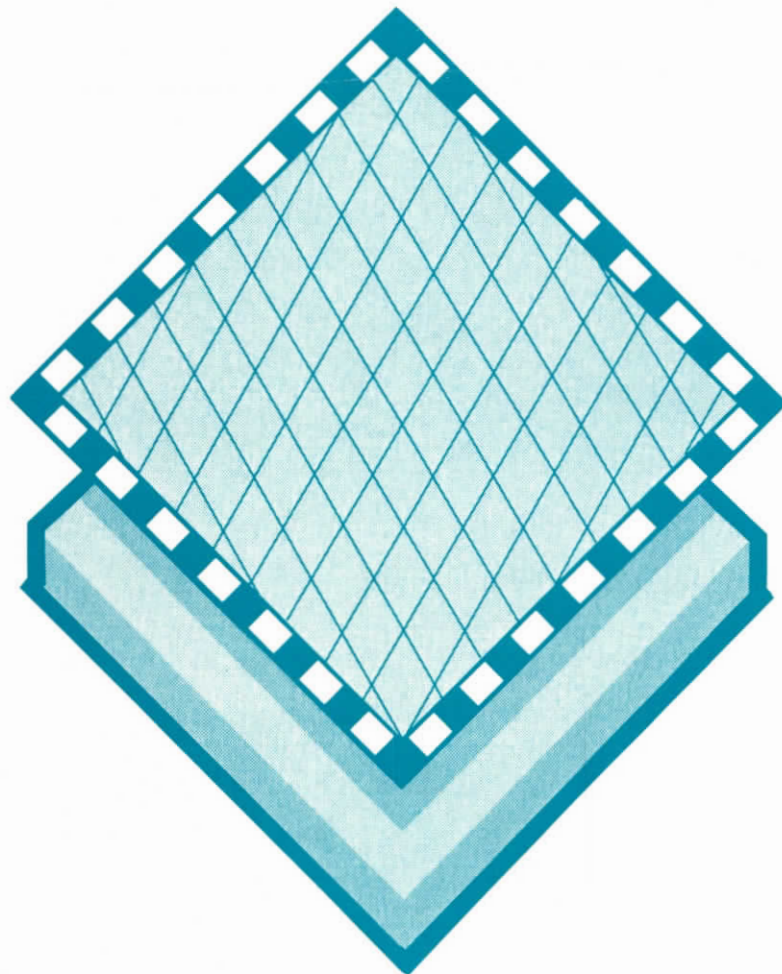

From Library Skills to Information Literacy

A Handbook for the 21st Century



**California Media
and Library Educators Association**

From Library Skills
to Information Literacy:
A Handbook for the 21st Century

California Media and Library Educators Association

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Table of Contents

| | |
|---|-----|
| Introductory Materials | |
| Acknowledgements..... | ii |
| Preface | iii |
| Introduction..... | v |
| Chapter 1 | |
| Information Literacy Defined | 1 |
| Chapter 2 | |
| Stages of the Research Process | 12 |
| Chapter 3 | |
| Instructional Planning for Information Literacy..... | 25 |
| Chapter 4 | |
| Instructional Strategies for Developing Information Literacy..... | 42 |
| Chapter 5 | |
| Sample Scenarios of Integrated Topical Units | 56 |
| Chapter 6 | |
| Integrating Information Literacy Into Local or State Frameworks | 86 |
| Appendix A | |
| Integrating Information Literacy Into National Agendas | 119 |
| Appendix B | |
| Research Process Competencies: A Planning Guide..... | 143 |
| Bibliography | 156 |
| Index | 161 |

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This publication is a merging and synthesis of materials from several sources. It incorporates, adapts and blends *Research as a Process*, published by the Los Angeles County Office of Education, *Information Skills Curriculum Guide*, published by the Office of Superintendent of Public Instruction, Olympia, Washington, and the doctoral research study of Christina Doyle on *Outcome Measures for Information Literacy Within the National Education Goals of 1990*. The committee wishes to express appreciation for permission to use these works.

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Preface

This handbook is intended as a useful guide for classroom teachers, library media specialists, and others who wish to integrate information literacy into their curriculum. It provides both models and strategies which encourage children and young adults to find, analyze, create and use information as they become productive citizens.

While it is a product of California and uses several California model documents, the handbook has been designed to appeal to a national audience. The following is a brief description of each section.

Chapter 1: Information Literacy Defined

Information literacy is defined in terms of personal outcomes. Characteristics of an information literate person are identified and an information literacy model is described. These concepts form the framework on which the rest of the document is based.

Chapter 2: Stages of the Research Process

Many people view "research" as removed from life. Mary Purucker's essay, "On Waiting for Real Life to Begin," personalizes the dilemma facing a teacher confronting this reality. Throughout this document, the research process is seen as vital to real life and as the central component of the information literacy model. Characteristic searcher behaviors and competencies for each stage of the research process are described.

Chapter 3: Instructional Planning for Information Literacy

In today's information-rich environment, information literacy depends on the searcher's awareness of and access to the vast array of information resources. Classroom teachers and library media specialists, working as partners, can plan resource-based learning that involves students in using a multiplicity of resources to address their needs for information. This curricular partnership ensures that the development of information literacy is integral to the instructional program.

Chapter 4: Instructional Strategies for Developing Information Literacy

Instructional strategies for information literacy are the same as those used for implementing the thinking, meaning-centered curriculum in all subject areas and at all grade levels. Special search strategies based on keyword analysis and Boolean logic are important for success in information acquisition. The I-Search Paper, used

here as a model for personalizing research, can be applied to almost any research project; the end product may be a videotape, a debate, a model, a research paper, an oral report or

Chapter 5: Sample Scenarios of Integrated Topical Units

A variety of research scenarios are offered as examples of searchers at all levels and in varied situations who are meaningfully engaged in the research process. Although these are not intended as lesson plans, potential implications for curricula are obvious. Taken from real life, most scenarios are interdisciplinary.

Chapter 6: Integrating Information Literacy into Local or State Frameworks

Curricular programs at school sites are typically influenced by conceptual frameworks and program evaluation guidelines developed at district, regional, and/or state levels. There are also opportunities for individual educators and professional associations to influence the development of curricula in their regions. Using California's documents as examples, this section suggests how information literacy goals can be integrated into curriculum.

Appendix A: Integrating Information Literacy Into National Agendas

The report of a national research study by Christina Doyle developed the definition and outcome measures for information literacy that provide the foundation for this document. The frame of reference for the study was a statement of national education goals.

Appendix B: Research Process Competencies: A Planning Guide

The list of research process competencies introduced in Chapter 2 is redesigned as a planning guide which may be reproduced. It is intended to assist in curriculum development and to facilitate collaboration between classroom teachers and library media specialists.

Introduction

Today many books and periodicals seriously discuss the fact that we have left the Industrial Age and have entered the Information Age. Futurists such as Alvin Toffler and John Naisbett have been writing about this for decades. More recently, several foundation and government-supported task forces have been discussing and writing about the need for the workforce to be "information literate," even if that term is not consistently used.

- *A Nation Prepared: Teachers for the 21st Century, the Report of the Task Force on Teaching as a Profession*,¹ published in May 1986, identifies skills needed to participate fully in the modern workforce and includes the following statement: "Such people will have the need and the ability to learn all the time, as the knowledge required to do their work twists and turns with new challenges and the progress of science and technology. They will not come to the workplace knowing all they have to know, but knowing how to figure out what they need to know, where to get it, and how to make meaning out of it." In other words, it is paramount that all workers be "information literate."

- *The National Education Goals of 1990*² (now known as *Goals 2000* by the Clinton administration) include as Goal 5, "By the year 2000, every adult will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship."

- *What Work Requires of Schools: A SCANS Report for America 2000*,³ published in June 1991, lists "information" as one of the five competencies necessary for all of today's workers. In Appendix B of the report, two of the four information competencies are defined as follows:

¹*A Nation Prepared: Teachers for the 21st Century, the Report of the Carnegie Forum on Education and the Economy's Task Force on Teaching as a Profession* (Washington, D.C.: The Forum, 1986).

²National Goals Panel. *The National Education Goals Report: Building a Nation of Learners* (Washington, D.C. National Education Goals Panel, 1991).

³United States. Department of Labor. Secretary's Commission on Achieving Necessary Skills. *What Work Requires of Schools: A SCANS Report for America 2000* (Washington, D.C.: U.S. Department of Labor, 1991).

Acquires and Evaluates Information: Identifies need for data, obtains it from existing sources or creates it, and evaluates its relevance and accuracy.

Interprets and Communicates Information: Selects and analyzes information and communicates the results to others using oral, written, graphic, pictorial, or multi-media methods.

Providing leadership in this area, the American Association of School Librarians and the Association for Educational Communications and Technology, in 1988, published *Information Power, Guidelines for School Library Media Programs*.⁴

• *Information Power* states: "The mission of the library media program is to ensure that students and staff are effective users of ideas and information."

With these and other national concerns in mind, this handbook provides a conceptual framework for developing information literacy throughout the curriculum. This framework is founded on the following basic premises:

Information Society

- We live in an information society.
- Information is an infinite commodity and our needs for it are pervasive and essential.
- Because technology changes the modes and pace for creating and storing information, it also demands changes in our information accessing strategies.

Access for All

- The needs for information, for decision making, and for problem solving based on critical thinking are inherent in all areas of the curriculum and in all aspects of life at all ages and stages.
- Information literacy for *all* is essential to the functioning of a democracy.

⁴American Association of School Librarians and Association for Educational Communications and Technology. *Information Power: Guidelines for School Library Media Programs* (Chicago: American Library Association and Washington, D.C.: Association for Educational Communications and Technology, 1988)

The Research Process

- The need to know is the most significant motivation for research.
- Research is a process that results in a product.
- Instruction in the development of information literacy should be integral to the educational process and the student's need to know.

Instructional Partnerships

- Classroom teachers and library media specialists must be co-designers of instruction.
- Students, teachers, and library media specialists must be partners in the research process.

Chapter 1

Information Literacy Defined

Information Literacy Defined

In the physical world how you use a stick, a shovel, or a back hoe will determine how fast or efficiently you can dig a hole. How you organize your operation as a building contractor will determine how many houses you can build in a year. (Will each home be designed separately from start to finish or will several basic designs be used repeatedly with minor modifications?)

In the information world, we would like to equip every person with the tools needed to deal with the Information Age. We know that the types of tools people learn to use will help them cope either efficiently or inefficiently with a world that is growing so fast and so complex that it may become overwhelming to even the best of minds.

But what is an information literate person? What characteristics would that person exhibit? What might we expect from people as we see them tackle information problems?

Christina Doyle, in a national Delphi study, defined information literacy and created a list of characteristics of an information literate person.¹ An adaptation of her list follows:

Information Literacy has been defined as "the ability to access, evaluate, and use information from a variety of sources."

An information literate person *accesses* information

- recognizes the need for information
- recognizes that accurate and complete information is the basis for intelligent decision making
- formulates questions based on information needs
- identifies potential sources of information
- develops successful search strategies

¹Christina A. Doyle, *Final Report to the National Forum on Information Literacy* (Syracuse, NY: ERIC Clearinghouse on Information Resources, 1992) ED351033. (See also Appendix A.)

- accesses print and technology-based sources of information
- is a competent reader

An information literate person *evaluates* information

- establishes authority
- determines accuracy and relevance
- recognizes point of view and opinion versus factual knowledge
- rejects inaccurate and misleading information
- creates new information to replace inaccurate or missing information as needed

An information literate person *uses* information

- organizes information for practical application
- integrates new information into an existing body of knowledge
- applies information in critical thinking and problem solving

Three Components of an Information Literacy Model

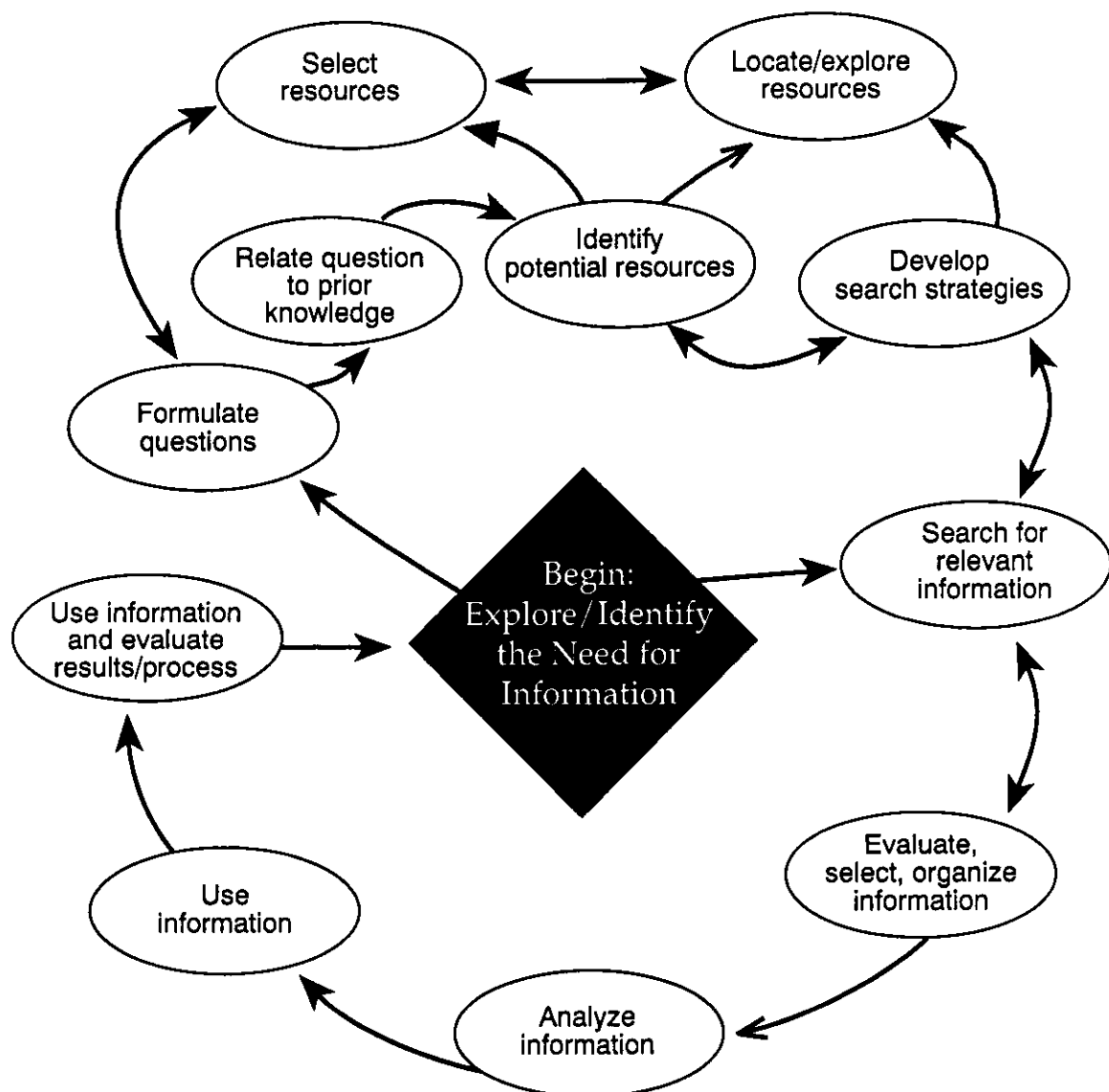
A model that assists in the development of information literacy might be viewed from three different perspectives:

1. The Searcher's Thinking Process
2. Stages of the Research Process
3. Instructional Strategies

Each of the components is interdependent, that is, each stimulates the other. The teacher and library media specialist will want to plan instruction based on discernible progress in thinking and research. Likewise, students must develop thinking skills if they are to proceed through the steps of the research process and expect success. The three components of the model are shown on the next three pages.

Stages of the Research Process

The second component of the information literacy model describes the research process. Here, a systematic way of approaching an information problem is displayed. While specific stages can be identified, the research process will look different for each person and for each problem. The process might look something like the following diagram:



An Information Literacy Model

The searcher's thinking, the stages of the research process, and instructional strategies can be brought together in an information literacy model. As presented below, the model is shown in a two-dimensional space, but in actuality, the components are not linear. However, the linear presentation is used to emphasize how a searcher's thinking can trigger a research process stage, which in turn triggers an instructional strategy. For example, "Why do I need information?" may trigger the research process stage of "Exploring the need for information" which may trigger the instructional strategy of "Start a journal to track the research process."

| Searcher's Thinking | Research Process Stages | Instructional Strategies |
|---|---|---|
| 1. Why do I need information? | 1. Explore/identify the need for information | 1. Start journal to track the research process Brainstorm/cluster/discuss/map Quickwrite |
| 2. What is the problem, topic, or question? | 2. Formulate the central search question | 2. Create possible questions Continue journal at each step |
| 3. What do I already know about this problem/topic/question? What must I find out? | 3. Relate the question to previous knowledge Identify key words, concepts, and names | 3. Quickwrite Brainstorm/cluster/map Use general information sources for background |
| 4. Where can I find the information I need? Is the information in my classroom or library media center? Are there people I can ask? Should I go to libraries, museums,...? | 4. Identify potential resources | 4. Brainstorm possible resources Cluster resources by type, location, etc. Create checklist of resources How appropriate is each? How accessible is each? |
| 5. How do I get started? What are some key words/topics/ideas? Where do I go first? | 5. Develop general strategies to organize the search | 5. Develop key word and Boolean search strategies |

Chapter 1 / Information Literacy Defined

- | | | |
|--|--|---|
| 6. What resources can I find? Which can I use? | 6. Locate and explore previously identified resources | 6. Interview people Go to libraries, museums, information centers Collect resources Observe/experience/read |
| 7. How shall I use/search these resources? How will I find the information I need? What strategies should I use? | 7. Select the most useful resources for further exploration and formu- late specific strategies for using them | 7. Develop search strategies Use information retrieval/ location/research skills |
| 8. What information will help me? | 8. Search for relevant information in these resources | 8. Read, view |
| 9. What should I record? What is important? How could I record it? How could I arrange it? | 9. Evaluate, select, and organize information | 9. Cluster ideas into subtop- ics Use outlining and note- taking skills |
| 10. Have I found the informa- tion I need? Should I look further? | 10. Analyze information retrieved; determine its relevance; interpret, infer, and synthesize | 10. Review information to see if it meets original needs |
| 11. How will I use/present the information? Who is my audience? In what form could I use/ present it? How could I structure it? | 11. Determine how to use/ present/communicate information Organize information for intended use | 11. Consider options for presenting information Make needed decisions Solve original problem Develop written, visual, oral, multimedia, or other presentation |
| 12. How have I done? ... in my opinion? ... according to others? What knowledge have I gained? What skills have I learned? What could I improve and how? | 12. Use information Evaluate results Evaluate process | 12. Review the product Review the research process journal Review with teacher, family, and peers Plan changes for next project |

The Information Literacy Model that appears on pages 6-9 has been adapted and expanded from *Research as a Process: Developing Skills for Life in an Information Society* (Los Angeles County Office of Education, 1989).

Other Information Process Models

Many models have been developed to analyze the concept of information literacy and the research process. A comparison of several information process models appears on page 11. Each of these models has a distinctive approach:

- Kuhlthau, Carol. *Information Skills for an Information Society: A Review of Research*. Syracuse, NY: ERIC Clearinghouse on Information Resources, 1987.
- Kuhlthau, Carol Collier. *Seeking Meaning: A Process Approach to Library and Information Services*. Norwood, NJ: Ablex, 1993.
- Eisenberg, Michael B. and Robert E. Berkowitz. *Information Problem Solving: The Big Six Skills Approach to Library & Information Skills Instruction*. Norwood, NJ: Ablex, 1990.
- Irving, Ann. *Study and Information Skills across the Curriculum*. London: Heinemann Educational Books, 1985
- Stripling, Barbara K. and Judy M. Pitts. *Brainstorms and Blueprints: Teaching Library Research as a Thinking Process*. Englewood, CO: Libraries Unlimited, 1988.

In addition to these excellent sources, library media specialists and teachers should consider the following book as required reading:

von Wodtke, Mark. *Mind over Media: Creative Thinking Skills for Electronic Media*. New York: McGraw-Hill, 1993.

An architect, von Wodtke explores the new world of electronic media providing visionary ideas about how humans can not only navigate electronic information, but use the new tools to be creative. His emphasis is not to have students cut and paste what is already known, but to use technology as a springboard to new ideas and creative expression.

Comparison of Information Process Models

| Kuhlthau Info. Seeking | Eisenberg/Berkowitz Info. Problem-Solving | Irving Information Skills | Pitts/Stripling Research Process |
|--|---|---|--|
| 1 Initiation 2 Selection | 1 Task definition 1.1 Define the problem 1.2 Identify info. requirem'ts | 1 Formulation/analysis of information need | 1 Choose a broad topic 2 Get an overview of the topic 3 Narrow the topic 4 Develop thesis/purpose statement |
| 3 Explora- tion (investi- gate info. on the general topic) | 2 Info. seeking strategies 2.1 Determine range sources 2.2 Prioritize sources | 2 Identification/appraisal of likely sources | 5 Formulate questions to guide research 6 Plan for research & production |
| 4 Formu- lation (of focus) 3 Collec- tion (gather info. on the focused topic) | 3 Location & access 3.1 Locate sources 3.2 Find info. | 3 Tracing /locating individual resources 4 Examining, selecting & rejecting indiv. resources | 7 Find, analyze and evaluate sources |
| 6 Presentation | 4 Information use 4.1 Engage (read, view, etc.) 4.2 Extract info. | 5 Interrogating/using individual resources 6 Recording/storing info. | 8 Evaluate evidence take notes/compile bib. |
| 7 Assessment (of outcome/process) | 5 Synthesis 5.1 Organize 5.2 Present | 7 Interpretation, analysis, synthesis and eval. of info. 8 Shape, presentation, and communication of info. | 9 Establish conclusions/ organize info. in outline 10 Create and present final product |
| | 6 Evaluation 6.1 Judge the product 6.2 Judge the process | 9 Evaluation of the assignment | [Reflection point— is the paper/project satisfactory] |

Eisenberg, Michael and Michael K. Brown. "Current Themes Regarding Library and Information Skills Instruction: Research Supporting and Research Lacking." *School Library Media Quarterly* XX (Winter 1992): 106.

Chapter 2

Stages of the Research Process

On Waiting For Real Life To Begin

What is the research process?

Is it looking things up, gathering facts, using encyclopedias, almanacs, or periodical indexes and copying these facts to create a report?

How do teachers and library media specialists keep research as a process orientation rather than a product orientation?

When does the product become more important than the process?

The result of research is a product, but research itself is the process of "looking for" and "looking for" again. *The Random House Dictionary* lists 14 meanings for the word *search*; they all involve activity. *Process* is defined as a systematic series of actions directed toward some end. In recent years educators have learned about the writing process, the reading process, and even the literature process. Frank Smith talks about the literacy club as the natural method of learning to read as we learn to speak.¹ The research process reflects the way most people instinctively set about solving problems from the first flurry of thought to the ultimate resolution.

How do we keep research from becoming product oriented rather than process oriented? At some point, of course, it must result in a product: an answer, a solution, a diagram, or even a report. But how do we keep students from rushing toward the product before their attention is ever engaged by the satisfaction of investigation, discovery, and evaluation of ideas; before they complete the process that will result in fresh original work?

Students often scorn a magazine index; they'd rather take a stack of magazines and browse through them, hoping something will click. For many, it's try this, try that, get something down on paper. Fulfill the letter of the teacher's assignment and get on with real life. The process usually begins when the teacher tells the student to do something: prepare for a debate, write a report about a mammal, role play an important figure in history, make a speech, or design a science project.

The first questions students ask (other than how long does it have to be, when is it due, can we use a pencil, does it have to be in handwriting, and how many points is it worth) is not what do I need to know, but what do I need to do to get through

¹Frank Smith, *Joining the Literacy Club: Further Essays Into Education* (Portsmouth, NH: Heinemann, 1988).

this without too much pain? What does the teacher want? A few students get really interested and dig deep; the rest lean on their shovels and watch. When does this process become something students can really use? Does anyone care? Or have they all drifted off into la-la land waiting for the bell to ring and real life to begin again?

The research process becomes real when the problem is real and when the product is something the student, age 8-80, really wants. Real problems are: the job I want; the man/woman I want to marry; a cure for AIDS, cancer, acne, heartbreak; being too tall/too short; being childless; buying a house or renting an apartment; finding a plumber, a hairdresser, or a doctor. Sometimes the answers are as simple as asking a good friend or looking in the telephone directory, but often the course of the search is difficult, complex, and just the beginning of a longer search.

Can students simulate this feeling now—this urge to seek, to plunge in, to find out, to ask questions? One possibility is to develop the model of the research process and apply it to actual classroom scenarios.

That real life that students are so eager to get back to has its true beginning when it becomes merged with what happens in the classroom. It begins when students perceive that the process they use to solve classroom generated problems can be the same one they use to meet the challenges of being a human in an increasingly complex world.

These insightful musings are from the creative pen of Mary Purucker, librarian, Santa Monica High School, California.

Research Process Stages: Searcher Behaviors and Competencies

The research process begins when an individual first identifies a need for information, then continues as he or she goes through stages to access, evaluate, and use the information. The research process is synthesized as information literacy when the searcher finally analyzes and evaluates the results of the process and internalizes it for future application.

