A FRAMEWORK FOR CRITICAL THINKING ACROSS THE CURRICULUM

PREPARED FOR THE
READING & WRITING FOR CRITICAL THINKING PROJECT

GUIDEBOOK I

Jeannie L. Steele, Kurtis S. Meredith, and
Charles Temple

This guidebook is intended as supplement to an interactive course. It is not intended for general distribution without an accompanying course presentation. It is intended as a guide for educators participating in the RWCT project who are being prepared to deliver workshops/courses to fellow educators.

CONTENTS

INTRODUCTION

The Reading & Writing for Critical Thinking (RWCT) project is a collaborative project working with educators from around the world. The purpose of this collaboration is to bring to classrooms methods of instruction that promote critical thinking among students of all ages and across all course content.

As the world grows more complex and as democracy spreads throughout the world, it has become evident that young people need more than ever to be able to solve difficult problems, examine circumstances critically, weigh alternative opinions, and make thoughtful informed decisions. It is also evident that the capacity to think critically is a skill that must be nurtured and encouraged within a supportive learning environment.

> **Critical thinking is a paramount skill in an open and democratic society.**

The RWCT project is collaborative because the collective wisdom of the people involved in the project from an array of lands and cultures offer a vast fund of knowledge and experience about how best to accomplish the project goals. No one set of ideas, no one group of people has the answer for what is best in a given circumstance. Collectively, however, we can work toward solutions and bring real improvement to students' learning that will last throughout their lives.

What Is Critical Thinking?

Much has been written about critical thinking. For critical thinkers basic understanding of information is the starting point rather than end point of learning. Thinking critically involves taking ideas and examining their implications, exposing them to polite skepticism, balancing them against opposing points of view, constructing supporting belief systems to substantiate them, and taking a stand based on those structures. Critical thinking is a complex process of integrating ideas and resources creatively, reconceptualizing and reframing concepts and information. It is an active and interactive cognitive process that occurs simultaneously at many levels. More often

> **Critical thinking involves a complex thought process which begins with information and ends in decision making.**

critical thinking is goal directed but also can be a creative process in which goals are less clear.

Critical thinking is sophisticated thought. As such it is often thought to be something in which only older students can engage. This is not the case. Young children are quite able to engage in developmentally appropriate levels of sophisticated thought. They willingly engage in complex problem-solving tasks and perform high levels of decision making.

Critical thinking is possible at all ages.

Without foundational premises teaching is often reduced to delivery of a haphazard collection of "strategies" or "instructional processes." The greatest hazard faced when introducing new instructional approaches is that teachers simply will add new strategies to a wide variety of other strategies, pulling them out randomly. Concern for this result grows with the realization that children learn better in a consistent, coherent learning environment, even if "best practices" are not employed, than in an environment where expectations are unclear or instruction lacks coherence. This course is intended to offer a framework for thinking about teaching and learning. The framework will then provide an umbrella under which subsequent courses and strategies can be organized into a coherent instructional model.

This course offers a theoretical framework. However, a theory course is without value if it is not placed within a practical context. Therefore, this course also offers interactive and engaging teaching strategies that immerse students in genuine learning activities. The course is designed, as well, to serve as a model for demonstrating various student-teacher interaction patterns. The sequencing of activities in the course is based on the belief that participants understand better what they are learning if they initially experience the strategies firsthand as students and then return to reflect upon and analyze what they have just experienced. Thus, only after participating in these directed learning activities is the general framework discussed. The framework is pulled from the immediate experiences of participants and made clear.

Practical teaching strategies are blended within a theoretical framework.

Outcome Expectations

General

The RWCT project has set some general expectations for the educators participating in the project. The expectations for participants at the end of the project are:

1. to be master teachers, able to serve as instructional models and resource people within their own professional setting, i.e., school, university, methods center, etc.; and

2. to conduct staff development workshops for other faculty who do not have access to the same intensive staff development.

The model of teachers teaching others, often their colleagues, serves as an excellent dissemination plan as it allows credible, knowledgeable, competent local educators to work with peers at a high professional level. Another significant outcome of the model is that when participants in the RWCT project understand that they will eventually teach others, they become highly motivated to attend to and experiment with the teaching strategies presented. They realize that one day they will have to present the information themselves as experts, sharing their personal experiences with the strategies. Further, by implementing the program in their own professional setting they gain credibility as experts. Thus, the goals of the RWCT project are:

> **The model of teachers teaching others is powerful motivation for implementation.**

1. to develop open, collaborative, collegial, long-term relations between educators from various cultures and circumstances, which will expand the understanding of teaching and learning for all children and lead to a free flow of ideas between peoples;

2. to increase the capacity of students to think critically, engage in critical reflection, take responsibility for their own learning, form independent opinions, and show respect for the opinions of others;

3. to present practical methods of teaching based on philosophically consistent and theoretically sound ideas;

4. to place teaching within a comprehensive instructional framework that guides instructional decision making;

5. to empower faculty to take responsibility for becoming model teachers of RWCT able to reflect on students' thinking and learning and refine methods based on those reflections;

6. to engender participant confidence based on successful implementation of the program in their own educational setting; and

7. to prepare participants to deliver the program to their peers.

Specific

At the conclusion of this course participants should:

1. understand and describe the three stages of the framework for teaching and learning;

2. be able to place various teaching strategies in the appropriate stage of the framework;

3. be able to prepare classroom lessons based on the framework using their present curriculum and available materials; and

4. be able to introduce the various teaching strategies in their classrooms.

General Precautions

This course is intended to provide a framework for all subsequent courses. In some settings participants will be familiar with the basic concept being presented. In others the framework will be quite new or possibly contradictory to present practice. In either case initial understanding of the framework is not difficult. What is difficult is moving the understanding from a superficial to a more internalized understanding. This will require subsequent revisiting of the framework with repeated emphasis on the importance of thinking about teaching and learning. It will require structured time to develop specific plans for implementation, actual practice, and feedback.

