hearing, and then selecting from what you hear, to integrate into your work are powerful tools for producing the best effort possible.

Collaborative Note-taking

Reflective questions:	My point form notes on key facts, terms, ideas and concepts:	
	•	
	•	
	•	
Reflective questions:		
	•	
	•	
	•	
Reflective questions:		
	•	
	•	

Connections with other topics or the contemporary world:

Critical Challenge Planning Package

Grade: **Subject:**

Topic: **Destination:**

Step One:

Identify the learning targets for the challenge. These targets should consider:
- ☐ Overall expectations
- ☐ The achievement chart
- ☐ Literacy goals
- ☐ Social goals (Character)

As targets, these are the universal design components – or the goals you want all students to achieve. You will differentiate the scaffolding in order to assist students to hit the learning targets but the learning targets should be fixed.

Overall Expectations	Connection to the Achievement Chart	Learning Target: What will achievement of the overall expectation look/sound like?
	Knowledge and Understanding: What students should *know* – concepts, ideas, events, people	
	Thinking: What students will *do* – to initiate inquiry and/or to process information to arrive at a reasoned assessment or judgment	
	Application: How students will *apply* – the connections they will make to create new knowledge	
	Communication: How students will *communicate* their learning and the role of purpose and audience	

Step Two:

Frame the critical challenge. Considering the learning targets and the students for whom the critical challenge is intended, identify the task to be completed. Consider:

- ☐ Does the task require reasoned judgment from among a range of options?
- ☐ Is the task age/grade appropriate?
- ☐ Does the task address the learning targets identified?
- ☐ Will the task engage the students?
- ☐ Is the task focused enough to be manageable for the students?

Type of Challenge:
- ☐ **Critique the Piece**
- ☐ **Judge the Better or the Best**
- ☐ **Decode the Puzzle**
- ☐ **Re-work the Piece**
- ☐ **Design to Specs**
- ☐ **Perform to Specs**

Overarching Critical Challenge:

In this challenge students will … (identify the learning targets) by … (explain the nature of the task to be completed.

How the challenge will be contextualized to engage the students:

Synopsis of the Critical Challenge:
By drawing together the pieces of the challenge identified so far, craft a paragraph overview of the critical challenge that will be used to engage students and address the overall expectations.

Teaching the Tools

Background Knowledge:
What background knowledge is required by students for them to be successful? (concepts, ideas, events, people). Note the background identified here should be part of Universal Design – important for all students.

Differentiation: How can students access the background they will need in different ways?

Literacy Supports: What literacy strategies would be most appropriate to support students in accessing the requisite background knowledge?

Criteria for Judgment:
What criteria will help guide students in their learning and frame their deliberations?

Criteria relating to the issue being studied:

Criteria relating to the end product:

Universal Design and Differentiation: Which of the criteria was central to the issue or task and which are expendable?

Critical Thinking Vocabulary:
Which terms relating to thinking need to be unpacked with the students in order for them to understand the challenge and to respond appropriately?

Thinking Strategies:
What thinking strategy(ies) will best assist students in processing the information they have gathered (see connections, draw plausible conclusion, read between and beyond the lines).

Habits of Mind:
Identify 1-2 central habits of mind and explain how they will be explicitly addressed through the critical challenge.

Identify 2-3 habits of mind that will be on the periphery of the challenge.

Steps to Teaching to the Challenge:
Outline the process by which you will introduce the challenge, teach the tools to support and engage students in completing the challenge.
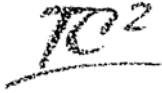
Mini-Critical Challenge Planning Template

Grade: 4-8   **Topic/Issue:**   **Create a headline**

State the Critical Challenge:

Create a great a headline for a news story/ title for a book.

Identify the Type of Challenge:

- ☐ **Critique the Piece**
- ☐ **Judge the Better or the Best**
- ☐ **Decode the Puzzle**
- ☐ **Re-work the Piece**
- ☐ **Design to Specs**
- ☐ **Perform to Specs**

Explain the Critical Challenge:

In this challenge students will demonstrate an understanding of what makes an effective headline/title by creating a great headline for an article provided or suggesting the title for a book that we have read.

Synopsis of the Critical Challenge:
By drawing together the pieces of the challenge identified so far, craft a paragraph overview of the critical challenge that will be used to engage students and address the overall expectations e.g.

Share with students a headline from a newspaper or magazine that is effective and suggest to them that the headline works because it is catchy, concise, informative and relevant. Provide students with a news story (video clip, written text, etc) and suggest three possible titles. Invite students to select the best title considering the four criteria provided (catchy, concise, informative and relevant). Finally, provide students with an article from a newspaper or magazine with the headline removed. Invite students to create a great headline for the article that meet the four criteria. To differentiate this task you may want to have a variety of articles of differing reading levels and interests available for students.

For younger students, you may want to have them create a great title for a book that you have read. Avoid showing the title of the book prior to reading it. After reading the story, invite students to suggest a great title that is catchy, relevant and brief. Encourage students to share their titles.

