SECONDARY EDUCATION ACTIVITY
АКТИВНОСТИ ВО СРЕДНОТО ОБРАЗОВАНИЕ

SEA PROJECT
SECONDARY EDUCATION ACTIVITY

MODULE 2
LEARNING THROUGH PROJECTS

Teacher Development Component

Skopje, August 2004

This publication was made possible through support provided by the U.S. Agency for International Development, under the terms of Cooperative Agreement No. 165-00-03-00104-00. The opinions expressed herein are those of the authors and do not necessarily reflect the views of the U.S. Agency for International Development.

The following writers collaborated and created this Training Module for use exclusively in conjunction with training conducted by the SEA program in Macedonia.

Elena Ackovska - Leskovska
Branko Aleksovski
William Brozo
Sonja Gosevska - Ivanovic
Vesna Janevski
Snezana Jankulovska
Jill Lewis
David Moore
Gary Moorman
Lirie Rexhepi
Florina Shehu
Elizabeth Sturtevant

Editor: Jill Lewis

Implemented by

SECONDARY EDUCATION ACTIVITY
АКТИВНОСТИ ВО СРЕДНОТО ОБРАЗОВАНИЕ

American Institutes for Research
and
International Reading Association

MODULE 2

LEARNING THROUGH PROJECTS

C o n t e n t s

I. Purpose of the Module 3

II. Characteristics and Needs of the Adolescent Learner 9

III. Demonstration Activity 1: Self-Questioning 11

IV. Demonstration Activity 2: Double Entry Journal 21

V. Demonstration Activity 3: Collaboration and Communication—Using Structured Academic Controversies..... 29

VI. Demonstration Activity 4: The Research Process 41

VII. References 59

Additional Resources 62

VIII. Appendices 65

IX. Evaluation Questions 105

I. PURPOSE OF THE MODULE

1. Introduction

In this module, participants will learn strategies involving research, collaboration, and emphasizing critical thinking for use with their students. These skills support successful implementation of project-based learning, a method for teachers to organize course student-centered curriculum to promote active learning and build on student interests. Project-based learning is a great tool for contemporary educators.

The world has changed. Nearly all teachers understand how industrial culture has shaped the organization and methods of schools during the 19th and 20th centuries, and they recognize that schools must now adapt to a new century. Students need both knowledge and skills to succeed. This need is driven not only by workforce demands for high-performance employees who can plan, collaborate, and communicate; but also by the need to help all young people learn civic responsibility and master their new roles as global citizens. In many ways the need for education to adapt to a changing world is the primary reason that learning through projects is increasingly popular. This method of learning attempts to create new instructional practices that reflect the environment in which students now live and learn. (Introduction to Project Based Learning)

Many predict that within ten years almost half the workforce will be employed in information-based occupations: gathering, processing, retrieving, and analyzing information. To be successful in the information economy, students must prepare themselves with the knowledge

and skills they will need in tomorrow's work world. Our students need to be information literate, lifelong learners. (Koechlin and Zwaan, Teaching Tools for the Information Age).

2. *Why is this topic so important?*

The challenge we face is how to make learning in schools more authentic, more useful, and more contextualized for students so that they are equipped to solve problems they confront in and beyond school. How can we connect schools to real life context or situations so that all students are successful after they leave the classroom? How can we provide students with the skills and motivation to be self-regulated and life long learners? (Scott G Paris)

By bringing real-life contexts to the curriculum through a project-based learning approach, students are encouraged to become independent workers, critical thinkers, and lifelong learners. Project-based learning is not only a way of learning, but a way of working together. If students learn to take responsibility for their learning, they will form the foundation for the way they will work with others in their adult life (Instructional Module - Project-Based Learning).

Learning through projects can help teachers create a high-performing classroom in which teachers and students form a strong learning community, focused on achievement, mastery, and contribution to the community.

Project-based learning enables students to develop the following skills:

- Personal and social responsibility
- Planning, critical thinking, reasoning, and creativity
- Strong communication skills, both for interpersonal and presentation needs
- Cross-cultural understanding (Project-Based Learning).

- Visualizing and decision making
- Knowing how and when to use technology and choosing the most appropriate tool for the task (Project-Based Learning).

3. How does the approach in this module compare and contrast with traditional perspectives?

In general, the traditional approach to learning is focused on mastery of content, with less emphasis developing skills and nurturing inquiring attitudes. The current education system is teacher centered, with the teacher focused on disbursing information about "what is known." Students are the receivers of information, and the teacher is the dispenser. Much of the assessment of the learner is focused on the importance of "one correct answer" (Inquiry-Based Learning).

Modern educators have proposed different approaches to encourage student participation in a wider range of learning experiences, so as to nurture students in developing certain high-level abilities such as analytical, problem-solving, and communication skills.

The strategies described in Module 2 are offered as practical, effective activities that help shift the focus of classroom from teacher-orchestrated mastery and memory information to student processing of information to create understanding and improve problem-solving (McKenzie, 1986).

The old-school model of passively learning facts and reciting them out of context is no longer sufficient to prepare students to survive in today's world. Solving highly complex problems requires that students possess both fundamental skills (reading, writing, and math) and Digital Age skills (team work, problem-solving, research gathering, time management,

information synthesizing, and using high-tech tools). With this combination of skills students become directors and managers of their learning process, guided and mentored by a skilled teacher (Instructional Module -Project-Based Learning).

Project-based learning is a teaching and learning strategy that engages students in complex activities. This method usually requires several steps, more than a couple of class days, and cooperative group learning. The project may focus on the development of a product or performance, and students are asked to organize their activities, conduct research, solve problems, and synthesize information (Contextual Learning Resources).

Unlike a traditional approach, project-based methods enable students to work cooperatively with peers and mentors in a student-centered environment where learners are encouraged to explore various topics of interest.

4. How does this topic fit within a quality improvement framework?

Learning through projects enhances the quality of learning and leads to higher-level cognitive development through student engagement with complex and novel problems. These techniques also teach students complex processes and procedures, such as planning and communicating. Accomplishing these goals, however, requires time for both teachers and students to master the behaviors and strategies necessary for successful projects. In addition to research, teachers report convincingly that that project-based learning is a rigorous, relevant, and engaging instructional model that supports authentic inquiry and autonomous learning for students. Along with encouraging academic proficiency and meeting the traditional goals of

education, learning through projects has important benefits for today's students because it (Introduction to Project Based Learning):

- Overcomes the dichotomy between knowledge and thinking, helping students to both "know" and "do."
- Supports students in learning and practicing skills in problem-solving, communication, and self-management.
- Encourages the development of habits of mind associated with lifelong learning, civic responsibility, and personal or career success.
- Integrates curriculum areas, thematic instruction, and community issues.
- Assesses performance on content and skills using criteria similar to those in the work world, thus encouraging accountability, goal setting, and improved performance.
- Creates positive communication and collaborative relationships among diverse groups of students.
- Meets the needs of learners with varying skill levels and learning styles.
- Engages and motivates bored or indifferent students.
- Teachers strategies for students to plan, implement, and evaluate projects with practical, real-world applications outside the classroom.
- Students find projects fun, motivating, and challenging because they play an active role in choosing the project and in the entire planning process (Challenge 2000 Multimedia project, 1999; Katz, 1994)

5. *What are the key practical skills and competencies expected to result from participation in this workshop module?*

Module 2 focuses on teachers building the skills needed to plan and manage project-based learning in their teaching practice. Teachers who participate in this workshop will

- become more aware of their own learning and teaching and make learning more meaningful through practical application;
- learn how to create project-based learning opportunities in their classrooms where students are encouraged to work together to solve the problems and prepare them for the world;
- acquire knowledge and skills needed for conducting research;
- work productively in small groups and independently, and use appropriate assessment tools;
- develop strategies for helping students become more autonomous, strategic, and motivated in their learning.

II. CHARACTERISTICS AND NEEDS OF THE ADOLESCENT LEARNER

The information in this module is consistent with research on the needs of the adolescent learner. Understanding the needs of the adolescent learner is essential for developing effective instruction that meets their needs.

Adolescents are at a stage of life where they are undergoing many changes. These changes are physical, social, emotional, and intellectual. Piaget (1969) described the progression in cognitive processes as a change from **concrete operations** to **formal operations**, a change from a concrete way of thinking about the world to an abstract thinking process.

With their ability to manipulate and understand abstract concepts, adolescents can formulate general rules about the world and then test them against available facts. They can speculate about alternative possibilities, reason in hypothetical terms, and understand analogies and metaphors. However, numerous studies have shown that a sizable percentage of adolescents don't reach the stage of formal operation. As Cowan (1978) points out, because the majority of secondary-school students have not fully reached formal operational thought, it would be a mistake to assume that hypothetical, logical instruction should entirely replace the use of concrete examples and personal experiences. Thus, active-learning environments are essential for this age group.

. Each youth is a unique individual, yet also a member of one or more groups (Sturtevant and Linek, 2004). For example, every young person is part of a family and may also belong to a club or religious organization. He or she may also identify with other youths who have similar

interests, such as dance, woodworking, or electronics. All youth need to learn many new social and academic skills to prepare for their future.

As part of their growth toward adulthood, all adolescents need to consider many life vocations and opportunities. They also need to develop skills and attitudes that will help them grow into responsible adult family members, workers in a market economy, and citizens in a democratic society. School programs that help adolescents develop skills in collaboration, communication, problem-solving, decision making, self-assessment, critical thinking, research skills, and leadership abilities are very important.

III. DEMONSTRATION ACTIVITY 1

Self-Questioning

Overview

Learners who ask and answer their own questions about what they are studying have an independent strategy that generally improves understanding and remembering. Learners benefit from self-questioning especially when they begin with prompts such as signal words and question stems and when they respond to metacognitive questions in writing.

SUMMARY OF SELF-QUESTIONING ACTIVITY
Phase 1 – Activating Background Knowledge • Have participants answer questions about SQPL. • Collaboratively examine benefits of answering questions after encountering subject matter. • Explain benefits of self-questioning after encountering subject matter.
Phase 2 – Constructing Meaning • Demonstrate self-questioning using Question Signal Words and Deliberation Question Stems with the passage, "Origins of the Olympics." • Have participants practice self-questioning as a large group. • Debrief.
Phase 3 – Evaluating and Applying • Have participants form small groups, apply self-questioning to the passage, "Traditions of the Olympics," and share questions-and-answers. • Debrief. • Extend the strategy to the additional set of Seminar Question Stems. • Debrief. • Extend the strategy to the additional set of Metacognitive Question Stems. • Invite comments and questions about how participants might implement self-questioning in their classes.

Objectives

1. As a result of this Demonstration Activity, successful participants will be able to

- independently use self-questioning as a study strategy, and
- plan instruction that enables students to independently use self-questioning as a study strategy.

2. As a result of this Demonstration Activity, participants will experience and reflect upon the following module themes:

- ✓ Collaboration
- ✓ Communication
- ✓ Problem-solving and decisionmaking
- ✓ Self-assessment
- ✓ Critical thinking
- ✓ Research
- ✓ Leadership

PHASE 1: Activating Background Knowledge

Display on an overhead and read aloud the following questions (see Appendix 1-A), which refer to teaching activities from Module 1.

1. What do the letters S Q P and L stand for in the SQPL activity?
2. What is the goal of SQPL?
3. How might SQPL change regular classroom instruction?

Have participants converse with partners when answering the questions.

Briefly review selected participants' answers to each question, probing and clarifying if needed.

Say, *"As we've just said, SQPL is a strategy that calls for students to ask themselves questions **before** they encounter subject matter. It is self-questioning that occurs **before** students listen to lectures, read materials, or observe demonstrations.*

*"The "Self-Questioning" activity that we're going to do now calls for students to ask themselves questions **after** listening to lectures, reading materials, or observing demonstrations. It is a strategy that occurs **after** subject matter is presented.*

*Let's think about the benefits of asking and answering questions **after** encountering subject matter."*

Display the question below on an overhead and read it aloud.

Why do learners benefit from answering questions **after** they encounter subject matter?

Have participants converse with partners to answer it.

Briefly review selected participants' answers to this question, probing and supporting as appropriate. Elicit from volunteers or directly state benefits, such as

- providing opportunities to review subject matter
- stimulating active thinking
- focusing on important ideas and information
- extending current understandings
- generating new understandings
- monitoring and regulating efforts and learning
- imagining what might be tested

Now display the words *dependent* and *independent* on the overhead.

Say, *"Most educators acknowledge the benefits of students answering questions. However, many educators are concerned that students who are used to answering only the questions that teachers and others supply become dependent on them. Students come to depend on others to stimulate their thinking – they become dependent rather than independent learners.*

Display a copy of a local newspaper (purchased before the workshop) and say *"Newspapers like this one do not offer questions at the end of each article to guide readers, nor are teachers available to ask questions of each and every newspaper reader. When people are on their own after school, they benefit from strategies that enable them to learn on their own – independently.*

"Think of individuals outside of school when they perform their jobs, run their households, act as citizens, and conduct their personal lives. They require academic independence – the ability to learn on their own.

This Demonstration Activity presents self-questioning as a tool for independent lifelong learning."

PHASE 2: Constructing Meaning

Say, *"When you introduce self-questioning to your students, you might first have them think about the benefits of answering the questions that others ask (e.g., stimulate active thinking) like we did with you just a few minutes ago. Then you might explain the benefits of self-questioning (i.e., independent lifelong learning strategy) like we just did. Next, you might demonstrate self-questioning to your class first by displaying Question Signal Words and Deliberation Question Stems."*

Display on an overhead the Question Signal Words and Deliberation Question Stems (see Appendix 1-B).

Explain that the question words and stems shown here are helpful when initiating self-questioning; they are only stepping stones to independence. As learners become proficient with self-questioning, they can construct completely original questions on their own.

Mention that selecting questions words and stems best suited to a particular passage can be more complicated than it seems at first.

* * * * * * * * * * * * * * * * * *

Question Signal Words

- Who _____ ?
- What _____ ?
- When _____ ?
- Where _____ ?
- How _____ ?
- Why _____ ?

Deliberation Question Stems

- What have I learned about _____ ? What should I remember about _____ ?
- What does _____ mean?
- What are the components of _____ ?
- How are _____ and _____ alike? How are _____ and _____ different?
- What are the strengths of _____ ? What are the limitations of _____ ?
- What caused _____ to happen?
- How does _____ affect _____ ?
- How does _____ relate to what I already know? How does _____ relate to _____ in the passage?
- What does _____ look (and sound) like?
- What is the significance of _____ ?