> **It is essential that teachers internalize the framework so it becomes an automatic way of thinking about teaching.**

If you are working with teachers who have worked together before, it is likely they will respond quickly to the interactive instructional approach of this course. If the group is newly formed, there may be some initial hesitancy to engage in dialogue or there may be some distrust of

your motives. Experience suggests that with some nurturing a richly varied and thoughtful dialogue will emerge.

When interactive instructional practices are first introduced into classrooms it is not uncommon for teachers to be confronted by silence. Students used to a more teacher-directed instructional approach will not know what to do. Reactions vary: Students are sometimes cautious, sometimes distrustful, or occasionally quite responsive from the start. The younger students respond much more quickly than older students. They have not had as many school experiences with being silent or passive. Usually it requires several attempts before students accept that expectations for their active participation are real and consistent.

> **Time and persistence as well as providing a calm and supportive atmosphere will be needed.**

Course Structure

This course is intended to introduce a framework for teaching and learning. The framework is a three-phase model of teaching and learning. It is a well-researched model of how people learn best. The model has been presented in numerous forms by numerous authors and researchers, some of whom include Vaughn and Estes (1986), Ogle (1986), Temple and Gillet (1996), and Tierney, Readence, and Dishner (1985). The model basically describes a process of thinking about the cognitive process students must engage in before, during, and after a learning experience to truly benefit from that experience. Therefore, this course is experientially based. First, participants will experience a genuine lesson incorporating the framework. Then, they will reflect on the lesson, analyzing it within the context of the model framework offered.

In the first portion of this course one activity is modeled at each stage of the framework for illustrative purposes. It is important for participants to understand that activities at each of the stages are not limited to those presented in this model lesson. There exists a large number of strategies that can be used effectively at each stage. Throughout all RWCT courses more strategies are added to all stages of the framework with a goal of building a large repertoire of strategies for each stage. They are only limited by the imagination and creativity of teachers and students. What is most important is that teachers and learners do something meaningful at each stage. What is done can and should

> **The framework is well documented and the model is experiential.**

vary widely depending on the content to be learned and purposes for learning. The course is divided into three parts, as follows.

Part I Presentation of Model Lesson

1. General introductory activities to be decided by workshop presenters.
2. Introduction of the workshop, describing what will occur during the workshop.
3. Presentation of a guided reading lesson
   a) Individual and paired brainstorming
   b) Group brainstorming
4. Reading example article using Interactive Noting System for Effective Reading and Thinking (INSERT) (Vaughn & Estes, 1986).
5. Discussion of reading—review of group brainstorm and charting INSERT marks.

Part II Analysis of the Process

1. Presentation of *Evocation Stage* with participants' reflection and participation.
2. Presentation of *Realization of Meaning Stage* with participants' reflection and participation.
3. Presentation of *Reflection Stage* with participants' reflection and participation.
4. Review of all stages—discussion of effects of framework and its importance

Part III Planning for Implementation

1. Discussion of where and how the framework can be implemented.
2. Participants work in teams (grade or content specific) to identify a content lesson for trial implementation.

3. Participants develop a specific plan for implementation, including setting a date for initial implementation and determining a time for follow-up discussion with the group.
4. Participants use the framework, frequently recording student responses and teachers' questions for discussion at follow-up group meetings.

PART I MODEL FRAMEWORK LESSON

History is a race between education and catastrophe.

H.G. Wells

Framework for Thinking and Learning
Model Lesson

Rationale

Educators have long debated the importance of learning factual knowledge versus learning practical and conceptual knowledge. Those who suggest that factual knowledge is the most important typically believe there exists a certain set of facts, which, when learned adequately, prepare students to become fully functioning participants in the social order. Those who suggest that conceptual knowledge and practical experience are most critical propose that knowledge itself is not enough. Rather, they propose that knowledge is only of value when it is useful and it is only useful when it is understood in conceptual terms and can be practically, creatively, and critically applied.

> **Knowledge is of value when it is useful and understood conceptually.**

No one doubts that factual knowledge is important. There is a great deal people must know to successfully negotiate daily commerce. However, the idea that a set of knowledge exists that will adequately prepare students for their future becomes less and less supportable the more rapidly societies change. The difficulty of describing such a collection of wisdom is seen when one realizes that 100% of what we know today will constitute only 10% to 15% of available knowledge in 25 years. Further, this rapidly expanding knowledge base will be increasingly available to everyone. With electronic communications extending into almost all cultures around the world, schools and homes are becoming information centers with access to information around the world.

What will be required of students to be successful in the changing world will be the ability to sift through information and make decisions about what is and is not important. They will have to be able to understand how various pieces of information fit together or can fit together. They will need to be able to give context to new ideas and knowledge, to assign meaning to new encounters, and to reject information that is irrelevant or invalid. Students will need to make meaningful in critical, creative, and productive ways that part of the information universe they encounter.

> **The future is for those who critically examine information and construct their own realities.**

To manage information well, students will have to be adept at applying a set of practical thinking skills that enable them to sort information efficiently into meaningful ideas, which can then be transformed into

practical behaviors. In short, they will have to become critical thinkers and learners. However, students do not become critical thinkers automatically (Collins & Mangieri, 1992). They must have experiences encountering, processing, and making personal and useful information and ideas. They must go through a systematic process of critical analysis and critical reflection: a process that, not only guides them through information while at school, but also serves as a framework for later independent critical thinking and reflection. For this to happen in classrooms teachers must provide a framework for thinking and learning that is both systematic and self-evident. The framework must be systematic so students can come to understand and apply the process consistently. The framework must be self-evident so students can recognize where they are in their own thinking in order to monitor and manage their thinking processes when learning independently.

> **Critical thinking is the outcome of a well-constructed classroom whose instruction is the fostering of critical thinking.**

When applied to teaching, the framework for teaching and learning in this guide offers a conceptual base for teaching that can be realized systematically within classrooms across grade levels and content. It provides a way of thinking about teaching that promotes students' critical analysis, meaning making, and critical reflection. When students apply the framework to their own thinking and learning in independent learning situations, they are able to contextualize their knowledge by adding new information to what they already know, actively engaging in new learning experiences, and reflecting on how new learning experiences change their understandings. The model presented is based in part on the model described by Vaughn and Estes (1986) and modified and expanded by Meredith and Steele (1997).