Each stage of the research process can be further amplified by a description of behaviors and competencies suggested as responses to searchers' questions. Those developed below are only some of the possible responses and understandings inherent in the research process. Classroom teachers, library media specialists, and students will discover a myriad of others as they analyze their needs for information.

Note that the numbers below refer to the Research Process Stages of the Information Literacy Model on pp. 8-9.

It is important to stress that these numbers are not intended to define a prescribed or preferred sequence of behaviors. A unique sequence of behaviors will be developed by each searcher in response to information acquired and evaluated at each stage of the process. Searcher competencies are developed by students as they perceive their own *need to know*.

1: EXPLORE/IDENTIFY THE NEED FOR INFORMATION

In life outside school, the quest for information usually begins as a response to a need or an interest. Students need guided experiences in defining their personal needs for information.

In school, the need for information is often in the form of an assignment or an engaging problem. If so, the students need to know what the parameters of the assignment are and how the process and any product will be evaluated. They also need to be able to choose questions or topics of personal interest.

The searcher will . . .

- A. Identify the assignment or other purpose for which information is needed.
- B. Identify general types of questions or other information needs.

- C. Begin a research process log/journal.
 - 1. Generate ideas using individual and group brainstorming strategies, e.g., discussion, quickwrite.
 - 2. Use cluster and map techniques to organize brainstorming notations.

2: FORMULATE THE CENTRAL SEARCH QUESTION

Whatever the impetus for seeking and using information, there is an advantage to formulating a central question as the first step of the quest. Thinking in terms of a question rather than a "topic" provides focus for the search.

The searcher will . . .

- A. Use a variety of questioning strategies (yes/no, open-ended, probing) to create possible questions related to the identified need for information.
- B. Focus the purpose of the research by formulating a specific question to be answered.
- C. Develop a preliminary central question or thesis statement.

3: RELATE QUESTION TO PREVIOUS KNOWLEDGE; IDENTIFY KEY WORDS, CONCEPTS, AND NAMES

If information is to have meaning, students must make connections between new information and previous experiences or knowledge. Lack of understanding results in frustration, plagiarism, and incoherence. The first step in orienting oneself to an unfamiliar subject is to find one or more existing connections that give the subject meaning.

The process begins with thoughtful consideration of what is already known that is related and useful. The student begins to make note of key words, concepts, and names related to the search question. After that, there may be a need to consult general sources and knowledgeable people to add to the list of key words and concepts. It is important to distinguish this step from the beginning of the search itself so that attention is focused on relationships and key terms, rather than on factual detail.

The searcher will . . .

- A. Record previous knowledge relating to the central question.
 - 1. Quickwrite.
 - 2. Brainstorm ideas and information about the central question by recalling previous experiences.

3. Note key words, concepts, and names related to the search question.
 4. Demonstrate the ability to use strategies such as the following to organize known information: list, cluster, traditional outline, mind map, radial outline, and other organizing strategies.
- B. Review research process journal to determine missing elements.
- C. When previous knowledge is limited, use general sources of information (e.g., encyclopedias, time lines, library media specialist, classroom teacher) to focus on relationships and key terms for overview of topic:
1. Skim encyclopedia articles, chapters in books, outlines, or summaries on the topic.
 2. Use video or other technology resources that present general overviews of the topic.
 3. Interview a knowledgeable person.
- D. Restate phrases/concepts in searcher's own words.

4: IDENTIFY POTENTIAL RESOURCES

Everyone has had experiences with a broad range of resources that are of potential use in exploring information or solving problems. After students relate the search question to their previous knowledge, they must begin to identify general and specific resources relevant to the question. This involves more brainstorming and clustering as they list and group resources by type and location.

To be successful in a search for information, a person must know generally where information comes from and how it is organized in the area of knowledge being searched. It is important that the information user be aware of the sources that are available, their extent, their quality, and the divergence or convergence of points of view they represent.

The student's understanding of what is available governs the search. Library media specialists and classroom teachers can expand students' awareness and facilitate access to a broad range of resources. These might include: personal interviews, firsthand observations, electronic searches, video and videodisc programs, and print or electronic subject-specific reference sources.

The searcher will . . .

- A. Identify potential resources.
1. List types of resources for seeking desired information: e.g., experts in the field of the search, newspapers, magazines, books, maps, electronic databases, audio, and visual resources.

2. Identify specific resources in each category that may be relevant to the search.
- B. Identify availability of resources; group according to where resources can be found.
- C. Use broad, general resources if more basic information about the search subject is needed.
 1. Use information from dictionaries, encyclopedias, and other general resources to identify major/significant sources of information regarding the central question.
 2. Recall words, terms, methods, facts, concepts, or specific items, by using broad, general information resources.

5: DEVELOP GENERAL SEARCH STRATEGIES TO ORGANIZE THE SEARCH

To answer the central question of the search, it is necessary to determine the components of that question and phrase them in subquestions. These questions constitute a plan for the search and become tests of relevance for what is found. The basis for formulating these questions is knowledge gained from previous experiences and from the development of key words, lists, and concept outlines. Lists and outlines developed in previous stages can serve as conceptual organizers to help the searcher categorize information and clarify relationships among the terms and ideas.

The searcher will . . .

- A. Use previously compiled terms and add subject headings and database descriptors that relate to the central question or thesis.
- B. Summarize in simple sentence form the main ideas regarding the central question.
- C. Ask further questions to clarify meaning.
- D. Construct subquestions about the central question.
- E. Discriminate between more important and less important questions and exclude the least important questions.
- F. Create a plan for the search based on the resulting questions.
- G. Organize key words, phrases, and subject headings into Boolean and other relevant search strategies (See p. 47-53, for further explanation).
- H. Reanalyze search strategies as success or failure is experienced.

6: LOCATE AND EXPLORE PREVIOUSLY IDENTIFIED RESOURCES

There are two steps to the basic process of locating and exploring information resources: (a) locating a citation or reference to a source, and (b) gaining access to the source itself. Students learn to use initial sources as a lead to other sources, e.g., using in-source bibliographies, noting the subject headings under which a source is listed, and locating sources recommended by others. As information users develop experience in this process, they become more sophisticated in pursuing multiple leads to extend the scope of the information resources they explore.

The searcher will . . .

- A. Identify and locate available resources from those previously listed.
 - 1. Recognize and use library media center resources, including the consulting role of the library media specialist.
 - 2. Reconsider general resource materials previously identified. Examine other resources such as periodicals, newspapers, special encyclopedias, nonprint materials also identified earlier.
 - 3. Consider resources outside the school: e.g., other libraries, museums, community resources, experts, and electronic media.
- B. Use information access skills.
 - 1. Recognize that most information sources are indexed and that indexes may be in a variety of formats (e.g., card, list, microform, or electronic).
 - 2. Recognize that information is arranged in one or a combination of ways: e.g., by subject, location, alphabetically, chronologically, on a continuum.
 - 3. Locate the index for each information source and interpret all information in index entries.
 - 4. Use subject headings and cross references to find additional resources.
 - 5. Access relevant records in electronic databases.
 - a. Determine the possible databases to be searched.
 - b. Design the search strategy, narrowing or expanding the search parameters as needed.
- C. Revise or redefine the central question as necessary.

7: SELECT THE MOST USEFUL RESOURCES FOR FURTHER EXPLORATION AND FORMULATE SPECIFIC STRATEGIES FOR USING THEM

Evaluate resources explored previously. Compare and contrast the formats, strengths, and weaknesses of various resources. Finding the most useful information in a film, videotape, or other nonprint medium requires one set of skills. A first viewing or listening may serve mainly to pinpoint sections that will be of use; subsequent replaying of those sections will permit detailed note taking. Interviewing people, on the other hand, requires a detailed set of questions and a willingness to improvise as the conversation takes unexpected turns.

The searcher will . . .

- A. Select the most useful resources from those available.
 - 1. Skim the article, media abstract, or text printout to find a word, name, date, phrase, idea, or general overview of the resource.
 - 2. Scan/search materials in electronic or other nonprint formats.
- B. Conduct primary research as needed.
 - 1. Plan and complete an interview, experiment, or observation.
 - 2. Plan and conduct a survey/questionnaire.
 - 3. Write a letter of inquiry.
- C. Revise or redefine the central question or statement by narrowing or broadening as necessary.

8: SEARCH FOR RELEVANT INFORMATION

Once resources have been selected, the relevant and useful information must be extracted efficiently. The student must be encouraged to skip quickly over any material that does not contribute to answering the questions from previous steps.

The searcher will . . .

- A. Locate the sections of each resource that are useful in answering the search questions.
 - 1. Use indexes, tables of contents, headings within chapters, and topic sentences of paragraphs.
 - 2. Use skimming skills to extract information from selected resources.
 - 3. Find and make effective use of the relevant sections in nonprint media, such as videotapes, films, and audiotapes.
- B. Continue to compile and organize information.

- C. Compare information with search questions.
 - 1. Identify gaps in information collected.
 - 2. Determine if additional sources are needed.
- D. Compile bibliographic information for each resource.
- E. Review, evaluate, update research process log/journal.

9: EVALUATE, SELECT, AND ORGANIZE INFORMATION

As the information user locates potentially useful bits of information, a screening process takes place. First, the information must pass the test of relevance established by the search questions. Next, it is scrutinized in terms of such factors as currency, authority, objectivity, consistency, and potential for being understood. The level of understanding depends on the student's personal learning style and familiarity with the subject. A piece of information that is useful to one student may be of limited value to another working on the same question. As previously discussed, there can be no understanding of information that does not relate to what is already known. As students progress, they gain skills in applying these and other tests of usefulness. Skill in applying each of these tests must be learned and reinforced through experience. Concurrent with interpreting and evaluating information, the student selects the most useful parts of the gathered information. By scanning and skimming, the learner wastes little time with bits of information that are not useful in answering the central question. This is the fine screening of the information that has already been sorted through previous steps.

One reliable test of a person's understanding of a piece of information is the ability to paraphrase it accurately. Developing habits of summarizing and paraphrasing in taking notes makes the student think about and interpret information at the time it is accessed, not later when context clues are missing.

In emphasizing the essence, rather than the form, of note taking, it is important to teach the organizing or indexing of paraphrased notes according to the search questions (or working outline). This makes the final steps of the process much easier. Such decisions may be left to the individual without sacrificing the essential process. In some cases, drawing diagrams, making audio recordings, or collecting artifacts may serve instead of notes as important means for preserving information.

The searcher will . . .

- A. Screen the potential bits of information.
 - 1. Choose those that contribute to the search questions.
 - 2. Record the chosen information in an organized way.

- B. Evaluate for currency of information.
 - 1. Identify copyright date.
 - 2. Identify the actual date, era, or time the ideas were created.
 - 3. Understand the significance of dated versus current information, or whether dating is significant at all.
- C. Establish authority.
 - 1. Identify the contributor/producer of the sources being used.
 - 2. Evaluate the contributor's/producer's work for motive, point of view, bias, scholarship, intended audience, etc.
- D. Distinguish among fact, opinion, and propaganda.
- E. Select information that is most useful in meeting the needs of the central question. Eliminate irrelevant information.
- F. Take notes, using one or more of a variety of note-taking strategies, e.g., highlighting photocopies, electronic note pad, note cards.
- G. Organize notes and ideas and develop outline or graphic organizer.

10: ANALYZE INFORMATION RETRIEVED: INTERPRET, INFER, AND INTEGRATE

Interpretation skills start, but do not end, with reading. A good reader makes use of context clues, discerns the structure of a piece of writing, draws inferences, and perceives relationships. Such skills are also essential to such diverse activities as reading maps, interpreting tables of statistical data, reading schematics, studying photographs, and viewing films or videos. During any information quest, the searcher must have the interpretation skills required by each format to retrieve the useful pieces of information or else the whole process becomes meaningless. At this stage, the searcher integrates fragments of information into a comprehensible whole to create personal meaning.

The searcher will . . .

- A. Read, view, or listen to sources, identifying main ideas, opinions, and supporting facts. Inconsistencies are noticed and questioned.
- B. Interpret graphic sources for information: maps, charts, pictures, diagrams, graphs, tables, etc. Inaccuracies are discovered and rejected.
- C. Derive valid inferences from information sources. Substitute new ideas when information is inaccurate.
- D. Summarize and paraphrase important facts and details that support the central question. Compile notes/information according to the outline previously developed. Create new conclusions from facts using different perspectives.

- E. Review compiled information to bring personal meaning and understanding to the original problem, topic, or question.

**11: DETERMINE HOW TO USE/PRESENT/COMMUNICATE
INFORMATION; ORGANIZE INFORMATION FOR INTENDED USE;
USE INFORMATION**

Information sources are rarely organized in ways that exactly match the searcher's end use of the content. As notes are created, they are classified in a way that meets the searcher's original need. This classification scheme may evolve during the quest and probably will closely approximate the final structure or outline. While the original questions led to the desired information, they might also lead to much repetition if used in a presentation of the findings. In some cases, it may be advantageous to create a new structure or outline.

Students benefit from a variety of experiences in applying information; written reports are only one of them. Students need to reach conclusions and to prepare for activities that are the outcomes of their quests for information. Presentation formats can include papers, dramatizations, panel discussions, multimedia presentations, models, demonstrations, or school-wide projects. Each application has its own set of skills required for success. Interpersonal skills are as important as language skills; visual skills are as important as verbal ones.

The searcher will . . .

- A. Determine the most effective method of presentation.
 - 1. Identify and use appropriate media technologies.
 - 2. Consider presenting thoughts, feelings, and creative ideas through student-produced media: books, posters, transparencies, slide shows, puppets, audio and video tapes, hypermedia, etc.
- B. Plan the project, e.g., dramatization, debate, writing, multimedia slide show, videotape presentation, demonstration, exhibit.
 - 1. Decide purpose; e.g., to inform, persuade, entertain, etc.
 - 2. Select an appropriate organizational style.
 - 3. Determine main points to be made or arguments to be developed and adapt working outline.
 - 4. Use the composition process; including prewriting, rough draft, writing/designing/scripting, etc. (Most forms of presentation require some written planning.)
 - 5. Prepare a bibliography or list of all references used.

- C. Make a clear, well-supported presentation that answers the central question, or solves the problem by applying search information.
- D. Draw conclusions based on search information.

12: EVALUATE RESULTS; EVALUATE PROCESS

Evaluation is an ongoing activity that includes many checkpoints and involves students and teachers as key figures in the assessment process. Students assess their knowledge, attitudes, and feelings about the project. Teachers guide and monitor skills development; students and teachers assess the product and the process.

Strategies for assessment include teacher and student review of logs or journals and all other documents or products including notes, scraps, etc. Evaluation of the product must be integral to a consideration of the total process.

The learner develops the ability to recognize the steps or stages in his/her thinking process and to internalize them for future application. The teacher aids the process of metacognition by involving the student in a conscious review and analysis of the research process as a part of the ongoing assessment.

The searcher will . . .

- A. Evaluate the project and the research process.
 - 1. Reflect on the process as a whole. What came easy? What was difficult? Why were there barriers? Which could be solved with a different approach?
 - 2. Reflect on the information sources that were used. Were they easy to find? What local libraries and agencies responded poorly or well? Why? What changes in library collections, procedures, and assistance would help in the information gathering process.
 - 3. Review the research process log/journal. Does it show progress in conducting information searches? What kinds of improvements in the process would lead to better results?
 - 4. What is the quality of the product created? Does it show careful analysis, thoughtful content, and good technical execution? Is it creative?

The Stages of the Research Process, pages 15-24 are adapted and expanded from *Information Skills Curriculum Guide: Process, Scope and Sequence*. Olympia, Wash.: Office of Superintendent of Public Instruction in conjunction with the Washington Library Media Association Supervisors Subcommittee on Information Skills, 1987.

Chapter 3

Instructional Planning for Information Literacy

The Partnership Between Classroom Teachers and Library Media Specialists

Library media specialists and classroom teachers have a symbiotic relationship. Teaching students a research process isolated from the curriculum is useless. Similarly, requiring students to perform research without teaching a research process frustrates the students and produces unsuccessful results. Process and content are both necessary for a successful research experience. The classroom teacher/library media specialist team-teaching experience can be rewarding when collaborative planning is based on mutual respect and shared expertise.

The Route to Thoughtful Research

Few teachers or students would begin a cross-country trip without a map. They know they must have a destination in mind and a general idea of the route they will follow. The research process is the road map to successful research. Classroom teachers, library media specialists, and students are encouraged to study the process, take from it those ideas that seem most useful, and plan their own trips. Side trips and excursions to new and exciting destinations are encouraged as long as the goal remains the same—well-informed, thoughtful research/problem-solving.

Step One: Brainstorming a Curricular Unit

At the initial planning session, the classroom teacher and library media specialist can brainstorm exciting alternatives for the planned curricular unit. The classroom teacher brings to the meeting the content objectives, an idea of the time to be spent on the unit, and a knowledge of the students' abilities and learning styles. The library media specialist brings a knowledge of applicable learning resources, of the students' information literacy competencies, and of the information literacy objectives to be incorporated.

Using the content and process objectives and the time line, the classroom teacher and library media specialist determine the levels of research and reaction. They brainstorm about the product, and generate ideas for several alternative assignments. One assignment can be chosen at this meeting, or the teacher can reflect on the brainstormed list and make the choice later.

Step Two: Developing the Unit

When the teaching team is ready to start planning the unit, they will use a research planning sheet based on the Curricular Partnership Planning Model on p. 29. Together they briefly describe the unit and the product. Then they write objectives for content (subject area) and process (information literacy competencies). These may be listed in terms of teacher objectives or student objectives. Then, the teaching team divides the responsibilities for the unit. They decide what each will do before the students arrive in the library media center, what and when each will teach, and who will be responsible for follow-up.

Step Three: Guidelines for Students

After all the plans are made, the classroom teacher and the library media specialist may both prepare guidelines for students. The guidelines should include the objectives, stated in terms that the students can readily understand; perhaps a schedule with daily goals (especially if the time in the library media center is long); a description of the final product or information about the presentation of the project (if appropriate); and evaluation criteria. The guidelines will give students a structure and focus and will increase their success.

Step Four: Implementation

When working with students in the library, the library media specialist and the classroom teacher should model the research process. Each can suggest alternatives (like possible topics or questions), keep an open mind, respond to student input, ask questions, and search for new ideas. As Emerson is often quoted, "What you do speaks so loudly, I can't hear what you say."

The library media specialist and classroom teacher must recognize their different areas of strength. Typically, the library media specialist helps students find and evaluate information. The classroom teacher helps students choose information compatible with the classroom studies.

Step Five: Evaluation of the Unit

Classroom teacher, library media specialist, and student must be involved in the evaluation of the process and the product of research. The product is evaluated based on criteria that were collaboratively developed and clearly communicated at

the beginning of the assignment. The process may be evaluated through review and analysis of the student's research process log or journal.

Involving the student in a conscious review and analysis of the research process is a critical part of the ongoing assessment. Through this involvement, the learner develops the ability to recognize the stages in her/his thinking process and to internalize them for future application.

Evaluating the unit itself is also essential. Effective and ineffective aspects of the unit as well as suggestions for changes should be noted on the research planning sheet. The sheet and any supporting material (e.g., copies of assignment sheet, assessment criteria, bibliographies) are then filed for referral the next time the unit is taught.

Adapted from *Brainstorms and Blueprints* by Barbara K. Stripling and Judy M. Pitts (Libraries Unlimited, 1988), pp. 24-26.

Curricular Partnership Planning

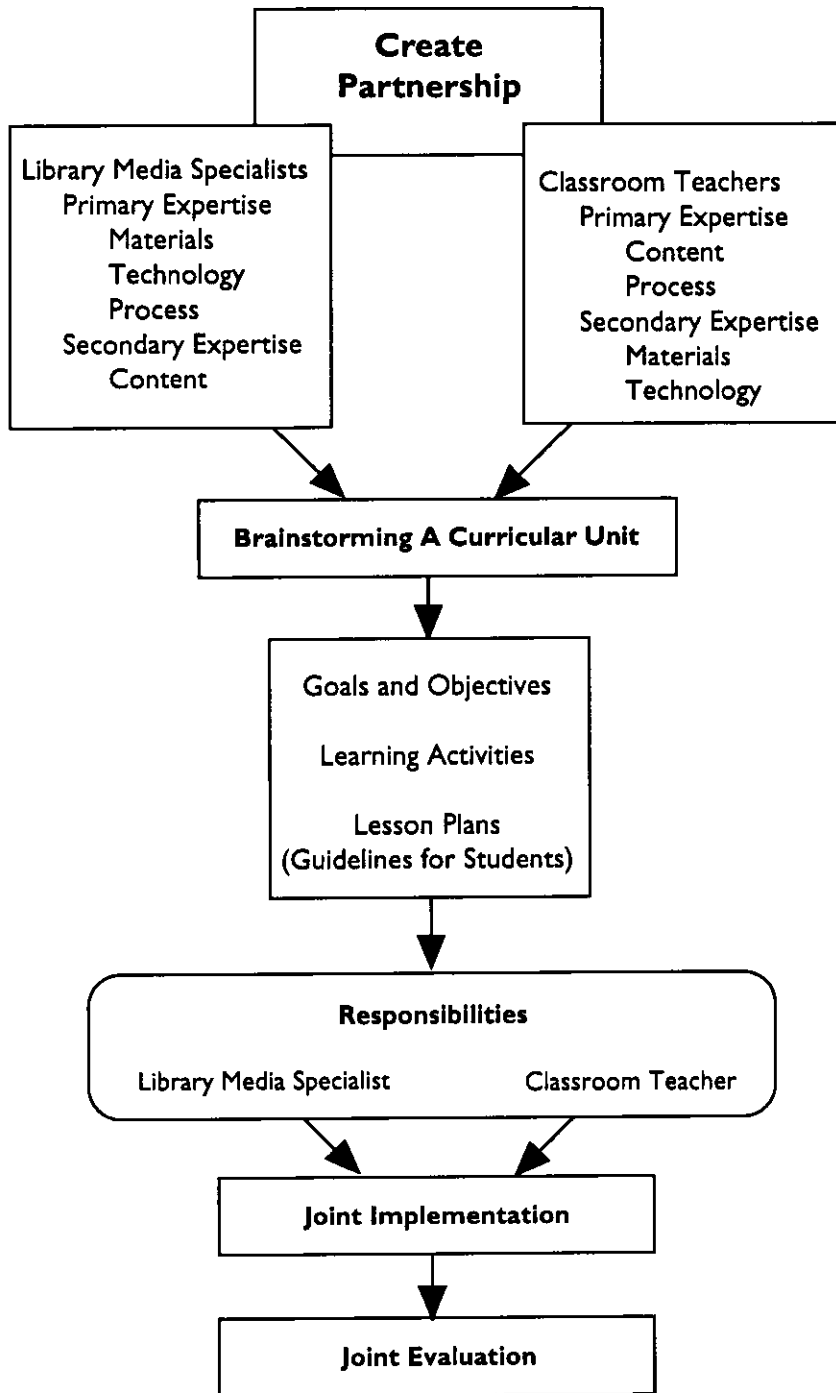


Chart developed for this publication by David Loertscher.

Resource-Based Learning

Information literacy or knowing how to learn is a basic survival skill for the 21st century. The development of information literacy must be placed within the context of the overall learning process, and linked with the processes of thinking, writing, discussing, problem solving, and decision making. Information literacy can be achieved when schools are restructured around resource-based learning and not resource-based teaching.

Resource-based teaching and resource-based learning are not synonymous. In resource-based teaching, teachers are using a variety of resources such as newspapers, library books, video, and computer software to facilitate their teaching. In resource-based learning, students may access the same resources but the focus is on what the students are doing with these resources to facilitate their own learning.

Resource-based learning requires restructuring of

- the learning environment
- the learning process
- the role of the student
- the role of the teacher
- the relationship between student and teacher

Resource-based learning requires teachers to function as facilitators of learning. "Facilitating learning is fundamental to the (role) of the school library media specialist." When classroom teachers and library media specialists function as facilitators of learning, they do three basic things:

- structure the learning environment
- guide student learning
- track and assess student learning

Structuring the Learning Environment

"It must be structured to ensure that inquiry, investigation, and the development of information literacy are nurtured, and that the optimum opportunity for student learning exists." The teacher:

- establishes objectives based on frameworks
- works with students to establish learning objectives and identify information needs
- selects or previews available resources to ensure suitability

- designs learning activities and experiences, or task-oriented assignments to connect students with resources in a meaningful way
- has high expectations and gives specific instructions

Guiding Student Learning

The teacher uses simple record-keeping devices, such as checklists or rating scales to record the level of processing and the development of information management skills.

The library media specialist works collaboratively with classroom teachers. Together, they work to structure resource-based learning environments where students have access to a wide range of "suitable" resources in the classroom, in the library media center, and beyond; and both are actively involved in structuring the learning environment and guiding and tracking student learning.

Library media specialists must move away from how to find "stuff," and place greater emphasis on how to extract, process, and use information. They must move from concentrating on physical access to concentrating on intellectual access.

The value of collaborative partnerships between the classroom teacher and the library media specialist is in having two teachers functioning as facilitators of learning, increasing the contact time with individual students, and in modeling collaboration strategies.

Resource-based learning means exploring beyond the four walls of the classroom and producing more than the legendary "research paper." It means the school library media center, once the site of brief, mandatory weekly visits for book exchanges, library skills instruction, study hall, or a place to do research must now function as "a learning laboratory," and an extension of the classroom in which student-centered, resource-based learning takes place.