* * * * * * * * * * * * * * * * * *

Next, distribute, or call attention to, the two reading passages, "Origins of the Olympics" (Appendix 1-D) and "Traditions of the Olympics" (Appendix 1-E), that will be used to demonstrate self-questioning. Mention that when teachers initiate self-questioning with their classes, they should use relatively simple material so students can concentrate on the learning strategy (self-questioning) and not the subject matter (e.g., mathematical derivatives).

Have participants skim "Origins of the Olympics" for about 30 seconds to get a general idea of its contents.

Next, model/think-aloud your use of the self-questioning (and answering) strategy with paragraph 1 using only the Question Signal Words and Deliberation Question Stems you think are appropriate.

When done with paragraph 1, elicit comments or questions from the participants about your use of the strategy.

Then model/think-aloud your use of the self-questioning (and answering) strategy with paragraph 2, again using only the Question Signal Words and Deliberation Question Stems you think are appropriate. Once again, elicit comments or questions from the participants about your use of the strategy after you finish.

Practice

Now have all workshop participants working to individually produce self-questions and answers for paragraph 3.

When participants are ready, elicit questions, answers, and comments from volunteer participants, probing and supporting as needed.

Then have all workshop participants again produce self-questions and answers for paragraph 4.

Again, when participants are ready, elicit questions, answers, and comments from volunteer participants, probing and supporting as needed.

PHASE 3: Evaluating and Applying

Application

Now have participants skim "Traditions of the Olympics" for about 30 seconds to get a general idea of its contents.

Have participants form groups of three. Provide about 10 minutes for each participant to write as many questions and answers as he or she thinks appropriate for the entire passage.

Then provide about 15 minutes for group members to share with each other what they wrote.

Reconvene the whole workshop and invite comments and questions about implementing this learning strategy in participants' classes:

> *What questions do you have about self-questioning?*
>
> *What materials would you use?* (e.g., double-entry notes)
>
> *How would you have students talk with each other about their questions and answers?*

Explain that strategy instruction requires a long-term commitment. The Reciprocal Teaching research indicates that students become adept and independent with self-questioning (and other learning strategies) after about 20 minutes of strategy instruction on 20 different days. If self-questioning instruction is shared among all the school's teachers, then no single person bears full responsibility for the time commitment.

> *How would you involve colleagues in self-questioning?*

When the participants seem competent and content with self-questioning so far, move to Extensions.

Extensions

Display on an overhead the two additional types of question stems, Seminar Question Stems and Metacognitive Question Stems (Appendix 1-C). Say, "*As your students become proficient with asking and answering Deliberation Questions, consider additional types such as seminar and metacognitive.*"

Seminar Question Stems

- What might be other examples of _____ ?
- What conclusion can I draw about _____ ?
- Why is it important that _____ ?
- What would happen if _____ ?
- What do I have to say about _____ ?

Explain the difference between Deliberation Questions and Seminar Questions:

Deliberation questions seek closure. Students are expected to produce a verifiable answer. Students might deliberate over several aspects of subject matter, but they eventually are to specify one answer and point to support for it. Deliberation questions encourage analytic thinking.

Seminar questions ask for openness. Students are expected to produce multiple credible answers as they explore possibilities. Students construct several possible interpretations of subject matter in response to open-ended questions. Seminar questions promote creative thinking.

Have workshop participants try out Seminar Questions. Point to and ask a Seminar Question about "Traditions of the Olympics" (e.g., *What would happen if* the Olympic traditions

stopped? *Why is it important that* the Olympics have traditions?), then invite answers. Have more than one participant answer a question to show how one item can stimulate multiple credible responses.

Have participants reform their groups of three and try out Seminar Questions with each other while using either "Traditions of the Olympics" or "Origins of the Olympics."

Debrief, eliciting comments or questions from the participants about their use of the strategy with Seminar Questions.

Explain Metacognitive Questions:

> *Metacognitive questions go to self-examination. Students are expected to think about their thinking, becoming aware of their learning processes and the decisions they make when studying. Students reflect on how subject matter is presented and how they deal with the presentation. Metacognitive questions support self awareness.*

Have workshop volunteers try out Metacognitive Questions. Point to and ask a Metacognitive Question about "Origins of the Olympics" (e.g., *How did the author put the ideas in order? How can I use this order to understand and remember the origins of the Olympics? What did I find difficult to understand? What can I do to improve my understanding of* _____*?*), then invite answers.

Metacognitive Question Stems

- How did the author/teacher put the ideas in order? How can I use this order to understand and remember _____ ?
- What are the key vocabulary words? How can I understand and remember _____ ?
- What did I find difficult to understand? What can I do to improve my understanding of _____ ?
- Does _____ make sense with what was presented before? If not, what can I do to make sense of _____ ?
- What did the author/teacher present to help me understand _____ ?

Have participants try out Metacognitve Questions in their groups of three.

Evaluation

Reconvene the group and debrief, inviting comments and questions about how participants can implement these new types of self questions in their classes.

Some additional information about the Self-Questioning Strategy can be found in Appendix 1-F.

IV. DEMONSTRATION ACTIVITY 2

Double Entry Journal

Overview

SUMMARY OF DOUBLE ENTRY JOURNAL LESSON
Phase 1 – Activating Background Knowledge • Teacher writes on the flip chart "Olympic Games." • Teacher asks participants to individually write a short essay on the topic of the Olympic Games. • When participants finish writing, teacher asks them to work in pairs to share and compare their essays. • Teacher invites a few participants to read their essays to the entire group.
Phase 2 – Constructing Meaning • Teacher writes "Double Entry Journal" on the flipchart and informs participants this is the name of the strategy they are learning. • Below this title, the teacher draws a line down the page dividing it into two equal halves. • Teacher explains that in the left-hand column statements and ideas taken directly from the author are to be recorded; while in the right-hand column are to be written reactions to or reflections on the statements from the left side. • Teacher asks for volunteers to supply statements directly from their essays and writes a few of these in the left-hand column, then invites comments and reactions that the teacher writes in the right-hand column.
Phase 3 – Evaluating and Applying • Teacher provides participants an article about the Olympic Games (*Revision* by Jeremy Barton) and asks them to individually write and complete a double entry journal based on the article. • When participants finish writing, the teacher asks them to pair up and share their statements and reactions from both sides of their journal, paying particular attention to the similarities and differences. • To conclude, small groups of participants create a sample double entry journal page based on their subject-area expertise and discuss the strategy's usefulness to their students.

Objectives

Participants will

1. Learn the teaching procedures used in the Double Entry Journal lesson.
2. Learn how the strategy can promote active, independent learning.
3. Learn the value of reflecting on their observations by making connections to something they have read, studied, or experienced in their own lives.
4. Experience and reflect upon the following module themes:

   - ✓ Collaboration
   - ✓ Communication
   - ✓ Problem-solving and decisionmaking
   - ✓ Self-assessment
   - ✓ Critical thinking
   - ✓ Research
   - ✓ Leadership

PHASE 1: Activating Background Knowledge

Begin by requesting the participants to talk briefly with the person sitting next to them about the Olympic Games. After a couple of minutes, ask for comments from the whole group, making sure to include comments from everyone wishing to share.

Next, ask the participants to individually write a short essay about the Olympics. Tell the group their essays can be structured in any way and may deal with the topic in general or any specific aspect. *(The purpose is to produce a participant-generated text for initial experience with the double entry journal strategy.)* While individuals are writing, move around the room to make yourself available for questions and clarification. Allow 5-10 minutes for students to write.

When writing concludes, ask participants to partner with the person sitting next to them and to share and compare their essays. Invite volunteers to read their essays to the entire group. *(Allow a total of 10-15 minutes for this activity.)*

PHASE 2: Constructing Meaning

Write at the top of a flipchart page **Double Entry Journal** and describe and exemplify the strategy. Beneath the strategy title, draw a line vertically down the middle of the page splitting it into two equal halves. Write at the top of the left-hand column "What the Author Says" and at the top of the right-hand column "What You Say." Tell the participants that the strategy involves writing in the left column direct quotes, statements, theories, definitions, and other information that may be of interest, of key importance, difficult to understand, or requiring clarification. Write in the right column any thoughts, questions, or reactions while trying to make sense of the information taken directly from the text or author in the left column.

Ask participants to read statements from their essay on the Olympic Games and write a few of these on the flipchart in the left column. Then, ask participants to talk with their partners and generate comments, reactions, and personal connections related to the statements in the left column. Afterward, gather some of these comments and write them in the right column next to the corresponding statement in the left column. Typical responses might resemble those in the example below.

Double Entry Journal

What the Author Says	What You Say (quotes, sentences, etc. from text, your own reactions, questions, personal connections, etc)
The Olympic Games are the most popular of any international sporting events	*Perhaps this is true because more countries participate than in any other event*
More and more Olympic athletes are taking performance enhancing drugs	*Athletes who get caught taking these kinds of drugs should be banned for li*

* * * * * * * * * * * * * * * * * * *

To help participants develop a deeper understanding of the Double Entry Journal, present these more detailed examples on the overhead projector.

Left-Hand Side The author says…	Right-Hand Side I say…
Effective politicians learn to convert into action attitudes that may not have crystallized. **Latent** opinions are frequently exploited by political leaders to move citizens to take up arms, embrace sweeping policies, or create national movements…	"Latent" is a key word here – found it in the glossary. Adolph Hitler did this with the German people in the 1930s and 40s as have other leaders, who have aroused "sleeping" nationalistic sentiments. I always felt Milosevic did this to create civil war in Yugoslavia.

Left-Hand Side	Right-Hand Side
Quote from the article/text	Visual commentary (drawings, visual analogies, or doodles)
Statements or paraphrases from article/text	Reactions (I disagree with...), reflections (I wonder if...), questions (Why does the author say...), possible answers (Maybe this can be explained by...) Making connections: • text to text (other things read) • text to self (personal experiences) • text to world (what we know about others and the topic) Note misunderstandings and potential strategies to improve understanding.
Theories derived from article/text	Questions (e.g., about race, class, and gender) Relating passages to the themes and ideas in your own papers and articles
Definitions taken from the article/text	Insights, parodies, or sarcasm
Statements of author's style	Naming literary devices and techniques

PHASE 3: Evaluating and Applying Information

Tell participants they are going to read an article about the Olympic Games and create one-page of a double entry journal BASED on the article. Direct participants to draw a vertical line down the middle of a sheet of note paper to record their journal entries. Distribute the article about the article *Revision* by Jeremy Barton (see Appendix) and instruct participants to read it

individually and complete their double entry journal page as they read and immediately after reading. Remind participants as they think about the article to consider questions such as:

- What are the author's key ideas?
- What kinds of connections can I make between these ideas and other books and articles I have read, experiences I have had, or things I already know about the topic?
- What questions do the author's ideas bring to mind? Can all questions be answered by this text?
- What kinds of personal reactions does the article evoke?

While participants are working, move around the room to provide clarification and answer questions. (Allow as much time as needed for participants to complete the reading and the double entry journal page.)

Once participants have completed reading and completing a journal page, ask them to work with a partner to compare their entries. Have students focus specifically on differing reactions and comments to similar statements from the article. (Provide 5-10 minutes for this activity.)

Next, invite volunteers to share their notes with the entire group and elicit alternative reactions and comments to common right-hand column statements. Discuss how entries in the right-hand column will always vary from individual to individual, but will promote a keener focus on the reading material and more thoughtful, critical thinking.

Reviewing the Double Entry Journal Strategy

Ask the participants to review the lesson, recalling everything they did. Allow participants to discuss answers to these review questions with their partners before eliciting responses from the entire group. You might begin by asking: *What was the first thing we did when we started the sample lesson on the double entry journal?* This should be followed by questions such as: *How did recording entries in the journal help you pay closer attention to the article on the Olympics? How did responses in the right-hand column of the journal facilitate critical thinking and making personal connections? What are the benefits of working in pairs and small groups?*

Also, be sure to ask the participants: *Did you understand the steps in the double entry journal strategy?* If additional clarification is needed, describe the procedure again. Finally, ask the participants: What is the purpose of this strategy? As you gather their responses, tell participants the overall goal of the double entry journal is to help students become more aware of how they read, interpret, and study content.

Guided Practice

As a concluding activity, provide each group of participants at a table a sheet of flipchart paper, tape, and markers. Ask them to brainstorm a topic from their subject areas and create a "sample" page of double entry notes based on a typical article or text on the topic. Remind participants to use the examples and sample questions provided them in constructing their notes. Move around the room to assist and clarify. Once participants have recorded a sample journal entry on the flipchart paper, ask them to attach it to the wall with the tape. Finally, ask a

representative from each small group to share with the entire class what they recorded in their double-entry journal notes with explanations. *(Provide 15 minutes for this activity).*

Evaluation

Ask participants to use a double entry journal format to write down what they learned as a result of the lesson (in the left-hand column) and their feelings and ideas about how the strategy will work in their specific schools in general, gymnasium, and vocational subjects (in the right-hand column).

V. DEMONSTRATION ACTIVITY 3

Collaboration and Communication—Using Structured Academic Controversies

Overview

SUMMARY OF COLLABORATION AND COMMUNICATION—USING STRUCTURED ACADEMIC CONTROVERIES
Phase 1 – Activating Background Knowledge • The teacher asks participants to think about how they currently use collaboration in their classrooms. • The teacher explains that collaboration among students has been found to improve learning, but it must be structured carefully to be successful. • The teacher explains that this activity will demonstrate a collaborative learning strategy called "Structured Academic Controversy." • The teacher asks participants to think about the following question: *If you were responsible for choosing disposable coffee cups for use during the Olympic Games in 2012 in Macedonia would it be best to choose paper or Styrofoam cups?*
Phase 2 – Constructing Meaning • The teacher explains that in this part of the lesson, participants will read a short selection that includes principles of both chemistry and economics related to the choice of cups. They will then discuss their ideas with others and argue their position. • The teacher divides the participants into groups of four. • The teacher divides each group into pairs. • Each pair is given a different goal: One pair will support selection of the paper cup, the other pair will support selection of the Styrofoam cup. • The teacher gives the short reading selection ("Paper or Styrofoam?"). Students read this silently and then, with their partner, make a list of reasons supporting their assigned position. • Each pair then presents its position to the other pair. • Pairs then critically evaluate and challenge the opposing pair's list and reasoning and defend their own reasoning from attack. • Pairs then change positions. They go back to the reading and make a list of reasons that support their new position. They then present their new position to the opposing pair.