A Framework for Teaching and Learning

To develop a practical understanding of a framework for teaching and learning the framework must be experienced within an instructional context. This guidebook will present the framework within a guided instructional context. Following this guided learning experience discussion will be presented examining the process within the context of the instructional framework modeled. This discussion also will include a rationale for the framework along with implications for teaching and learning.

Experiencing the Framework

It is suggested that the framework presentation begin with a brief description of what participants will experience and what is expected of them. Participants are asked to read and engage in a number of individual and group activities. They also will read a short article. As they go through this process they should try to attend at two levels. First, they should attend to the content and experience the learning process as it unfolds for them, being mindful of what is occurring instructionally and thinking about how they are responding to the instruction. Second, they should notice what the instructor is doing pedagogically. Explain that following the model lesson they will discuss the process, looking first at how it made them feel as learners, and second at the lesson from a pedagogical point of view.

Next, begin the instruction with an introduction similar to the following:

We now ask you to read a short article entitled "The Sea Turtles" by Keith G. Hay. However, before reading the article we will do some thinking about sea turtles. Please choose a partner for discussion. In the next three to five minutes with your partner make a list of all you know or think you know about sea turtles. It is important to write down everything that comes to mind about sea turtles. It does not matter if what is written down is accurate or not. The important thing is to write down as much as possible, thinking about what you already know or think you know about sea turtles. Please begin making your list now.

> **Brainstorming about the content.**

When the partners have completed their discussion, call upon the group to share their knowledge of sea turtles. As they share, write their ideas on poster paper on the wall or on an overhead projector. Any disagreements should be brought to the surface by asking from time to time if all agree with what is being said. For example, with sea turtles there is often disagreement over the number of eggs laid, what turtles eat, and how large they grow. If these issues do not surface it is fine to ask what the partners think about these questions. It is quite good to encourage discussion, friendly disagreement, and taking stands on one side or another of the various notions. Considering the content of the article, questions should be asked to direct thinking to areas that participants did not mention.

Next, make an announcement similar to the following:
It is time to prepare to read the article. While reading, there are some things you should be doing. As you read you should make some marks in the margins of the article.

Describe then the Interactive Noting System for Effective Reading and Thinking (INSERT) method. The marks should be as follows:

"✔" Put a "✔" (check) in the margin if something you read confirms what you knew or thought you knew.

"-" Put a "-" (minus) if some information you are reading contradicts or is different from what you already knew or thought you knew.

"+" Put a "+" (plus) in the margin if a piece of information you encounter is new information for you.

"?" Place a "?" (question mark) in the margin if there is information that is confusing to you or there is something you would like to know more about.

> **The INSERT method is a means of monitoring comprehension.**

Thus, as you read you will be placing four different marks in the margin according to your own knowledge and understanding. You will be marking in the margins using a ✔, -, +, ? as appropriate to your own knowledge base. It is not necessary to mark each line or each idea presented, but to make your mark reflective of your relation to the information in general. You may end up with one or two markings per paragraph, sometimes more or less. Please begin now to read the following article, making sure to mark as you read.

Pass out the article for the participants to read. The example article "The Sea Turtles" is enclosed in the appendix. When almost all or all participants have finished reading proceed as follows:
Now that you have read the article pause for a moment to reflect on what you read. Please turn to your partner and discuss what you read. What knowledge was confirmed? What beliefs were disconfirmed? What new information did you encounter? What do you have questions about? You may look over your list or go back over the article and look at your marks. They should serve as a convenient reference for information confirming or disconfirming your previous knowledge. They should also reference new or confusing information or ideas about which you would like to learn more.

It is often helpful at this time to have each participant make an individual chart of the markings to categorize information similar to the following example:

✔	+	-	?
young left to survive on their own	eats plants and fish	lays 50 to 100 leathery eggs	where do the young go
lays eggs on same beach every year	travels thousands of kilometers		how do they find the same beach again
	sheds tears		

Now, as a group discuss the article, returning to the group brainstorming written on the poster paper on the wall or overhead. Review when there was agreement. Discuss disagreements and whether the article resolved them or if other sources are needed. This can be an elaborate and enjoyable conversation if there are questions that arise or disagreement persists. This entire process should take approximately one to one and half hours. A longer article or different topic could add more time.

PART II ANALYSIS OF THE PROCESS

*Students need to tell each other and the world what they know—
in order to find out what they know. Through the telling,
they will learn. Through the telling, they will interpret the world
as they see it to the rest of us.*

Judith Renyi

Examining the Framework

Evocation

After conversation is completed, explain that the task is now to go back and analyze what has just taken place. Guide the participants in a way similar to the following:

Now that you have experienced an application of the framework firsthand let's return and examine what has happened. Think back to the very beginning just before reading about sea turtles.

What were you asked to do?

Give participants time for responding. Be patient.

The very first thing was to try to recall everything you knew or thought you knew about sea turtles and to make a list.

What else did we do?

The next was group discussion and sharing. It was important at that time to get out everything you thought about sea turtles without concern for whether it was right or wrong. This is the very first phase in a three-phase framework for thinking and learning. This first phase is referred to as the *evocation* phase. In classrooms using the framework during the evocation stage students are often asked to brainstorm lists of what they know or think they know first. Sometimes brainstorming is done individually, sometimes in pairs, and then with the entire group. Someone writes the brainstormed ideas on the board or as done here accepting all ideas without concern for whether or not they are accurate. The teacher may elicit some ideas from the students by questioning them about ideas that were not discussed but are relevant in the reading. During this stage it is important that the teacher refrain from talking to the extent possible and let students talk. The teacher's role is to guide and elicit thought and listen carefully to students' ideas.

Discussion about the evocation phase should then follow. At this time ask participants to reflect on and discuss what they did during the evocation stage. Guiding this discussion works well to focus first on what was done, then consider how it affected participants as learners and finally how evocation was accomplished from a pedagogical point of view. Guide discussion to include ideas as presented in the following section.