This article, written by Bonnie O'Brian, is a summary and interpretation of an earlier piece written by Carol-Ann Haycock called "Resource-Based Learning: A Shift in the Roles of Teacher, Learner" which appeared in the *NASSP Bulletin* of May, 1991. Bonnie's summary was printed in the *CMLEA Newsletter*, November 1991.

Resource-Based Learning: What Does It Look Like?

Learning Resources

Technology

Video/ITV
Filmstrips
Audio
Computers
Videodiscs
CD ROM
Telecommunications
Other

Print

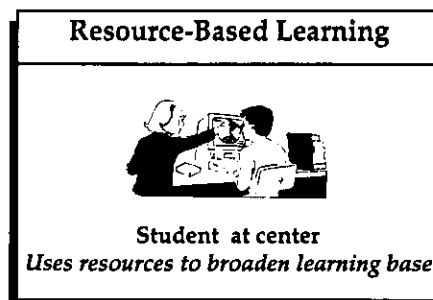
Books
Magazines
Newspapers
Textbooks
Pamphlets
Maps
Other

Places

Universities
Schools
Libraries
Museums
Zoos
Communities
Other

People

Classroom teachers
Library media specialists
Parents
Experts
Resource people
Other



Classroom teachers and library media specialists function as facilitators of learning:

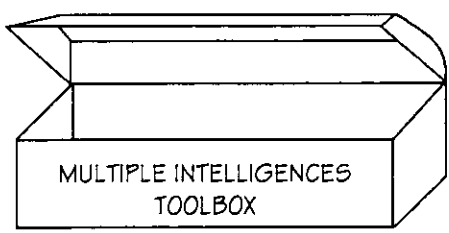
- Structure learning environment . . .**
- Establish learning objectives
 - Select/preview resources to ensure suitability for learning/learners
 - Design learning experiences
 - Set task-oriented assignments
 - Create engaging problems

- Facilitate student learning . . .**
- Question to stimulate thinking
 - Guide students to identify their own information needs
 - Prompt to facilitate understanding
 - Assist to ensure that students receive help with learning when/where necessary

- Track and assess student learning . . .**
- Record student's level of cognitive processing
 - Record development of information literacy skills
 - Evaluate how students use learning resources
 - Evaluate student achievement of learning objectives
 - Evaluate products

Multiple Intelligences and the Research Process

Student learning style should influence the types of resources used and the final presentation of the synthesized information. Howard Gardner has identified “seven intelligences,” which in combination affect an individual’s thinking and learning style. David Lazear has assembled a “Multiple Intelligences Toolbox” of creative strategies. Any of these strategies might be used to engage learners in developing information literacy.

| | | |
|--|---|---|
| <p>VERBAL/LINGUISTIC</p> <ul style="list-style-type: none"> • Reading • Vocabulary • Formal Speech • Journal/Diary Keeping • Creative Writing • Poetry • Verbal Debate • Impromptu Speaking • Humor/Jokes • Storytelling | <p>LOGICAL/MATHEMATICAL</p> <ul style="list-style-type: none"> • Abstract Symbols/Formulas • Outlining • Graphic Organizers • Number Sequences • Calculation • Deciphering Codes • Forcing Relationships • Syllogisms • Problem Solving • Pattern Games | <p>VISUAL/SPATIAL</p> <ul style="list-style-type: none"> • Guided Imagery • Active Imagination • Color Schemes • Patterns/Designs • Painting • Drawing • Mind-Mapping • Pretending • Sculpture • Pictures |
| <p>MUSICAL/RHYTHMIC</p> <ul style="list-style-type: none"> • Rhythmic Patterns • Vocal Sounds/Tones • Music Composition/Creation • Percussion Vibrations • Humming • Environmental Sounds • Instrumental Sounds • Singing • Tonal Patterns • Music Performance |  | |
| <p>INTRAPERSONAL</p> <ul style="list-style-type: none"> • Silent Reflection Methods • Metacognition Techniques • Thinking Strategies • Emotional Processing • “Know Thyself” Procedures • Mindfulness Practices • Focusing/Concentrating Skills • Higher-Order Reasoning • Complex Guided Imagery • “Centering” Practices | <p>INTERPERSONAL</p> <ul style="list-style-type: none"> • Giving Feedback • Intuiting Other’s Feelings • Cooperative Learning Strategies • Person-to-Person Communication • Empathy Practices • Division of Labor • Collaboration Skills • Receiving Feedback • Sensing Other’s Motives • Group Projects | <p>BODY/KINESTHETIC</p> <ul style="list-style-type: none"> • Folk/Creative Dance • Role Playing • Physical Gestures • Drama • Martial Arts • Body Language • Physical Exercise • Mime • Inventing • Sports Games |

From *Seven Ways of Knowing: Teaching for Multiple Intelligences* by David Lazear © 1991 by IRI/Skylight Publishing, Inc. Palatine, IL. Reprinted with permission.

Integrating Information Literacy into the Curriculum

One temptation to avoid is to teach the research process as a set of separate skills as one would teach typing skills. While an information literacy course could be taught, the probability that the teaching will transfer beyond the classroom door is slight. A better plan is to integrate the content of a topical study with the information skills needed to accomplish an instructional task. Consider information skills and content as ingredients in a recipe—each of which is required to create a satisfying product.

Teacher-Generated Tasks

Shaping the problems that students will encounter triggers the need for appropriate information skills. The following are some teacher-generated tasks from several curricular areas. The reader might review the research process stages (pp. 15-24) to identify learning experiences.

Business Education

- Compare advertising techniques and results from 100 years ago and today.
- Describe the methods businesses use statistics to advertise their products. Can these statistics be verified?
- Compare the research and development program of two major corporations.
- Develop a business plan for starting your own company.

Consumer and Homemaking Education

- Judge the merits of a group of consumer products.
- Explain the changes in eating utensils over the years in at least two different cultures.
- Analyze the diet in a variety of ethnic cultures. Is the diet healthy according to our government's definition of healthy?
- Compare the fashions of 50 years ago with those of today.
- Prepare a weekly budget for a family of four.
- Prepare a menu for a family meal and compare the cost of using convenience foods with the cost of making all the dishes from scratch.

English/Language Arts

- Examine the features of a publications such as newspapers, magazines and then create a new design. How does restructuring page design affect what readers get from the information presented?
- Explore an unfamiliar subject and then write an article, speech, or letter about it for a younger student.
- Assemble the works of an author in the order they were written. What happened over time?
- Categorize various literary genres and explain what distinguishes each.
- Compare historical nonfiction and fiction and analyze the similarities and differences.

Foreign Language

- Read several versions of a story in the foreign language and in English. What are the differences?
- Plan a trip to a foreign country.
- Plan a celebration for a particular country's holiday.
- Describe a country's culture, crafts, folklore.

Health and Physical Education

- Explore the symptoms and diagnosis of a disease in a successful case; in an unsuccessful case. What went right? What went wrong?
- Investigate the role of steroids in athletic competition.
- Construct a plan for physical development and improvement for a physically-challenged person.

History-Social Science

- Write a letter to a member of Congress, to a corporation head, to a celebrity, to a newspaper editor concerning a current problem using data you have gathered about the problem.
- Trace a route, battle, or travelog of a specific time and place.
- Research how students' background and cultural roots affect how they respond to everyday events in our society.
- Reconstruct an event from history and dramatize it.
- Defend an opinion that is opposite from yours.
- Predict the role of women in the society of 2150 A.D. in a country other than your own.

Industrial and Technology Education

- Draw or build a historical replica.
- Prepare a plan to bring a new invention into the general marketplace.
- Evaluate materials used in constructing a variety of buildings. What are the comparative costs? Effects on the environment? Effects on quality of the structure?
- Demonstrate the difference between internal combustion and Wankel engines.

Mathematics

- Create a stock market report for an imaginary company.
- Demonstrate how math is used in sports, e.g., baseball, hockey, football. Who collects and reports sports statistics?
- Identify recent mathematical discoveries. What potential do these discoveries have in the practical world?
- Explain the importance of the work of well-known mathematicians.
- Make a list of at least twenty careers in which mathematics is a necessary skill, and describe how this skill is used.

Science

- Collaborate on a newsletter detailing the latest scientific discoveries in one or more fields.
- Create a science dictionary for a small science topic. Create the dictionary to help those unfamiliar with the topic understand an article about the topic.
- Pack your bag for a trip to Mars.
- Search for descriptions of what technologies we would be using today in magazines published 20 years ago. How close did futurists come?

Visual and Performing Arts

- Compare film/video/television reviews of movies and plays *after* you have seen and reviewed the event yourself.
- Analyze the use of technology by a contemporary musical group. What sounds are real versus manufactured electronically?
- Design a video collage representing a specific period.
- Evaluate a specific work of art (painting, opera, ballet, etc.) as a contemporary of the artist might have or as it would be assessed today. Why would the two evaluations be different?

Interdisciplinary

- Describe what technologies helped U.N. troops achieve victory in Desert Storm.
- Compare the role of medicine (or lack, thereof) in the progress of two wars (e. g., Cortez and the Indian population versus World War II).
- Describe what artists need to know about aerodynamics before they can create a futuristic design for a car.

Student-Generated Engaging Problems

Many teachers are finding that if students generate engaging problems from their own needs, their interest increases and their need for information skills become apparent. As you review the following problems, consider appropriate information skills students might need to resolve them.

- A primary student has a new caterpillar, butterfly, snake, baby squirrel, baby bird, egg, cocoon, or seed. What is it? How do I take care of it? What's going to happen to it?
- A ninth grade girl has written children's stories and wants to know how to get them published.
- Maria, a first time baby sitter, wants to be successful in her first child care experience.
- Someone in Susan's family has a disease and she wants to know if it is hereditary.
- Jason, who is responsible for preparing dinner three days each week, wants to know about cooking, menus, recipes, and nutrition.
- Fifteen-year-old Leslie has decided to become a vegetarian. How will she be assured of a balanced diet?
- A group of seventh grade students want to start a drama club and put on a play.
- Sergio reads, writes, and breathes science fiction; he wants to create a major bibliography.

- Debbie's passion for horses leads to her learning more about breeds, care, cost, riding, showing, and reading every novel ever written about them.
- Carlos wants to know all about his favorite rock star.
- A ninth grader wants a mountain bike. What's the best? Who says so?
- Several high school students are planning a cross country skiing trip. They need to know about equipment, places to go, what to take, etc.
- Cloe and her family are moving to France for three years. What will it be like? Schools? Kids? Clothes? Amusements?
- Robert is interested in film animation as a career.
- The Girl Scout group wants to learn storytelling for Christmas and Hanukkah.
- Jorge wants to find out about raising a seeing eye dog.
- Eleni insists that a bird won't be too much trouble in an apartment; now she has to prove it.
- A group of friends wants to make costumes for the Renaissance Fair.
- Marjan wants to enter the local newspaper's contest on identifying city landmarks.
- Tenth grade student Jill needs to find out about teenage parents now.

Checking Plans for Instructional Activities

How can we, as teachers and library media specialists, be sure that we are on the right track as we plan instructional activities and projects? It may be helpful to use the following checklist *before* we start teaching.

How will this assignment contribute to the development of information literacy? Is it:

- an outgrowth of curricular goals and objectives or motivated by student need?
- essential and timely to the task at hand?
- designed to create and sustain interest in learning?
- worthy of the time and effort required?
- developmentally appropriate for the class or group?
- tailored to meet adequately the varying capabilities of the class or group—with each student challenged yet capable of completing the requirements?
- relevant to students' cultural, social, economic, and personal circumstances?
- planned to ensure the availability of a sufficient quantity of suitable resources?
- designed so that specific learning skills, reference tools, and/or research techniques are introduced and reinforced by the classroom teacher and the library media specialist?
- clearly and completely communicated so that students know what is expected of them?

You might also wish to consider these important questions:

- Would you (willingly, eagerly, happily) welcome this assignment, or is it humdrum, mechanical, unchallenging work?
- Have you done this assignment yourself? Have you ironed out the pitfalls and problems?
- How will you involve the student in evaluation of the process and the product?

It is essential that students have assignments that are precisely defined, carefully circumscribed, and within the students' competence to perform.

This checklist is adapted with permission from: Ruth Ann Davies, "How Feasible Is Your Assignment?" *Emergency Librarian* XI (September-October 1983): p.13. © 1983 Ken Haycock and Associates Inc.

Performance-Based Assessment

In performance assessment, students are asked to perform specific behaviors that are to be assessed. For example, they may debate an issue as if they were Thomas Jefferson; to prove that they can write, students produce a writing sample; they might also plan and assemble portfolios of their work to demonstrate their competence or progress in a specific area. Consider the following factors as performance-based assessment plans are formulated:

- **The research process is a performance.** It is a series of behaviors a searcher performs in response to a need for information.
- **Both the process and the product of research can be assessed.** To document and analyze the process, searchers use a research process journal as they continually assess how their actions are moving them toward their information objectives. Assessment of the products of research is as varied as the products themselves, e.g., debates, dramatic performances, visual presentations, research papers.
- **The research process is applicable for either portfolio or authentic assessment models.** A portfolio is a sample of representative student work collected over time. Portfolios are as diverse as the teachers and students who collaborate to design what will go into them. An assessment portfolio in any curriculum area might include the student's research process journal as well as the product or other result of research in that subject area.

In authentic assessment, performance is assessed in a context similar to that encountered in real life. Thus, a project in which the student identifies and pursues a personal need for information might provide a unique opportunity to engage student and teacher in authentic assessment.

- **The searcher, the classroom teacher, and the library media specialist should all be involved in the assessment.** Each has a unique perspective and distinct criteria that will govern the assessment. The combination of their individual perspectives will determine the outcome. Through involvement in the assessment process, students are responsible and accountable for their own learning.

Consider the following questions that could be asked of a student project. Which questions are appropriate to a specific project? Who will do the evaluation? The classroom teacher alone? The library media specialist alone? A joint evaluation?

1. How clearly was the problem expressed?
2. Were appropriate key words, concepts, and names identified?
3. What search strategies were used?
4. Were appropriate sources consulted?
5. How was the information evaluated?
6. In the final product, were all sources adequately identified?
7. How much copying was done? Are all sources cited? Is there evidence that the work presented is the work of the student rather than friends or family?
8. What was the quality of the content and presentation of the product? (accuracy of information, sound reasoning, suitable structure, transitions between ideas, grammar, spelling, and usage)
9. How was the material presented? How suitable was the presentation for the intended audience?
10. What evidence was there of creativity in approaching the problem and creating a product?
11. Was technology appropriately used for project research and presentation?

Chapter 4

Instructional Strategies for Developing Information Literacy

Instructional Strategies for Information Literacy

Strategies to facilitate information literacy can be developed by using the best pedagogy from all areas of educational theory and practice. This chapter provides brief descriptions of some of these strategies and suggests how they can be used to achieve the objectives of both the curricular content area and information literacy.

All strategies must be adapted to the appropriate developmental level and sophistication of the students. Each strategy must be evaluated carefully for the effect on student motivation and learning.

The Instructional Strategies component of the information literacy model focuses on activities designed to help the searcher develop critical thinking skills. In a thinking, meaning-centered curriculum, these strategies are embedded in instruction in all curricular areas. The strategies are applicable to many stages of the research process as determined by the individual searcher and the nature of the research project.

The following terms are used in the information literacy model and the stages of the research process. They are expanded here for further clarification.

- **Log/Journal**

A log or journal is the searcher's ongoing written account of the search process. It may include comments about activities, needs, responses, plans, ideas, and questions. The log or journal begins as the need for information is identified and concludes with the self-evaluation of the project. It is useful for teacher and student review, analysis, and assessment of both the research process and the product.

- **Quickwrite/Quicktalk/Quickdraw**

Quickwrite is a special kind of writing that lets students use the act of writing itself to discover what they already know. Students write without stopping for a given amount of time (i.e., two or three minutes). They write anything that they can think of about the topic. If students reach a point where they can't think of anything to write, they repeat the last word until something new comes to mind. They do not worry about punctuation, spelling, or grammar . . . they just write! Using the same procedures, students can quicktalk an idea through a conversation with a partner or quickdraw through a simple sketch or illustration.

- **K-W-L**

These initials refer to metacognitive format that involves a three-part thinking process. Students respond to: 1) what they *know*, 2) what they *want* to know and (3) what they have *learned*. This process activates previous knowledge, provides a purpose for investigation, summarizes what has been learned.

- **Brainstorming/Clustering/Mapping**

A triad of presearch activities can be used to help establish the scope of research and to develop related areas of inquiry. When brainstorming, searchers ask, "What comes to mind when we think about this topic?" All possibilities are recorded as individual words or phrases, and all ideas are accepted; evaluation of the ideas comes at a later stage. The purpose of brainstorming is to generate a wide range of possible approaches.

Clustering is an intermediate step in which the searcher groups ideas from the brainstorming session in logical clusters to provide a focus for research. Clusters become subtopics on the map.

Clusters of ideas developed during brainstorming are organized in a visual format or map to which the student refers during the research process. Mapping is an organized visual representation of ideas that are viewed graphically as a whole. The map becomes the guide to locating significant information and is the basis for the research outline.

The purpose of these strategies is to discover a wide range of ideas. One idea piggybacks on the previous, leading to fresh, new ways of looking at the subject. These strategies help students view ideas as a whole, using both sides of the brain.

- **Key Word Search**

The searcher identifies and defines essential elements of the topic or question and connects these to appropriate terms for searching. (See p. 46-49)

- **Venn Diagram**

The Venn Diagram is an organizational device for charting similarities and differences between elements. It can be used as a preliminary to developing search strategies using Boolean logic. It is frequently used to enable students to organize their thoughts. (See p. 51)

- **Boolean Logic**

The searcher analyzes and establishes the relationships among concepts or key elements in a topic. Used in electronic searches, this strategy limits or expands the number of citations reported by using the Boolean operators AND, OR, NOT (See pp. 51-52)

- **Scanning/Skimming**

Reading or reviewing quickly to get an overview of the content helps the searcher to clarify the topic or question.

- **Notetaking**

The searcher uses pictures, key words, or phrases to record and organize information. Searchers take notes from both print and nonprint sources.

- **Outlining**

The map or a combination of a map and notes provide a guide for drafting, paragraphing, and editing any presentation of information.

- **Metacognition**

A higher level of critical thinking occurs when one is aware of one's thought processes. The learner develops the ability to recognize the steps or stages in her or his thinking process and to internalize them for future application. The classroom teacher and library media specialist aid metacognition by involving the student in a conscious review and analysis of the research process as a part of the ongoing assessment. Some questions the student might respond to are: What enabled you to gain the most from this experience? What would you do differently if you had the time to return to the project?

These and other relevant strategies are further amplified in *Meaning-Making Strategies for a Literature-Based Curriculum* (CSU Dominguez Hills, California Literature Project, 1992).

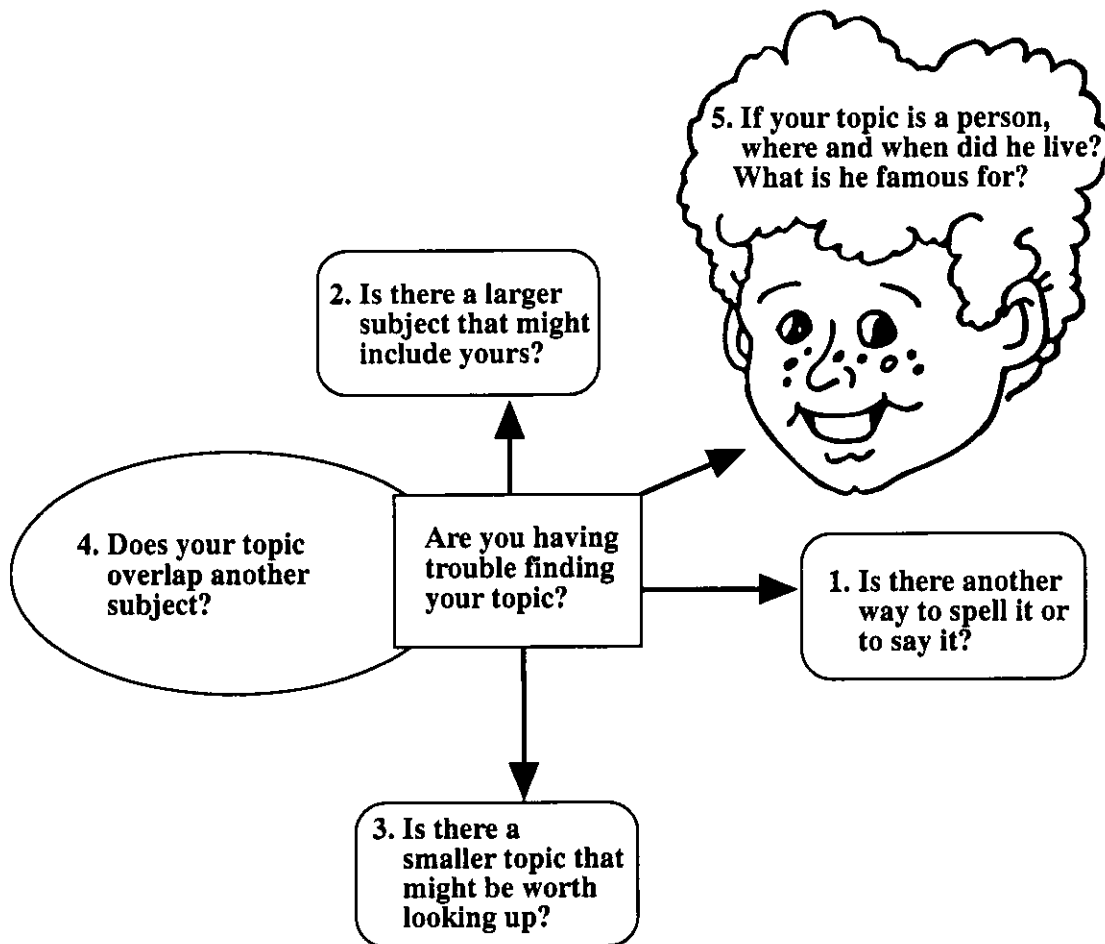
Developing Search Strategies

One of the most challenging aspects of the research process is the analysis of the problem and the related need for information. "What is it I really need to know? How is this kind of information likely to be organized or identified? What headings, key words, descriptions can I use? How are parts of this topic/problem related to each other?" As students work out these problems, they are developing search strategies. As new technology provides access to exponentially increasing amounts and varieties of data, our ability to retrieve the information we need will depend on the extent to which we can analyze and develop effective search strategies.

The following section presents two basic search strategy concepts: 1) key word search, and 2) Boolean logic. While these are sophisticated intellectual concepts, they should be introduced early and developed in depth consistent with students' intellectual development. These strategies can be applied to searching for information in any format, from card catalogs to online databases to CD-ROM.

Key Word Search

Students need to develop skills in analyzing the key concepts and elements in their search questions to develop appropriate search strategies. How is information on their topic likely to be indexed? What key words or phrases will they need to use? The following materials suggest questions that should help students develop patterns for exploring their information needs. While these basic patterns can be applied in most situations, they are only examples of search analysis concepts. You and your students may discover or develop other patterns that you can use in developing search strategies.



The material on key word search strategies is adapted with permission of the author, Lillian Wehmeyer, from *The School Librarian as Educator* (Englewood, CO: Libraries Unlimited, 1986).