Phase 3 – Evaluating and Applying

- The teacher explains that the purpose of this stage is for students to synthesize and integrate their knowledge and come to consensus with other members of their group.
- The teacher tells students that as part of the Olympic Planning Group their group of four will have to agree on a common position (Paper or Styrofoam?).
- The teacher asks each group to write a brief report advocating for their position.
- The teacher then brings all groups together and asks how many groups took each position. Students should then report their reasons for their position, as the teacher writes reasons for each position on chart paper.
- The teacher then asks students to self-assess by answering reflective questions.

Objectives

Participants will:

1. Gain knowledge related to their course of study (e.g., information related to chemistry).
2. Develop skills in communicating and collaborating with others.
3. Develop logical arguments from reading and listening to others.
4. Explain and defend a position based on evidence.
5. Learn to see alternate points of view and make agreements with others.

This strategy helps to develop the following skills:

- ✓ Collaboration
- ✓ Communication
- ✓ Problem-solving and decisionmaking
- ✓ Self-assessment
- ✓ Critical thinking
- ✓ Research
- ✓ Leadership

Phase 1: Activate background knowledge (30 minutes for this phase)

- The teacher asks participants to think about how they currently use collaboration in their classrooms. Specifically, ask: *In what ways do your students work together in your classroom? What are the benefits of this approach? What are the drawbacks? What else would you like to know about collaboration? (Oral whole-group discussion using transparency, Appendix 3-A).*
- The teacher explains that collaboration among students has been found to improve learning, but it must be structured carefully to be successful. Students must be taught specific steps in order to collaborate productively.
- The teacher explains that this session will demonstrate a collaborative learning strategy called "Structured Academic Controversy" developed by two professors at the University of Minnesota, David Johnson and Roger Johnson (1995). Note that these professors are brothers and are very well known for developing and researching collaborative learning strategies.
- The teacher shows a transparency (Appendix 3-B) to preview the steps for using this strategy in a class:
    - *Teacher divides students into groups of four, and then assigns each student a partner within their group.*
    - *Students work with their partner to research the answer to a question that has at least two logical alternative positions. With their partner they develop a rationale to support their position.*
    - *Both sets of partners present their position to their group of four. Each pair defends their own position to the other pair.*

- *The pairs change positions and then defend the opposite position persuasively to group of four.*
- *All four in the group discuss the topic and come to consensus on one position, based on their best reasoning.*

- The teacher presents the following question: *If you were responsible for choosing disposable coffee cups for use during the Olympic Games in 2012 in Macedonia, would it be best to choose paper or Styrofoam cups?* (Appendix 3-C).

  - Ask participants to briefly discuss this question with others at their table.
  - Ask a few participants to share what they decided with the whole class, and give some reasons. Write the reasons they give on chart paper under columns as follows: Column I: Paper is Best; Column II: Styrofoam is Best).
  - Point out that there are different meanings of the word "best." For example, the "best" cup could:

    ✓ Be least costly to purchase.

    ✓ Use a natural resource that is easily available or renewable.

    ✓ Create the least waste during manufacturing.

    ✓ Have the fewest environmental effects upon disposal.

    ✓ Keep coffee hottest the longest.

  - Ask students to think about the types of reasons they provided for their "best" choice. Were their reasons related to cost, environment, manufacturing issues, convenience, or some other concern? Explain that in making decisions, people often have different goals and concerns, which is an important reason various people or groups often make different decisions.

PHASE 2: Constructing meaning (30 minutes for this phase)

1. The teacher explains: *In this part of the lesson, you will read a short selection that includes principles of both chemistry and economics related to the choice of cups. You then will discuss your ideas with others, form a position, and argue your position.*
2. The teacher divides the participants into groups of four.
3. The teacher divides each group of four into pairs (two). Each pair is given a different goal: One pair will support selection of the paper cup, the other pair will support selection of the Styrofoam cup.
4. The teacher now hands out the short reading selection (Appendix 3-D, "Paper or Styrofoam?"). Students are instructed to: *Read this silently and then, with your partner, make a list of reasons that support your assigned position on the question. Use any reasons found in the reading selection or that you can think of on your own.*
5. Each pair then presents its position to the other pair. Participants should be told to: *Be as convincing as possible; take notes; clarify anything you do not understand; argue forcefully and persuasively for your position; critically evaluate and challenge the opposing pair's list and reasoning; and defend your reasoning from attack.*
6. Pairs then change positions. They should be asked to go back to the reading and make a list of reasons supporting their new position. They then present and defend their new position to the opposing pair so that they can learn to see both sides of the issue.

PHASE 3: Evaluation and Application (30 minutes for this phase).

- The teacher explains that at this stage, the purpose of the activity is for students to synthesize and integrate their knowledge and come to consensus with other members of their group of four.
- The teacher should say to participants: *As part of the Olympic Planning Group you now have to decide on a common position (Paper or Styrofoam?) that all members of your group agree upon. This is necessary in order to purchase cups in time for the Olympic Games. (The teacher can also point out that in business, government, and other occupations, it is important for workers to know how to come to consensus on decisions).*
- The teacher asks each group of four students to decide on their group's position and to write a brief report advocating for this consensus position. The report should begin with the following sentence: "Our group is in favor of selecting (Paper Cups or Styrofoam Cups) for use during the Olympic Games because..." The group should then write at least three good reasons why their choice is best.
- The teacher then brings the whole class together and asks how many groups took each position (how many groups voted for Paper? How many groups voted for Styrofoam?). Each group should then state their reasons for their position, as the teacher writes this on a comparison chart (one side for "Advantages of Paper," the other side for "Advantages of Styrofoam"). *(Teachers should note that this is very similar to the activity in Phase I, but at this point the students have had an opportunity to study the issue, while previously they were only recording their background knowledge. If there is time, teachers can show students the comparison between the quality of reasons they are giving now versus the reasons they gave earlier in the lesson).*

- The teacher will then ask students to write answers to the following reflective questions. Student can be asked to volunteer answers to share with the class (but they should be permitted to keep answers private if they wish to do so). The questions are as follows (see also Appendix 3-E).

  1. *What new information did you learn about chemistry today?*
  2. *What did you learn about collaborating with others?*
  3. *How well did your group work together?*
  4. *Is there anything your group could do next time that would improve how you work together?*

Reviewing the Activity (30 minutes)

I. Purpose

This section provides steps for reviewing with teacher participants both the strategy that was just modelled (Structured Academic Controversies) as well as general principles of collaborative learning. Teachers will be invited to think about how these techniques might work in their classrooms.

II. Reviewing the Steps

Ask teachers to review the steps in the strategy *Structured Academic Controversies*, as follows:

Show transparency 3-B, and ask, for each part: Why did we do this? Do you think it would work well with students in your class? Why or why not?

[From Appendix 3-B]:

Steps for teaching using Structured Academic Controversies

1. *Teacher divides students into groups of four and then assigns each student a partner within their group.*
2. *Students work with their partner to research the answer to a question that has at least two logical alternative positions. With their partner they develop a rationale to support their position.*
3. *Both sets of partners present their position to their group of four. Each pair defends their own position to the other pair.*
4. *The pairs change positions and then defend the opposite position persuasively to group of four.*

5. *All four individuals in the group discuss the topic and come to consensus on one position, based on their best reasoning.*

III. Reviewing More Information About Collaborative Learning

Review the information below about collaborative learning. If time is short, point out this information to teachers and review some key points. They will want to study it further on their own.

Overview of collaborative learning:

Structured Academic Controversy is one example of a wide variety of collaborative or cooperative learning instructional techniques. These techniques were developed to help students learn to work together to gain content knowledge as well as skills in collaboration and communication (Johnson, et al. 1991, 1994; Millis and Cottell, 1998).

Forming groups:

It is strongly recommended that teachers divide students into groups for collaborative learning based on the goals of the activity, rather than allowing students to form groups with their friends. Teachers should create groups that are the smallest group possible to accomplish the task (generally three to five group members). Large groups are inefficient. Also, place students in groups so that a) members of the class learn to work with different people at different times, and b) the groups are balanced in terms of student academic strengths and personalities. For example, teachers may want to put the most advanced students into distinct groups or the most talkative or quiet students into separate groups.

Teaching students to work in groups:

Most students will not naturally know how to work in groups. They will need specific guidance on how to work effectively with others. Some suggestions for secondary students include:

- Be respectful of each other.
- Be sure everyone has a chance to speak.
- Disagree with another person's position and ideas but don't be critical of the person.
- Don't take criticism of your ideas as a personal attack.
- Listen to everyone's ideas, especially if you don't agree with them.
- Change your mind when the evidence supports this.
- Try to understand both sides of a controversy.
- Focus on reaching the best outcome, not on winning.

Gradual Implementation

Cooperative grouping often works best if teachers start with short-term (such as one class) group assignments, and then move gradually to longer-term group assignments. Also start with the smallest (two or three person) groups, and move gradually to larger (five person) groups.

Assessment

Teachers will find it important to assess both content objectives (e.g., that students will learn information in chemistry), and process objectives (e.g., that students will learn to make collaborative decisions) when using collaborative grouping. Teachers should ask students to self-

assess at the end of each lesson. This will help students think about their successes as well as what they should improve on next time. In addition, teachers should keep notes evaluating whether students have met the objectives of the lesson. They should watch the groups as they are working and assist any that slide off track. They also should assess students' content knowledge continually.

IV. Guided Practice

During this part of the session, guide teachers in thinking about applying what they have learned to their teaching methods.

A. Ask teachers to form a small group with one or two other teachers who teach in the same or a similar subject area. (e.g., three teachers of agriculture in one group).

B. Each group should select a topic that is related to their content area (e.g., "energy" in science).

C. Each group should then write a question that could be used for the strategy Structured Academic Controversies. For a science class on energy, a question might be: "Nuclear energy should be used more/used less in our country."

D. If time permits, each group should write out the steps of a lesson they would present to students, as well as the assessment. If time is short, teachers can discuss these steps informally.

V. Sharing and Evaluation

A. Ask each group from above to share their ideas with the class.

B. Ask teachers to express their opinions on how well this strategy would work with their students. Specifically, do they think there would be benefits? If so, what benefits? Do they have any concerns about using this strategy? If so, what? Emphasize that there are many types of strategies, and they might need to modify a strategy to make it work well with their students.

VI. DEMONSTRATION ACTIVITY 4

The Research Process

Overview

SUMMARY OF THE RESEARCH PROCESS
Phase 1 – Activating Background Knowledge • Teacher introduces the topic and purpose of the activity. • Teacher asks participants to brainstorm ideas that they associate with the term *research project.* • Teacher poses four thought-provoking questions and displays them to participants on flip charts or transparencies: *What is a research project? Why are research projects important in teaching and learning? What are some difficulties students might have when they do research projects? What is the process students need to use for completing a research project?* • Teacher divides the participants into four groups; each group is assigned to answer one of the questions. • Participants work individually and then in their groups to answer the assigned question and write responses to it on flip chart paper. • Teacher asks representatives from groups to display its work.
Phase 2 – Constructing Meaning • Teacher provides a concise review of the four questions from Phase 1 and gives participants a brief introduction and explanation about the research process. • Teacher asks participant to brainstorm about the research steps. • Teacher introduces the main steps of the Research Cycle: (1) Defining the problem, Developing a Research Question and Statement of Purpose; (2) Developing Research Plan, (3) Gathering and Collecting Data, (4) Sorting and Analyzing Data, (5) Synthesizing Data, (6) Evaluating, and (7) Presenting • Teacher gives instruction to participants that they will work on a group Research project using the Research Cycle. Participants are given an overview of the work, which will be done in three phases: Activating Background Knowledge (Research Cycle Steps 1 and 2); Constructing Meaning (Research Cycle Steps 3, 4, and 5); Evaluating and Applying (Research Cycle Steps 6 and 7); • Teacher tells participants that they will work on questions they may have generated during earlier Activities. • Teacher guides participants through the small group activity. Each Lesson Phase is explained, participants work in groups under the direction of the teacher, then each

group reports back to the whole group. This procedure is repeated for each of the three Lesson Phases.

- Teacher summarizes the activity, discussing how teachers must be flexible when guiding students in the research process.

Phase 3 – Evaluating and Applying

- Teacher asks participants to self-evaluate their effectiveness in carrying out the research project.
- Teacher invites participants to examine evaluation rubrics in the Appendices.
- Teacher asks participants to consider these questions about their experiences:
- *What important educational objectives do research projects address? What difficulties can you expect when implementing research projects? When do you think it would be most appropriate to use research projects? Do you think the Seven Step Research Cycle meets your classroom needs? How might you modify it?*
- Teacher reviews each of the Steps of the Research Cycle participants experienced, problems they may have encountered, and how these could be solved.
- Teacher asks participants to discuss how they could use the information from this activity with their students and elaborates on the teacher's role when students conduct research projects.
- *Participants engage in guided practice, working in groups of similar content areas to* develop a lesson plan for starting a student research project. They use a chart to indicate student activities during each Step of the research project.