> **Reflecting on the beginning process of thinking about a topic.**

Rationale for Evocation Stage

In this first phase several important cognitive activities are accomplished. First, the learners are actively engaged in recalling what they know about a topic. This forces the learners to examine their own knowledge and begin thinking about the topic they will soon be exploring in detail. The importance of this initial engagement will become more clear as the remaining two phases are described. However, of primary importance is that through this initial activity the learners establish a baseline of personal knowledge to which new knowledge can be added. This is critical as all lasting knowledge is understood within the context of what is already known and understood. Information presented without context, or information that learners are unable to connect to known knowledge, is information that may soon be lost.

> **Evoke, arouse interest, excite, summon forth, provoke students to think about what they know.**

The learning process is a process of connecting the new with the known. Learners build new understandings from the foundation of previous knowledge and beliefs. Thus, by assisting students with the reconstruction of previous knowledge and beliefs the broadest foundation can be established upon which long-term understanding of new information is accomplished. It also serves to illuminate misunderstandings, confusion, and errors in knowledge that otherwise would not surface without active examination of held knowledge and beliefs.

The second purpose of the evocation phase is to activate the learner. Learning is an active rather than passive activity. Too often students are seated passively in classrooms listening to their teachers do all their thinking while they sit mindlessly taking notes or daydreaming.

> **Learning is an active, robust activity.**

For meaningful, lasting, critical understanding to occur students must be actively engaged in the learning process. Active engagement means that students must become aware of their own thinking using their own language. They then must express their knowledge and understanding through either active thinking, writing, or speaking. In this way personal knowledge is at an awareness level and the students "schema" or previously established construct for thinking about a topic or idea is elicited. By eliciting this construct or schema the student is better able to connect the new information with the known because the context for understanding has been made self-evident.

Because lasting understanding is the process of linking new information with previous schemata the third purpose of the evocation stage

is critical. Through this stage interest and purpose in exploration of the topic is established. Interest and purpose are essential to sustain the

learners' active engagement. Purposeful learning is more effective than non-purposeful learning. However, there are two types of purposes: teacher- or text-driven purpose versus self-directed purpose. Self-directed purposes are more powerful than those imposed from external sources and one's interest often determines one's purpose. Without sustained interest the motivation to reconstruct schemata or to accommodate new information is diminished. Prior to reading the passage about sea turtles, interest was generated through brainstorming a list of thoughts and ideas about them. With the group discussion additional ideas were added to the mix. Some of those ideas and beliefs may have been contradictory. This is important to uncover in a classroom setting because differences can lead to personal questions, and personal questions can be a powerful motivator for reading for understanding. One U.S. researcher has suggested that the definition of comprehension actually is "having your own questions answered" (Pearson, in Pearson & Fielding, 1991).

Realization of Meaning

The second phase of the framework for thinking and learning is referred to as *realization of meaning*. This is the phase in which the learner comes into contact with new information or ideas. This contact could take the form of reading text, as in the sea turtles example, watching a film, listening to a speech, or doing an experiment. This is also the phase of learning during which teachers have the least influence on the learner. It is during this second phase that the learner must independently sustain active engagement.

At this time ask the participants what they just did during this stage of the lesson. Give time for reflection and discussion of their own learning experience, focusing first on how the process affected their learning and second on the pedagogical aspects of what was done.

There are teaching strategies that can be used that assist students to maintain sustained engagement. In the sea turtles example the reader was instructed to employ the INSERT (Interactive Notating System for Effective Reading and Thinking) method of monitoring comprehension

(Vaughn & Estes, 1986). The number of marks students use in classrooms varies according to the age and maturity of the students. It is recommended that students in Grades 1 to 4 use no more than two marks. We suggest using ✔, "I know that," and ? or -, " I did not know that." The marks students use also vary depending on their purpose for reading and their experience with the marking system.

INSERT is a powerful tool because it allows students to actively monitor their own comprehension as they read. The phenomenon of finishing a page of reading and having absolutely no recall of what has just been read is common to all readers. It is the best example of reading without understanding, of reading without active cognitive engagement in the reading process, and reading without monitoring comprehension. Too often students approach reading or other learning experiences with the same lack of cognitive engagement. The realization of meaning stage is critical in the learning process, but learning opportunities can go by without impact if the learner is disengaged.

> **INSERT is a tool for sustaining engagement with text.**

Rationale for Realization of Meaning Stage

The first essential task of this second phase, realization of meaning, is to sustain engagement, to maintain the interest and momentum established during the evocation phase. The second essential task is to support learners' efforts to monitor their own comprehension. Effective learners and efficient readers monitor their own understanding as new information is encountered. When reading, good readers will reread if comprehension wanes. Listeners, when listening to a presentation, will ask questions or make a note of confusion or misunderstandings for later clarification. Passive learners simply pass over these lapses in understanding, unaware of the confusion, misunderstanding, or outright omissions of information.

> **Meaning–making requires sustained engagement, self–monitoring comprehension.**

Additionally when students are monitoring their own comprehension they are engaged in applying the information to their established schemata. They are purposively connecting the new with the known. As Figure 1 depicts, students are building bridges between known and new knowledge to establish new understanding.

Much can be discussed here regarding this phase. Issues relating to enhancing engagement and maximizing comprehension can be discussed at length. The conversation should remain within the context of the realization of meaning stage. However, discussion of realization of

meaning within the context of setting purposes, critical analysis, comparative analysis, and synthesis are encouraged.

Figure 1 Building Bridges Between Known and New Knowledge
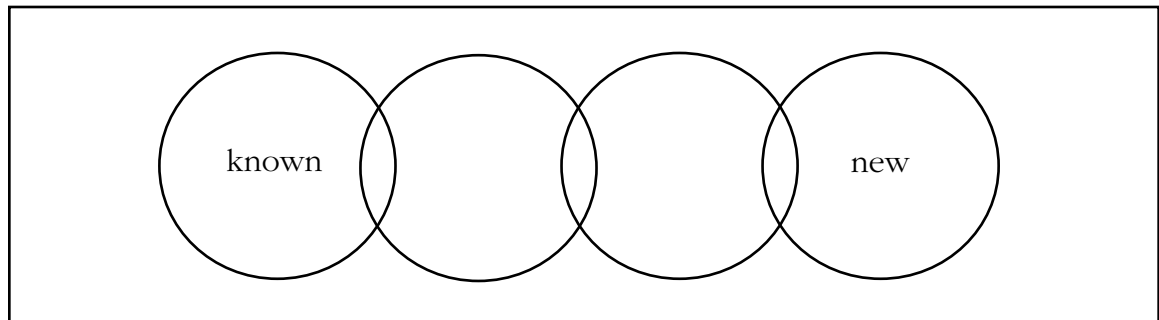
Reflection

Ask now what was done following reading the article, and discuss briefly the review of brainstorming both individual and group.