MY SEARCH

**RESEARCH
PROBLEM**

KEY WORDS

**DIFFERENT
SPELLINGS**

SYNONYMS

**LARGER
SUBJECTS**

**NARROWER
SUBJECTS**

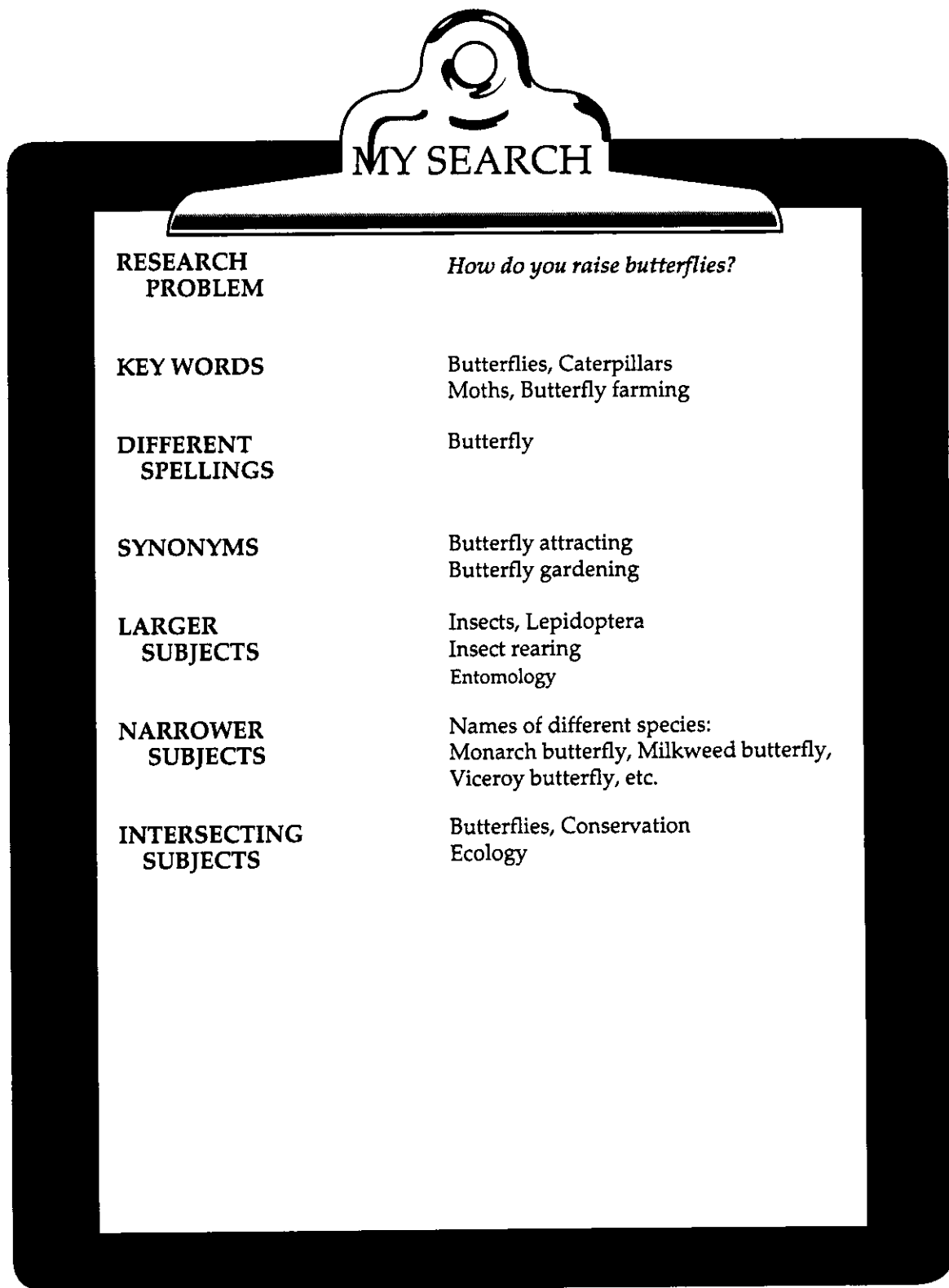
**INTERSECTING
SUBJECTS**

TIMES

PLACES

FIELDS

WORKS





MY SEARCH

**RESEARCH
PROBLEM**

How were the Japanese Americans who were placed in relocation camps in the United States during World War II treated?

KEY WORDS

Japanese Americans, Relocation camps

**DIFFERENT
SPELLINGS**

SYNONYMS

Nisei, Internment camps

**LARGER
SUBJECTS**

World War, 1939-1945
Prisoners of War -- United States
Concentration camps, Refugees
Evacuation of civilians

**NARROWER
SUBJECTS**

Manzanar, Tule Lake Relocation Center
(other individual relocation camps)
Koremaster v. United States

**INTERSECTING
SUBJECTS**

WorldWar, 1939-1945--Japanese Americans
United States, Internment

Boolean Logic

For many kinds of information searches it is important to analyze and develop relationships between the concepts or key ideas that you are using. This is especially important in computer-assisted searching, either "online" or on CD-ROM. Once you have identified concepts and selected suitable key words or phrases, you can establish the relationships that most clearly define or limit your search. For most electronic searching three words — *or*, *and*, *not* — are used as logical operators in a system developed by George Boole, a mathematician. The basic uses of these Boolean operators are defined briefly below. The diagrams used to illustrate these logical operators are called Venn diagrams.

Search question:

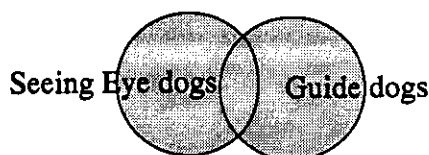
How are German Shepherds trained to be seeing eye dogs?

Or

Used for synonymous terms; indicates that you want information on either topic.

Example:

Seeing Eye dogs
or
Guide dogs

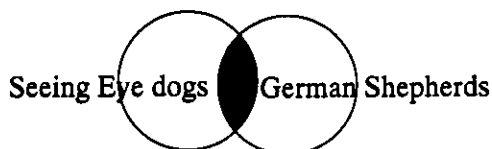


And

Used to connect two terms or ideas; you want only the information that contains both concepts together.

Example:

Seeing Eye dogs
and
German Shepherds

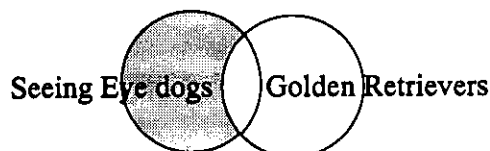


Not

Used to exclude a term or idea; you do not want information on this topic.

Example:

Seeing Eye dogs
not
Golden Retrievers



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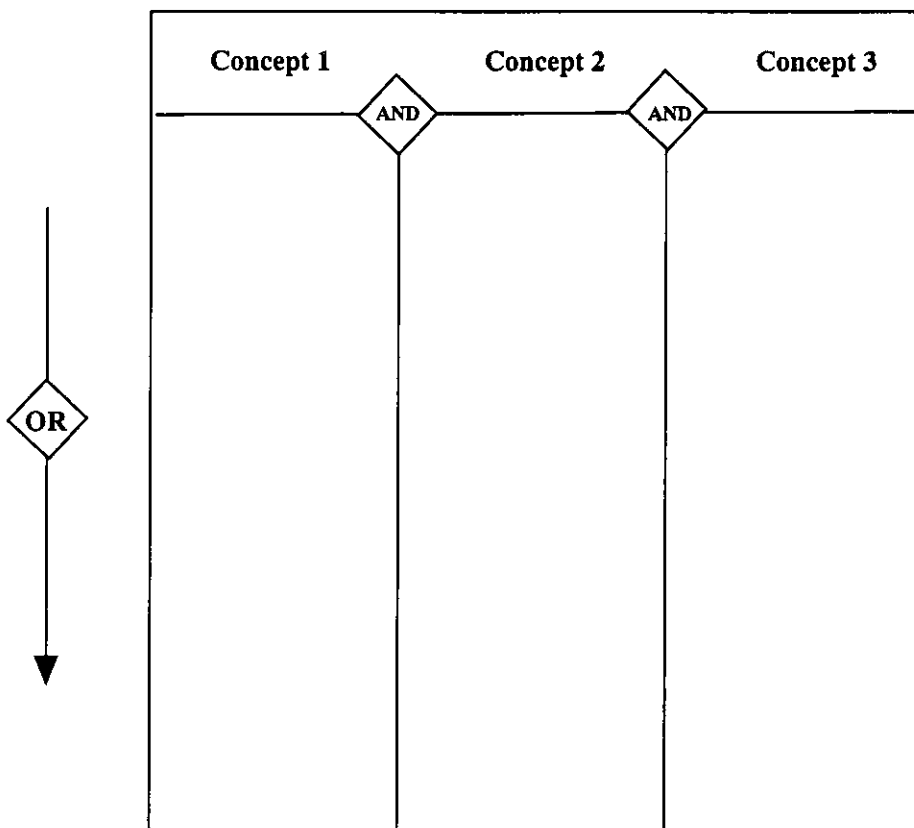


INFORMATION SERVICES, INC.

Search Worksheet

Topic _____ Teacher Approvals _____

Important Ideas:



Databases 1. _____ 2. _____ 3. _____

Author: _____

Magazine/Journal: _____

Command Statements:

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The I-Search Paper: Personalizing a Research Project

Ken Macrorie has coined the term "I-Search" to connote an original search to fulfill the searcher's need for information. Students learn and practice searching skills: gathering information, sifting it, analyzing and synthesizing it, and then reformulating it for an important purpose of their own. In his classes, students compose a paper chronicling their search and what they found.

Any search can become an I-Search if the student takes ownership of the question, problem or topic. The following steps can be applied to the development of any paper or of any other kind of presentation that is a product of research.

Steps in an I-Search Paper

Jenee Gossard, educational consultant, describes a process that she uses with students.

1. **Letting a Topic 'Choose' You:** Macrorie asks students to "Allow something to choose you that you want intensely to know or possess. . . that will fulfill a need in your life rather than a teacher's notion of what would be good for you to pursue." My students cluster, share, and discuss possible topics of personal significance. For one or two of these they write short answers to the following questions:
 - a. Why is this issue important right now in your life?
 - b. What do you already know about it?

After sharing their possible topics in a small group, students focus on the topic that is most meaningful to them personally.

2. **Searching:** Students gather information on their topic in several ways:
 - a. Talking: casual conversations to formal interviews
 - b. Observation: sensory data, information, impressions
 - c. Participation: first-hand experience
 - d. Collecting: brochures, fliers, manuals, ads, objects
 - e. Reading: relevant print sources

3. **Sharing and Reporting:** Students share and report regularly on their search process.
 - a. Initial sharing: students share topics in small groups (5-7), then with the whole class.
 - b. Weekly "updates": a two-page summary detailing the week's progress, shared orally in read-around groups.
 - c. Plenary sessions: (every other week) five-minute written summaries of major progress to date, read aloud to the class.
4. **Practice Assignments:** Students draft, share, and revise two short papers to practice skills needed in the I-Search paper.
 - a. Observation report using all sensory information
 - b. Interview quotes, summaries, connective narration
5. **Readable Rough Draft:** Students synthesize their I-Search material (notes, updates, collected materials, practice assignments) into a coherent record of their search (5-8 pages). Beginning the draft, groups discuss
 - a. Purpose and audience
 - b. Organizational strategies: chronological, impressionistic, flashback, topical
 - c. Development: details, examples, descriptions, anecdotes, summaries, direct quotations, paraphrases.
 - d. Structure: the draft must have at least four "chapters" addressing:
 - What did you search for?
 - Why was it important to you?
 - What did you know about it to begin with?
 - What did you learn (or not learn)?
 - What do you plan to do next, if anything?
6. **Revising:**
 - a. Students exchange rough drafts and read several silently, then share their own orally with their read-around group.
 - b. After reading and hearing a number of drafts, partners exchange papers, and make written comments on various aspects of organization and development.
 - c. Students revise rough drafts based on their partners' comments and other drafts they've seen.

- d. Students attach cover sheet to all revised drafts:
 - What specific changes did you make in this draft?
 - What effects do these changes create?
 - How do you feel about your paper now?
7. **Editing:** In small groups or pairs, students exchange and revise drafts pointing out effective/weak language: precise diction, fresh expressions, clichés, repetition, “English,” dead words, passive voice, etc. As a final step, pairs or groups proofread each other's papers for surface errors in conventions.
8. **Preparing for Presentation of I-Search Papers:** Students present their papers to the class orally, three papers per class over a period of ten days. The room is arranged theater-style and guests are invited to each day's presentation.
 - a. Titles: to help students with effective titles for their I-Search projects, I use the following written exercise in class:
 - Write a question as a working title: "Should I become a physical therapist?"
 - Write three more titles: another question, one using alliteration, one completely ridiculous
 - Cluster significant words/ideas from your topic
 - Write three more titles using ideas from the cluster
 - Write a title reflecting the most important idea/insight from your search
 - A decision prompted by your search
 - A bumper sticker advertising your search (6 words or less)
 - b. Invitation and program sent to invited guests (other teachers, administrators, classified staff, parents, local newspapers, etc.)
 - c. Oral skills practice session
9. **Presenting the Final Draft:** Students read their I-Search papers orally, and then hand in their completed papers.
 - a. Oral presentation response sheet: each class member completes one evaluation sheet for one speaker each day.
 - b. Self-evaluation, readers' affidavits: completed and signed forms must accompany the final draft.
 - c. Written final drafts are due the day following the oral presentations.
 - d. Students receive grades on the oral and the written versions of their I-Search.

For full development of I-Search concepts and strategies see Ken Macrorie, *The I-Search Paper*, revised edition of *Searching Writing* (Boynton/Cook, 1988).

Chapter 5

Sample Scenarios of Integrated Topical Units

Research Scenarios

The essence of the research process is the ability to recognize a problem, analyze it, and then act to resolve it. The research scenarios that follow describe situations, both curricular and personal, in which students are involved in a research process. They are intended to illustrate a sampling of the infinite variety of ways in which groups and individuals might think and respond in problem-solving situations. Although they follow the research process stages they are *not* intended as lesson plans. Actual lesson plans must be developed with a local curriculum, actual students, and the resources of an actual library media center in mind.

Each of the ten scenarios on the following pages illustrate the following:

- Students use and apply the research process model to identify stages in their own thinking about a problem.
- Students use mapping or brainstorming as they consider the aspects of the problem, possible resources, and key words.
- Students keep journals in which they use a two column format to record both information and personal responses.
- Students convey information by creating time lines, graphs, flow charts, Venn diagrams, or other graphic organizers.
- Students work cooperatively to make and carry out decisions about who looks for what and why.
- Students interview people and explore other resources beyond the school walls.

The scenarios on pp. 58-82 first appeared in *Research as a Process*.

1. Owl in Distress

Scenario

The tank trucks leave a thick layer of black tarry road oil on the dirt road. The two families in the cabins on either side of the road have been warned to leave their cars beyond where the oiling would take place and not to walk on it for 24 hours. The next morning Allie and Robert, 9 and 7 year-old weekend visitors, go out to look at the road and find a bird mired, covered with tar, and exhausted.

Explore/identify the need for information

This bird looks half dead; can we save it? Who/what can tell us what we need to do? What kind of bird is it?

Identify potential resources

Their father, an avid city dweller, has no idea of what to do, but recognizes the need to do something quickly. Don, the man across the street, lives here all the time and might have some better idea of how to care for ailing wildlife. They could also look in the phone book for the number of a veterinarian, or some public service agency for animals.

Develop general search strategies to refine the question

Going back to the cabin and looking in the phone book would take time. They decide to go and get Don and take him to the bird while Allie runs to get some newspaper to wrap the bird in.

Locate and explore resources; select specific resources and formulate search strategies for using them.

Bob, Robert and Allie's father, has an idea that they might use paint thinner; but before they try it, Don suggests they'd better call a veterinarian and see what he says. Better to take the time than make a fatal mistake.

Locate, analyze, and select information needed

They look in the phone book for some government agency that might help, like a department of animal control, but find nothing under state or county. They try the

Humane Society, but there's no answer because it's a weekend. Finally, they try one of the veterinarians listed.

Evaluate information retrieved; determine relevance

Don thinks that since it's petroleum they ought to try detergent, and the vet agrees. Paint thinner would be toxic and damage the bird's skin. He tells them the bird will be very dehydrated and to try to give it water with an eyedropper, also to keep it warm.

Determine how to use information

They put some warm water in a tub with detergent and begin sponging the bird repeatedly. Its big yellow eyes are all that they have been able to see as proof of life, as they open and close. They can feel its heart beat. After uncounted washings, most of the oil is gone, but the bird is very weak and just lies in the box they've prepared. They begin to give it water with the eye dropper and it tries to drink.

Evaluate results; evaluate process

The bird survives and after a while stands on Don's gloved hand. It has talons, beak, and big round eyes. It makes a clicking noise with its beak and moves its head from side to side as it looks at its benefactors. It must be an owl. What kind is it?

Identify potential resources

They look in the indexes of the bird books under owls. There are many different kinds, but only one seems to match theirs in size—the pygmy owl. Later that day, when they go into town for groceries, they find a book in the library about a pygmy owl, called *Owl* by William Service (Knopf, 1969).

Locate, analyze, select information, evaluate information retrieved, determine relevance, determine how to use

Don checks it out on his card; the book is not only interesting and funny, but also contains a great deal of information about how to care for and feed the feisty, determined bird they have found and befriended.

2. We Care

Scenario

After hearing Maurice Sendak's *Pierre*, where the moral is to 'care,' and after reading biographies of other caring individuals such as Johnny Appleseed and Martin Luther King Jr., elementary school students decide to spearhead a "We Care" campaign.

Explore/identify the need for information

Students list global to community concerns that "We Care" about: endangered animals, care of the aged, pollution, hunger, crime, litter, graffiti, gangs, the homeless, cafeteria noise, etc.

Formulate questions

They select the problems on which they might be able to have some effect and team up for discussion.

Identify potential resources

Brainstorming generates ideas about where to find information and assistance. Besides library resources that will yield printed and visual information, they decide to contact people such as teachers, parents, neighbors, legislators, park rangers, and zoo docents. Organizations such as the Sierra Club, MADD, and UNICEF should prove to be useful too.

Develop general search strategies to refine the questions

Through group discussion, one team develops questions about the care of the aged: Who are the aged? What are some good things about being old? What are the special needs/problems of older Americans? Why should we care? What is being done now? How can we help?

Locate and explore resources; select specific resources and formulate search strategies for using them

Developing search strategies such as determining synonyms and related subjects, takes the students to the library media center to explore print and visual resources.

They locate agencies and organizations. They then telephone, write letters of inquiry, invite speakers to the classroom, talk to neighbors and relatives, and contact nursing homes, hospitals, senior citizen centers, and local governmental agencies.

Determine how to use/present/communicate information

When the students have finished gathering background information and answering their questions, they share what they have found with the rest of the class. Using multiple visuals from video tapes to posters they help the class determine what they can do to alleviate the problems they have investigated. They begin to raise school consciousness about the campaign through sharing their knowledge and concerns and with their positive efforts to make the world a better place.

3. Science Fair

Scenario

Each year all 4th, 5th, and 6th grade students participate in a school-wide Science Fair. When the dates are announced along with categories, criteria for judging, and the viewing of a video tape of last year's winners, the excitement grows.

Explore/identify the need for information

Karen's class brainstorms ideas after seeing a series of filmstrips on preparing science projects and browsing through the library media center's collection of books and materials in the science and technology sections. Some are interested in making working models involving batteries, mechanics, live animals, or chemistry. Many want to choose projects about which they already know something or for which they have materials at home. All begin to keep journals about what happens as they develop their projects.

Formulate questions

Karen, whose grandfather has a garden, has always been interested in plants. She remembers her kindergarten class when all the students planted beans in paper cups and watched them grow; that was fun. She has also enjoyed helping her grandfather. What could she do with plants that would be scientific?

Identify potential resources

In kindergarten, she and the others kept scooping out the beans to see what was happening. Maybe there was a way she could show the beans growing without digging them up. Through glass? Like an ant farm? Where could she find out? In the library media center? From her grandfather? A nursery?

Develop general search strategies to refine the questions

How could she find out? What should she look under in the catalog? She used the techniques the library media specialist had shown them by making a list of categories to identify. She would fill in key words, synonyms, larger and smaller topics, and intersecting subjects. She had little trouble because she looked in the dictionary and in the index of an encyclopedia for help.

Karen's Search Strategy

| | |
|------------------------------|--|
| <i>Keyword</i> | <i>plant</i> |
| <i>Different Spelling</i> | <i>plants</i> |
| <i>Synonym</i> | <i>seedling</i> |
| <i>Larger Subjects</i> | <i>botany, gardening, vegetables, fruits</i> |
| <i>Smaller Subjects</i> | <i>beans, tomatoes, peas, ...</i> |
| <i>Intersecting Subjects</i> | <i>plant experiments, plant projects, plant growth</i> |

Locate and explore resources; select specific resources and formulate search strategies for using them

Some topics covered more than she needed or were too complicated. Botany was just too big a subject and she couldn't find much about the smaller subjects except for what was in the books she did choose. It made sense to learn about them, but she really didn't need to know much about them for her project. Investigating general encyclopedias and books about seeds, gardening, and science projects in the library media center gave her plenty of information and ideas.

Locate, analyze, and select information needed

In one encyclopedia she saw a picture of seeds during each day of growth. This helped her decide to plant seeds in glass baby food jars at one-day intervals. She used her log to record what happened each day. She wrote down the books she used, when and how she planted the seeds, her progress, and her setbacks.

Evaluate information retrieved; determine relevance

When her family went away for the weekend, she not only forgot to germinate new seeds, but also to keep the others watered. She recorded their demise in her journal and decided to keep the plants to show what happened to seeds that weren't nourished. She placed a reminder on the refrigerator door that plants must be tended, watered, and given enough light for growth, and she started the project again.

Determine how to present information

In one book she found a diagram showing the parts of a seed. She went home and cut open a bean seed; it was just like the picture. She decided that a poster would be a good addition to her display at the science fair.

To display the project, Karen decided to mount the baby food jars on a peg board that her father helped her cut out. She used colored paper labels to identify the dates of her plantings. A large poster would show the parts of a seed and parts of a growing plant.

Evaluate results; evaluate process

Karen was mostly satisfied with the results although she had learned so many interesting things along the way that she couldn't use; she wished she could do more than one project. However there was always next year!

4. How Much Should We Charge?

Scenario

As a fund raising project to provide the class with additional computer software, the class decided to sell cans of nuts that a parent offered to provide at a discount.

Explore/identify the need for information

To give the students background in fund-raising, the teacher showed "To Buy or Not to Buy," from the ITV series *Trade Offs*. This program presented students with such concepts as what happens when your price is too high for the market and how competition can limit your sales.

Formulate the questions

As a follow-up to the film, students were organized into teams to determine what price would sell the most cans and give the greatest profit.

Identify potential resources

Students identified tasks to provide them with information. These were: (1) contacting another class with experience in fund-raising, (2) surveying newspaper ads and store price surveys, (3) checking the library for books and magazines that might have techniques for organization and selling, and developing a market survey (as suggested on the videotape).

Locate and explore resources, develop general search strategies to refine the questions

Teams developed strategies for each task group. They identified key words to expedite their library search of books and periodicals, e.g., sales, marketing, competition, pricing, fund raising, marketing surveys. They developed a list of questions to use in contacting other fund-raising groups, designed a check sheet to compare current prices, and designed a survey sheet to determine the market for their product. They used the computer software program called "Hot Dog Stand" (in *Survival Math* by Sunburst) which introduced additional variables to consider when setting a price.

Evaluate information retrieved, determine relevance

After using these instruments to obtain the necessary information, a decision was made on the price that would give them the highest profit per can. Students test marketed for one week and discovered sales were slower than they anticipated. After reviewing the situation, they lowered the price per can and sales increased.

5. Relating Literature to Life

Scenario

After reading *So Far From the Bamboo Grove* by Kawashima Watkins (Lothrop), an autobiographical novel about the flight of two Japanese daughters and their mother from Korea to Kyoto, Japan at the end of World War II, Nora decided that reading books like this would be one way to make World War II come alive for the students in her 9th grade World History class.

Explore/identify the need for information

Nora planned to make the books come alive for students by using the “into, through, beyond” approach to the teaching of literature. With the help of other teachers and the librarians in the school and public libraries, a good sized list of books having to do with ordinary, nonmilitary people during World War II was made.

Identify potential resources

To set the tone, she would read aloud two serious and moving picture books about children in Japan and Europe during the war. *Hiroshima No Pika* by Toshi Maruke (Lothrop) and *Rose Blanche* by Innocenti (Stewart Tabori & Chang). After a general class discussion about war and its consequences for ordinary people and innocent bystanders. She would distribute a list of related books and comment on each of them. Each student would choose a book to read.

Locate, analyze and select information needed

She would ask them to keep dialectical journals (comments on specific, self-chosen, portions of the text) while reading their books, keeping in mind the written and oral project they would do when finished.

Evaluate information retrieved; determine relevance

Hoping for questions and ideas provoked by their reading and dialectical journals, she would ask for a short research report that would attempt to answer their most pressing questions. She knew that for many of them that would be difficult, but with the help of the school and public librarians who had also read many of the books, she hoped to be able to help them focus on important ideas. Interviews with people who lived during the time of the story, who served in the armed forces in World War II, or those in the community familiar with the customs and philosophy of the people and country involved would be valuable.

Identify valuable resources

To obtain information on their selected topic, students brainstormed lists of potential resources similar to the following:

- People who lived in Japan/Germany, etc. during the time of the story
- People who served in the armed forces during World War II
- People in the community familiar with the customs and philosophy of various ethnic groups
- School and public libraries and museums
- Embassies

Develop general search strategies to refine questions

Three forms of exploration were chosen:

- Students prepared questions for interviews of selected community members and learned interview techniques.
- Students wrote letters of inquiry to embassies.
- Teacher and students met with the librarian to plan further research.

Select specific resources and formulate search strategies for using them; locate, analyze, and select information needed; evaluate information retrieved; determine relevance.

Working in pairs, students selected appropriate materials from library resources and recorded pertinent information. Those students on interview teams arranged and recorded information from interviews. Useful responses from embassies were selected.

Determine how to use/present/communicate information

The drama of what they read combined with the interviews they held with community members inspired many with the desire to simulate oral interviews with the characters in their novels and biographies. They felt this would be an effective way of sharing with other students their own intense experiences.

Evaluate results; evaluate process

So, what is worthwhile about reading books like *So Far From the Bamboo Grove*? The vividness of the experiences, the reality of the characters, the recreation of a period

of history in a vital personal way. The project seemed to be a general success. The difficult part was the one she anticipated, getting at the ideas, themes, and questions of each novel. Some succeeded better than others, of course, but all who participated came away with a more intense awareness of the lives of people during World War II, and that, was the purpose of the project.

6. Historical Role Playing: Research and Writing Process

The writing process and the research process are well matched. The activities of prewriting, rough drafts, revision, editing, and producing a final draft (rather than a finished product) work well with a process that focuses on *how* and *why* rather than on the final *what*.