Objectives

Participants will:

1. Better understand research process and problem-solving process.
2. Be able to implement the Research Project in their practice and improve thought about the research process.
3. Acquire knowledge and skills about how to use research steps: defining the problem, planning the research process, accessing and using information from a variety of sources, synthesizing, evaluating, and creating a final product.
4. Be able to assess project work.
5. Experience and reflect upon the following module themes:
   - ✓ Collaboration

- ✓ Communication
- ✓ Problem-solving and decisionmaking
- ✓ Self-assessment
- ✓ Critical thinking
- ✓ Research
- ✓ Leadership

NOTE: This Demonstration Activity is lengthy and will be done during one and a half days. There are suggestions within the Activity for reducing the amount of time needed for each Phase. The time allocations (without suggestions in reducing time length) is as follows:

Phase 1 of DA		20
Phase 2 of DA	Opening	20
	Phase 1 Research Cycle	75
	Phase 2 Research Cycle	180
	Phase 3 Research Cycle	30
Phase 3 of DA	Evaluate and Apply	60
Guided Practice		60
		445

TOTAL TIME = 7 1/4 hrs

PHASE 1: Activate background knowledge (This phase should take 20 minutes)

Begin this activity by asking, *How many of you ask students to do research projects? Many students in secondary schools are interested in doing research but have not had much experience with it and may have difficulty starting. In this next activity we will be working on how we can help students be successful with developing successful research projects. What comes to mind when you hear the term "research project?"*

The teacher writes participants' responses on the flip chart. Participants are asked to elaborate on some of their contributions, especially on those words that are highly connected to the research process, such as *question, information, students individually work, investigation, independent work, problem-solving, explore, critical thinking.*

Next, the teacher trainer displays four questions on a flip chart or transparency. The trainer says, *we will look at some questions that will provide a framework for understanding the importance of research projects in our teaching. The questions are: What is a research project? Why are research projects important in teaching and learning? What is the process students need to use for completing a research project? What are some of the challenges students might encounter with research projects?*

The trainer divides the participants into four groups; each group working on a different question. The trainer says, *we will form four groups and each group will work on a different question.* Once the groups have been divided and a question has been assigned to each group, the trainer says, *I would like each participant to think individually for three minutes about your group's question and for you to write some ideas.* Provide each group with handouts outlining all four questions. Participants work in groups to answer the assigned question and write the group responses on flip chart paper. The teacher assists the group work. After 15 minutes, the teacher asks each group to display responses.

PHASE 2: Constructing Meaning

The teacher displays the following transparencies saying, *these questions have also been considered by others who have their students conduct research. Let's see how their answers compare to yours.* (NOTE: Plan no more than 20 minutes for this opening part of Phase 2.)

What is a research project?

- A research project asks a question or poses a problem that the student or researcher can answer by using problem-solving strategies and multiple resources.
- A research project asks students to investigate issues and topics addressing real-world problems, while integrating subjects across the curriculum.
- A research project is a method that fosters abstract, intellectual tasks to explore complex issues (Instructional Module - Project-Based Learning).

Why are research projects important in teaching and learning?

- Research projects help students develop skills for living in a knowledge-based, highly technological society.
- Research projects encourage students to become independent workers, critical thinkers, and life long learners.
- Research projects develop students' ability to work with their peers, building teamwork and group skills.
- Schools where research work is practiced find a decline in absenteeism, an increase in cooperative learning skills, and improvement in student achievement.
- Research work promotes critical thinking and communication.
- Research projects prepare students with the knowledge and skills they will need in tomorrow's work world (Instructional Module - Project-Based Learning).

What are some of the difficulties students might have when they undertake research projects?

- Students might not know how to formulate good questions.
- Students might not know where to obtain information.
- Students might not have access to computers or libraries for information.
- Students might not know how to sort valuable information from what is less valuable.
- Students might not know how to synthesize information or may not understand the dangers of plagiarism.
- Students might not know how to cite the sources they have used.

What is the process students need to use for completing a research project?

The Research Cycle consists of: (1)Defining the problem, Developing a Research Question and Statement of Purpose; (2)Developing a Research Plan; (3) Collecting Data, (4) Sorting and Analyzing Data, (5) Synthesizing Data, (6) Evaluating, and (7) Presenting . (Appendix 4-A).

- The seven steps of the Research Cycle are "recursive;" meaning that it is often necessary to return to previous steps as the research cycle progresses. (Appendix 4-B).

Instructions for research project work using research steps

The teacher trainer says, *you will now work on a research project using the steps of the Research Cycle.* Participants are given the Research Cycle handout (Appendixes 4-A and 4-B) to help them with this activity. The teacher explains to the participants: *Because we are in a workshop setting, and we do not have enough time to carefully work though the research cycle, we are combining the seven steps into three phases. You will note that the three phases are the same as the three phase lesson plan we presented in our first workshops. From a teacher's point of view, it is wise to always keep these three phases in mind. In the "Activating Background Knowledge", or "Pre-" phase, you are developing students' background knowledge and preparing them to be successful in the lesson. In the "Constructing Meaning" or "During" phase, you are helping students construct new understandings and acquire new knowledge. In the "Evaluate and Apply" or "Post-" phase, you are helping students reflect on what they've learned, share their knowledge, with others and evaluate their learning. We want to emphasize that when working with your students, you will need to slow down this process, and address each of the seven steps in the research process separately.*

PHASE 1: Activating Background Knowledge (Research Cycle Steps 1 and 2) Plan 1 hour and 15 minutes for all activities in this Phase of the Research Process

The teacher trainer tells to participants: *In the first phase you will work on Steps 1 and 2 of the research cycle. You will need to complete both Steps in 45 minutes. Please appoint one person in your group to act as a timekeeper: Their job is to keep your group on task so that you can finish in the allotted time. You should also appoint a spokesperson for your group: Their job*

will be to report back to the entire group each time we finish one of the phases. As a teaching tip, the use of both timekeepers and spokespersons when your students are working in groups is often very helpful in ensuring that groups working together effectively.

The teacher then reviews both Steps as outlined below before moving participants back into their research groups.

STEP 1: Defining the problem, Developing a Research Question and Statement of Purpose

The teacher tells participants: In this step you will build on the questions that you produced in earlier activities, or questions that occurred to you while reading about the Olympics. For instance, you might like to investigate further one of the Seminar Questions you developed in the Self-Questioning activity. When you completed the Double Entry Journal, you may have developed interesting questions from one of your group member's essays or from the essay everyone read on the Olympics. Or you might have wondered about something related to the Olympics that we have not discussed. Think about questions you have had about the Olympics and determine which ones might be interesting to develop further and to research. With your group, prioritize your questions and develop a single research question that requires problem-solving or decisionmaking and using multiple resources.

Tell participants:

- *Your group should develop a single research question about the Olympic Games. Use the* QUESTIONS TO ASK ABOUT RESEARCH QUESTIONS guidelines (Appendix 4-C) for successfully creating your questions.

- Next, your group should develop a statement of purpose about the research question. This statement should address why the question is important, and what your group wants to learn from doing the research. MAKE SURE YOUR STATEMENT OF PURPOSE IS SPECIFIC ENOUGH; you will want to review the handout "Writing a Statement of Purpose" (see Appendix 4 –D).

STEP 2: Develop a plan for research

Explain to participants: *Once the problem, question, and purpose have been carefully defined and developed, you will need to establish a plan that will guide the investigation. The research plan indicates the steps that will be taken and in what sequence they occur.*

First, you should develop a strategy for the best way to find pertinent and reliable information that will help you with your research. You should begin by answering the following questions:

- What kind of information do you need?
- How much information is required?
- Where is the information likely to be published or located?
- How much time will it take to complete the research and get the information?

Next, you should address WHAT, HOW, WHO, and WHEN questions:

- WHAT is the best way to gather information related to the research question?
- HOW can we organize our activities to accomplish our goals?
- WHO is responsible for the various activities?
- WHEN will we complete our task (develop a timeline).

When all groups are finished, participants return to whole group to discuss their research questions and plans. The teacher guides the discussion, providing elaborations and constructive criticism of the research questions and plans. Use Appendix 4-C to guide discussion and make modifications to questions, if needed. ***NOTE:*** **An alternative approach (if there are two teachers conducting the workshop) is to have each teacher work with half of the groups. Note: This discussion could take 30 minutes.**

PHASE 2: Constructing Meaning (Research Cycle Steps 3, 4, and 5)
Plan 3 hours for all activities in this Phase of the Research Cycle.

The teacher instructs participants: *In the second phase of doing a research project you will work on Steps 3, 4, and 5 of the research cycle. Data is the central focus during this phase. You should keep in mind that as you collect, analyze, and synthesize data, you may need to refine your research question.*

Let's first review each of the Steps in this Phase of the Research Cycle.

The teacher then reviews all three steps as outlined below before moving participants back into their research groups.

STEP 3: Collecting data

The trainer tells participants: *The implementation of the research plan begins with collecting data. Locating and retrieving information involves finding the books, articles, statistics, websites, and other resources to answer your research questions. You should look through the articles that are available, and use the computers to access information through the Internet. You will need to decide how you will allocate Internet time to group members. As you*

find relevant data, you should consider whether you need to refine your research question and subtopics; you may need to return to Step One in the Research Cycle. As you locate information in the available resources, you may want to consider what additional information would be useful, and where it can be found.

It is important that you carefully choose materials to use from the Internet. The handout I'm giving you is Appendix 4-E of the Module. It provides you with guidelines for making these selections.

Also, be sure to keep careful notes of the sources you have used for your research project. It is useful if students have a guide that shows them how to cite the sources they have used. Appendix 4-F shows you the procedures often used, referred to as the American Psychological Association (APA) style of formatting. If you ever submit material for publication in a professional journal, you may be requested to use this format.

STEP 4: Sorting and analyzing data

The teacher says: *The next step in the Research Cycle is to carefully review the data you have gathered in Step 3. You must analyze the data you have collected to separate what is important from what is trivial or irrelevant. Next, you must systematically organize the important data to make it useful in answering your question. You should ask yourself:*

- What information do we have that provides possible answers to the research question?
- What information have we collected that is not useful?
- How can we organize ideas and information to answer the question?
- How can we present the information in a clear and persuasive manner?

- Do we need to collect more data (if so, return to Step 3)?
- Do we need to refine the research question (if so, return to Step 1)?

STEP 5: Synthesizing data

The teacher says: *In this step you must interpret your data, formulate an answer to the question, provide insights and conclusions, and develop the products that communicate the results of your research. To synthesize findings and formulate conclusions ask:*

- Was there enough data to lead to a conclusive decision (if not, return to Step 3)?
- Does the data lead to a clear answer to the research question (if not, return to Step 4)?
- What insights does the data provide?
- What does the data lead me to believe?
- What tools (tables, charts, graphics, outlines, and texts) can be used to communicate results?
- The group is now given up to two hours to complete Phase 2 of the Research Cycle.

Before they begin, participants are told, *As in Phase 1, please make sure your group has appointed a timekeeper and spokesperson. NOTE: You should also decide which one or two people in your group will use the Internet for research. You will have approximately two hours to complete Steps 3, 4, and 5, Phase 2 of the Research Cycle.*

When all groups are finished, participants return to the larger group to discuss the processes of data collection, analysis, and synthesis. The teacher guides the discussion, providing elaborations and encouraging participants to discuss how they resolved any difficulties encountered during this phase of the research questions and plans. **NOTE: An alternative**

approach (if there are two teachers conducting the workshop) is to have each teacher work with half of the group. Note: This discussion could take 30 minutes.

PHASE 3: Evaluating and Applying (Research Cycle Steps 6 and 7)
Plan 30 minutes for this Phase of the Research Cycle.

The teacher instructs participants: *In the third phase you will work on Steps 6 and 7 of the research cycle. We will use the same process as Phases 1 and 2. Because of time limitations, we will move quickly through these Steps: You will need to complete both Steps in 30 minutes.*

The teacher then reviews both Steps as outlined below before moving participants back into their research groups.

STEP 6: Evaluating Data

The process of the research process both benefit from being evaluated. In this step, participants are asked to reflect first individually and then in groups. The teacher trainer tells participants: *In this step you will self-evaluate your effectiveness in carrying out the research project. You should discuss the following questions:*

- Did your research question lead to a clear and reasonable conclusion? If not, was the problem due to a poorly written research question? How could you rewrite the question to produce a better conclusion?
- Do you have enough data to support your conclusions? If not, return to Step 3.
- Is your analysis of the data clear, logical, and compelling? If not, return to Step 4.
- Are your conclusions supported by your data in a persuasive manner? If not, return to Step 5.

- Do you have the communication tools (tables, charts, graphics, outlines, and texts) ready to begin developing a presentation?

There are three rubrics which you may find useful (handouts of Appendices 4-G, 4-H, and 4-I). In this phase the teacher has two important tasks: to help students evaluate their research projects, and to provide in depth evaluations of the projects.

STEP 7: Present findings

The teacher trainer tells participants: *In Step 7, we guide students in making presentations of their research projects. Unfortunately, we do not have time to do this in our workshop today. Keep in mind there are many ways to make presentations, including traditional written reports, oral presentations, computer-based presentations (such as PowerPoint), and posters.*

PHASE 3: Evaluate and Apply (This phase will take at least one hour.)

The teacher reviews the goals and objectives of research projects. Ask: *What important educational objectives do research projects address? What difficulties can you expect when implementing research projects? When do you think it would be most appropriate to use research projects? Do you think the Seven Step Research Cycle meets your classroom needs? How might you modify it? In this phase, the role of the teacher is to help participants understand their own strengths and gaps, and to develop strategies that will help them implement research project instruction in their classroom.*

Reviewing the research process

Have participant review activities experienced during Demonstration Activity of Research Process. You may say: *Let's go back to the activities we have just completed. What was the first thing we did when we started the research process? What did we do in the first Phase (Activate Background Knowledge)? Which Steps of the Research Cycle are included in Phase One? What is accomplished in each Step? What did we do in the Second Phase (Constructing Meaning)? Which Steps of the Research Cycle are included in Phase Two? What is accomplished in each Step? What did we do in the Final Phase (Evaluating and Applying)? Which Steps of the Research Cycle are included in Phase Three? What is accomplished in each Step? Then ask: Which of these Steps do you think is the most important? Which Step or Steps will take the most time? Do you think it might be necessary sometimes to eliminate any of these steps? Which steps would you eliminate?*

This should be followed by questions such as: *Did you find the Research Cycle a useful way to understand how research process is can be taught? Why or why not? Did you finish everything and include all that was required for the steps? What did you understand easily and what was more difficult?*

Next, review with participants how they might implement research projects: Do you think that the steps to the research process could be useful in your teaching? What difficulties do you expect in the applying research process? *What is the main role of the teachers in the implementation of the research process?*

The teacher emphasizes that the teacher's role in the research process is very important. The teacher often acts as a coach in guiding students through the process. Some necessary skills include (Martin & Baker, 2000):

- Analyzing tasks and skills needed to carry out the project
- Facilitating the process of analyzing project tasks, setting up the plan of action, and implementing and evaluating the project.
- Determining how the project will contribute to the students' learning.
- Facilitating decision making, thinking, and problem-solving skills.
- Facilitating students' demonstration of personal responsibility, self-esteem, and integrity.
- Facilitating students' growth of interpersonal skills, such as working in teams, working with community members, and working with people who are from diverse backgrounds.