The third phase in the framework is the *reflection* phase. This phase is also often forgotten in teaching yet it is equally critical. It is during the reflection phase that learners consolidate new learning and actively restructure their schema to accommodate new concepts. It is in this phase that learners truly make new knowledge their own. It is here that lasting learning takes place. Learning is an act of changing, of becoming in some way different. Whether that difference is seen in terms of new understandings or a new set of behaviors or a new belief, learning is characterized by genuine and lasting change. This change occurs only when learners actively engage in restructuring their schema to accommodate the new.

| **Learning is reflected in lasting change.** |

In the sea turtles example this stage was accomplished first by reviewing and discussing reading referring to the list made prior to reading to determine what was confirmed knowledge and what was disconfirmed. Then a chart was constructed to graphically represent the various comprehension marks made during reading using the INSERT method. Group discussion then was held to resolve or determine whether additional information was needed. Through these various activities the reader was obligated to review the text and reflect on the content.

| **Learners take ownership of ideas when they state them in their own words.** |

Rationale for Reflection Stage

There are several essential accomplishments targeted for the reflection stage. Foremost, students are expected to begin expressing in their own words the ideas and information encountered. This is necessary for new schemata to be constructed. Long-term learning and in-depth understanding is personal. Learners remember best what they understand in their own context, in their own words. Understanding is lasting when information is placed within a meaningful contextual framework (Pearson & Fielding, 1991). By actively reformulating understandings into familiar, personal vocabulary, a personal, meaningful context is created.

A second goal of this phase is generating a robust exchange of ideas between students thereby expanding their expressive vocabulary as well as exposing them to varying schemata to consider as they build their own. By engaging in discussion during the reflection phase students are exposed to a variety of constructs for consideration. This is a time of change and reconceptualization in the learning process. Exposure to multiple ways of integrating new information at this time leads to more flexible constructs, which can be more practically and purposefully applied in the future.

Again, there is opportunity here for more discussion of the importance of this stage. It is helpful to ask participants to reflect on this immediate learning experience and consider how their learning was affected by the activities of this stage of learning.

> **If you need to remember you will forget.**
> **If you need to understand you will remember.**

> **Thinking critically — flexibly —is enhanced in an atmosphere where diversity of opinion is encouraged.**

Student Response

The framework, when applied to instruction, gives teachers a context in which learning experiences are presented, which enables them to guide students through the learning process. It provides teachers with a context in which they can

- activate student thinking,
- set purposes for learning,
- provide rich discussion,
- motivate student learning,

- actively engage students in the learning process,
- stimulate change,
- stimulate reflection,
- expose learners to varied opinions,
- help students to ask their own questions,
- encourage self-expression,
- ensure that students process information, and
- facilitate critical thinking.

By guiding the learning process teachers become more than conduits for rote information; rather, they become facilitators of genuine learning of contextualized knowledge (Meredith & Steele, 1995) that students can practically apply in the future. The teacher's role is transformed into that of partner in the learning process, in which students must bring to the learning environment an active mind and sufficient energy to make the personal changes required during the acquisition of lasting knowledge. Teachers employing a framework for teaching and learning based on active student engagement now have benefit of the knowledge, schemata, and creativity of all the students in the class. All students become teachers and the classroom becomes a robust learning community.

> **When classrooms become communities of learners, diversity of opinion flourishes.**

Students moving through this framework for learning experience a set of definitive learning behaviors, which lead them toward successful integration of new information with previous knowledge.

Equally important to recall is that this framework is both a process of teaching and of learning. Therefore, students should be taught at all times on two levels. They should certainly be taught the content, that is, the subject material of the course. They should also be taught the process of learning the content. Teaching is best when it is transparent so students can see the teaching process unfold. In this way they can learn to apply the process independently. By understanding both the content and the process of learning, students become lifelong learners able to encounter new ideas and information and transform them into practical working knowledge throughout their lives (see Figure 2).

> **Teaching should be transparent.**

Figure 2 Learning on Two Levels

Content

Process

Lifelong
Learning
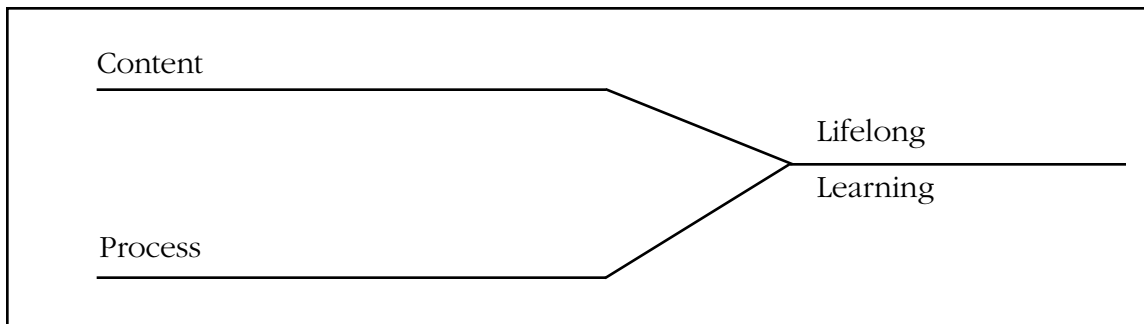
Critical Thinking and the Framework

How is this framework for teaching and learning linked to critical thinking? As we have indicated, critical thinking requires the ability to understand and reflect on what one knows and thinks. Before this can happen students must bring their knowledge and understandings to an awareness level. Often students fail to activate their prior knowledge, making it more difficult to reflect on new information in meaningful terms. By failing to activate prior knowledge learners also can have confusing or even conflicting thoughts, which can inhibit future learning. To think critically it is essential that learners come to know what they know.