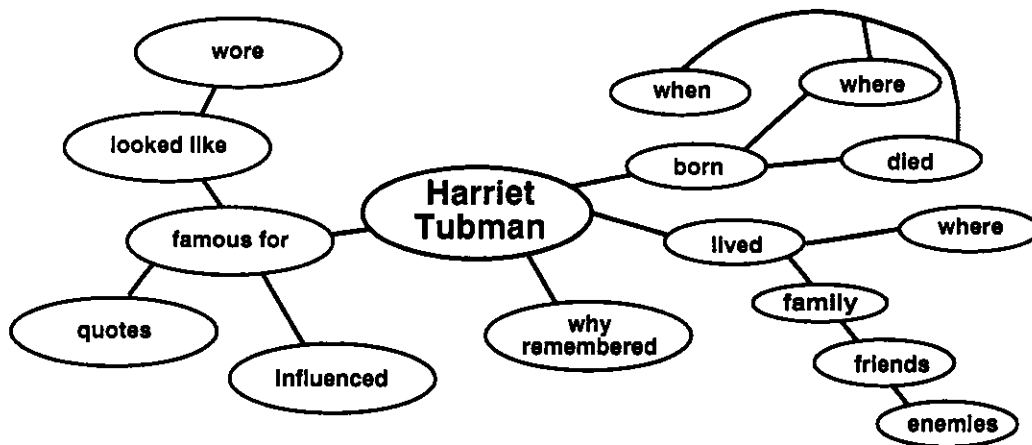
Scenario

The assignment: role play an assigned key figure in history, e.g., Susan B. Anthony, Adolf Hitler, Harry S. Truman, Harriet Tubman. You will need enough information to convey a sense of the personality and historical importance of your character to your classmates: say what he or she might have said, dress as he or she did. You will have five minutes to present your character. Members of the class, including the teacher, will ask you questions.

Explore/identify the need for information

Alex starts by asking the people in his group who the heck is Harriet Tubman? Or is it Harry Truman? That must be it. Surely Mrs. Bone does not expect him to play the part of a woman? But she does, and it is Harriet Tubman. Susan remembers that she was an African-American woman who lived around the time of the Civil War. Joe thinks Alex is lucky, because he has to be Adolf Hitler.

What are they going to need to know, they ask each other. They decide they will all need to know the same kinds of things and begin to brainstorm and cluster as they have for other research problems.



Identify potential resources

Alex and the others grouped their ideas and talked about where they could find this information. They could ask parents, other teachers, relatives, older siblings. Of course they could use the print or electronic encyclopedias, biographies, almanacs, social studies text book, biographical dictionaries, books on costume, *Album of American History*, the catalog. In the logs or journals they had to keep as part of the assignment, they wrote down what they had all discussed and made lists and plans of attack. Susan reminded them to use the public library too and Joe remembered that there was a museum about Holocaust victims he could use. Alex wondered if there was a museum about African Americans anywhere around.

Develop general search strategies to refine the questions

After checking the encyclopedia in the classroom, Alex and the others did quick-writes on their people—five minutes of writing without stopping about what they knew or what ideas they had or what plans they'd started to come up with. They put their clusters and brainstorming activities to good use by turning them into questions to be answered. In addition, they ask, what are they going to do with the information? How much do they really need for five minutes?

Locate and explore resources

Alex checks out some of the books they talked about. He discovers the vertical file, dips into a periodical index, browses through the *Dictionary of American Biography*. All the while, he writes down what he's looking at and jots down a quick impression of whether the material will be useful to him or not. He borrows a couple of the biographies and finds a picture book with amazing illustrations of Harriet. He talks to the librarians at the school and public library and asks his parents what they know. He skims through the biographies, checking for pictures, looking through the table of contents and the index.

He zeroes in on some interesting facts. Her nickname was Moses. Why? He begins to get an idea of how he will portray HT. The Civil War and slavery are just about too big to tackle for a five minute presentation, but if he can take one event from her life and dramatize that, and dress the right way, it should be pretty good. He writes his ideas in his journal and makes some sketches of his costume.

Alex sticks to his biographies, the picture book, a costume book, and also decides to look for some quotations he could use—hers, maybe Moses?

Select specific resources and formulate search strategies

He wastes no more time, beginning to realize exactly what he's looking for, a dramatic retelling of one of Harriet's daring escapes. The key words are Moses, Tubman, underground railway, etc.

Locate, analyze, and select information needed

All the while, he keeps careful track of the sources he uses, makes notes, copies quotes from important passages and comments on them in dialectical journal fashion. His focus and ideas for presentation begin to jell.

Evaluate information retrieved; determine relevance

He compares what he found out with what he thought at first; he discards irrelevant information (but doesn't throw it away, just in case!). He organizes the information and begins to write his draft.

Determine how to use/present/communicate information by writing a script, making a costume, making a poster, getting some props, and lining up some of the other kids in class to be slaves, keepers of the railroad, etc. Suddenly he remembers *The House Of Dies Drear* and wonders if he could use that somehow too? Maybe he could have the kid in that book interview him (her)? He decides to stick to his original plan, but simplify it by not having too many characters.

Drafting, revising, editing, proofreading now take place as the script is refined. As he shares it with his group and they make suggestions, he makes some revisions. Together they edit and proofread each other's written final drafts that will be given to the teacher along with their bibliographies.

Alex, dressed like Moses to begin with and then revealed as Harriet is a great hit with his wanted poster, props and interaction with other students as slaves she sets free.

Evaluate results; evaluate process

Alex writes: I think it turned out good. It was fun fooling the kids with the Moses costume and being brave and daring like Harriet. The encyclopedia was a good place to start to find out who HT was. Every book I looked at seemed to add some little bit more that made her seem real to me. One of the best things was the Bartlett's quotations book; I like how she said, "I started with this idea in my head, 'There's two things I've got a right to. . . death or liberty'." It might have been interesting to have Harriet interviewed by the kid in the *Dies Drear* book too. But actually this was more fun, and I learned a lot too. I think everyone knows who Harriet Tubman is now.

7. Their Places in Time

Scenario

Seventh grade history students needed to have a more polycentric view of historical figures and their places in history. Rather than seeing someone like George Washington, for example, as first president, a general at Valley Forge, and the man who stood up in a boat, their teacher, Stella, hoped they would discover other people who lived and other events that occurred throughout the world in Washington's time. Several processes involving research were negotiated.

Part I - Personal Timeline

Believing that students could learn best by dealing first with the familiar, each student would be required to develop three timelines related to his or her own life. The three timelines were: 1) a personal timeline from memory, 2) an extended personal timeline that involved informal (primary source) research, and 3) an extended timeline relating their personal life to world events.

Explore/identify the need for information; locate, analyze and select information needed

For Timeline #1, the library media specialist and the classroom teacher initiated a class discussion about important events in an individual's life, about how people share similar memories, and about how early events shape our future lives. The class brainstormed types of events to include on a personal timeline such as family members, school events, trips, sports, and friendships. Students then created a personal timeline from memory using a 12-inch piece of adding machine tape divided into 12 equal sections (1 section per year of their lives.)

Evaluate information retrieved; determine relevance

Students discussed the categories of events they had included and noted similarities and differences. In addition, they discussed the problems they had in recalling events.

Explore/identify the need for further information

The library media specialist and the classroom teacher guided the students in a discussion of the limits of their memories as they developed their first timelines. Students suggested possible sources for further information such as relatives, photo albums, baby books, diaries, school yearbooks, etc.

Formulate questions

Students determined which part of their timeline needed further information and selected a source to research.

Locate and explore resources; locate, analyze and select information needed

Students gathered additional information for their extended personal timelines.

Evaluate information retrieved; determine relevance

Students presented their new timelines and discussed how they had gathered information and how their two timelines differed. New categories of information were noticed such as historical events, sports, disasters, and other events that had influenced their families' lives.

Part II - Extended Library Research

Explore/identify the need for information

Since many students had included historical events on their extended timelines such as the 1984 Olympics and the Space Shuttle Challenger disaster, the teacher initiated a discussion of how events outside our immediate lives affect us.

Formulate questions

To explore these potential connections, students were assigned to work on a third timeline, researching events to be included.

Identify potential resources

Students, with the assistance of the library media specialist, identified the following resources; *The World Almanac*, *Information Please Almanac*, *World Book Encyclopedia*, newspapers, periodicals, textbooks, trade books.

Locate and explore resources

Students used the selected resources to research events for their extended timelines. They labeled events according to the categories of information.

Evaluate information retrieved; determine relevance; evaluate results; evaluate process

Students presented their three timelines and compared them. At the end of the unit, they had gained experience in using various reference sources and developed an understanding of how an individual's life is related to world events. Their knowledge was transferred to future projects involving world history.

Part III - Studying the Sources

After completion of the personal timeline research, each 7th grader selected an individual from the World History curriculum to research. A major objective of the project was to assist students in connecting the lives of these individuals to the time in which they lived. The project was to take the form of a visual/written/oral presentation (poster report) including information on the individual's life and achievements, a timeline illustrating the historical period, a map, and a statement of why that individual is studied today.

Explore/identify need for information

Students developed a list of basic information to be used as a guide in preparing their reports such as important dates, geographical information, career information, and world events.

Identify potential resources

Each student took a short research pretest to evaluate their familiarity with the reference sources in the school. The results of this pretest were discussed and students were divided into cooperative learning groups for sessions on their familiarity with available resources.

Locate and explore resources

As a skill building activity, each group developed and delivered an oral report on a specific resource. Students generated a list of questions to cover each resource:

- What kind of information does the resource contain?
- Where is it located?
- How do you use it?

After these presentations, students selected resources to support research on their historical subject, did the research, and prepared the poster reports.

8. Where Do I Begin?

Scenario

Mr. Marker is a creative social studies teacher who gives students choices about assignments. He alerted me that he was sending Robbie, an eighth grader, for help with a pending oral exam on the Vietnam War, a topic that seemed to be swallowing him with its complexities.

Explore/identify the need for information

"Mr. Marker sent me up here to get a book about the Vietnam War," Robbie said. "Do you just need a little information, or are you going to write a report, or what?" I asked.

"Well, it's 10% of my grade and I have to know everything...how we got in, how we got out, and what happened after. . ."

"Are you going to write something?"

"No, he's going to ask me a bunch of questions. When he asked this other guy questions and he answered right, Mr. Marker said he'd showed he'd read a book. So I need a book."

"What do you know about it already? Do you know when it began or ended?"

"I know when it ended. . .1973. . .I think. I figure if I read a book about it, I'll find out everything."

"Do you have time to talk about it? Maybe I could help you get started. "Okay, let's sit down and see if we can make a plan, figure out a strategy so you can do a really good job and get your 10%. Where do you think a good place to begin would be?"

"The card catalog? To find a book about it? I think a book would be proof that I'd done some work on it. . .to back up my answers."

"How about getting some basic information about the whole war. Do you think that's a good idea?"

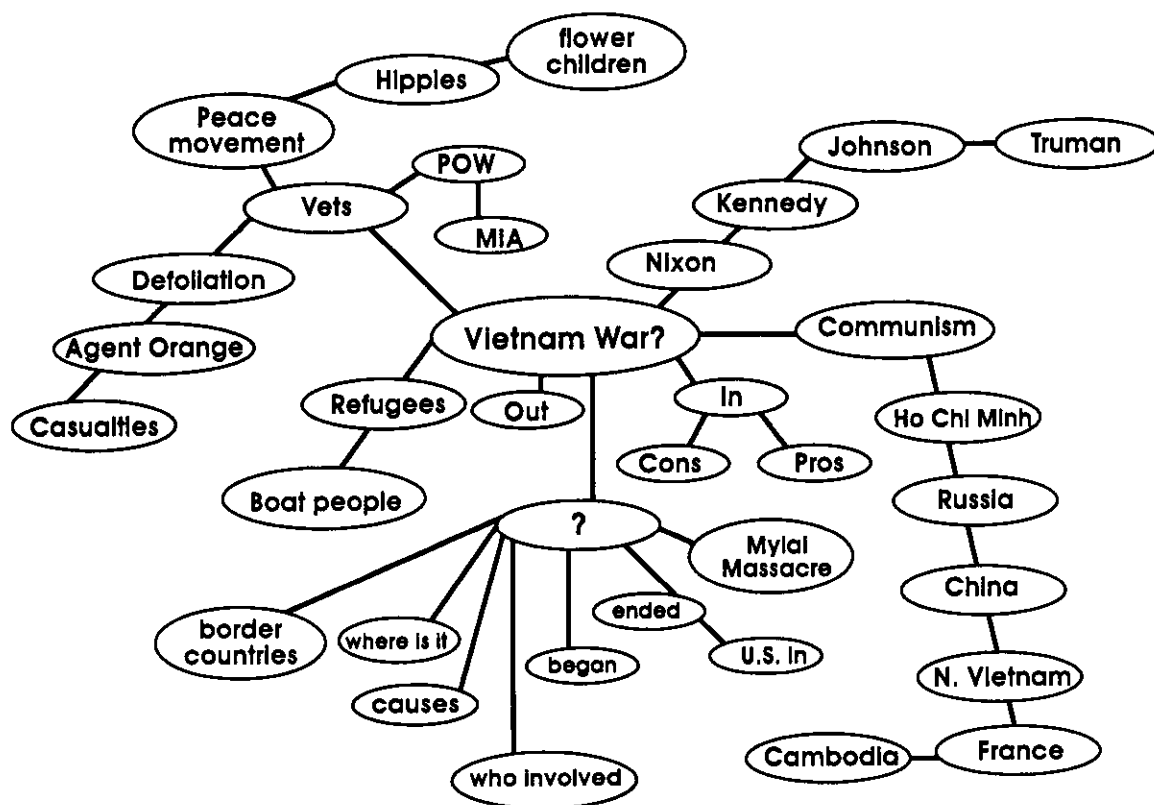
"No, I think I just need a book."

"Well the bad news is that the ninth graders have been here ahead of you and I don't think there's one book left here or at the public library. Do you have a lot of time before you have your oral exam?"

He did have plenty of time so I set out to convince him that he needed a plan of action, that possibly reading a book wouldn't be enough. If the book were too old, it wouldn't tell him as much as he needed to know. It might be one sided. He might need to read more books than he had time for.

Formulate questions

Between us, we brainstormed what he knew and I added a few ideas. I showed him how to cluster while we talked. As we did it, he began to indicate that there was a lot he would need to know, more than he thought.



Identify potential resources

We talked about some resources he might use to "find out something" such as a print or electronic encyclopedia, an atlas, maybe some biographical dictionaries later, books, periodicals. He thought he might be able to talk to some people who might

have information. Maybe he would see some movies, like *Platoon* and *Hanoi Hilton* too.

Develop general search strategies to refine the questions

“And what will you look under in the reference books?”

“Vietnam War.” He looked at me as if to say, what else?

“Let’s look and see.”

When we did, we came up with some synonyms and allied subjects, e.g., Vietnam, Vietnamese Conflict. In *World Almanac* alone, we found 26 possible topics to research. *World Book Encyclopedia* with back-to-back articles on the country and the war, provided dozens more.

While he could see that *World Book* told more than he needed, it provided a good background. He felt he would need to memorize a good bit of material to answer Mr. Marker’s questions.

“What kind of questions will he ask you?” I asked. Robbie really didn’t know if he had to have names, dates, statistics, battles, places memorized. He realized it would be important to know that before he went too far.

Locate and explore resources

Looking at it laid out in the almanac and encyclopedia made it seem less formidable. Now when he did read his books (when the ninth graders finally returned them) he would have a better idea of what was important to know. Finding out Mr. Marker’s expectations would help too.

Robbie learned about a variety of resources including *Newsbank*, *Facts on File*, and some biographical dictionaries he hadn’t used before. He was really pleased to learn that when he searched some sources on CD-ROM, he was able to print out the full text of articles or other material he was looking for. He also became reacquainted with some old standbys he knew at least by sight... almanacs, encyclopedias, atlases, the vertical file, and the dictionary. He listed the other places and people who could help him: the public library, relatives, maybe the Veteran organizations.

Select specific resources and formulate search strategies for using them.

After he talked to Mr. Marker, he found out that there were some facts he would have to memorize, but not as many as he thought. He now knew what to concentrate on, what questions were important, and how to go about finding the answers.

- How and when did the U.S. get involved in the Vietnam War?
- When did they get out? When did the war end?
- What was the outcome? the aftermath?
 - for South Vietnam; North Vietnam
 - for the refugees
 - for the veterans, prisoners, MIAs,
 - for the United States
 - for China, Thailand, Kampuchea (Cambodia), etc.

The resources he chose to use included:

- *The World Almanac*
- *World Book Encyclopedia*
- Atlas
- *Magazine Article Summaries*
- *Facts on File*
- Various trade books
- Interview with relative who's a veteran

Evaluate results; evaluate process

Robbie discovered that beginning with the *World Almanac*, which became his framework, everything he read filled in and fleshed out what he knew. By the time he finished reading, gathering, and discarding data, he had a good grasp on the background and outcome of the Vietnam War. His oral presentation and exam by Mr. Marker, in front of the rest of his class, were well received by teacher and students. He more than earned the final 10 % of his grade.

9. Fire-Safe Container Systems

Scenario

High school students often complain that they are forced to study and learn about things they will not need to know after they graduate and enter the work force. An industrial technology teacher, Mrs. Green, wanted her students to see how the skills they were learning in all of their classes could be applied to the "real world" they so much wanted to be a part of. She arranged for the principal to talk to her class about the "bad news" he had just received from the fire marshall; the school district was in danger of being fined unless chemicals, which were improperly stored and thus posed a fire hazard, were either removed from the premises or properly stored within two weeks. Mrs. Green thought this was a good problem for her students to solve. She asked the principal to address her class to enlist their support.

Explore/identify the need for information

The principal explained that the fire marshall had found that the way chemicals, cleaning compounds, paint and other janitorial supplies were stored was endangering the students and school employees. In addition, the emergency safety plan was out of date, based on the number of students and employees currently at the school. The fire marshall had given the principal two weeks to correct all potential fire hazards. Knowing it would take some money to make the building safe again, the principal also needed to know where proper storage containers could be purchased and at what cost.

Formulate questions

Where are substances that might require fire-safe storage located? What are the names of all the chemicals and cleaning supplies found on the campus? Which ones require fire-safe containers? What is an appropriate fire-safe container for each item? If an item is found in more than one location, might it need a different type of container depending on the location? Where might the school district purchase appropriate fire-safe containers, and what is the cost of each container needed? When was the last emergency safety plan last revised, and what was different about the school now?

Relate the question to prior knowledge

The students brainstormed what they knew about hazardous substances and where they might be found. They listed the locations as: science classrooms, vocational

educational classrooms, custodial storage areas, boiler room(s), and field and landscaping materials storage areas. They found from teachers and other students that some office and art supplies were also flammable.

Identify potential resources

They decided to ask the science teachers, custodian, gardeners, secretaries, vocational education teachers, and art teachers for lists of all chemical supplies in use. They asked the principal for the last emergency safety plan. They thought there would be books, magazines, and on-line resources in the library media center to help them identify how flammable certain chemicals were, how to store them, and what to do in case of an emergency. They also thought the local or state OSHA and EPA offices might have some advice and could give them or fax them any brochures that would help. They also planned to talk to the fire marshall.

Develop general search strategies to refine the questions

They planned to ask to see the containers in which the substances were delivered to see if there were warnings. They would ask the custodian and gardener if any additional information about special handling had come with the chemicals. They would ask the library media specialist to assist in locating materials in the library; although they knew they would need a telephone book and reference books on hazardous industrial materials, they had heard that there were specialized on-line databases available that would help them locate answers to specific questions. They would get a map of the school to help them plan a new emergency procedure. They would call the local government offices for some help in determining exactly what the safety regulations are for chemical storage in different situations.

Locate and explore resources; select specific resources and formulate search strategies for using them

Using the *Readers' Guide to Periodical Literature*, *Magazine Article Summaries*, *Library of Congress List of Subject Headings*, and a booklet describing the databases available in the Classmate program of Dialog Information Services, the students searched for information.

Determine how to communicate information

The students decided to present a written report to the principal at the end of two weeks. They would design a manual for the school that contained:

- a materials safety data sheet (MSDS) for each flammable substance used on the campus
- a new safety plan for emergencies.
- available sources and current prices for necessary fire safe containers
- safety requirements for each area where flammable materials are used: science, vocational, and art classrooms, offices, etc.

Evaluate results; evaluate process

The students worked in teams of four. When the students saw the relevance of the project, they got right to work dividing the tasks and using all their information skills, their ability to work in groups, their knowledge of safety from their industrial technology courses, their knowledge of chemicals from their science courses, and the communications skills they learned in their English courses. The principal reviewed all the proposals and selected one to be submitted to the superintendent and to the fire marshall.

10. Waste Disposal Plant

Scenario

Students in an industrial technology class at _____ High School in Anytown, U.S.A., were quite concerned about the arguments in the newspaper regarding the waste disposal plant to be located one mile from their community. Arguments in favor of the location of the plant included: 1) the land was already owned by the city; 2) the local dump was near capacity; 3) the closest residential area was at least a mile away; 4) the plant, which would incinerate solid waste, was expected to create 250 much needed jobs in the community. The arguments against the location were: 1) although the plant was a mile from their community, prevailing winds would blow the pollution directly at it; 2) the design for the plant did not include technology for the maximum efficiency, and there would be more air pollution than necessary. A hearing before the city council was scheduled for the next month with several strategy planning meetings in the community before. The students thought if they could submit a design that might improve the efficiency of the plant, maybe everyone would win.

Explore/identify the need for information

The students needed to access the plans for the proposed waste disposal plant. They needed a copy of the environmental impact study. They wanted to review all the public discussion that had occurred to date. They needed to understand how other communities had dealt with the problem of solid waste disposal.

Formulate questions

What have people in our community and other communities said and/or written about solid waste disposal? What are the pros and cons of the type of plant currently under consideration? How have other communities dealt with the air pollution question?

Relate the question to prior knowledge

The teacher encouraged the students to keep logs on their discussions, where they went for information, their thoughts about the project, and any other relevant information while working on the project. The students first brainstormed everything they knew about waste disposal. They listed all the reasons they could think of for and against the incinerator method. They suggested other ways of disposing of the trash from their community and discussed the feasibility of these methods.

Identify potential resources

Potential resources for background on solid waste disposal were reference books, magazines, newspapers, and indexes (hard copy and electronic) for these materials. The city planning office might be able to provide them with copies of the environmental impact study and plans for the waste disposal plant.

Develop general search strategies to refine the questions

The students asked the library media specialist for assistance when they couldn't find everything they needed in the library catalog and *Readers' Guide*. He helped them use *Sears' List of Subject Headings* and the *Library of Congress List of Subject Headings* to isolate appropriate subject headings to search under. He also helped them select a full-text newspaper database and *Pollution Abstracts* from Dialog Information Services for local and general information on waste management. The library media center also had a subscription to *Biology Digest*, an index with abstracts of articles in popular and scientific magazines on all types of scientific subjects. A call to the city planning office helped them find out how to obtain the reports they wanted.

Locate, analyze, and select information needed

Several newspapers across the country had articles on problems that were similar to those of Anytown. The students were able to understand the arguments for and against the type of waste disposal plant suggested for their area. Starting with popular magazines' treatments of the problem and working up to the scientific magazines' discussions helped the students see that there were other alternatives to the type of plant that had been proposed. Information about the wind patterns in their area also enabled them to suggest a different orientation of the exhaust mechanism that would minimize the amount of air pollution coming into the community.

Analyze information retrieved; determine its relevance

The students found information about how communities similar to theirs handled the problem. They found different ways to construct waste disposal plants.

Determine how to communicate information

The students wrote a careful report citing facts and figures describing all the pros and cons they were able to find about solid waste disposal plants, air and other types

of pollution emanating from the operation, and how to minimize the negative effects of such an operation. They presented their figures using slides produced by a computer program. Using their computer aided drafting (CAD) skills, they drew plans for another plant, making changes they thought would help both sides of the conflict come to a resolution. They applied for and were granted time to make their presentation orally at the community hearing before the City Council.

Evaluate results; evaluate process

The students' presentation was well-received. In reviewing their logs, they were surprised how much they had learned.

Chapter 6

Integrating Information Literacy Into Local or State Frameworks

Making a Difference

A role for library medial specialists and information literacy is not only being carved out in a single school but often at the district, state, and national levels. External pressures for change can at various times dictate what can happen in a school. State budget crises, national educational mandates, state legislative reform initiatives, and professional association standards are but a few examples of factors that might affect what program a library media center might offer.

Library medial specialists who are active beyond their school can affect the larger vision of how the library media program fits into education. This chapter documents how a group of library media professionals in California set about to make an impact on the education of students in their state.

Why was it that no one seemed to understand the critical role that library media specialists and library media centers should play in a society so dependent on information? What was it that library media specialists were supposed to know that could help others? What kind of leadership could they provide in a state that was acknowledged for its curriculum and educational leadership? These were the challenges that the Curriculum Committee of the California Media and Library Educators Association (CMLEA) set for itself. Everyone designated "library skills" as the appropriate, hallowed (dull, archaic) but probably necessary province of the library media specialist. Conscientious teachers asked library media specialists to help their classes locate materials on specific topics. But what did library catalogs, Dewey classifications, and periodical indexes have to do with the "thinking, meaning-centered curriculum" that was at the heart of educational reform in California? How could we ensure that classroom teachers and "library media teachers" (our official title) were working toward common goals? If we were going to make an impact, we would have to speak a common language, share common understandings, work toward common goals.