Teaching the Tools

Background Knowledge:
Students will need to understand news reports as a text form and there may be some need to pre-teach concepts in the articles if they are unfamiliar to the students.

Criteria for Judgment:

What criteria will help guide students in their learning and frame their deliberations?

Criteria for a great headline:
- catchy
- informative
- relevant
- concise

Critical Thinking Vocabulary:
Which terms relating to thinking need to be unpacked with the students in order for them to understand the challenge and to respond appropriately?

- informative
- concise

Thinking Strategies:
What thinking strategy(ies) will best assist students in processing the information they have gathered (see connections, draw plausible conclusion, read between and beyond the lines).
- brainstorming
- sorting

Habits of Mind:
Identify 1-2 central habits of mind and explain how they will be explicitly addressed through the critical challenge.

- attention to detail
- open-minded
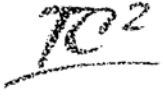
Digital Inquiry Planning Template

Element of Inquiry	Learning Target	Intellectual Tools	Learning Activities	Use of technology as an instructional tool
Frame powerful inquiry questions				
Locate and Select Sources				
Access ideas from sources				
Uncover and interpret ideas				
Assess options and make a reasoned judgment				
Present ideas				
Provide peer critiques				

OTF Thoughtful Use of Digital Learning - Outline

9:00	Welcome, introductions, objectives – C3 Inquiry – inquiry that nurtures creative, critical and collaborative thinking – distinguishing between project-based learning and inquiry-based learning
9:20	Education as transformation – a discussion on the goals of 21st century education
9:40	Considering Dimensions of Engagement – considering 3 factors that impact on student engagement (challenge, relevance, and concentration) and how classrooms can be tweaked to increase the frequency and depth of engagement. Discussion of digital inquiry – how can digital technology help to enhance and enrich inquiry and student engagement – how can it hinder?
10:30	Break
10:45	Introduction to TPCK and the digital citizen – helping students to become thoughtful users of technology
11:15	Critical thinking in action I (visuals)
11:45	Recognizing a critical thinker
11:30	Unpacking/reviewing TC2's conception of critical thinking
12:00	**Lunch**
12:45	Questions that invite thinking
1:15	Applying our learning – framing a critical challenge for our grade and subject
1:45	Common Practices among highly effective teachers and how technology can further enhance
2:15	Break
2:30	The do's and don'ts of digital inquiry
2:50	Tweaking and fortifying an invitation to inquiry with effective use of technology
3:15	Send a telegram
3:30	Departure

Determining Criteria for Judgment

Critical question	Criteria for judgment	
Should ice cream be part of a family's diet? *(critique the piece)*	**Criteria for a <u>healthy diet</u>:** • **nutritious,** • **affordable,** • **sensitive to allergies.**	
Was the giant's wife nasty or nice to Jack? *(judge the better or best)*	**Criteria for a <u>nasty person</u>:** • **spiteful,** • **selfish,** • **vindictive.**	**Criteria for a <u>nice person</u>:** • **kind,** • **helpful,** • **generous.**
Was Simon Fraser a hero or a rogue? *(critique the piece)*	**Criteria for a <u>hero</u>:** • • •	**Criteria for a <u>rogue</u>:** • • •
Was the Prime Minister justified in his decision to remain in office despite the scandals? *(judge the better or best)*	**Criteria for a <u>sound decision</u>:** • • •	
Which theory explaining the economic development in Third World countries is most plausible? (_____)	**Criteria for a <u>plausible theory</u>:** • • •	
Are the Ministry of Education's conclusions about student performance warranted by the data presented in the table? (_____)	**Criteria for a _____** • • •	

Critical question	Criteria for judgment
Rewrite the story (redraw the illustration) from the viewpoint of one of the minor characters. (_____)	**Criteria for a** _____ • • •
Create a poster explaining the concept of "nationalism" using as few words as possible. (_____)	**Criteria for a** _____ • • •
Which best reflects the essence of the Renaissance, Michelangelo's "David" or Machiavelli's "Prince"? (_____)	**Criteria for a** _____ • • •
Create the musical score and lyrics for a new national anthem. (_____)	**Criteria for a** _____ • • •
Plan an survey about national identity to determine which government initiative is most effective at forging a common national identity. (_____)	**Criteria for a** _____ • • •
Which two items that you possess best reflect your personal identity? (_____)	**Criteria for a** _____ • • •

Critical Challenges for Primary Students

Critical challenge	Criteria for judgment
In *The Little Red Hen*, is it fair for Red Hen not to share the bread?	Criteria for fairness: • •
From all the clues predict one thing that might be in the box.	Criteria for……
Which of the suggested solutions demonstrates responsible behaviour?	
Select three most helpful items you would include in a package for a homeless person.	
Create a symbol that represents your family.	
Draw a picture of two things you need for a specified activity and two things it would be nice to have.	
What is the problem in the story?	
What is the best choice for an activity at centre time?	
Record a scientific weather observation once a week for the next four weeks.	

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