Reflection and critical analysis requires thoughtful, creative consideration about how new knowledge can be applied to previous understandings and about how previous understandings may be altered to accommodate new information. This is an active process. It takes time, attention, and intention to accomplish. It typically does not happen spontaneously. Students must be allowed time to activate prior knowledge and must be provided a systematic process leading to uncovering knowledge and reconstructing schemata. Teaching for thinking is about both cognitive and metacognitive processes. It is cognitive as students must think about content, that is, about ideas and understandings, about information and general knowledge. However, it is also metacognitive in that they must also think about their thinking. Critical thinkers ask themselves:

> **Critical thinking takes time, attention, and intention.**

- "What do I think about that?"
- "How does this information fit with what I already know?"

- "What can I do differently now that I have this new information?" and
- "How are my beliefs affected by these ideas?"

Critical thinkers are active, engaged thinkers working systematically and reflectively with their knowledge base to redefine themselves and how they perceive their world as they grow and learn.

What happens when students become aware and in control of their own metacognitive processes is that they become better able to hear and understand new ideas, new schemata, and new ways of putting information and concepts together. Their schema becomes both more flexible and less fragile because of the increased awareness of one's own belief system. Students become more able to reflect on new information because they have greater access and control over their own thinking. They are then better able to manage new information because they have greater confidence in their ability to successfully integrate new knowledge with previous knowledge. The benefits are multiple. Students able to effectively manage metacognitive processes and to think critically are less susceptible to manipulation and the whimsy of momentary pressures or fads. Yet, they are also more open to new ideas and influences that can be productively incorporated into their existing schemata. Finally, critical thinkers are able to more freely combine ideas and information because they are starting from a familiar and self-evident knowledge base. By being aware of their knowledge they are better prepared to make creative use of that base to solve problems, formulate opinions, and generate new ideas.

> **Critical thinkers are less susceptible to manipulation more secure with their own belief system.**

Framework Strategies Organizational Chart

As a concluding activity participants should make a chart to organize the strategies they have encountered thus far. Ask participants to take a piece of paper and turn it lengthwise, placing the stages of the framework at the top of the page and placing the strategies in the appropriate stages (see Figure 3). Explain that participants will keep this chart up to date, adding new strategies to each stage as they are experienced throughout the RWCT courses.

Figure 3 Framework Strategies Organizational Chart

Evocation	Realization of Meaning	Reflection
Paired Reading Group Brainstorming	INSERT	Paired Discussion Group Discussion Charting ✔ + - ?

Categorical Overview

Another effective evocation activity is a categorical overview. We did not take time to do this strategy during the model lesson because we wanted to keep the process simple, as it was the first experience with the framework. However, we will now look back and experience this strategy so that it may be added it to a growing repertoire of strategies. This strategy involves students in organizing the ideas they brainstormed. This organization provides a framework for new understandings. Creating a categorical overview is more important as a process than as a product. Categorical overviews are based on ideas students have brainstormed and categories for those ideas that emerge from students. Teachers do not assign the categories.

Now as a group look over your brainstormed ideas about sea turtles. How is this information related? How can some of the information go together and relate to a more general idea? From this thinking and discussion come up with categories for the ideas. Place the categories on chart paper or chalkboard and put brainstormed ideas in appropriate categories. Continue the process until all items are placed in a category. Sometimes during the process the group will see they need to alter the categories. The discussion and debate that is a part of this process helps build a framework upon which new understandings can be developed. There is, of course, no one right way to categorize the information and the categorization will vary from group to group. The categories that emerge are concepts with the brainstormed ideas that fit in each category features of that category.

The following example is presented only as an illustration of how one group completed the task.

Brainstorming—Sea Turtles

    have a hard shell
    claws
    webbed feet or flippers?
    lay eggs (10–200 eggs)?
        (hard / soft)?
    vegetarians
    weigh as much as 50 to 200 kilos
    eat fish
    live in tropical waters
    reptiles / mammals ?
    can hold their breath underwater
    prehistoric
    endangered
    they shed tears
    good swimmers
    get caught in fishermen's nets
    people eat them / turtle soup
    they always come to the same beach
    live long life
    live in the ocean
    babies get eaten
    sharks eat them
    man is their enemy

Categorization

1. Behavior
   - lay eggs - (10–200 eggs)?
                (hard / soft)?
   - vegetarians
   - eat fish
   - good swimmers
   - live long life
   - can hold their breath underwater

2. Physical characteristics
   - have a hard shell
   - claws
   - webbed feet or flippers?
   - they shed tears
   - weigh as much as 50–200 kilos

3. Habitat
   - live in the ocean
   - live in tropical waters
   - they always come to the same beach

4. Species
- reptiles /mammals?
- prehistoric
- endangered

5. Enemies
- babies get eaten
- sharks eat them
- man is their enemy
- get caught in fishermen's nets
- people eat them /turtle soup

PART III PLANNING FOR IMPLEMENTATION

The best way to reform the order of things in the world is to start with reformation of schools because schools are the workshops of light. It is the light and the dark that are the first cause of order and confusion in the world.

Ján Amos Komensky
(1592–1670)
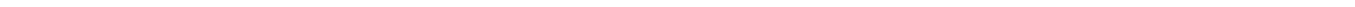
Implementation

The next step in the process is to have participants begin to plan at a very practical level for implementation. To make the content of the workshop real and transferable to classrooms specific plans need to be made for implementation using actual content materials. This step is critical. Participants just beginning will need encouragement and support, but this phase of the course can become a creative and rewarding experience for all.

Planning implementation is always difficult to start. Some initial questions can serve as prompts for thinking, such as the following:

- Let's imagine that tomorrow you are going to do what we have just done in your own classroom. What content or topic would you be working with or what content would you select to work with?
- How would you go about it? How would you start? What would you do?
- What materials would you need?
- What questions do you have about what we did today? What needs to be clarified before you proceed?
- What would you want the students to learn or be able to do? What exactly would you do?