Guided practice (NOTE: This will take approximately 1 hour.)

The teacher divides participants into small groups by teaching area. The teacher asks participants to begin work on a lesson plan for starting a student research project. Provide participants with a table similar to the one below. For each step of research cycle participants should identify possible activities and define what skill students will improve. (In this activity participants can use Appendix 4–J)

The teacher asks representatives from groups to share their work.

The Research Cycle

Steps	Activities	Skills students will improve
Defining the problem, Developing a Research Question and Statement of Purpose		
Developing Research Plan		
Gathering and Collecting Data		
Sorting and Analyzing Data		
Synthesizing Data		
Evaluating		
Present Findings		

VII. REFERENCES

Bangert-Down, R. L, Hurley, M. M., & Wilkinson, B. (2004). The effects of school-based writing-to-learn interventions on academic achievement: A meta-analysis. *Review of Educational Research*, *74*, 29-58.

Cowan, P.A. (1978) Piaget, with feeling: Cognitive, social, and emotional dimensions. New York: Holt, Rinehart & Winston

Contextual Learnin g Recourses: Project-Based Learning. Retrieved May 26, 2004, from http://www.cord.org/lev2.cfm/65

Collaborative/Cooperative Learning: Extensive information on teaching using Collaborative/cooperative learning is available at David and Roger Johnson's University of Minnesota website at: www.co-operation.org

Hellenic Cyber Centre (2003). *Brief history of the Olympic games*. Retrieved June 21, 2004 from http://www.nostos.com/olympics/

InfoPEI (2004). How does your cup runneth over? The Styrofoam versus paper debate. Official Website of the Government of Prince Edward Island, Canada http://www.gov.pe.ca/infopei/onelisting.php3?number=43942. Accessed June 26, 2004.

Inquiry- based Learning. Retrieved May 28, 2004, from http://www.thirteen.org/edonline/concept2class/month6/index_sub1.html

Information Studies: Retrieved June 5, 2004, from http://www.accessola.com/action/positions/info_studies/html/intro.html

Instructional Module, Project-Based Learning. Retrieved May 23, 2004, from http://www.glef.org/modules/PBL/whypbl.php

Johnson, D. W. et al. (1997). Academic controversy: Enriching college instruction through intellectual conflict. ERIC Document # ED409828. Downloaded June 24, 2004 from http://www.ericdigests.org/1998-1/academic.htm

Johnson, D. W., Johnson, R. T., and Smith, K. A. (1996). *Academic Controversy: Enriching College Instruction through Intellectual Conflict*, ASHE-ERIC Higher Education Report Volume 25, No. 3. Washington, D.C.: The George Washington University, Graduate School of Education and Human Development.

Jerremy Barton. "Revision", New York Times- http://www.stanford.edu.

Kiewra, K. A. (2002). How classroom teachers can help students learn and teach them how to learn. *Theory into Practice*, *41*, 71-80.

Kapoun, J. teaching undergrads Web evaluation: A guide for library instruction. C&RL News (July /August 1998):522-523. Retrieved June 21, 2004 from http://library.cornell.edu/olinuris/ref/research/webcrit.html

Michael Weiser. "VCCS Litonline Introduction to Literature"- http://www.tncc.vccs.edu/faculty/weiser/Double-Entry

McKenzie J. 1986 Beyond Technology: Questioning, Research and the InformationLiterate School, The Research Cycle. Retrieved June 28, 2004 from http://newlibrary.org/rcycle.html

McKenzie J. 1986 Beyond Technology: Questioning, Research and the Information Literate School, The Research Cycle. Retrieved May 24, 2004 from http://questioning.org/rcucle.html

McKenzie J., 1986, Filling the tool box, Classroom Strategies to Engender Student Questioning. Retrieved May 26, 2004 from http://www.fno.org/toolbox.html

Railsback J., 2002, Project Based Instruction: Creating Strategies for Learning. Retrieved June 2, 2004 from http://www.nwwrel.org/request/2002aug/textonly.html

Piaget, J 91969). The intellectual development of the adolescent. In G. Caplan & S. Lebovici (eds). Adolescence: Psychosocial perspectives. New York: BASIC BOOKS

Parker, W. C. (2001). Classroom discussions: Models for leading seminars and deliberations. *Social Education*, *65* (2), 111-115.

Project Based Learning Handbook, Introduction, Retrieved June 4, 2004, from http://www.bie.org./pbl/pblhandbook/intro.php

Rosenshine, B., & Meister, C. (1994). Reciprocal teaching: A review of the research. *Review of Educational Research*, *64*, 479-530.

Rosenshine, B., Meister, C., & Chapman, S. (1996). Teaching students to generate questions: A review of the intervention studies. *Review of Educational Research*, *66*, 181-221.

Scott G. Paris. The role of self-regulated learning in contextual teaching: Principles and practices for teacher preparation. Retrieved June 6, 2004, from http://www.ciera.org./library/archive/2001-04/0104parvin.htm

Sturtevant, E. G., and W. L. Linek. *Content Literacy: An Inquiry-Based Case Approach.* Columbus, OH: Merrill/Prentice Hall (2004).

Samules, H. (2003). Cambridge Rindge and Latin Schools Research Guide- Tip sheet 9 Retieved June 21, 2004 from http://www.crlsresearchhuide.org/09_writing_state_of_purp.asp

Student self-Assessment Rubric for Research Module (n.d.) Retrieved June 25, 2004 from http://www.bcpl.net/~sullivan/modules/tips/rubrics_sec/stud_rubric.html

Springfield Township High School Virtual Library. (n.d.) Rubric for research project. Retrieved June 14, 2004, from http://mciu.org/~spjvweb/resrub.html

Tracy Hamler Carrile. "A Handbook for Teaching in the Writing Program"- http://wrt.syr.edu/pub/handbook/Double-entrywriting.html

University of Mionesota, Crookston (2003). American psychological association (APA) format (5th Edition) Retrieved June 21, 2004, from http://www.crk.umn.edu/library/links/apa5th.htm

William G. Brozo & Michelle L. Simpson. Readers, Teachers, Learners: Expanding Literacy Across the content Areas, 4th ed. Upper saddle River, NJ: Merrille Prentice Hall (2003)

ADDITIONAL RESOURCES

Ashman, Adrian & Conway, Robert. (1997). *An Introduction to Cognitive Education.* London: Routledge Publishing.

Beuhl, D. (2001). *Classroom Strategies for Interactive Learning*. International Reading Association.

Book Bridges: *A Family Literacy Program.* Retrieved Oct 31, (2002). http://www.nald.ca/CLR/BookBridges/Book2/page80.htm

Bransford, J & Brown, A. (2000). *How People Learn: Brain, Mind, Experience & School.* Washington: National Academy Press.

Bransford, J.D., Stein, B.S., Shelton, T.S. & Owings, R.A. (1981). *Cognition and adaptation: the importance of learning to learn.* In J. Harvey (ed.). *Cognition, social behavior and the environment*. Hillsdale, NJ: Erlbaum.

Cohen, Elizabeth G. (1994). *Designing Groupwork: Strategies for the Heterogeneous Classroom.* New York: Teachers College Press.

Costa, Arthur L. (1984). *Mediating the Metacognitive.* Educational Leadership, 57-61.

Edwards, C. (1997). *Promoting Student Inquiry.* The Science Teacher, 7, 18, 20, 21.

Glaubman, Rivka. (1996). *Effects of Self Directed Learning, Story Comprehension, and Self Questioning in Kindergarten.* Journal of Educational Research, 6,

Gordon, Ann Miles & Williams-Browne, Kathryn. (1996). *Beginnings and Beyond.* United States: International Thomson Publishing Inc.

Hartman, H.J.. (2001). *Metacognition in Leaning and Instruction.* Netherlands: Kluwer Academic Publishers.

Holt, Daniel D. (1993). "Cooperative Learning for Students from Diverse Language Backgrounds: An Introduction," in *Cooperative Learning: A Response to Linguistic and Cultural Diversity.* Edited by Daniel D. Holt. McHenry, Ill. and Washington, D.C.: Delta Systems and Center for Applied Linguistics, pp. 1-8. (Note: As this publication was developed with public funds, authors receive no compensation from sales.)

Johnson, David W. and Roger T. Johnson. (1990). "Social Skills for Successful Group Work," *Educational Leadership*, Vol. 47, No. 4, December, 1989/January, pp. 29-33. (Publication of the Association of Supervision and Curriculum Development.)

Johnson, David W. and Roger T. Johnson. (1994). *Learning Together and Alone. Cooperative, Competitive, and Individualistic Learning, Fourth Edition*. Edina, Minn.: Interaction Book Company.

Johnson, D. W., and Johnson, R. T. (1994). "Structuring academic controversy" In Sharan, S. (Ed.), *Handbook of cooperative learning methods*.

Johnson, D. W., Johnson, R. T., and Smith, K. A. (1998). *Active learning: Cooperation in the college classroom*. Edina, MN: Interaction Book Company.

Kagan, Spencer. (1993). "The Structural Approach to Cooperative Learning," in *Cooperative Learning: A Response to Linguistic and Cultural Diversity*. Edited by Daniel D. Holt. McHenry, Ill. and Washington, D.C.: Delta Systems and Center for Applied Linguistics, pp. 9-19.

King, Alison. (1992). *Comparison of Self Questioning, Summarizing, and Notetaking Review as Strategies for Learning from Lectures*. American Educational Research Journal, 2, 302-323.

McGroarty, Mary. (1993). "Cooperative Learning and Second Language Acquisition," in *Cooperative Learning: A Response to Linguistic and Cultural Diversity*. Edited by Daniel D. Holt. McHenry, Ill. and Washington, D.C.: Delta Systems and Center for Applied Linguistics, pp. 19-46.

Millis, B. J., and Cottell, P. G., Jr. (1998). *Cooperative learning for higher education faculty*, American Council on Education, Series on Higher Education. The Oryx Press, Phoenix, AZ.

Pressley, M. & El-Dinary, P.B. (1992). Memory strategy instruction that promotes good information processing. In D. Herrmann, H. Weingartner, A. Searleman & C. McEvoy (eds.) *Memory improvement: Implications for memory theory*. New York: Springer-Verlag.

Senge, Peter M. (1994). *The Fifth Discipline: The Art and Practice of the Learning Organization*. New York: Doubleday.

Slavin, Robert E. (1989&1990)"Research on Cooperative Learning: Consensus and Controversy," *Educational Leadership*, Vol. 47, No. 4, December, 1989/ January, 1990, pp. 52-54. (Publication of the Association of Supervision and Curriculum Development.)

Sternberg, Robert. (1996). Teaching for Thinking. Washington: American Psychological Association.

Strategies for Developing Metacognitive Behaviors. Retrieved Nov. 10, 2002, http://www.pwcs.edu/curriculum/sol/metacognition.htm

Wilson, Jeni & Wing Jan, Lesley. (1993). Thinking For Themselves. Australia: Eleanor Curtain Publishing.

Swain, Merrill. (1985). "Communicative Competence: Some Roles of Comprehensible Output in Its Development," in *Input in Second language Acquisition*. Edited by Susan M. Gass and Carolyn G. Madden. Boston, Mass.: Heinle and Heinle, pp. 235-253.

Willoughby, T., Desmarais, S., Wood, E., Sims, S. & Kalra, M. (1997). Mechanisms that facilitate the effectiveness of elaboration strategies. *Journal of Educational Psychology*, *89*, 682-685.

VIII. APPENDIX

Appendix 1-A

Activating Background Knowledge Questions

1. What do the letters S Q P and L stand for in the SQPL activity?

2. What is the goal of SQPL?

3. How might SQPL change regular classroom instruction?

Why do learners benefit from answering questions after they encounter subject matter?

dependent independent

Appendix 1-B

Question Signal Words

- Who _____ ?
- Where _____ ?
- What _____ ?
- How _____ ?
- When _____ ?
- Why _____ ?

Deliberation Question Stems

- What have I learned about _____ ? What should I remember about _____ ?
- What does _____ mean?
- What are the components of _____ ?
- How are _____ and _____ alike? How are _____ and _____ different?
- What are the strengths of _____ ? What are the limitations of _____ ?
- What caused _____ to happen?
- How does _____ affect _____ ?
- How does _____ relate to what I already know? How does _____ relate to _____ in the passage?
- What does _____ look (and sound) like?
- What is the significance of _____ ?

Appendix 1-C

Seminar Question Stems

- **What might be other examples of _____ ?**
- **What conclusion can I draw about _____ ?**
- **Why is it important that _____ ?**
- **What would happen if _____ ?**
- **What do I have to say about _____ ?**

Metacognitive Question Stems

- **How did the author or teacher put the ideas in order? How can I use this to understand and remember _____ ?**
- **What are the key vocabulary words? How can I understand and remember _____ ?**
- **What did I find difficult to understand? What can I do to improve my understanding of _____ ?**
- **Does _____ make sense with what was presented before? If not, what can I do to make sense of _____ ?**
- **What did the author or teacher present to help me understand _____ ?**

Appendix 1-D

Origins of the Olympics

(1) According to legend, Heracles (the Roman *Hercules*), a son of Zeus, began the Olympic Games. The first games that documented in writing were held in 776 BCE. The games grew and continued to be played every four years for nearly 1,200 years. However, the Roman emperor Theodosius I, a Christian, abolished them in 393 CE because of their pagan influences.

(2) About 1,500 years later, a young Frenchmen named Pierre de Coubertin began the revival of the Olympics. Coubertin was seven years old when Germany defeated France during the Franco-Prussian War of 1870. Coubertin blamed this defeat on what he saw as the French soldiers' lack of vigor. After examining the educational systems of other countries, Coubertin decided that France should emphasize sports to promote his countrymen's strength and spirit.

(3) In 1890 Coubertin established the Union des Sociétés Francaises de Sports Athlétiques (USFSA). Two years later he presented the idea to hold an Olympic Games at an international level. He invited delegates from nine countries, and they decided to support Coubertin in forming a larger committee to revive and organize the Games. This committee became the International Olympic Committee (IOC), and Demetrious Vikelas from Greece was its first president.