We decided to start with the language of education in California. The California Department of Education (CDE) developed its concepts of education reform through a series of collaborative projects. They brought together groups of experts to review research and trends in the field of their expertise, study societal needs, consider practical applications, and develop visions for education. The resulting documents attempted to translate their visions into statements of philosophy, conceptual frameworks, and specific guidelines.

So we searched the documents. We studied the curriculum frameworks for each of the major subject areas. We found that in a thinking, meaning-centered curriculum,

students were expected to investigate, to solve problems, to analyze information, to form opinions based on the evidence (e.g., information, data) they had gathered. We kept reading that students were to go beyond textbooks, that they were to use real world resources, use technology as tools to enhance learning. Reading these visionary documents, we pictured library media centers that were at the hearts of their schools and of the learning process. Focusing on California's frameworks through the screen of *Information Power* (AASL's Guidelines for School Library Media Programs), we saw classroom teachers and library media specialists as instructional planning partners. We saw that through our collaboration, students and teachers could be more "effective users of ideas and information." Wasn't this what the thinking, meaning-centered curriculum was all about? Further, California documents speak of the commitment to provide access for all students and to address their diverse learning needs . . . Isn't the library media center uniquely designed to address diversity and to provide universal access? How could we make all people see this part of the picture? How could we enhance the mosaic?

We have used and are using several different strategies. We are working with CDE to try to ensure that library media specialists are part of the state level projects for developing new documents. We are participating in field reviews of documents in progress, suggesting additions, changes. Developing the vision. And we are making major efforts in helping to interpret published documents and disseminate our understandings throughout the education community in our state.

Why all this in a book on information literacy? Information literacy—for students, teachers, parents, library media specialists, administrators—is a key to problem solving, analysis, the thinking curriculum. . . . We have looked at California's various documents through the library media specialist lens and have drawn phrases, statements, and case studies that make an unmistakable call for what we have identified as information literacy. Chapter 6 is composed of selected quotations from these documents. Compiled in this way, they make a strong case for developing information literacy as a part of the curriculum for all students, K-12.

How should this material be used? Teachers, administrators, curriculum developers, library media specialists in California can use these excerpts to strengthen curricular planning, to assess instructional programs, to develop and guide library media services and resources that are integral to curriculum. Readers from other states can use the process and content of this example as a motivation and guide to reviewing, influencing, and using their own state documents. Using this model, they can validate and promote existing library media services that implement curriculum. From this base, they can also provide curriculum leadership.

Excerpts from California Task Force Reports

The California Task Force Reports on schooling at all levels focus on common themes. Central to all the reports is the concept of "the thinking curriculum." The following quotations are excerpted from documents that analyze the task force reports and from the reports themselves. They are selected for their application to and reinforcement of the connection between the thinking curriculum and the development of information literacy.



From: "Themes in Four CA Task Force Reports." *Research/Evaluation Perspectives*. San Bernardino County Superintendent of Schools, January 1993:

The thinking curriculum spans the grade levels. This curriculum has a problem-solving orientation not a content-filled one. It is based on providing depth of knowledge to students rather than coverage of material. While this may be time intensive during the school day, it also allows teachers and students to explore topics in depth, stimulating the creative and experiential aspects of education. . . The "thinking curriculum" promotes more involvement with problem solving approaches to learning and less involvement with the content and rote approaches. The curriculum is based on active learning, on the experiential learning of students. The curriculum gets the students involved in their own education. (p. 1)



From: *It's Elementary! Elementary Grades Task Force Report*. California Department of Education, 1992:

Make a rich, meaning-centered, thinking curriculum the centerpiece of instruction for all students, in all subject areas in the elementary grades. (p. 22)

Choose depth over coverage in teaching a subject. (p. 25)

Provide more collaborative learning opportunities. (p. 34)

Invest shrewdly in technology to help promote the thinking curriculum. (p. 46)

Continue building a system of authentic, performance-based assessments that measure the full scope of the thinking curriculum. (p. 71)



From: *Caught in the Middle: Educational Reform for Young Adolescents in California Public Schools*. California Department of Education, 1987:

Thinking and Communication:

Every middle grade student should develop the capacities for critical thought and effective communication. (p. 13)

Students in the middle grades experience a rapid unfolding of their intellectual capacities. There is a dramatic emergence of the ability to think reflectively—to think about thinking. This ability opens the way for more complex and abstract thought processes. These have profound implications for the development of moral reasoning, problem-solving, critical thinking, and the ability to use scientific methods and make aesthetic judgments. These capacities must be matched by curricula and instructional practices that demand thought and thoughtful communication in the classroom. (p.13)

Students are called on to analyze and synthesize data, to pose questions, to explore, to experiment in explaining their reasoning, and to apply different strategies and solutions to problems. (p. 13)

Learning to Learn:

Every middle grade student should develop a repertoire of learning strategies and study skills that emphasize reflective thought and systematic progression toward the goal of independent learning. (p. 24)

A sequence of steps such as the following, is useful in helping students to become increasingly more independent in their learning. Students can be guided to:

- Look for new information in readings, presentations, and discussions.
- Look for clues which help to explain the relevance of what is already understood—to surround the new with the background of that which is already familiar
- Experiment with what is already known, to search for connections, and to relate previously unrelated information.
- Note or create patterns and relationships which identify ways of breaking down complex ideas and concepts into manageable components.
- Develop models and use other strategies to represent patterns and relationships among parts and wholes, which bridge the gap between existing and new information.

- Play with new information, explore new combinations of data, and develop an awareness of the power of concepts and generalizations that unify previously independent facts.
- Reflect on the ways in which new levels of understanding change perceptions, attitudes, and values. (p. 25-26)

Students learn by exploring multiple sources of written information, including library references, collateral texts, original documents, or other similar resources. Their ability to do more abstract thinking gives them the capacity to use research skills to find answers available to them through their own efforts. (p. 36)

Questioning techniques encourage and provoke students to think, to organize their thoughts, and to reach conclusions based on reason and evidence. (p. 36)



From: *Second to None: A Vision of the New California High School*. California Department of Education, 1992:

Schools must prepare students who know how to think and to learn, who know how to gather, organize, and analyze information and then apply it to solving a problem, and who can work collaboratively with others. (p. 5)

Students' work often focuses on projects they "construct" using experiences that relate to the world outside school and primary source materials they select because of the appropriateness and personal connection to their lives. Learning activities include complex concepts that require students to apply skills across subject matter boundaries and to confront personal and group values related to learning. (p. 23-24)

For powerful teaching and learning to occur and for academic work to be real and engage students, they have to go beyond the bounds of textbooks. In a rapidly changing world, teachers model the intellectual curiosity that moves students to seek the most accurate and up-to-date information. Students are challenged to use resources beyond those in the classroom. (p. 31)

Excerpts from California Curriculum Frameworks

California's curriculum frameworks provide the conceptual base for instruction in each of the major subject areas for all students in kindergarten through grade twelve. Curriculum planners in school districts use the frameworks as their guide for developing local programs. Subject matter projects at state universities provide professional development to prepare teachers to implement the frameworks in specified curricular areas. Statements from the frameworks carry great weight. The statements quoted here support and strengthen the need for diverse learning resources used with understanding by all students.



From: *English-Language Arts Framework*. California Department of Education, 1987 (Note: This framework calls for a literature-based curriculum and students who understand how to search for information. The following statements support these ideas):

Classrooms filled with books as well as schedules allowing frequent visits to the school library are essential elements of a teaching plan that produces voracious readers who think, speak, and write about what they have read on a wide range of subjects. (p. 29)

...students learn study skills and research and reference techniques most effectively when those skills are integrated into the meaningful context of a particular class rather than studied in isolation. (p. 31)



From: *History-Social Science Framework*. California Department of Education, 1987 (Note: This framework identifies critical thinking skills and basic study skills as central to its curriculum. The following critical thinking skills are to be developed in the context of the history-social science curriculum):

Define and clarify problems. Included in these skills are the ability to identify central issues or problems, to determine which information is relevant, to make distinctions between verifiable and unverifiable information or between essential and incidental information, and to formulate appropriate questions leading to a deeper and clearer understanding of an issue. (p. 25)

Judge information related to a problem. This skill requires ability to distinguish among fact, opinion, and reasoned judgment; to determine whether statements are consistent with one another and with the context from which they are taken; to identify unstated assumptions; and to recognize stereotypes, clichés, bias, propaganda, and semantic slanting. (p. 25)

Solve problems and draw conclusions. Included in these skills are the ability to decide whether the information provided is sufficient in quality and quantity to justify a conclusion; to identify reasonable alternatives for the solution to a problem; to test conclusions or hypotheses; and to predict probable consequences of an event, a series of events, or a policy proposal. (p. 25)

The basic skills of history-social science include the ability to:

1. Acquire information by listening, observing, using community resources, and reading various forms of literature and primary and secondary source materials.
2. Locate, select, and organize information from written sources, such as books, periodicals, government documents, encyclopedias, and bibliographies.
3. Retrieve and analyze information by using computers, microfilm, and other electronic media.
4. Read and interpret maps, globes, models, diagrams, graphs, charts, tables, pictures, and political cartoons.
5. Understand the specialized language used in historical research and social science disciplines.
6. Organize and express ideas clearly in writing and in speaking. (p. 26)



From: *Mathematics Framework*. California Department of Education, 1992 (Note: The emphasis in the Mathematics Framework is on thinking and problem solving. Many of the skills required for today's mathematics are also embodied in information literacy.):

Thinking refers to intellectual activity and includes analyzing, classifying, planning, comparing, investigating, designing, inferring and deducing, making hypotheses and mathematical models, and testing and verifying them. (p. 3)

Many of the words used to describe mathematical thinking—such as classify, plan, analyze, conjecture, design, evaluate, formulate, investigate, model, and verify—have a natural meaning more general than their mathematical meaning. There are

other activities we label less frequently in everyday life, such as deducing, inferring, hypothesizing, and synthesizing. As a group, these activities are often referred to as higher-order thinking skills and are characterized in three of the first four standards contained in the NCTM standards; that is: reasoning, problem solving, and making connections. (p. 20)

. . . understanding different points of view lets students choose among many strategies. (p. 24)

Students take responsibility for their learning; they question, create, and help decide what to do. (p. 41)

Finally, opportunities for communication need to be varied in audience and purpose. Thus, over the course of a year, each student is expected to present and explain his or her thinking to an expert, a layperson, a parent, a teacher, a peer, and a younger sibling to inform, explain, teach, and persuade. Students should communicate orally and in writing; use pictures, graphs, tables, and symbols; and produce projects, journals, presentations, and performances. (p. 99)



From: *Visual and Performing Arts Framework*. California Department of Education, 1989 (Note: Finally, the Visual and Performing Arts Framework looks broadly at the future.):

Students now in our schools need a curriculum that will prepare them for life in the twenty-first century when computer terminals will make the vast store of human information accessible everywhere. (p. 138)

Excerpts from Program Quality Review: Focus on the Thinking, Meaning-Centered Curriculum

The new Program Quality Review (PQR) process being implemented statewide in California in 1993-94 is designed to help school staffs determine how well they have implemented the thinking, meaning-centered curriculum and how well all students are being prepared for the future and for lifelong learning. During the self-review process, schools focus on what students are doing and producing in one curricular area, and then plan strategies to improve student learning. All the excerpted statements on pages 95-118 are taken from the following publications: *Guide and Criteria for Program Quality Review Elementary*¹ and *Guide and Criteria for Program Quality Review Middle Level*.² Page numbers for citations are preceded by an E for Elementary and M for Middle Level to identify the publications from which the statements are quoted. The statements are selected to focus on information literacy.

¹School Improvement Office, California Department of Education. *Guide and Criteria for Program Quality Review—Elementary* (California Department of Education, 1993).

²School Improvement Office, California Department of Education. *Guide and Criteria for Program Quality Review—Middle Level* (California Department of Education, 1993).

Program Quality Review Process

(Note: Part I of each PQR document is designed to guide staff in the process for conducting reviews. Statements quoted below suggest possible roles for library media personnel, and uses of the library media center, as school staffs observe, gather data, and seek evidence of the thinking, meaning-centered curriculum.)

Gather information and data about the nature and quality of work your students are doing in your area of focus and the features of the program which foster this work. (p. E19, M21)

In focusing on student work, it is important to review both student work (products) and students working (performance). Therefore, in addition to reviewing students' written work, it is just as important to observe students working in the classroom as well as in other school settings, such as in the computer lab or library media center. (p. E19, M21)

Some samples of student work and the form in which it is collected might include:

- essays
- journals
- reports
- portfolios
- written responses
- project products (p. E19-20, M21-22)

Some examples of students working might include:

- Making oral presentations
- Discussing ideas
- Role playing
- Doing individual and group work
- Conducting investigations
- Performing hands-on activities
- Engaging in library and other types of research (p. E20, M22)

You should observe students individually (e.g., writing, making oral presentations) and in groups (e.g., group discussions or projects). The primary focus should be students' performance—what they can do, how they proceed, and how well they do it. During the curriculum self-review process, it is strongly recommended that all classrooms be visited. Students should also be observed in other settings, such as the library media center, auditorium, and computer lab, to see what they are doing and producing. (p. E21, M23)

While observing the students, you need to focus primarily on what the students are doing and learning . . . Additional areas of focus may include availability of materials and use of technology. (p. E21, M23)

In addition to the leadership team's observations, it would be helpful to review observation notes made by teachers (who may not be on the leadership team) as part of the ongoing assessment of students' work and their performance as well as students' research journals. (p. E21, M23)

Students can be interviewed individually or in groups to gather information on how and what students are learning, as well as how well they understand and can use what they are learning. Interviews, both formal and informal, validate and expand information gained through review of student work and classroom observation.

The following are some possible questions to ask students during interviews:

- What kinds of projects do you do? . . .
- What kinds of problems do you solve?
- How often do you solve difficult but interesting problems for which there are often many possible answers?
- How often do you do research in the library and elsewhere with other students?
- Are the resources, such as books and other materials at your school, adequate for your research projects and other activities? . . .
- What kinds of work do you put in your portfolio? Why? (p. E23, M25)

Teachers, administrators, program coordinators, and library and other personnel at your school can be interviewed about how and what students are learning. (p. E23, M26)

Examples of general essential questions that apply to the various curricular areas:

- What evidence do we have that students are adapting their learning to new situations in the real world?
- What evidence do we have that students are making inferences, researching ideas, and experimenting?
- What evidence do we have that, when solving problems, students are considering a variety of approaches and selecting the most efficient?
- What evidence do we have that students are making sense of new information by connecting it to what they know or have experienced? (p. E26, M28)

Your school might look at the effect each key idea in the instructional support criteria has on student work. For example, the leadership team could talk about such issues as grouping practices, high expectations, interdisciplinary teaching, use of technology and the library media center, parent involvement, and services for special needs students as these issues relate to improving the curricular area of focus. (p. E34, M37)

Program Quality Review Criteria

(Note: The 1993-94 PQR documents include curricular criteria for each of five subject areas. These criteria are derived from the frameworks, focused on student work, and consistent with the new statewide performance-based assessment. Statements quoted below and on the following pages provide a picture of student work in a high-quality program. They also reflect the need for information literacy. In 1994-95, curricular criteria will be added for physical education and health.) Each curricular criterion begins with a focus statement. The following are excerpts from these introductory statements):

I. Focus Statements

In a strong program, students think creatively and develop abilities in such a way that they value themselves as more knowledgeable, discerning, critical and participatory citizens. The talent of critical thinking involves the use of such skills as reading, writing, and speaking articulately and logically, and using relevant facts in forming opinions and evaluations. A strong history-social science program develops such skills cumulatively and specifically over the grades. Engaging activities allow students to apply knowledge to new or different situations, to judge how ideas effect human conduct, and to use history as example and analogy for issues in their own lives and in the world today (History-Social Science Criterion, p. E85, M88)

The goal of mathematics education is mathematical power for all students. In empowering mathematics programs, the teacher is a facilitator and catalyst for learning, rather than the "center" of classroom action. The student is primarily responsible for the thinking. Students formulate problems and choose approaches to solutions. Students talk and write frequently, reflecting on what they have done, and clarifying their own thoughts, and communicating their ideas and results to others. Students decide what materials and tools to use from the constantly available calculators, computers, and manipulative materials. Students are asked to organize and record their accomplishments, findings, or conclusions, and to give evidence or arguments supporting their conclusions. Students are consistently expected to use mathematics to make sense of situations and to achieve purposes that have meaning for them. (Mathematics Criterion, p. E114, M117)

The science curriculum is designed with students' interests and experiences in mind. Since science and its technological applications are evident in every aspect of our world, the curriculum is replete with investigations that engage all learners in the classroom. A curriculum that focuses on a few ideas, deeply understood, is composed of many activities that are conducted in a meaningful context and make

students care about the results and the meaning of the concept. As students construct their own meaning, they take greater responsibility for developing their own conceptual models. The student's enthusiasm and natural curiosity act as a springboard for further investigations, allowing for more in-depth study. Students are encouraged to grapple with the ideas, issues, and interests that make up our contemporary understanding of science and technology. Among the most important intents of the science curriculum is the lasting interest in and motivation for future success in the sciences for all students. (Science Criterion, p. E130, M133)

In science, students' work emphasizes deeply understanding a small number of key concepts through a variety of experiences and the use of multimedia resources. Students' work shows many examples of investigations that address fundamental ideas in science. Many samples of work are investigations undertaken by groups of students whose roles are identified and whose membership changes from project to project. (Science Criterion, p. E130, M133)

In a comprehensive school program, the arts are a basic part of the education of each student. The arts are studied in their own right as well as integrated into other subject areas In a well-planned arts program, students gain the skills necessary to express creatively their ideas, feelings, and imagination as they produce works in the arts They study historical and contemporary arts from throughout the world and reflect on the role of the arts in many cultures. (Visual and Performing Arts Criterion, p. E154, M157)

II. Student Work

(Note: Each curricular criterion contains brief scenarios, or vignettes, that describe what students are doing and learning in schools where the frameworks are implemented. Many of these scenarios describe and/or imply student involvement in the research process and other activities that contribute to information literacy. The scenarios are excerpted from each curricular criterion for elementary and middle level schools.)

Language Arts Criterion

- **Students read, publish, and display individual and class projects.** (p. E65, M69)

Using a variety of sources, a fourth grade bilingual class researches the period of California history in which the missions were built. Students then collaborate to produce an *ABC of Missions* book. Each page explaining an article or item used during the time. Some pages are written in the students' primary language. Students use the computer to write their explanations, illustrate their pages, and publish the book as a reference for future fourth graders. (p. E65-66, M69)

Sixth grade students use a computer data base and view films to develop travel brochures for countries they are studying. The format is determined by classroom discussion regarding the information that could be included in such a brochure. Students then research, write, and illustrate their own brochures. Then they develop itineraries for trips through their countries. They keep diaries or travel journals which include preparations for the trips, travel notes, and personal responses to the sights they visit. (p. E66, M69)

A special section in the school library contains books published by students. Available for library use only, the books remain favorites among students visiting before, during, and after school. These books are featured during the annual Back-to-School Night. (p. E65, M70)

- **Students synthesize personal experiences with the situation presented in the text, thereby comprehending and making meaning for themselves.** (p. E67, M70)

Eighth grade students, reading *Roll of Thunder, Hear My Cry*, explore the Emancipation Proclamation and view segments from GTV, a multimedia American history and geography computer and video program, about the Civil War and Reconstruction as background material for the novel. Students make personal connections about the true implications of a civil war from information about the divisions among neighboring communities found in the book. In small-group discussions, they identify how they would be affected in such a situation and how current civil wars in other countries led newly arrived students to the United States from Vietnam, Laos, Cambodia, and El Salvador. Limited-English-proficiency students do this activity in their primary languages. (p. E68, M71)

- **Students read in different ways for various purposes.** (p. E69, M72)

Fourth graders Lauren and Amy are developing a zookeeper's manual. Using the school library, they research the food, climate, space, and other requirements for animals most commonly found in zoos. The zookeeper's manual, illustrated in full color, is full of tried-and-true advice. (p. E69, M73)

In researching the rain forest, sixth graders Mario and Kevin read literature and student magazines about the topic, visit exhibits, and view relevant films, video, and laser discs. Each of the two students writes a short paper identifying what he believes every student ought to know about the rain forest. A student editorial committee then reviews the papers, and the student authors appear on a teleconference broadcast to every classroom. Mario participates in the teleconference in both English and his primary language. (p. E70, M73)

Jennifer and Michelle are making a report on Harriet Tubman as a biographical project in their seventh grade language arts class. The girls go back through the notes they have taken over the past two weeks and pull out the most significant experiences from this courageous woman's life. They discover that they had gathered few facts from Harriet's early life and ask for some library time to search out additional information. (p. E70, M73)

Eighth grade students have just completed a thematic unit on "What the Future Holds." The teacher asks students to look at their own possible future careers and write to experts working in their fields, asking the experts what they (the students) need to do to prepare for their careers, and what the experts are now reading to make them more knowledgeable about their fields. Araceli has always wanted to be a marine biologist. She writes to Scripps Oceanography Institute and receives a letter from a young marine biologist. That includes copies of several recent journal articles, which she then reads during sustained silent reading time. (p. E70, M72)

- **Students use the writing process while writing on self-selected topics and teacher-assigned topics.** (p. E73, M76)
- **Through a variety of writing experiences in all subject areas, students synthesize information and gain insights.** (p. E74, M77)
- **Students revise their writing using various techniques.** (p. E75, M78)

Responding to a suggestion from a member of his conference team, fifth grader Kyle uses the word processor to rearrange the paragraphs of his research report about dinosaurs. He creates new transitional sentences. (p. E75, M78)

- **Students use appropriate tone, style, and voice when preparing oral and written presentations for intended audiences.** (p. E77, M79)

After researching famous authors, students dress up and become the authors they have researched; their costumes, voices, and mannerisms reflect the findings of their research. An authors' reception is held in the library, and language arts classes are invited to meet, and hear from the authors they will be studying throughout the year. (p. E77, M79)

History-Social Science Criterion

- **Students connect the study of history (time) with its geographical setting (place).** (p. E86, M89)

Older primary students enjoy local history because of the familiarity of the region and the immediate connections they can make. In third grade, student groups study the people who settled the local community, including those of different ethnic, religious, or occupational backgrounds. For their topic, Luci, Martin, Joan, and Kaya choose to research the Portuguese who settled the outlying rural area of their town. They generate questions and, with teacher assistance, contact local descendants for interviews. Their questions focus on why Portuguese dairymen came here, the opportunities they sought, how the land features influenced settlement, and how the local geography compared with that of the Azore Islands. The interviews serve as primary source material for the group's report. The team prepares a community map showing where the Portuguese tended to settle. The four students decide how best to present their information: narration and charts, role playing, a diorama, a series of illustrations or other means. To emphasize the concept of chronology, the groups make their presentations in historical order. As the other groups present their information, they add names of important people and events to a classroom timeline that indicates the growth and changes of the community. (p. E87, M89)

- **Students use a multicultural perspective to reflect on the experiences of different racial, religious, and ethnic groups.** (p. E88, M91)

Students need to understand the topic of slavery from a historical worldwide perspective. At the beginning of the sixth grade course, the teacher explains that slavery will be a common topic of study in all civilizations studied and each student group is responsible for helping to complete a comparison "matrix chart" during the year. Barry, Alma, David, Zack, and Athena research slavery in Sumer, focusing on areas that will help complete the Sumer part of the matrix. A variety of materials are used in research, including reference books, supplementary textbooks, and Milton Meltzer's *All Times, All People: A World History of Slavery*. Near the end of the year, when the last group has completed the matrix, a "think, pair, share" activity centers on open-ended questions: "How is slavery a violation of human rights? Why has it taken so long to rid the world of slavery?" Individual students first think about the questions and then meet with partners. The partners share their responses with the class while Kelly acts as leader and Denzil as recorder at the chalkboard. (p. E88, M91)

- **Students consider multiple perspectives and analyze controversial issues when studying major topics, people, and events.** (p. E89, M92)

The changes within local communities provide "windows of opportunity" for exploring multiple perspectives. In one town, a seventy-year old landmark, a civic clubhouse, has been earmarked for destruction. After reading and hearing articles

clipped from a local newspaper, the whole third grade class brainstorms questions for scheduled visitors. A member of the local historical society visits to explain why the society wants the clubhouse preserved. A planner from city hall explains why city planners believe destroying the building is necessary. After the visits, students work in teams of three to devise possible solutions to the problem. The teacher leads a class discussion to arrive at a consensus on possible solutions. Students then write letters to the planning commission and city council, conveying their concerns and ideas. (p. E89, M93)

As part of their Civil War studies, eighth grade students decide to have a Debate Day on topics related to the war. Topics include tariffs and trade attitudes, states' rights and popular sovereignty, the Dred Scott issue, northern and southern views of slavery, and the Missouri Compromise. Students research their topics in groups and individually, using primary sources such as Julius Lester's *To Be a Slave*. Mike and Alex become living historians in their debate about John Brown and Jefferson Davis. Leticia's group presents the northern viewpoint, and Ryan's group assumes the southern viewpoint in their debate on the issues of the Missouri Compromise. Students not on the debate panel prepare questions ahead of time to ask the panel and write their new realizations in their history logs. Students evaluate the panel using a rubric to analyze their presentation skills and accuracy of facts. (p. E89-90, M92)