Plans, once developed, should be shared with the group as a whole. The group should look for good, creative ways of implementing the plans as well as potential pitfalls or incomplete plans.

Materials Needed

This course requires very few materials. The example text used here, "The Sea Turtles," is contained in the appendix. It serves only as an example. Any similar article can be used for demonstration purposes. When participants give their own workshop it will be important for them to select local articles, and when teachers select content material for their classroom they should select age-appropriate and content-relevant material. It is helpful to select material that is of interest to students and reasonably well written.

Materials

- copies of an article for each participant
- poster paper, tape, and markers or overheads and markers
- extra paper for participants to use for developing their plans.
- in addition, if communication is available with participants ahead of time they should be asked to bring a relevant content text to use for planning implementation

Planning for Follow Up

Participants will need support and feedback for their implementation efforts. It is important to plan for discussion and feedback sessions between workshop programs. Specific dates for these activities should be identified. Participants should plan when they will implement then set a date for reconvening with the group for discussion. Participants should be prepared to discuss the following:

- In general how did the implementation go?
- What were the successes or most successful parts?
- What failures or difficulties were encountered?
- How did students respond?
- How might you do it differently next time?
- How would you gauge the level of student interest in learning?
- How did the lesson feel? Did it feel right or were there times that felt difficult or cumbersome?
- How many times was implementation attempted?

Participants should be encouraged to work in small groups again to share their experiences then share with the larger group. Discussion should be encouraged regarding successes and failures and how procedures might be modified to fit local culture, circumstances, teacher preferences, etc.

Framework for Thinking and Learning

The framework for thinking and learning is a procedure by which teachers guide students toward understanding. It can be described only by its parts, but it must be perceived as an integrated, highly connected strategy. The framework for thinking and learning is built on the following premise:

What one knows is the primary determiner of what one can learn.

The framework here was developed around a content lesson. It is not limited to content lessons but it is applicable to all learning situations. The content lesson here serves only as an example application.

Stages of the Framework

E 1. *Evocation* (pre-content discussion)
1. What is the topic? (identify it)
2. What do you already know about it? (list on the board)
3. What do you expect, want, and/or need to learn about it? (list on the board)
4. Why do you need to learn that?

R 2. *Realization of Meaning*
Done by the learner as he/she seeks information relative to the predictions.

R 3. *Reflection* (post-content discussion)
1. What did you find out? (expand answers as much as possible)
2. Ask cued questions to elicit important information not mentioned in the evocation stage.
3. In response to their answers ask, "Why do you think so?"

Begin the cycle anew.
For example, *Evocation* (of the next segment of content)
1. What else do you think you'll find out? or
2. What haven't you found out that you'd still like to know?
3. Why is that important, or Why do you think so?
(Elaborate your discussion and add to information on the board.)

Application of the framework varies based on the age and sophistication of learners. Appendix A depicts how the framework is modified for use with students in Grades K–4 and Appendix B outlines how it can be used with students in Grades 5–12. As we have stated, this model lesson and the strategies presented here are only one way to apply the framework. We will build on this adding more strategies throughout the following courses.

Evaluation of Course: A Framework for Critical Thinking Across the Curriculum

Date and place:

Questions:

1. What in the course was most valuable to you?

2. What would have made this course more meaningful?

3. What will change in your teaching as a result of this course?

4. What was your overall impression of the course?

   1   2   3   4   5
   little value   great value

5. Suggest topics you would be interested in discussing in future meetings.

6. Please make any comments you would like on the course.

REFERENCES

Collins, C., & Mangieri, J.N. (Eds.). (1992). *Teaching thinking: An agenda for the 21st century*. Hillsdale, NJ: Erlbaum.

Meredith, K.S., & Steele, J.L. (1997). Learning for understanding. In Z. Kollarikova, P. Gavora, J. Steele, & K. Meredith (Eds.), *Critical thinking II*. Bratislava, Slovakia: State Pedagogical Institute of Slovakia.

Meredith, K.S., & Steele, J.L. (1995). Questioning for critical thinking. In P. Gavora, J.L. Steele, K.S. Meredith, & Z. Kolláriková (Eds.), *Critical thinking*. Bratislava, Slovakia: State Pedagogical Institute of Slovakia.

Ogle, D. (1986). K-W-L: A teaching model that develops active reading of expository text. *The Reading Teacher, 39*, 564–570.

Pearson, P.D., & Fielding, L. (1991). Comprehension instruction. In R. Barr, M.L. Kamil, P. Mosenthal, & P.D. Pearson (Eds.), *Handbook of reading research* (Vol. 2). White Plains, NY: Longman.

Temple, C.A., & Gillet, J.W. (1996). *Language and literacy: A lively approach*. New York: HarperCollins.

Tierney, R.J., Readence, J.E., & Dishner, E.K. (1985). *Reading strategies and practices*. Boston, MA: Allyn & Bacon.

Vaughn, J.L., & Estes, T.H. (1986). *Reading and reasoning beyond the primary grades*. Boston, MA: Allyn & Bacon.

GLOSSARY

Active learning   An approach to learning that encourages inquiry and discovery.

Brainstorming   The act of freely generating many ideas about a topic, initially without critical restraint.

Critical thinking   A process of considering ideas from many points of view, following their implications, and comparing them to other ideas.

Evocation   A phase in a lesson in which students are asked to think about what they already know about a topic, to raise questions about the topic, and to set purposes for learning.

Framework   A set of (often substitutable) ideas in relation to one another: For example, the evocation/realization of meaning/reflection framework allows the substitution, within categories, of teaching strategies that serve similar purposes.

Implementation   Putting an idea into practice, as in trying out new teaching methods in a classroom.

INSERT   Interactive Noting System for Effective Reading and Thinking, a procedure that begins with searching prior knowledge and asking questions for marking texts, and then marking the different kinds of information that are found in the texts.

Realization of meaning   A phase in a lesson in which students inquire and search for knowledge and, as a result of their activity constructor, realize meaning.