(4) The sites of the games have been as follows:

1896 - Athens
1900 - Paris
1904 - St. Louis
1906 - Athens
1908 - London
1912 - Stockholm
1916 - *Not held*
1920 - Antwerp
1924 - Paris
1928 - Amsterdam
1932 - Los Angeles
1936 - Berlin
1940 - *Not held*
1944 - *Not held*
1948 - London
1952 - Helsinki
1956 - Melbourne
1960 - Rome
1964 - Tokyo
1968 - Mexico City
1972 - Munich
1976 - Montreal
1980 - Moscow
1984 - Los Angeles
1988 - Seoul
1992 - Barcelona
1996 - Atlanta
2000 - Sydney
2004 - Athens

Appendix 1-E

Traditions of the Olympics

(1) Olympic traditions are major features of the Olympic Games. Each tradition places the games as a special event where both athletes and spectators come together. One powerful tradition is the Olympic motto which states: *"Citius, altuis, fortius"* meaning "faster, higher, stronger." The Olympic flag consists of five interconnecting rings representing the five continents of the world: Africa, America, Asia, Australia, and Europe.

(2) The opening ceremony of the games is quite impressive with all competing athletes marching into the main arena. Athletes from Greece enter first in honor of the original games from that country. The athletes of other nations then march in country by country, according to alphabetical order.

(3) The lighting of the Olympic flame is a dramatic moment during the opening ceremonies. The flame first is lit at the ancient Greek site of Olympia. Then, thousands of torch-carrying runners, as well as airplanes and ships, are used to carry the flame to the host city. The final runner carries the torch into the host arena, circles the track once, and lights the flame to signal the beginning of the games.

(4) The dates when the various medal sports were introduced into the Olympics are as follows:

Archery 1900-1908, 1920, 1972
Athletics
- Jumping 1896
- Running 1896
- Shot-Put 1896
- Discus 1896
- Javelin 1908
- Hammer Throw 1900

Badminton 1992
Baseball 1992
Basketball 1936
Boxing 1908, 1920-
Canoe/Kayak
- Sprint 1936
- Slalom 1972, 1992

Cycling*
- Mountain Bike 1996
- Road 1896
- Track 1896

Diving 1904
Equestrian
- Dressage 1912
- Jumping 1900
- 3-Day 1912

Fencing 1896
Football 1900
Gymnastics
- Artistic 1896
- Rhythmic 1984
- Trampoline 2000

Handball 1936-1944, 1972
Hockey 1908, 1920; 1928
Judo 1964, 1972
Modern Pentathlon 1912
Rowing 1900
Sailing 1900
Softball 1996
Table Tennis 1988
Tae Kwon Do 2000
Tennis 1896-1924, 1988
Triathlon 2000
Volleyball
- Beach 1996
- Indoor 1964

Water Polo 1900
Weightlifting 1896
Wrestling 1896

Appendix 1-F

Self-Questioning Strategy

Description

Learners who ask and answer their own questions about what they are studying have an independent strategy that generally improves understanding and remembering. Learners benefit from self-questioning especially when they begin with prompts such as signal words and question stems and when they respond to metacognitive questions in writing.

Procedure

Phase 1 –Activating Background Knowledge

- Have participants answer questions about SQPL.
- Collaboratively examine benefits of answering questions after encountering subject matter.
- Explain benefits of self-questioning after encountering subject matter.

Phase 2 – Constructing Meaning

- Demonstrate self-questioning using Question Signal Words and Deliberation Question Stems with the passage, "Origins of the Olympics."
- Have participants practice self-questioning as a large group.
- Debrief.

Phase 3 – Evaluating and Applying

- Have participants form small groups, apply self-questioning to the passage, "Traditions of the Olympics," and share questions and answers.
- Debrief.
- Extend the strategy to the additional set of Seminar Question Stems.
- Debrief.
- Extend the strategy to the additional set of Metacognitive Question Stems.
- Invite comments and questions about how participants might implement self-questioning in their classes.

Advantages

Self-questioning is an independent lifelong learning strategy.

Application and Illustration

Self-questioning applies to all subjects and all topics within subjects.

Glossary of Terms

Self-questioning	A tool for independent, lifelong learning that involves learners asking and answering their own questions.
Question Signal Words	Common beginnings of questions: who, what, when, where, why, and how
Deliberation Question Stems	Question prompts that seek closure. Students are expected to produce a verifiable answer. Students might deliberate about several aspects of subject matter, but they eventually must specify one answer and provide support for it. Deliberation questions encourage analytic thinking.
Seminar Question Stems	Question prompts that ask for openness. Students are expected to produce multiple credible answers as they explore possibilities. Students construct several possible interpretations of subject matter in response to open-ended questions. Seminar questions promote creative thinking.
Metacognitive Question Stems	Question prompts that go to self examination. Students are expected to examine their thinking, becoming aware of their learning processes and the decisions they make when studying. Students reflect on how subject matter is presented and how they deal with the presentation. Metacognitive questions support self awareness.

Appendix 2-A

Jeremy Barton
Popular Essay REVISION
New York Times

The Simple Two Step Program

Sure, the Olympic Games are the greatest sporting event in the world. But as you may have realized from all of the hoopla that surrounded the bidding for the 2002 Winter Games, which were eventually held in Salt Lake City, the Olympic rings have been stained. Senator John McCain from Arizona stated to Congress in an investigation of the Olympic scandal, "Something very wrong has happened to the Olympics. The ideal of amateur competition is struggling to survive." The Salt Lake City scandal brought to the surface many issues regarding the organization that runs the Games, The International Olympic Committee (IOC), and specifically their procedure for selecting a city to host the Olympics.

Since the time when the Salt Lake City scandal brought the corruption of the IOC bid process out into the open, there have been reforms proposed to the IOC. These proposals suggested a change in the IOC's bid process for selecting a host city. The IOC has in fact begun to implement these reforms, and they are making steps in the right direction, but these adjustments are just not sufficient. The site selection process that the IOC goes through to choose a host city for the Games is what causes all of the corruption and taints the pure image of the Olympic Games. This site selection process needs to be changed, and I will lay out for you exactly how it should be changed so the Olympics can avoid future scandals.

First off, some evidence on the corrupted bid process for choosing a host city. Unbeknownst to the public, there have been many instances where the IOC has accepted

bribes by bid cities hoping to lure the Olympics to their city. Michigan Representative Fred Upton stated to the Subcommittee on Oversight and Investigations in their hearing about the IOC bid process that, "There is a system or, as I have identified, a culture of corruption that exists within the bidding for the Olympic Games that encourages the practice of excessive lobbying of the IOC members. This activity, this culture must stop. It is tarnishing the pride and prestige of the Olympic Games and it is not fair to the athletes or the cities all over the world who are bidding for the honor of hosting the games."

First, we will look at the Salt Lake City scandal. Salt Lake City is a cold place, a nice city, filled with lots good, honest people. But of course, like many other cities around the world, they wanted to host the Olympics. Badly. And Salt Lake understood what it would take to bring the Games to Utah. As Senator John Ashcroft said in his statement to Congress about the investigation of the Salt Lake City scandal, "The facts are bleak. In their attempts to land the 2002 Olympics, the leaders of the Salt Lake City Olympic Committee spent $4 million on gifts, scholarships, cash payments, and other inducements for the International Olympics Committee members." Salt Lake City went all out, actually, their bribes to the IOC went further than any other city's had in the past.

When the news of Salt Lake City's wrongdoings went public, the U.S. Congress decided to see if there was a pattern associated with the host city selection process or if the Salt Lake City scandal was just a fluke, a one time affair. There was a pattern, and it turned out that there had been multiple scandals that predated the bidding for the 2002 Winter Olympics.

In the bidding wars for the 2000 Summer Olympics, which were eventually held in Sydney, Sydney did not exactly follow the bid process rules either. E.M. Swift wrote in a *Sports Illustrated* special report on the Olympics scandals, that the Australian Olympic Committee President admitted "that on the night before the vote on the 2000 Games, he offered

$35,000 each to IOC members Charles Mukora of Kenya and Major Geneneral Francis Nyangweso of Uganda. The offer was accepted, and though the money was earmarked for sports programs in Kenya and Uganda, the underlying purpose of the gifts, said Coates, was to 'encourage [Mukora and Nyangweso] to consider their votes for Sydney'." The next day, Sydney won the vote for the 2000 Games by two votes over Beijing.

It only gets worse. Nagano, Japan, the host city of the 1998 Winter Olympics also was found to have lured in the IOC's votes with bribery. As Andrew Jennings, an expert on the Olympic scandals writes, "The Japanese had swamped members with gifts and geishas and drummed up an incredible $27 million contribution to help Samaranch build a monument to himself, the IOC's magnificent museum in Switzerland." Samaranch was the IOC President from 1980-2001 who happily ran a corrupt organization and did not even attempt to change or stop any of the wrongdoings.

And it was even worse in Atlanta. This host city for the 1996 Summer Olympics was also found to be at fault for excessive lobbying of the IOC members. In his report, Swift also shows that the bidding for the 1996 Summer Games was also riddled with bribery. He says, "Six African delegates asked his group for new cars and the services of prostitutes in exchange for their votes." A bold and daring move by the IOC members!

The IOC "realized" that they had a problem, unfortunately, only after it was publicly disclosed that they had been accepting countless gifts and favors from bid cities for many years..So, after the Salt Lake City scandal broke loose in 1999, the IOC decided to take a look at their bid process, and see if they needed to make any changes.

The U.S. Congress strongly believed the IOC needed to change their bid process, they had a large hand in helping the IOC along with its reformations. Congress basically forced the IOC to change their bid process for selecting a host city in 1999. Henry Waxman, a

Representative from California said in the Congressional hearing in 1999, "I proposed legislation, and my legislation would say we would prohibit American corporations, including the TV networks, from providing any financial support to the IOC until the IOC adopts the Mitchell Commission reforms." The IOC made too much money off of the TV networks, so they went to work on themselves, and attempted to change.

The IOC constructed the IOC 2000 Commission. The sole responsibility of this commission was to evaluate the IOC, and make recommendations to the IOC about their structure, rules, and procedures. The IOC 2000 Commission then made a report back to the 110th IOC Session that was held in Lausanne, on December 11th and 12th, 1999. They strongly suggested that the IOC revise its host city selection process by making four major changes. First, they clearly laid out the responsibilities of the National Olympic Committees in the bidding process. Second, they proposed a new phase in the bidding process called the acceptance phase. This phase was a rigorous screening of the accepted bid cities. Next, they redefined the bid city Evaluation Committee. They recommended an expansion of this committee to include more technical consultants and experts for a better evaluation. Lastly, and most importantly, the IOC 2000 Commission recommended the elimination of IOC member visits to the bid cities.

The IOC truly believed that they had righted their bidding ship by creating the IOC 2000 Commission. Most people believed that they had. But had they?

. By creating the IOC 2000 Commission and several other committees to "inspect" the IOC, they almost did, except people noticed the fact that all of the committees and commissions that were constructed to evaluate the troubles of the IOC contained actual IOC members. Doesn't this sound a bit strange to you? I think it would be difficult to get a true, thorough evaluation of your organization if it was only looked at from the inside.

It is! The kind of corruption that has plagued the process in the past can still be detected. In recent months, just within the US alone, there have been possible mishaps in the bidding war for the Games. New York City and San Francisco seem like they have not learned from the Salt Lake City scandal. According to a *USA Today* article, "Sen. Hillary Clinton, pitched New York as a host city during a limousine ride she gave to an IOC member." Many bad things can happen during a limousine ride.

So, how can this process of selecting a host city be fixed? Well, after closely examining the bid process, and some of the suggestions that have been made to correct the problems within the course of action, I propose something entirely new: The two simple steps to IOC bid process honesty.

First, the IOC would set a limit to the amount of money each city that is bidding for the Games can spend on their bid process. This would be a sort of "bid budget." If a bid city exceeded this amount, their bid would become ineligible. By making this amount of money set, every country would have an equal opportunity in their bidding to host the Games. Wealthy countries would not have an unfair advantage over poorer countries.

Second, the IOC would designate a set amount of money that they make from the television advertisements during the games to go straight to an established fund. With the money going straight to the fund, it would never be in the IOC's possession and would be neutral money. This fund's sole purpose would be to pay for the cost of an independent auditing firm that would closely watch over the potential host cities in their bidding for the Games. This auditing firm would examine the bidding process from start to finish, making sure that the bid cities followed the rules, paying particular attention to the things that the bid cities spend money on. In past scandals, bid cities got around the established $150 gift limit by giving other things to the IOC members such as plane tickets, cars, or even prostitutes.

The auditing firm could closely inspect anything with a cash value that was given to an IOC member, and count it towards that city's bid budget. The independent firm would be able perform an accurate evaluation because it would be completely separate from the IOC, and would not be influenced by the internal dealings and temptations that the IOC members face.

Retrieved June 28, 2004 from:

From http://www.stanford.edu/~jtotheb/PWR%20Popular%20Essay%20REVISION%203-17-03.doc

NOTE: This appears to be a student essay that the student did for a course at Stanford and then put on the web. There is no such article listed in the NYT archives.

Appendix 3-A

1. ***In what ways do students work together in your classroom?***
2. ***What are the benefits of this approach?***
3. ***What are the drawbacks?***
4. ***What else would you like to know about teaching using collaboration?***

Appendix 3-B

Steps for Using Structured Academic Controversy (adapted from Johnson et al. 1997)

1. *Teacher divides students into groups of four and then assigns each student a partner within their group.*

2. *Students work with their partner to research the answer to a question that has at least two logical alternative positions. With their partner they develop a rationale to support their position.*

3. *Both sets of partners present their position to their group of four. Each pair defends their own position to the other pair.*

4. *The pairs change positions and then defend the opposite position persuasively to the group of four.*

5. *All four in the group discuss the topic and come to consensus on one position, based on their best reasoning.*

Appendix 3-C

If you were responsible for choosing disposable coffee cups for use during the Olympic Games in 2012 in Macedonia, would it be best to choose paper or Styrofoam cups?

Appendix 3-D

Short Reading Selection (Print one per participant for silent reading).

Paper or Styrofoam?

Many companies and organizations today need to decide whether they will use paper or Styrofoam coffee cups in their offices or for special events. While this may seem like a simple decision, there are many aspects to consider, including both cost and environmental issues.

First, it is important to understand that Styrofoam is a form of polystyrene (PS), which is a plastic. Plastics are derived from petroleum, a nonrenewable resource. However, only a small fraction (less than 1%) of crude oil is actually used to make PS (InfoPEI, 2004).