- **Students are living historians; they investigate, research, and analyze, using primary and secondary source materials.** (p. E90, M93)

After studying Lewis and Clark's expedition, fifth grade students experience their journey by viewing laser discs on national parks and "Animal Pathfinders." While viewing, the students stop to discuss the journey. Some students pick Merriweather Lewis and William Clark and keep a journal of what they are observing for Thomas Jefferson. Others write an imaginary diary from the viewpoint of Sacagawea. Their journals include drawings of the land, plants, animals, and peoples, historic dates, and a short description of the vast new land. They also include narratives describing the hardships, diet, weather, unexpected events, conversations with their companions, and similar events. The activity develops historical empathy based on research. (p. E90-91, M93-94)

After hearing such stories as "Dakota Dug-out," "From Me to You," "The Potato Man," and "They Were Strong and Good," second graders become living historians by preparing a family history. Students and their parents decide whether the child is to do a history of the student's family, the family history of a neighbor or relative, or that of a family from personal experience. Mario and Anna collaborate to devise

questions for an interview to find out where their families came from, how long they have been here, and why they came. For her oral report Anna brings family photos, an old letter, a hand-carved toy, and a scrapbook as artifacts. Mario presents his report by enacting his great-grandfather. Eileen tells the class what her grandmother told her and, based on her grandmother's descriptions, has drawn pictures of places and artifacts remembered but no longer in existence. Students use outline maps to complete narrative maps of the places mentioned in their histories. As a result of this project, Mario, Anna, and their classmates are better able to interview a community member when studying the unit, "People from Many Cultures, Now and Long Ago," later in the year. (p. E90, M94)

- **Students use literature of and about a period to better understand historic times, places, and people.** (p. E91, M94)

While reading biographies of such figures as Abbie of the Lighthouse, Jan Matzeliger, "Snowshoe" Thompson, and Eleanor Roosevelt, Marcus meets with his partner Javier to discuss the books they have been reading—what the books are about, what they admire about their subjects, and how these famous people made a difference in the lives of others. Marcus and Javier then relate to their second grade classmates what each partner has shared with the other. When they have finished reading their books, they prepare a simple outline (title, author, who the person was, what the person accomplished, and what the student admires about the person) for an oral report to the class. They give their oral reports to their partners before presenting them to the entire class. The presentation of the reports culminates the second grade unit, "People from Many Cultures, Now and Long Ago," reflecting a variety of people, cultures, times, heritages, and accomplishments. (p. E91-92, M95)

As a result of reading biographies such as *Young Frederick Douglass: Fight for Freedom*, by Lawrence Santrey, third-grade students examine more deeply the lives of famous people who took risks and improved the lives of citizens. Moses, Aaron, Kendrick, Alicia, and Vanessa make their own costumes for a "Moments from the Past" simulation. The students portray Frederick Douglass, Abraham Lincoln, Harriet Tubman, Richard Allen and Sojourner Truth in a "round" table reader's theater regarding their roles in slavery and the freedom of Negroes. Sam appears as Paul Lawrence Dunbar, telling about his life and reading aloud a favorite Dunbar poem. The presentation is videotaped and traded with other classes. (p. E92, M95)

In small groups, fifth-grade students compare and contrast the cultures in *Immigrant Kids* by Russell Freeman. After reading excerpts from *Amos Fortune, Free Man* by Elizabeth Yates and viewing the video "Bound For Glory," they engage in exploratory talk and motion to voice why and how these people came to America, whether

their coming was voluntary or involuntary, and what freedoms were granted to each on their arrival in America. The students construct a pictorial timeline of historical events at the time of their arrival. They stand under each event on the timeline and give short excerpts of the event and how it affected them. (p. E92, M95)

- **Students consider the effect of such factors as geography, economics, religion, and culture when studying a historical period or event.** (p. E92, M95)

Sixth grade students select a decade in history for the purpose of producing a television news show about that decade. Some students view excerpts from the series "Newscasts from the Past" as examples or models. The students decide on events to be covered, including sports and entertainment, fashions, food, art and architecture, use of leisure time, music, national and international events. A rubric is developed containing criteria for the quality of presentation (e.g., eye contact, projection, use of stage or space) and the quality of research (e.g., completeness, accuracy, organization, cooperation). The video is shared with parents and other classes. (p. E93, M96)

Eighth-grade partners have been given different primary source materials that relate to the framework strand of "National Identity." Phuong and Paul are given a copy of a letter written by George Washington to a newly-founded Jewish congregation, welcoming them to the fledgling republic. The two eighth graders draw conclusions and make interpretations, supported by passages from the letter as well as their prior knowledge. They share their thoughts with their classmates, who make similar reports. Together the whole class devises themes or "umbrella statements" that identify the ideals or values evidenced by the materials they examined. This is an "into" strategy for the lesson "The Bill of Rights" contained in the textbook, *A More Perfect Union*. (p. E93, M95)

- **Students use skills acquired in other subject areas to facilitate their understanding of history-social science.** (p. E94, M98)

In the unit "Our Nation's History," third graders study the legends, folktales, tall tales, hero stories, and lore of the United States. In one district, classes study *Pecos Bill* for "core" literature in English-language arts class. As an extended activity, Randy, Tia, and Gina research the life of a real cowboy, African-American Nate Love. They report their findings to the class: who he was, when he lived, what hardships he faced, what he achieved. Another team's research results in their map showing routes of cattle drives between Texas and Montana. Other teams make reports on such topics as Charlie Russell, Frederic Remington, authentic cowboy poems and songs, Annie Oakley, Buffalo Bill, Sitting Bull, and the daily life of the

cowboys. In this way reading, writing, speaking, and listening are applied to history-social science content. (p. E94-95, M98)

- **Students use knowledge and skills acquired in history-social science lessons to enhance what they are learning and doing in other subject areas.** (p. E95, M98)

Third graders Temeka, Natalia and their classmates learn American folk and patriotic songs such as "There Are Many Flags in Many Lands" and "The Night Herding Song." The entire class performs "Our Nation's History Through Songs" for an open house. Murals and screens provide a "set" for the songs, which are introduced by students enacting the roles of the composers or those who first performed them. While preparing the songs and the murals, groups of students use textbooks, picture books, art prints, photographs, and videos for images and information used in the performance. The program is rehearsed so that students show significant achievements in the arts: good singing habits (e.g., diction, breathing, posture), mastery of simple descants, unified composition in the murals, ability to mix colors, and appropriate overlapping to show depth. (p. E95-96, M99-100)

The arts can help establish a sense of time, place, and mood of a historic period. A recording of authentic folk music from the rancho period is played as background while the fourth-grade teacher exhibits paintings of early Spanish rancheros, missions, and landscapes around the room. Each picture is placed above a piece of large chart paper. Dante remembers the music from the music lesson last week. The Spanish words and the tempo and rhythm of this music are like that of the Spanish dance they watched. The teacher connects words that they used when talking about the dance and music to words they use in looking at the paintings such as rhythm, movement, balance, space, composition, form, harmony, and texture. The class is divided into six groups, and each group is given a marker to write words, comments, and questions on the chart below the paintings. Dante and his group note what they observe in the paintings regarding the time, place, color, landforms, architecture, composition, vegetation, and use of art media. Sabu likes this process because it allows him to express himself without the intimidation of raising his hand in front of the group. Each group moves from painting to painting until comments, feelings, ideas, and questions have been added to all charts. The charts develop students' understanding of the time and place from the students' perspectives. They are reviewed together, and other ideas and questions are added. Comparisons of impressions and ideas add to the information; questions lead to research in areas of interest to the students. These charts are used as "quickwrites" for later writing. Using the ideas on the charts, the art prints, the discussion, and the rancho music, Dante can imagine the time and place of the Spanish landowners and writes a story titled, "Life on a Spanish Rancho One Hundred Fifty Years Ago." (p. E96, M99)

- **Students develop basic precepts of good character and democratic values, drawing examples from history, literature, and the world in which they live.** (p. E97, M100)

Voters in a democratic society have the responsibility of staying informed and giving careful attention to issues and policies of campaigners. At Copa de Oro Elementary School, students in the third and fourth grades vote for student council representatives. They listen to campaign speeches, preparing for a follow-up discussion in which they will identify the ideas of each candidate and state opinions regarding the impact the ideas would have on their school. Students apply notetaking skills while listening. On election day, students step into voting booths to cast their votes, and their names are marked on the registration list. Students who have voted are given a "Remember to Vote!" badge to wear throughout the day. Because this is a yearly tradition at Copa de Oro and tends to be taken for granted, class officers or teachers lead discussions of why it is important to vote and how this prepares students for adult life. Discussion leaders bring clippings from local newspapers that identify contemporary issues that community voters will be deciding by ballot in approaching elections. (p. E97-98, M101)

- **Students examine important documents, speeches, autobiographies, art prints, songs, and similar primary source materials to understand and appreciate the democratic heritage and ideals that bind us as a nation.** (p. E98, M102)

Students learn that a primary source can require them to draw conclusions, ask questions, and make conjectures. Fourth graders Jason and Diana examine a facsimile copy of California's first Constitution. They notice that the document is handwritten in both English and Spanish. They conjecture reasons for this and answer "guided study questions" assigned to them: "What is the purpose of this Constitution? What changes did this Constitution bring about in the lives of Californians?" Jason and Diana use reference materials in formulating their ideas. (p. E99, M102)

Students in an eighth grade history class study Lincoln's Emancipation Proclamation. Students work in five different groups to determine the reactions of these states: Massachusetts, South Carolina, Texas, California, and Missouri. They examine editorials and articles from the time, viewing excerpts from the PBS series "The Civil War," and referring to such collections as *The American Reader, Voices from the Civil War* and *Black Americans, A History in Their Own Words*. Representatives are chosen from each group to read the papers aloud to the class. The teacher, monitoring the reports, guides and checks for historical accuracy and support for assertions. (p. E99-100, M102)

- **Students experience strategies involving different learning styles.** (p. E103, M106)

After reading *Cassie's Journey* by Brett Harvey, fourth and fifth graders investigate and research the westward movement of families during the 1840s. The students make a list of historic findings. Using their discoveries, students write their own picture books, weaving historic facts into them. The picture books include a cover, maps of the journey westward, tracings, drawings, and a story of the student's journey. (p. E104, M107)

- **Students use a variety of technologies to make content accessible and meaningful.** (p. E104, M107)

A fourth and fifth grade class uses the simulation game "Golden Spike" about the building of the transcontinental railroad from the builder's point of view. To store their information they use a database. (p. E104, M108)

Piotr and Vladimir, recent seventh grade immigrants from Russia, play the computer game "Where in the World Is Carmen San Diego?" Using an English-Russian dictionary, an atlas, an almanac, peer guidance, and an electronic encyclopedia, they catch the villain and solve the crime. (p. E104, M108)

Using the computer cooperatively, eighth grade students create and design their own hypercard stacks about a historical topic. Jason and Javier creatively interface music, buffalo sounds, drawings, graphics, and written text about the Oregon Trail. Using print materials, including Francis Parkman's *The Oregon Trail* and Leonard Everett Fisher's photography book of the same name, they design and draw maps of their journey, and write text about the westward movement. The hypercard stacks are shared with the entire class after the unit is finished. (p. E105, M107)

(Note: The PQR process supports the concept that curriculum and instruction should be aligned with performance based assessment so that students are assessed in a variety of ways. When students are engaged in the performance of research as a process for problem solving, both process and product can be assessed.)

- **Samples of students' work are collected in portfolios.** (p. E105, M108)

Third grade students and their teacher review the purpose of the portfolio and agree on the types of information to be placed in them. Mr. Pham checks Mei-mei's and Choy's folders for the checklist, indicating their social participation skills; samples of writing assignments related to their understanding of the natural features of a region, including book reviews of people who settled in the area; comparison of two

maps for the same region describing influence on employment opportunities; and pictures of Mei-mei's and Choy's participation in the group project to produce a relief model of the region. (p. E105, M108)

- **Students, peers, and teachers actively participate in evaluating their oral and written work and projects.** (p. E105, M108)

In preparation for presenting oral reports, the seventh-grade class identified the components of a good report (focus, impact, relevancy) and the criteria for evaluating reports. Lisa, Ralph, John, and Shigeko formed a committee to prepare an evaluation form for students and the teacher, which includes a check-off list and comments section. Cathy and Christopher agreed to prepare the outline for the report on how early inventions in China influenced current technology to present to the class. Their classmates and the teacher will critique the presentation according to the criteria on the evaluation form. Results of the evaluations will be shared with the presenters. (p. E105, M108)

Mathematics Criterion

- **... students grapple with increasingly complex questions and investigations and assume increasing responsibility for developing complete and comprehensive reports or products.** (p. E115, M118)

The program is designed so that students are consistently engaged in experiences that require them to be responsible for their thinking. (p. E115, M118)

- **Students formulate and create mathematical questions and determine what they already know and must find out.** (p. E116, M118)
- **Students decide which of a variety of constantly accessible manipulative materials and technology to use to explore mathematical ideas and to solve problems. All students have access to calculators and computers and decide when and how to use them.** (p. E116, M119)
- **Students use a variety of techniques, including pictures, diagrams, charts, graphs, spreadsheets, tables, scatter plots, matrixes, and physical models.** (p. E116, M119)
- **Students organize and record their accomplishments, findings, or conclusions and give evidence or arguments supporting their conclusions. At times, students present their results and conclusions to various audiences such as:**

classmates, the teacher, another class, younger students, or adults at home, with the purpose of informing, explaining, teaching, and/or persuading. They use multimedia approaches for making the presentations. (p. E116, M119)

- **Some students go more deeply into some aspects of tasks and investigations, in accordance with their interests or their rapid grasp of the ideas. (p. E117, M120)**

As part of a data analysis unit, fifth grade students, who are in charge of the school's snack booth, decide to survey students to find out their favorite snacks. After receiving 500 responses, they decide to organize their information in a report that includes several bar graphs. They prepare a videotape on the topic, which they present to the student council. (p. E119, M120)

Science Criterion

- **Since the nature of science is open to controversy and is non-dogmatic, students understand how we come to know and how we come to revise our thinking when presented with new evidence as they experiment with open-ended investigations. (p. E135, M138)**

Eighth-grade students are shown pictures of several mammals, including a rhinoceros, a large anteater, and a walrus. They are asked to identify the one they think is most closely related to the elephant and to provide an explanation for their classification. The teacher, having identified students' preconceptions, suggests that groups conduct some research to see which mammal possesses the most shared, derived characteristics with the elephant. Research is not limited to textbooks and reference books; students also use a CD-ROM on mammals and selected hypermedia resources. Groups report on the similarities and differences they found in their research. Students then adjust their predictions to reflect the things they discovered in their research and write questions they still have after their research. (p. E136, M138)

- **Students have multiple opportunities for active, engaged learning while investigating questions about the world around them. (p. E136, M138)**

Seventh grade students, after learning about earthquakes and tsunamis, read the books *The Big Wave* by Pearl S. Buck and *The Magic Fan* by Keith Baker. The group decides that they would like to learn more about the different types of bridges and bridge building. They check out the appropriate books from the library, view several laser discs about bridges, and contact the Army Corp of Engineers. Using the

information they have gained, they construct several miniature bridges which they hope will be the strongest bridges in the world. After testing each version, the students discuss what went right and what went wrong and move on to building a better bridge. They are satisfied after their fifth bridge is built, because it withstands all the strength tests they have devised. (p. E137, M139-140)

- **All students see themselves as scientific investigators of the world around them and sometimes have questions that cannot be fully answered.** (p. E137, M140)

Third-grade students, working in groups of four, are attempting to answer the question "What influences whether the stems of a plant grow up and the roots grow down?" They have small, potted lima bean plants and access to a supply closet containing a variety of everyday materials such as waxed paper, tape, and toothpicks. The teacher's directions include only that they can use any materials to devise an investigation that will provide an answer to the question. This is planned to be a long-term investigation. Daily for several weeks, at the beginning of science period, they are given time to observe and record any changes to the plant caused by manipulation of their experiment. Group roles include: artist (who draws what is happening to the plant), grapher (who collects data and graphs the data on a computer), recorder (who writes the lab report for the group), and gardener/waterer (who waters the plant). In addition to their investigations, students view time-lapse photography of growing plants (either on video tape or laser disc). The results of the students' investigations are posted around the room. (p. E137-138, M141)

- **Students have opportunities to use their skills of observing, communicating, comparing, ordering, categorizing, relating, inferring, and applying when developmentally appropriate.** (p. E139, M142)
- **Students work together in collaborative groups, searching for solutions to given or selected problems with little outside help and with few parameters.** (p. E139, M142)

The seventh grade class use images of the planets and their moons to complete a report comparing conditions or features they see in the photographs to those seen on Earth. The materials they work with are available from the library media center—slides, filmstrips, photographs, and laser disc images. Groups of students are free to select the planets and conditions on which they wish to focus their attention. Similarly, they are free to choose the method by which they share the results of their investigations. Depending on the strengths of members within each collaborative

group, students report with posters, videotape and photographic essays, hypermedia products, an activity of their own design in which members of other groups participate, and traditional reports. Acceptance of multimedia presentations by the teacher is one way the entire class participates fully in this learning experience. (p. E140-41, M142)

- **Students use a variety of instructional materials, including lab equipment, reference books, trade books, and relevant educational technology, to facilitate active learning and construction of new knowledge.** (p. E141, M144)

As part of a computer project in their own classroom, sixth-grade students design and create for the fourth grade a database containing information about the typical flora and fauna of a Sierra Nevada yellowpine forest. In their study of ecosystems, the fourth-grade class is challenged to take on various roles concerning the use of that yellowpine forest – some are to file an environmental impact report concerning the logging of black oak within the forest, others are considering the possibility of placing a bounty on mountain lions, and the like. Students use the database to find relationships between various organisms, conduct more traditional research in trade and reference books, and seek information from resources within the community. Students simulate a town-hall meeting as they make their reports to the class and decide what is to be done with the forest's ecosystem. (p. E141, M144)

- **Students integrate science with other curricular areas.** (p. E145, M148)

A third grade class is studying weather throughout the school year. They begin in the fall with a mini-unit on instrumentation, which includes building several weather instruments and collecting daily weather information. With the fourth-grade class, they watch several episodes of an instructional television program which includes information on weather instrumentation. In conjunction with these preliminary investigations, students also make a solar water collector, test the evaporation rate of different amounts of water, and make closed terrariums to enrich their understanding of the water cycle. In addition, they read *The Magic Bus at the Waterworks*, (Joanna Cole, Scholastic, 1986) learn how to make wet-on-wet watercolor clouds, and write cinquain poetry about water, wind, and clouds. For most of the rest of the year, the class studies other topics of interest, but they continue to collect weather data on a daily basis. When the class returns to the weather unit in the spring, they have accumulated a great deal of information. "But is the weather here the same as in other parts of the state?" Abel wanted to know. "Good thing you asked!" replies the teacher, who had hoped just such a question would arise. She had earlier arranged (and practiced) exchanging data over a modem with a friend in the southern part of the state. It is not a difficult task to persuade the class to try it

themselves, and before long they are looking for similarities and differences in the weather patterns at the two locations, closely examining weather maps (and physical relief maps) of the two regions, and writing lots of letters back and forth with their new pen pals. The project is so successful, that the teacher talks the fourth-grade teacher into participating the following school year in a network that allows students to exchange data and conversation. (p. E145-46, M149-50)

Using trade books, reference materials, and laser discs, sixth grade students conduct research on the adaptations of a wide range of plants and animals. Specifically, they are trying to determine whether they can predict the type of habitat in which an organism would most likely be found if they knew something about its physical and behavioral characteristics. Once they seem to know a lot about organisms and adaptation to habitats, their teacher turns their question inside out – if they know something about an area’s environmental conditions, could they predict the types of organisms most likely to be found there? The teacher assigns an interesting assortment of world habitats to each group, closely related to regions of the world in which ancient civilizations or early human settlements appeared. Geographic and geologic influences on habitat require additional sources of information as students soon discover that little reference material on these areas is in their library. Specialized maps (rainfall, climate, temperature, vegetation, natural resources, and the like) become useful interpretive tools to help them more clearly define the environmental conditions in their area. Students write reports, make maps, and write stories about their regions of study. The art teacher helped them collect photographs and other visual images, shows them how to sketch and enlarge a landscape painting of their region, and finally assists them as they make poster paint murals on panels of butcher paper. Having predicted the types of organisms they feel might live in their regions, students now attempt to verify their hypotheses with research. Pictures and photographs are made to scale of real organisms that inhabit their areas, and these are placed on the murals. The teacher makes a videotape of the students’ reports about their murals. Now, the computer teacher plans to show the students how to scan some of the pictures they have created and to make hypermedia stacks of the regions they studied. (p. E146, M148)

- **Students’ work represents a balanced treatment of each discipline each year.**
(p.147, M150)

Charlene’s eighth grade science class is currently involved in an interdisciplinary unit with the rest of her team’s teachers. They are investigating rockets and missiles as their social studies classes discuss modern war weapons. She builds and launches her rocket and measures its speed and trajectory. Earlier in the semester, her team was involved in a study of the local environment and river valley. She made some

erosion models and researched rivers on the electronic encyclopedia in the computer lab. As part of the cross-age tutoring program she's in, she teaches Delfino, a fourth grader from a local feeder school, how to look things up on the computer's encyclopedia. The interdisciplinary unit that started off the school year was centered on health and well-being. Charlene wrote an "I-search" paper on a health care profession, made (along with three other class members) a video presentation to her social studies class on the "health" of the economy, and put together a hypermedia presentation on drugs and alcohol for her science class which included pie graphs of statistics she'd gathered from several classmates and photos of microscope slides of damaged tissue. She is able to relate all the science projects she created and helped with to other classes she takes. (p. E147-48, M150)

Visual and Performing Arts Criterion

- **When appropriate, student learning and in the arts includes relating the arts to each other.** (p. E155, M158)

After reading excerpts from a pioneer woman's diary, fifth-grade students collaborate in the development of dialogue and movement sequences based on entries in the diary. Because the information is from a primary source document, each small group pays close attention to the details and works to express them in their own dramatic presentations. (p. M160)

- **Students compare and contrast periods, cultures, and major themes in the arts from throughout the world.** (p. E165, M168)

Using their art textbook, art magazines, and art books, each sixth-grade student selects an artist who worked in one of four styles: realistic, abstract, nonobjective, or surrealist. Each student prepares a short oral or written statement that includes the artist's name, style, the name of one of his or her works of art, the date the work was created, and a sentence or two about events that happened during that time. Carol finds that she likes the powerful self-portraits done by Frida Kahlo and that, while they have realistic elements, they are abstracted from real life and are surrealist. Carol notes that Kahlo lived in a time when there was a socialist movement in Mexico in which she and her husband, the artist Diego Rivera, participated. The students discuss how this might have influenced the work of the artist. (p. E165, M168)

- **Students understand the effects of the arts from past and present cultures on today's society.** (p. E165, M168)

Students in Mrs. Franco's sixth-grade class are studying the myths of ancient Greece, in particular that of Pyramus and Thisbe. Nicole recognizes the story of young love gone awry as similar to that of Romeo and Juliet, which was recently presented at the high school. A class discussion ensues and research begins on other stories based on this myth. The students discover *West Side Story* and listen to a recording of the songs in class. Mrs. Franco's students decide to retell the story in modern times and write it as a play. The play is then performed for other sixth-grade classes. (p. E165, M168)

- **Students can communicate about the contributions of great innovators and creators in the arts.** (p. E166, M169)

While working on a unit on creating nontraditional sculpture materials, fifth-grade students are assigned to research sculptors who were great innovators. Juan reports on Alexander Calder, who took the innovative step of making sculpture move. Calder called his sculptures mobiles, and Juan did a mobile for his sculpture project. Suzanne reported on the work of Cristo showing slides of "The Running Fence" and "The Umbrellas" projects. (p. E166, M169)

- **Students study and understand basic ideas, styles, and schools of thought in each arts discipline.** (p. E167, M170)

Students in the fourth grade are learning about folk music from various cultures represented in California, comparing and contrasting forms and styles. Carlos' uncle, who plays in a mariachi band, loans the class a book on Carlos Chavez, who used Mexican, Aztec, and Mayan themes to capture the spirit of Mexico in the music he composed. John, who is Hungarian, wants to know whether any composers used Hungarian folk music in their music. The teacher plays a section of Bela Bartok's *Hungarian Sketches* entitled "Bear Dance" from the fifth grade music series records. Each child decides to research a composer from his or her culture who incorporated folk music in composed works. They enlist the band director's help. (p. E167, M170)

- **Students see how the arts of cultures from which our society emerged are relevant to our current life as links to our origins, guides to our future, and starting points for new ideas.** (p. E170, M173)

After studying the culture, contributions, geographical location, and art of the Amish people, the fifth graders view many examples of old and modern Amish quilts. This leads to several students comparing the Amish quilts to those they have at home. Tonya's grandmother comes to class the following week and shares a history of African-American quilting, showing examples from her family's collection. Several students decided to make a quilt that reflects patterns they see in the world around them. (p. E170, M173)

For open house, eighth graders Maria and Sonia are presenting their report on "The Roots of Jazz Dance." They are weaving samples of music and dance steps through their talk. Maria has traced the Irish-European root. Sonia has traced the African root. Together they are explaining how aspects from both cultures connected in America to evolve into our native dance form of jazz. (p. E170, M173)

- **Students become receptive to artistic productions from different cultures; they understand the important role the arts play in communicating the values, beliefs, desires, and hopes of a particular group of people.** (p. E170, M173)

In celebration of Black History Month, fifth-grade students play instruments they made after investigating the origins of African-American music. Call and response was a form used in spirituals, and folk and gospel music. It was used, they found, as a vital means of communication (e.g., gossip, secret messages, consolation), when slaves were forbidden to speak to one another. Then the students used this form to create their own compositions. While the student with video production skills tapes them, the students demonstrate how to make instruments from recycled materials in the style of early African instruments and perform their compositions. Kenya asks if they can share this tape with their friends in the primary grades. Yue Xi and Wei Yuan suggest that in addition, they teach some of the call and response songs to their non-English-speaking Chinese friends, so all will be able to sing together. They present the videotapes to the library media center so they can be used by others. (p. E170-71, M173-74)

III. Professional Practices

(Note: This section of each curricular criterion includes discipline-specific information about what teachers do, as professionals who are serious about the quality of teaching and learning, on a regular basis to make improvements.)