Reflection   A phase in a lesson in which students look back over the ideas they have encountered and the meaning they have realized, and question, interpret, apply, debate, challenge, and extend that meaning to new areas of endeavor.

APPENDIX A

Framework for Thinking and Learning With Expository Text, Grades K–4

E 1. *Evocation* (pre-reading or learning discussion)

- Group brainstorm of topic.

- Write information from brainstorming on chalkboard, over-head, or chart.

- Categorize information.

R 2. *Realization of Meaning* (actual reading or learning)

- If children can read material, children read silently and mark the text with ✔ = I knew that

    + = I didn't know that

- If children cannot read material, teacher reads material to the children.

R 3. *Reflection* (post-reading or learning)

- Children make individual and/or group lists of the following:

    ✔ (things they knew)　　　+ (things they learned)

    -　　　　　　　　　　　　　　-

    -　　　　　　　　　　　　　　-

    -　　　　　　　　　　　　　　-

- Children talk or write about what they think about what they have learned.

- Following reading children may write and/or draw stories about the topic and share these with others.

APPENDIX B

Framework for Thinking and Learning With Expository Text, Grades 5–12

E 1. *Evocation* (pre-reading or learning discussion)

- Group brainstorm of topic.

- Write information from brainstorming on chalkboard, over-head, or chart.

- Categorize information.

R 2. *Realization of Meaning* (actual reading or learning)

- Students read silently and mark the text with the following:

    ✔ = confirms what I thought

    + = new information

    - = contradicts what I thought

    ? = puzzles me

R 3. *Reflection* (post-reading or learning)

- Students make individual and/or group lists of the information based on their marks.

- Students talk or write about what they think about what they have learned.

- Following reading children may write and/or draw stories about the topic and share these with others.

APPENDIX C

The Sea Turtles by Keith G. Hay

Roaming the oceans are the largest turtles in the world. These giant reptiles are called sea turtles.

If you and your whole family could get on the bathroom scales at one time, your combined weight would not equal that of the leatherback.

The leatherback is the largest of five different kinds of sea turtles found along our Atlantic and Gulf coasts. Some weigh more than 682 kilos or 1,500 pounds! The four other kinds are the hawksbill, ridley, loggerhead, and great turtle. This last one is not the tiny green turtle you can buy in the pet store, although it is a distant cousin.

Sea turtles have been swimming the open seas and coastal bays throughout the world for millions of years. They are powerfully built for their life in the ocean, with strong flippers for swimming and the ability to stay underwater for over an hour with only one breath of air.

Their huge, hard shells protect them against most enemies. But to a hungry shark, even a tough turtle looks good. When attacked, a sea turtle may raise its body and slap the water with its flippers to frighten away the attacker.

Turtles travel together through the open seas. A group may travel more than a thousand miles during one year. Much of their time is spent floating on the surface just sleeping. Sometimes they will wander up rivers that flow into the oceans and get hooked by fishermen. But not for long, for one swish from a huge flipper and the fisherman's line is broken. Many a fisherman would be surprised to know that the big one that got away was really a very large sea turtle.

In the sea the turtles find many different kinds of food. They often dine on fish only, but sometimes eat sea plants, crabs, clams, oysters, sponges, shrimp—even jellyfish.

We know very little about these giants of the sea. They are rarely seen except in zoos or large aquariums near the ocean.

We do know that they journey great distances at sea, but they return during the late spring and summer to the same area every year to mate and lay eggs. In the United States, their nesting areas are mainly along the coasts from North Carolina to Texas.

During the summer nights when the tide is in, the big mother turtles swim ashore to build a nest and lay eggs. Each one wanders about the beach until she finds just the right spot for her nest. She digs a shallow pit in the sand with all four flippers. Then she begins to carve a round hole in the sand using her hind flippers only. Very carefully she moves her body from side to side, cupping her flippers one at a time, neatly removing the sand. When the hole is as deep as she can reach—usually about 60 cm (2 ft) deep and 25 cm (10 in) wide—she stops and begins to lay her eggs.

Once the eggs start to fall, she pays no attention to onlookers. Large "tears" stream down her face. But she is not really crying. Her eyes water constantly so that they will be kept clear of loose sand.

It takes the female turtle about twenty minutes to lay from 100 to 150 eggs. They are perfectly round, about the size of golf balls, and have thick shells, which prevent their breaking as they fall into the nest. She immediately covers the hole with sand, packing it down with her flippers, and throws sand about to hide the nest.

After resting a few minutes, she turns toward the dark ocean, wearily walks into the surf, and swims out to sea. She leaves her eggs to hatch with the heat of the sun, and her young to face the world alone.

During the summer, a mother sea turtle may "nest" several times. After each nesting, she rejoins her mate offshore. The father turtles never leave the sea, but wait until the end of summer when the group is once again free to travel.

The baby turtles hatch in about sixty days. Their size varies from one to four inches, depending upon the kind of sea turtle. Together they slowly dig and wiggle up through the sand. They wait until nightfall and then suddenly burst out of the nest to be welcomed by enemies eager to destroy them. On the shore are raccoons, wild dogs, hogs, and other enemies searching for a meal. In the sea wait large fish. No one knows what happens to the young turtles once they enter the ocean. They just disappear and are seen only after they have grown up.

Few of the babies live to be adults. It's a good thing the mother lays so many eggs because so few of her young do survive. But, even so, there has been a decline in the number of sea turtles.

Turtle eggs were once gathered and sold by the thousands in marketplaces. The meat of some turtles is very tasty, and many are still caught and used to make soup or "turtleburgers." Few beaches are left that sea turtles can use for nesting, and even these are slowly being taken over by man.

The United States government protects many wild animals by setting aside for them large areas of land called wildlife refuges. There they can live without being disturbed by men. Two of the refuges where sea turtles nest are Cape Romain in the state of South Carolina and Blackbeard Island off the coast of the state of Georgia. There are now laws, too, that help to protect sea turtles. Although it is all right to hunt them at sea, people are not allowed to take their eggs or to disturb adults or young on land.

All those protections are necessary in order that these interesting and ancient reptiles may continues to live.