Styrofoam obtaines its texture from a process in which a specific gas is blown into the PS. Prior to 1988, some of the gas that was used contained chlorofluorocarbons (CRCs), which were thought to harm the ozone layer in the Earth's atmosphere. However, since the late 1980's the use of this gas has been discontinued (InfoPEI, 2004).

Many groups have shifted to paper cups because of their concern that petroleum is not a renewable resource. Paper, which is derived from trees, is a renewable resource. However, according to some reports the cost of manufacturing paper cups is six times more expensive than manufacturing Styrofoam cups. Thus, paper cups often cost much more than Styrofoam cups (InfoPEI, 2004).

Another issue relates to recycling. In many areas of the world, paper cups and other types of paper are recycled, while used Styrofoam cups go to trash landfills. However, recycling of Styrofoam is growing. Some countries and regions, including parts of Toronto, Canada, and California, U.S., are beginning to collect PS used in cups and other products for recycling. However, quantity is a problem since it is not efficient to recycle only a small number of items (InfoPEI, 2004).

Overall, there are advantages and disadvantages to both paper and Styrofoam cups.

Appendix 3-E

(For transparency)

1. *What new information did you learn about chemistry today?*

2. *What did you learn about collaborating with others?*

3. *How well did your group work together?*

4. *Is there anything your group could do next time that would improve your collaboration?*

Appendix 3–F

Note: The following pages are designed to be used as transparency masters for use with Sections III, IV, and V of Module II, DA III.)

Review of Demonstration Activity 3

A. Main Idea:

Structured Academic Controversy is one example of a wide variety of collaborative or cooperative learning instructional techniques.

B. Forming groups:

- Teachers divide students into groups for collaborative learning based on the goals of the activity, rather than allowing students to form groups with their friends.

- Each group should have three to five members. Large groups are inefficient.

- Pairing students (into groups of two) is also valuable.

C. Teach students to work in a group. Instruct them to:

- Be respectful of each other.
- Be sure everyone has a chance to speak.
- Disagree with another person's position and ideas but don't be critical of the person.
- Don't take criticism of your ideas as a personal attack.
- Listen to everyone's ideas, especially if you don't agree with them.
- Change your mind when the evidence supports this.
- Try to understand both sides of a controversy.
- Focus on reaching the best outcome, not on winning.

Implement grouping gradually

- Start with small groups
- Start with short-term assignments.

Assessment:

- Assess content objectives (e.g., that students will learn information in chemistry).

- Assess process objectives (e.g., that students will learn to make collaborative decisions).

- Ask students to self-assess.

Directions for Guided Practice

1. Form a small group with teachers in your subject area.

2. Select a topic you might teach to secondary students (for example, "energy" in science).

3. Write a question that could be used for "Structured Academic Controversies" related to the topic you selected. (For example, "nuclear energy should be used more/used less in our country.")

4. Make a list of steps you would use in teaching the lesson.

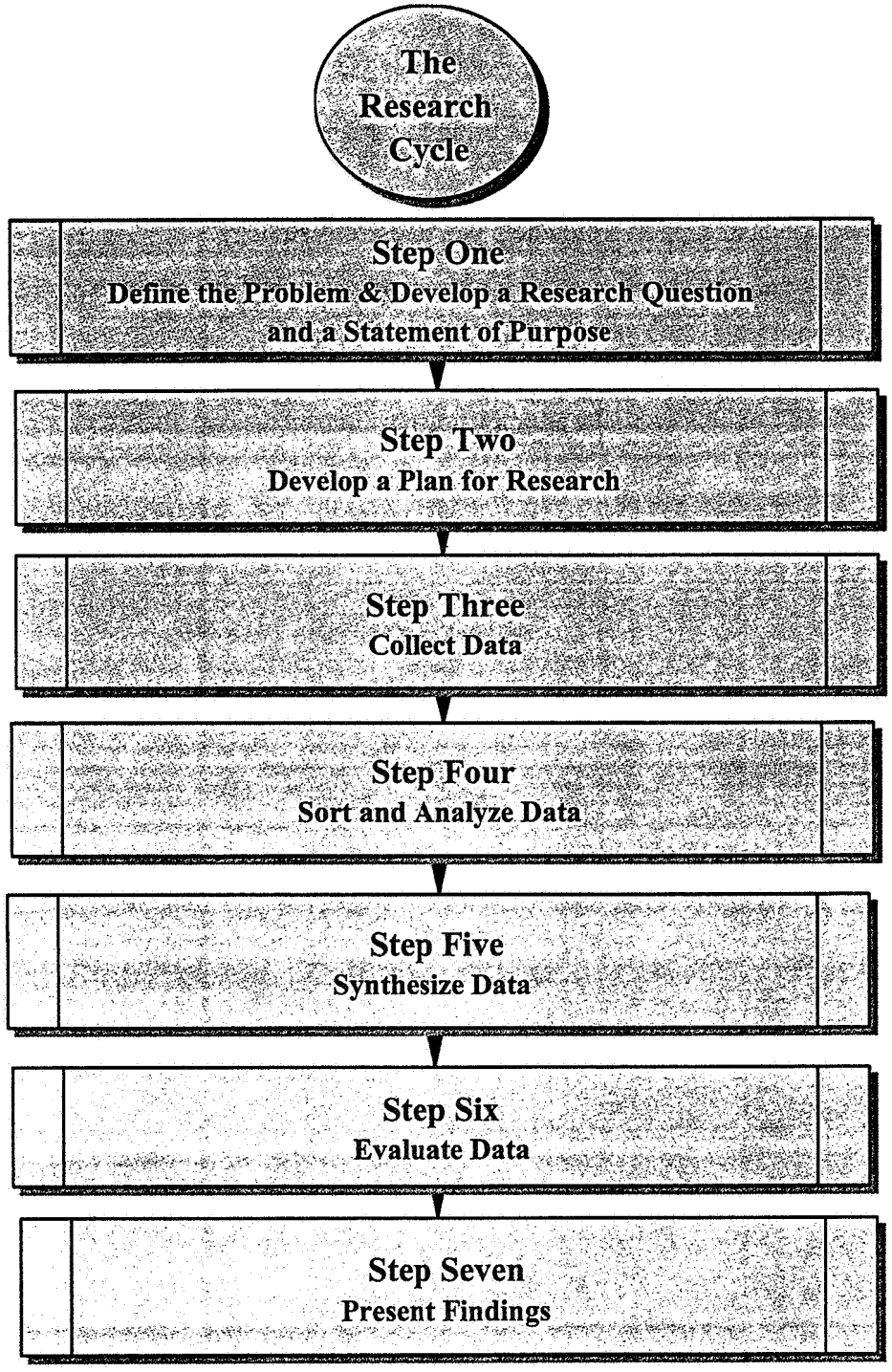
5. Discuss how you assess the lesson.

6. Share your topic and question with the whole group.

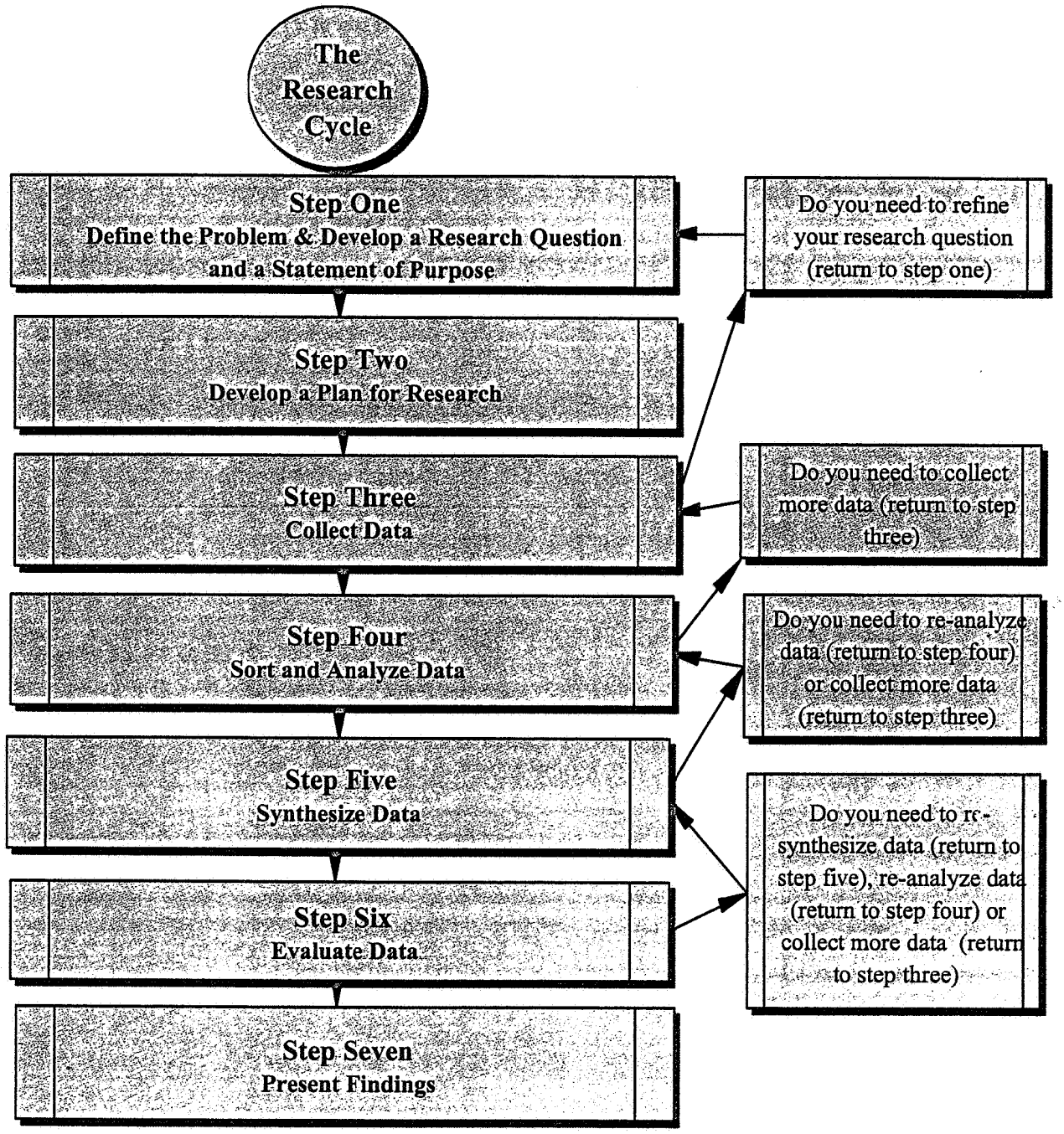
Final Discussion:

- What do you think your students would learn from participating in a Structured Academic Controversy?
- Do you have any concerns about using this strategy?
- What kinds of support would help you to use this strategy?

APPENDIX 4-A


The Research Cycle
Step One
Define the Problem & Develop a Research Question and a Statement of Purpose
Step Two
Develop a Plan for Research
Step Three
Collect Data
Step Four
Sort and Analyze Data
Step Five
Synthesize Data
Step Six
Evaluate Data
Step Seven
Present Findings

APPENDIX 4-B



Adapted from: McKenzie, Jamie. ( ) Beyond technology: Questioning, research and the information literate school. Retrieved June 28, 2004 from http://newlibrary.org/rcycle.html

Appendix 4-C

QUESTIONS TO ASK ABOUT RESEARCH QUESTIONS

- Is it a researchable question?
- Does your question have a clear purpose?
- Is it an important question?
- Is it similar to other research questions or does it show creativity or originality?
- Is your question realistic given the time frame for producing results?
- Can the answer make a difference to our knowledge base or solving the problem?

And also to think about:

- Have you considered the What, Why, How, and So What of your research question?
- Have you thought about the concepts, issues and contexts surrounding your topic?
- What terminology must be clearly defined?

Appendix 4-D

Writing a Statement of Purpose

Ask these questions:

What is it?
A Statement of Purpose is a sentence that you write that describes in some detail what you want to learn about in your research project.

The statement guides you as you work so that you will read and take notes only on what's needed for your project.

Why do I need to do it?
Writing a statement of purpose will do four things to help:

- You will become more interested in your project.
- The statement will keep you from feeling overwhelmed and panicky at all the information you may find.
- The statement will help you develop a thesis statement, which comes later in the research process.
- The statement saves you valuable time and effort.

When and how to do it?
After you focus your topic and have completed some overview reading, write a sentence that describes what you want to learn about. Don't worry if you're not completely certain because your Statement of Purpose may change three or four times before you're finished. To write the sentence, first answer these questions as best as you can:

1. What is my real personal interest in the topic?
(There will always be something that can interest you)

2. What do I specifically want to learn about my topic?
(Don't overwhelm yourself with too many things. Two or three are plenty.)

Start your Statement of Purpose with words like "I want to learn about..."

For example:

One person was very concerned about the Macedonian economy and wanted to know if the government is doing anything to improve it.

Her Statement of Purpose was this: **I want to learn about what is being done by our government to improve the economy.**

This Statement of Purpose will lead her to eventually write a Thesis Statement in which she will be able to make an assertion (a statement she can defend) and support it with the evidence she has gathered with her research.

Her Thesis Statement may sound something like this: "In Macedonia, government regulation plays an important role in the effort to improve our economy." Or, conversely, "Macedonian government regulation has little effect in the effort to improve our economy."

Whichever the case, she will use the evidence she has gathered in her research to prove her Thesis Statement.

Make sure your Statement of Purpose is specific enough.

A Bit Too General	Much Better, More Specific
"I want to learn about the Dalai Lama."	"I want to know what role the Dalai Lama plays as the spiritual leader of the Tibetan people."
"I want to find out about teen gangs."	"I want to find out some ways to stop teen gang activity."
"I want to learn about AIDS."	"I want to know how close we are to a cure for AIDS."
"I want to know about pro soccer."	"I want to know what it takes to be a professional soccer player."
"I want to find out about the Marshall Plan"	"I want to know if the Marshall Plan still has any effect on the world's economy."
"I want to find out about Porsches and Ferraris."	"I want to compare the performance of a Porsche 911 and a Ferrari 430 and see which I will buy when I have the money."
"I want to learn about teen pregnancy."	"I want to know how teenage pregnancy affects young fathers and young mothers differently."
"I want to find out about the juvenile criminal justice system."	"I want to know what juveniles experience when they are sent to legal detention for committing a serious crime."
"I want to learn about the Crusades."	"I want to know why Christians and Muslims fought so hard with each other during the middle ages."

Adapted from: Samuels, H. (2003) *Cambridge Rindge and Latin School Research Guide- Tip sheet 9*
Retrieved June 21, 2004 from: http://www.crlsresearchguide.org/09_writing_state_of_purp.asp

Copyright © 2003 Holly Samuels All Rights Reserved email: **hsamuels@crlsresearchguide.org**

Appendix 4-E

Five criteria for evaluating Web pages

Evaluation of Web documents	How to interpret the basics
1. Accuracy of Web Documents • Who wrote the page and can you contact him or her? • What is the purpose of the document and why was it produced? • Is this person qualified to write this document?	Accuracy • Make sure author provides e-mail or a contact address or phone number. • Understand the distinction between author and Webmaster.
2. Authority of Web Documents • Who published the document and is it separate from the "Webmaster?" • Check the domain of the document, what institution publishes this document? • Does the publisher list his or her qualifications?	Authority • What credentials are listed for the authors? • Where is the document published? Check URL domain.
3. Objectivity of Web Documents • What goals or objectives does this page meet? • How detailed is the information? • What opinions (if any) are expressed by the author?	Objectivity • Determine if page is a mask for advertising. If so, information might be biased. • View any Web page as you would an infommercial on television. Ask yourself why was this written and for whom?
4. Currency of Web Documents • When was it produced? • When was it updated' • How current are the links (if any)?	Currency • How many dead links are on the page? • Are the links current or updated regularly? • Is the information on the page outdated?
5. Coverage of the Web Documents	Coverage • If page requires special software to view the

- Are the links (if any) evaluated and do they complement the documents' theme?
- Is it all images or a balance of text and images?
- Is the information presented cited correctly?

information, how much are you missing if you don't have the software?

- Is it free or is there a fee, to obtain the information?
- Is there an option for text only, or frames, or a suggested browser for better viewing?

Putting it all together

- **Accuracy.** If your page lists the author and institution that published the page and provides a way of contacting him/her and...
- **Authority.** If your page lists the author credentials and its domain is preferred (.edu, .gov, .org, or .net), and...
- **Objectivity.** If your page provides accurate information with limited advertising and it is objective in presenting the information, and...
- **Currency.** If your page is current and updated regularly (as stated on the page) and the links (if any) are also current, and...
- **Coverage.** If you can view the information properly—not limited to fees, browser technology, or software requirement, then...

You may have a Web page that could be of value to your research!

Kapoun, J. Teaching undergrads WEB evaluation: A guide for library instruction. C&RL News (July/August 1998): 522-523. Retrieved June 21, 2004 from http://www.library.cornell.edu/olinuris/ref/research/webcrit.html

Appendix 4-F

AMERICAN PSYCHOLOGICAL ASSOCIATION (APA) FORMAT (5th Edition)

This information is a guide to the APA style. It is not intended to replace the Publication Manual of the American Psychological Association, 5th edition. Only selected citations were chosen for inclusion here. For other examples see the printed Manual. Use this only as a reference.

Journal Article, one author
Simon, A. (2000). Perceptual comparisons through the mind's eye. *Memory & Cognition, 23,* 635-647.

Journal Article, two authors
Becker, M. B. & Rozek, S. J. (1995). Welcome to the energy crisis. *Journal of Social Issues, 32,* 230-343.

Magazine Article, one author
Garner, H. J. (1997, July). Do babies have a universal song? *Psychology Today,102,* 70-77.

Newspaper article, no author
Study finds free care used more. (1982, April 3). *Wall Street Journal,* pp. A1, A25.

Book, two authors
Struck, W., Jr., & White, E. B. (1979). *The elements of style* (3rd ed.). New York: Macmillan.

Letheridge, S., & Cannon, C. R. (Eds.). (1980). *Bilingual education.* New York: Praeger.

Book, several editions
American Psychological Association. (1994). *Publication manual of the American Psychological Association* (5th ed.). Washington, DC: Author.

Entry in an Encyclopedia
Imago. (2000). In *World Book Encyclopedia* (Vol. 10, p. 79). Chicago: World Book Encyclopedia.

Mass, J. B. (Producer), & Gluck, D. H. (Director). (1979). *Deeper into hypnosis.* (Motion picture). Englewood Cliffs, NJ: Prentice Hall.

Electronic Formats

Internet Article Based on Print Source
The citation is done as if it were a paper article and then followed by a retrieval statement that identifies the date retrieved and source.

Sahelian, R. (1999, January). Achoo! *Better Nutrition, 61,* p. 24. Retrieved September 17, 2001, from Academic Index.

Web page, no author, no date
GVU's 8th WWW user suvey. (n.d.) Retrieved September 19, 2001, from http://www.cc.gatech.edu/gvu/user_surveys/survey-1997-10/

Web page, no date
Thompson, G. (n.d.). Youth coach handbook. In *Joe soccer.* Retrieved September 17, 2001 from http://www.joesoccer.com/menu.html

Web page, Government author

Wisconsin Department of Natural Resources. (2001, March 14). *Glacial habitat restoration areas.* Retrieved September 18, 2001 from http://www.dnr.state.wi.us/org/land/wildlife/hunt/hra.htm

Web Site, no author, no date

Eldorado. (n.d.). In PlacesNamed.com. Retrieved September 18, 2001 from http://www.placesnamed.com/e/l/eldorado.asp

Email messages

Email messages should be cited by Personal Communications. The citation should not appear in the reference list and should look as follows: Example: J. Burnitz (personal communications, September 20, 2000).

Reference Citations in Text

To refer to an item in the list of references from the text an author-date method should be used. That is, use the surname of the author (without suffixes) and the year of the publication in the text at appropriate points.

One author

Issac (2001) indicated in his research..

In a recent study, research indicates (Isaac, 2001)

Two or more authors

When a work has two authors, always cite both names every time the reference occurs. For works with three, four, or five authors, cite all authors the first time the reference occurs. In subsequent citations, include only the last name of the first author followed by et al.

When a work has no authors

Cite in text the first few words of what appears first for the entry on the list (usually the title) and the year.

Some general rules for APA reference pages:

- Begin the reference list on a new page. The page begins with the word References (Reference if there is only one), centered in the top, middle of the page, using both upper and lower case. If the references take up more than one page, do not retype the word References on sequential pages, simply continue your list.
- Use one space after all punctuation.
- The first line of the reference is flush left. Lines thereafter are indented as a group, a few spaces, to create a hanging indention.
- Double space between citations. Single space in the citations.
- Use italics for titles of books, newspapers, magazines, and journals.
- References cited in text must appear in the reference list; conversely, each entry in the reference list must be cited in text.
- Arrange entries in alphabetical order.
- Give in parentheses the year the work was published. For magazines and newspapers, give the year followed by the month and date, if any. If no date is available, write n.d.
- Give volume numbers for magazines, journals, and newsletters. Include the issue number for journals if and only if each issue begins on 1.

University of Minnesota, Crookston (2003). *American psychological association (APA) format (5th Edition)* Retrieved June 21, 2004, from http://www.crk.umn.edu/library/links/apa5th.htm

Appendix 4-G

Student Self-Assessment Rubric for Research Module

QUESTIONING

☐	4	My question is clear, well-focused and requires high level thinking skills in order to research.
☐	3	My question is clear and well focused. My question requires moderately high level thinking skills.
☐	2	My question is incomplete and unclear. My teacher needed to help me form a question.
☐	1	I was unable to come up with a research question.

PLANNING

☐	4	I made really good use of my time. I was able to remain focused on the tasks and make changes when I needed to. I was able to develop a clear method to organize my information. I was able to make revisions in my plan when needed.
☐	3	I was able to work within the timeframe my teacher gave me. I was able to develop a system to organize my information. I was able to make revisions with help from my teacher.
☐	2	I needed the teacher's help to list and organize what I needed to do. There are some steps missing in my planning. I made revisions with the teacher's help.
☐	1	I was unable to come up with an organized plan and work within the time limits.

GATHERING

☐	4	I used a variety of resources and carefully selected only the information that answered my question. I was able to continually revise my search based on information I found.
☐	.3	I used many resources to find information that answered my question. I tried to revise my search, but had some problems doing so.
☐	2	I used one or more sources. The original question or focus guided my search, although I should have made revisions. I made errors in selecting references.
☐	1	I lost focus during the gathering process and therefore my information was not accurate and complete.

SORTING	
☐ 4	I thoroughly selected and organized information that answered my question in well organized way. I selected appropriate information.
☐ 3	I sorted information and organized information that answered my question without too many errors.
☐ 2	I tried to organize the information I found, but I made some mistakes. I wasn't able to completely stay focused on information that would answer my question.
☐ 1	I was unable to sort and organize the information I found to answer my question.

SYNTHESIZING	
☐ 4	I used the information I found in a meaningful way to create an original product that clearly answers the question with accuracy, detail, and understanding.
☐ 3	My product answers the question in a way that reflects learning using some detail and accuracy.
☐ 2	My product is not complete and only answers part of the question.
☐ 1	My product is incomplete, contains missing details, and it isn't completely accurate.

TOTAL POINTS

COMMENTS

Student's Name:

Teacher

Student Self-Assessment Rubric for Research Module (n.d.) Retrieved June 25, 2004 from: http://www.bcpl.net/~sullivan/modules/tips/rubrics_sec/stud_rubric.html

Appendix 4-H

Identify Learning Goals and Objectives

Before the project is started, teachers should identify the specific skills or concepts that the student will learn, form clear academic goals, and map out how the goals tie into school and curriculum.

Herman, Aschbacher, and Winters (1992) have identified five questions to consider when determining learning goals:

1. *What important cognitive skills do I want my students to develop?* (e.g., to use algebra to solve everyday problems, to write persuasively).
2. *What social and affective skills do I want my students to develop?* (e.g., develop teamwork skills).
3. *What metacognitive skills do I want my students to develop?* (e.g., reflect on the research process they use, evaluate its effectiveness, and determine methods of improvement).
4. *What types of problems do I want my students to be able to solve?* (e.g., know how to do research, apply the scientific method).
5. *What concepts and principles do I want my students to be able to apply?* (e.g., apply basic principles of ecology and conservation in their lives, understand cause and effect relationships).

Be as specific as possible in determining outcomes so that both the student and the teacher understand exactly what is to be learned.

Other things that teachers and students need to consider:

- *Do the students have easy access to the resources they need?* This is especially important if a student is using specific technology or subject matter expertise from the community.
- *Do the students know how to use the resources?* Students who have minimal experience with computers, for example, may need extra assistance in using them.
- *Are students clear on the roles and responsibilities of each person in a group?*

Appendix 4-I

Rubric for a Research Project **Student Name(s)**_____ **Final Grade**_____

	Thesis/Problem/Question	Information Seeking/Selecting and Evaluating	Analysis	Synthesis	Documentation	Product/Process
4	Student(s) posed a thoughtful, creative question that engaged them in challenging or provocative research. The question breaks new ground or contributes to knowledge in a focused, specific area.	Student(s) gathered information from a variety of quality electronic and print sources, including appropriate licensed databases. Sources are relevant, balanced, and include critical readings relating to the thesis or problem. Primary sources were included (if appropriate).	Student(s) carefully analyzed the information collected and drew appropriate and inventive conclusions supported by evidence. Voice of the student writer is evident.	Student(s) developed appropriate structure for communicating product, incorporating variety of quality sources. Information is logically and creatively organized with smooth transitions.	Student(s) documented all sources, including visuals, sounds, and animations. Sources are properly cited, both in-text/in-product and on Works-Cited/Works-Consulted pages/slides. Documentation is error-free.	Student(s) effectively and creatively used appropriate communication tools to convey their conclusions and demonstrated thorough, effective research techniques. Product displays creativity and originality.
3	Student(s) posed a focused question involving them in challenging research.	Student(s) gathered information from a variety of relevant sources, print and electronic	Student (s) product shows good effort was made in analyzing the evidence collected	Student(s) logically organized the product and made good connections among ideas	Student(s) documented sources with some care, Sources are cited, both in-text/in-product and on Works-Cited/Works-Consulted pages/slides. Few errors noted.	Student(s) effectively communicated the results of research to the audience.

2	Student(s) constructed a question that lends itself to readily available answers	Student(s) gathered information from a limited range of sources and displayed minimal effort in selecting quality resources	Student(s) conclusions could be supported by stronger evidence. Level of analysis could have been deeper.	Student(s) could have put greater effort into organizing the product	Student(s) need to use greater care in documenting sources. Documentation was poorly constructed or absent.	Student(s) need to work on communicating more effectively.
1	Student(s) relied on teacher-generated questions or developed a question requiring little creative thought.	Student(s) gathered information that lacked relevance, quality, depth and balance.	Student(s) conclusions simply involved restating information. Conclusions were not supported by evidence.	Student(s) work is not logically or effectively structured.	Student(s) clearly plagiarized materials.	Student(s) showed little evidence of thoughtful research. Product does not effectively communicate research findings.
Teacher/ Librarian Comments						

Springfield Township High School Virtual Library. (n.d.) *Rubric for a research project.* Retrieved June 14, 2004, from http://mciu.org/~spjvweb/resrub.html

Appendix 4-J

Planning Grid for Student Research Projects

Steps	Activities	Skills students will improve
Defining the problem, Developing a Research Question and Statement of Purpose		
Developing Research Plan		
Gathering and Collecting Data		
Sorting and Analyzing Data		
Synthesizing Data		
Evaluating		
Presenting Findings		

IV. EVALUATION QUESTIONS

At the end of each day of the workshop, ask the following questions:

Evaluation Questions for End of Demonstration Activities Each Day

1. What were the most valuable strategies that you learned today?
2. What new ideas did you learn about effective teaching?
3. What questions do you have about the strategies you learned today?

Evaluation Questions for End of Entire Workshop

1. What in the workshop was most valuable to you?
2. What would have made this workshop more meaningful?
3. What will change in your teaching as a result of this workshop?
4. What was your overall impression of the workshop?

   1 2 3 4 5 (1 = little value — 5 = great value)

5. Suggest topics you would be interested in discussing in future workshops.
6. Please make any comments you would like on the workshop.