Teachers use the valuable and unique resources available in the community.
(Language Arts Criterion, p. E82, M85)

- Support parents as educational partners by encouraging parents to: take their children to the library... (Language Arts Criterion, p. E82, M85)

Teachers and administrators have a professional responsibility to learn about the field of history-social science and can do this best by committing time to...

- Maintain ongoing awareness of available curriculum resources supporting the framework. . . . (History-Social Science Criterion, p. E107, M110)

Improvement in the school's history-social science program depends on a commitment of time and resources by teachers and the administration. (History-Social Science Criteria, p. E108, M111)

- Allocate funds for the purchase of instructional and library media resources. (p. E108, M111)

Teachers use multiple resources and a broad array of instructional strategies in addition to history-social science textbooks. (History-Social Science Criterion, p. E109, M112)

- Investigate, study, and incorporate a wide variety of literature and primary sources into the history-social science program. (p. E109, M112)
- Involve students actively in the learning through content-appropriate strategies that may include:
 - Reading widely, incorporating resources with varied perspectives...
 - Note taking and outlining...
 - Varied writing activities, including logs, diaries, and journals
 - Varied types of technology
 - Local and oral history projects
 - Collaborative learning
 - Whole-group and independent projects, research, and assignments
 - Use community resources... (p. E109, M112)
- Encourage students to become historians by:
 - Using sources for research, such as libraries, newspaper offices, museums, and historical societies
 - Investigating current events and issues
 - Interviewing local historical figures and those with potential impact or influence
 - Keeping logs and journals (p. E110, M113)

Teachers, working with administrators, focus resources in planning and implementing their science program. (Science Criterion p. E151, M154)

- Collaborate with library media personnel to organize and inventory materials on site, e.g., literature that connects with science topics being taught.
- Purchase additional materials and equipment and pursue people to come in and work with them.
- Explore and use parent and community resources (p. E151, M154)

Teachers use a variety of performance-based assessment techniques to assess students and the program. (Science Criterion, p. E151, M154)

- Encourage students to assess their own work and conceptual understanding. (p. E151, M154)
- Use hands-on activities, investigations and research, problem-solving situations, and open-ended questions to assess students. (p. E152, M155)

Teachers use classroom practices that enable all students to construct meaning for themselves. (Science Criterion, p. E150, M153)

- Use open-ended approaches that enable students to solve problems creatively. (p. E151, M154)

Teachers work with school administrators to ensure that necessary resources are allocated for the visual and performing arts program. (Visual and Performing Arts Criterion, p. E176, M178)

- Allocate funds to purchase materials from the arts program, from the general school budget, School Improvement funds, fund raisers, the P.T.A., community resources and grants. (p. E175-76, M178)

Appendix A

Integrating Information Literacy Into National Agendas

Information Literacy and the National Agenda

From time to time, the federal government creates model plans or initiatives, which it encourages states and local schools to adopt. While not the rule of law, these plans are usually encouraged with grants to schools willing to participate in the national agenda. The *National Educational Goals of 1990*, created during the Bush presidency, continue to be addressed by the Clinton administration as *Goals 2000*.

As states, districts, schools, and teachers become aware of national goals, the question becomes: should we adopt all or part of the national agenda? How can the national agenda be worked into what is happening in the classroom and the library media center?

The following report shows how one research study attempts to relate information literacy to the national goals and educational policy. Library media specialists can take leadership roles in translating this agenda for lifelong learning.

Final Report to
National Forum on Information Literacy
June 24, 1992

Outcome Measures for Information Literacy
Within the National Educational Goals of 1990

by
Christina Doyle

Summary of Findings

Introduction

Information literacy, first noted as a term in 1974 (Zurkowski, cited in Kuhlthau, 1987) a key concept in today's Information Society, is defined as "the ability to access, evaluate, and use information from a variety of sources" (Doyle, 1992). As the amount of available information grows in geometric proportions, it has become impossible to stay current with general interests much less a specialized subject. A shift in focus is needed from accumulation of facts by memorization to proficiency in the skills of information literacy.

Background

From September, 1991 to March, 1992 research was conducted to 1) create a comprehensive definition of information literacy and 2) develop outcome measures for this concept. The National Education Goals of 1990 were used as a framework to demonstrate the critical nature of information literacy for attainment of selected goals. The intent of this project was to prepare policy recommendations for the National Forum on Information Literacy (NFIL). The next step is for NFIL to consider the Summary of Findings, presented in this paper, as the basis for selected national policy recommendations.

The National Forum on Information Literacy is composed of representatives of 46 national organizations from business, government, and education, all of whom

share an interest and concern with information literacy. The purpose of the Forum is to develop and disseminate an understanding of the critical importance of this concept.

On September 6, 1991, the proposal for this research was presented at the quarterly meeting of the Forum in Washington, D.C. It met with a positive response, both in moral support and with agreement by representatives present to assist with a list of persons to be contacted for participation. From respective organizations' membership rosters, representatives selected three to six names of those most knowledgeable in the area of information literacy.

Delphi Research Technique

Listed persons were invited to participate in a Delphi panel, a research technique aimed at assisting a panel of experts to reach consensus on an issue, through a reiterative and structured communications process. Round I had two parts: (1) focus statements dealing with a definition and attributes of information literacy; and (2) evaluation of national goals' relationship to information literacy and possible outcome measures. From this point on the development process was based entirely on responses from the group. Responses were summarized and rated in Round II by each participant. Only those measures with a mean agreement of 1.5 or better, on a five-point Likert-type rating system, were included in Round III. These three rounds were successful in reaching consensus on a number of points.

A total of 136 persons were contacted. Geographically, they covered the United States, Canada, and Puerto Rico. Organizationally, 18 different associations were involved, with the largest number from the field of education. Initially, 125 persons were mailed a packet including details of the project, background information, and a copy of Round I. Fifty-eight (46.4%) of these were returned completed with agreement to participate. Before Round II was mailed, 11 additional names were added, making a total of 69 packets distributed. Response on this round was made by 56 (81.1%) people. The final round, Round III, was returned by 55 (98.2%) panel members from Round II, a clear indication of participants' interest and involvement in the issue. In each round respondents were encouraged to include comments to further explain or amplify their reactions. These comments add a richness in interpreting the findings with implications for additional development and implementation of information literacy.

Data Analysis

While there were frequency counts in Rounds I and II, the primary techniques were those of qualitative analysis: looking for patterns, searching for themes to group common items, and checking for clusters of similar terms/phrases. The general approach was to gradually collapse the categories until they were as concise as possible while maintaining the intended meaning.

By Round III the entire document used a five-point Likert-type rating scale to quantify consensus. There were 124 rated items in Round III. Thirteen dealt with the definition, 21 were subtopics under the goals, and 90 were specific outcome measures. Consensus was reached on 11 of 13 on the definition, all 21 of the subtopics, and 45 of the 90 outcome measures.

Results and Conclusions

The work of this panel of experts included two major tasks — developing consensus on a definition of the term information literacy and naming outcome measures for the concept. Through the reiterative, structured communication process, a high level of consensus was reached on both.

Definition: *Information literacy is the ability to access, evaluate, and use information from a variety of sources* — this represents the basic components of group consensus. This concise statement is expanded in the following section with a listing of the discrete attributes of an information literate person.

An information literate person is one who:

- Recognizes the need for information
- Recognizes that accurate and complete information is the basis for an intelligent decision
- Formulates questions based on information needs
- Identifies potential sources of information
- Develops successful search strategies
- Accesses sources of information including computer-based and other technologies
- Evaluates information
- Organizes information for practical application
- Integrates new information into an existing body of knowledge
- Uses information in critical thinking and problem-solving

This expanded definition of attributes highlights the process of information literacy. The attributes progress through the *access, evaluate, and use* order of the concise definition. The attributes are potential rubrics for a checklist of skills comprising the process. This comprehensive definition is a valuable tool that goes beyond an explanatory function into an operational list of the desired outcomes. With these skills comes empowerment because the ability to process information is necessary to making informed decisions throughout a lifetime.

National Education Goals: The National Education Goals of 1990 addressed six areas of needed reform in American education. In considering these six goals in terms of attainment through information literacy, the panel ranked three as relevant. The common theme through all three was lifelong learning. The three national goals are (U. S. Dept. of Education, 1990):

Goal 1 — By the year 2000, all children in America will start school ready to learn.

Goal 3 — By the year 2000, American students will leave grades 4, 8, & 12 having demonstrated competency over challenging subject matter including English, mathematics, science, history, and geography, and every school in America will ensure that all students learn to use their minds well, so that they may be prepared for responsible citizenship, further learning, and productive employment in our modern economy.

Goal 5 — By the year 2000, every adult will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship.

These goals represent a continuum for lifelong learning. Goal 1 stresses the pre-school, formative, affective aspects of developing a value for information. Goal 3, concerned with schooling, points to the attainment of skills necessary for successful living throughout life. Goal 5 addresses the widespread application of skills for employment and citizenship. Since each goal applies to a different age group, outcome measures differ, each must be developmentally appropriate. The work of developing outcome measures was a special challenge to the panel members because it was the first effort of its kind. This study demonstrates that information literacy skills are at the heart of successful attainment of these three goals.

Focus of Each Goal

Goal 1 calls for all children to start school ready to learn. Respondents agreed this may be interpreted to mean that the key to attainment is having children understand the basic purpose of school, which is to acquire the skills of knowing how to learn, to value information, and to have positive/enthusiastic attitudes. Preschool children learn to value information by watching their parents, a child's first teachers. Other adults, such as preschool teachers, are also role models. The motivation to read and to access information begins with these first role models.

Results indicate that in order for children to start school ready to learn policy must facilitate the following:

- National commitment to the access of information for every American must be developed.
- Community support must be provided through library facilities/community services with information rich resources, both print and non-print.
- Parents must accept their responsibility to develop a value for information through reading to and engaging children in discussion of what has been read.

It may be concluded that parents must value information and be able to demonstrate effective strategies for accessing, evaluating, and using information to their children. Many parents have yet to acquire these skills, so that Goal 5 applies to them as learners. The continuum of lifelong learning is a circle. The present need for resources and skills development for adults affects future generations.

Goal 3 has a critical focus on students learning to use their minds well — knowing how to learn in order to make informed decisions. During the years of general education (K-12), all students need to learn how to process information as they apply problem-solving and critical thinking skills regularly in school and personal areas. To learn these skills requires an active learning format where students process information to meet specific needs at a level that is developmentally appropriate. The inquiry approach is basic to active learning. An information rich environment is needed with many resources available including computer-based and other technologies. Teachers will need skills to facilitate resource-based learning.

Comments by the panel members supported the concept that teachers are the most critical key to student attainment of information literacy. Because active learning represents a major shift in instructional strategies, a shift not often ad-

dressed in teacher preparation, massive staff development must be conducted. It needs to be ongoing over a period of years as teachers build confidence and develop applications for their own classes. They must become information literate themselves, comfortable with the variety of resources as well as with the process of accessing, evaluating and using information. Furthermore, assessments that integrate the process of information literacy into meaningful final projects, portfolios, or performances must be developed.

A library/media center stocked with a wide variety of print/non-print resources was identified as critical to the implementation of information literacy. Staffed with a trained library/media specialist who collaborates with classroom teachers to carry out classroom objectives, the library/media center becomes the hub of a school. Equity of access to resources increases.

Resource sharing between school and community was mentioned frequently, a recognition that rising costs and evolving technologies call for rethinking traditional institutions. The point was well-made that reference to no/low cost resources was misleading. There are always costs to accessing information. It must be determined at what point payment will be made. This research points to equity of access being guaranteed at the highest possible level (federal, state), rather than penalizing those who cannot pay for opportunities to be knowledgeable.

Implications are that in order for students to become self-motivated, policy must facilitate the following:

- National/state governments must make a commitment to ensure all students have equal and regular access to information by assuring adequate resources at each site.
- State Departments of Education/local school systems will develop and implement a resource-based learning curriculum.
 - Curriculum standards that reflect a resource-based learning approach will be developed.
 - Ongoing inservices will be conducted to ensure that teachers have the skills necessary to facilitate resource-based learning.
 - Library/media centers will be recognized as a key to successful implementation of resource-based learning.
- Parental support and participation in their children's learning will be considered integral.
- School goals will assure that information literacy skills are included across all curricular areas, so that all students apply information literacy as they learn the underlying principles of each curricular area.

- Sites will develop curricular objectives that include the process of information literacy across all curricular disciplines in the context of basic principles that are inherent to a particular subject area.
- Sites will develop curricular assessment methods that include alternative assessment procedures such as projects, portfolios, and performances and integrate the information literacy process.
- The library/media specialist will be an integral part of the instructional program working in coordination with classroom teachers to carry out the curricular objectives.
- Teachers will implement resource based learning in their classrooms.
 - A variety of teaching strategies will be used to support students as active learners.
 - Critical thinking/problem-solving skills will be developed and honed through meaningful activities involving the location and interpretation of information
 - Ongoing demonstrations will be made of how facts learned in classes become woven together to reveal the interrelated patterns of the world.
 - Student assessment procedures will be used that include demonstration of the information literacy process, as through portfolios, projects, and performances.
 - The library/media center will be viewed as an extension of the classroom.

Goal 5 focuses on adult literacy and possession of skills necessary for employment and citizenship. In terms of information literacy, all Americans need to be lifelong learners, able to access a variety of resources, proficient with various types of technologies, able to evaluate and use information to meet personal and job-related needs. With over 80% of American jobs related to services, information has become the most important commodity in the marketplace. Those who can access information will be empowered with the skills to be successful as employees and citizens.

The Secretary's Committee on Achieving Necessary Skills (SCANS) Report, *What Work Requires of Schools*, was issued in the fall of 1991 by the Department of Labor. Included in this document were five competencies basic for all entry level employees. Among them were: technology, (works with a variety of technologies,) and information, (acquires and uses information.) This is a cross-validation of Goal 5's attainment through information literacy for employable skills.

Colleges were recognized as an area that especially needs to address information literacy, though no specific outcome measures were suggested. Several respon-

dents commented that this requires immediate attention so that students learn and/or reinforce information processing skills.

Implications are that in order for Americans to be lifelong learners policy must facilitate the following:

- National/State governments will be actively involved in improving the information literacy of citizens.
- Communities will promote lifelong learning.
- Businesses will promote the acquisition of information literacy skills by all.
- All Americans will be able to seek information to solve problems and make informed decisions.
 - A wide variety of print and non-print resources will be available to all Americans at no/low cost to the public through public libraries, national on-line networks, and shared resources with business and public institutions.
- Colleges will recognize that information literacy skills must be mastered by all college graduates.

Summary

The results of the research have been twofold. One result has been development of a list of specific outcomes for the process of information literacy as part of a comprehensive definition. The second is that panel members reached consensus on 45 outcome measures for information literacy in the context of selected National Education Goals.

These results have received cross-validation through recently published national reports such as the SCANS Report, *What Work Requires of Schools*, November, 1991, as well as the Council of Chief State School Officers' (CCSSO) *Improving Student Performance Through Learning Technologies*, November, 1991. Public awareness is rapidly increasing as to the need for attainment of the skills of information literacy even though many have not consciously connected the term to the needed skills.

This is an opportune moment for the National Forum on Information Literacy to consider drafting national policy recommendations. The work of this Delphi panel has provided solid material to support recommendations. Leaders in business, as well as state educational leaders, support these concepts. It is important to focus national attention on the critical importance of information literacy in producing lifelong learners, responsible citizens, and wage earners with employable skills.

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GOAL 1 OF THE NATIONAL EDUCATION GOALS OF 1990

GOAL 1 By the year 2000, all children in America will start school ready to learn.

- All disadvantaged and disabled children will have access to high quality and developmentally appropriate preschool programs that help prepare children for school.
- Every parent in America will be a child's first teacher and devote time each day helping their child learn; parents will have access to the training and support they need.
- Children will receive the nutrition and health care needed to arrive at school with healthy minds and bodies, and the number of low weight babies will be significantly reduced through enhanced prenatal health systems.

Interpretation of Goal 1 from the Information Literacy Perspective

Parents are the child's first teachers. They provide the most important role models of the value of information to make decisions. In addition, they set an example for motivations to read and to access information.

National Goal 1 — Outcome Measures

1. National commitment to the access of information for every American must be developed.

Outcome Measures

None identified.

2. Communities will provide support for preschool children and their families.

Outcome Measures

Every home will have access to information-rich resources, both print and non-print, through school and/or libraries.

Every community will have a library that will be a no cost training center with easy access to a wide variety of information resources, print and non-print.

3. Parents will accept responsibility as a child's first teachers. Time must be taken before formal schooling starts to develop a value for information.

Outcome Measures

Parents will participate in parenting classes that stress the importance of: engaging children in discussions about materials that have been read (even if just to identify objects on a page)

4. Children will start school valuing information and having positive/enthusiastic attitudes.

Outcome Measures

None identified.

GOAL 3 OF THE NATIONAL EDUCATION GOALS OF 1990

GOAL 3 By the year 2000, American students will leave grades 4, 8 & 12 having demonstrated competency over challenging subject matter including English, mathematics, science, history, and geography, and every school in America will ensure that all students learn to use their minds well, so that they may be prepared for responsible citizenship, further learning and productive employment in our modern economy.

Interpretation of Goal 3 from the Information Literacy Perspective

The basic focus of education should be to prepare students to be lifelong learners, to know how to learn. Developing the competencies of information literacy requires an active learning process, which represents a paradigm shift for education.

National Goal 3 — Outcome Measures for National/State Governments, State Departments of Education, Parents and School Sites

1. National/state governments will ensure that all students have equal and regular access to information by assuring that there are adequate resources at every site.

Outcome Measures

None identified.

2. State Department of Education/local school systems will develop and implement a curriculum that stresses a resource-based approach.

Outcome Measures

Curriculum standards that reflect a resource-based learning approach will be developed by states and local school districts.

Ongoing inservices will be conducted to ensure that teachers have the skills necessary to facilitate resource-based learning.

Adequate materials will be available for teachers and students at all schools.

Library/media centers will be recognized as a key to successful implementation of resource-based learning.

3. Parental support and participation in their student's learning will be considered.

Outcome Measures

Regular interaction between teachers and parents will be sought.

4. School sites will ensure that information literacy skills are included across all curricular areas so that all students learn the underlying principles of each curricular area while applying information literacy.

Outcome Measures

Sites will develop curricular objectives that include the process of information literacy across all curricular disciplines, as well as those principles that are inherent to a particular subject area..

Sites will develop curricular assessment methods that include alternative assessment procedures such as projects, portfolios, and performances involving the information literacy process.

Sites will have available a wide variety of information resources, print and non-print, that students will access.

The library/media specialist will be an integral part of the instructional program, working in coordination with classroom teachers to carry out the curricular objectives.

National Goal 3 — Outcome Measures for Teachers

5. Teachers will implement a resource-based learning approach in their classrooms.

Outcome Measures

A variety of teaching strategies will be used that support students as active learners.

Learning opportunities will be arranged that utilize group as well as individual settings.

Critical thinking/problem-solving skills will be developed and honed through meaningful activities involving the location and interpretation of information.

Ongoing demonstration will be made of how facts learned in classes become woven together to reveal the interrelated patterns of the world.

Student assessment procedures will be used that include demonstration of the information literacy process, as through portfolios, projects, and performances.

The production of information, e.g., visual formats as videotapes, graphics, etc., will be included in curricular objectives.

The library/media center will be viewed as an extension of the classroom.

Teachers will be informed about and use resources outside of the school as appropriate.

National Goal 3 — Outcome Measures for Students

6. Students will demonstrate competency in the process of information literacy in order to become self-motivated, independent learners.

Outcome Measures

Students will:

read with understanding at grade level.

have the ability to access computers and other technologies.

have the ability to identify an informed need.

be able to formulate specific questions that focus the information need.

generate a list of various resources that could provide appropriate information.

have the ability to access a variety of information sources including computer-based and other technologies.

compare and contrast the formats, strengths and weaknesses of various sources such as primary sources, textbooks, data bases, indexes, video productions, coverage, and human resources.

select from among a variety of techniques those strategies most appropriate for a particular information search.

know how to learn.

National Goal 3 — Outcome Measures for Students (cont'd.)

be able to judge information based on internal and external criteria.

automatically question assumptions and have the skills to research alternative answers.

have a willingness to look at and understand various points of view.

be able to make informed decisions.

make connections between existing knowledge and new information.

apply problem-solving skills regularly in school and personal areas.

use critical thinking skills regularly in school as well as personal areas.

be able to work individually or in groups.

demonstrate flexibility in ideas and attitudes.

develop and refine oral and written communication skills.

choose appropriate resources to support a proposal, debate, argument.

recognize that accurate and complete information is the basis for intelligent decision making.

GOAL 5 OF THE NATIONAL EDUCATION GOALS OF 1990

GOAL 5 By the year 2000, every adult will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship.

- Every major American business will be involved in strengthening the connection between education and work.
- All workers will have the opportunity to acquire the knowledge and skills, from basic to highly technical, needed to adapt to emerging new technologies, work methods, and markets through public and private educational, vocational, technical, work place, and other programs.
- The number of quality programs, including those libraries that are designed to serve more effectively the needs of the growing number of part-time and mid-career students will increase substantially.
- The proportion of college graduates who demonstrate an advanced ability to think critically, communicate effectively, and solve problems will increase substantially.

Interpretation of Goal 5 from the Information Literacy Perspective

All Americans need to be lifelong learners.

The following measures speak both to those adults without information literacy skills as well as the need to ensure the availability of resources for realizing lifelong learning.

National Goal 5— Outcome Measures

1. National/State governments will be actively involved in improving the information literacy of citizens.

Outcome Measures

Policies/laws will be developed that support the availability of a wide variety of information resources for all Americans.

2. Communities will promote lifelong learning.

Outcome Measures

Public libraries, stocked with a wide variety of resources to meet information needs, will be available in every community.

Lifelong learning will be encouraged by a variety of adult programs offered by colleges, community services, and public libraries.

3. Business will promote the acquisition of information literacy skills by all.

Outcome Measures

Programs to keep job skills updated will be offered as on the job training.

National Goal 5 — Outcome Measures (cont'd)

4. All Americans will be able to seek information to solve problems and make informed decisions.

Outcome Measures

A wide variety of print and non-print resources will be available to all Americans at no/low cost to the public through public libraries, national on-line networks, and shared resources with business and public institutions.

The number of persons able to understand and paraphrase information in newspapers will increase.

Voter participation will increase.

The number of persons able to locate city, state, and federal data in telephone directories so as to register to vote, obtain car licenses, and fulfill other basic tasks will increase.

Americans will increasingly recognize that they are part of the global village and have an increased tolerance and appreciation for multi-cultural differences and divergent points of view.

5. Colleges will recognize that information literacy skills must be mastered by all college graduates.

Outcome Measures

None identified.

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Organizations that are represented in this study

| | |
|-------|--|
| AAACE | American Association for Adult Continuing Education |
| AACJC | American Association of Community and Junior Colleges |
| AASL | American Association of School Librarians |
| AECT | Association of Educational Communications and Technology |
| ACRL | Association of College and Research Libraries |
| ALA | American Library Association |
| ALISE | Association of Library and Information Science Educators |
| ANPA | Association of Newspaper Publishers of America |
| ASCD | Association for Supervision and Curriculum Development |
| IVLA | International Visual Literacy Association |
| MSCHE | Middle States Associations, Commission of Higher Education |
| NASSP | National Association of Secondary School Principals |
| NSBA | National School Boards Association |
| NCLIS | National Commission on Libraries and Information Science |
| NCTM | National Council of Teachers of Mathematics |
| NFBPA | National Forum for Black Public Administrators |
| NFIL | National Forum on Information Literacy |
| NPLL | National Partners for Libraries and Literacy |
| NAIS | National Association of Independent Schools |
| SHEEO | State Higher Education Executive Officers |

Appendix B

Research Process Competencies: A Planning Guide

A Guide for Curricular Planning

The planning guide on the following pages provides a new format for the searcher competencies previously identified in the Research Process Stages (p. 25) and based on the Information Literacy Model (pp. 4-9). The guide is designed as a working document for use by classroom teachers, library media specialists, and others who collaborate to plan and develop curriculum and instruction.

Research Process Competencies: A Planning Guide

To use this as a planning document, identify the grade levels, courses, or units into which you will integrate information literacy experiences. Use the planning space as an aid to the collaborative curricular planning process. This process is applicable to any curricular area, grades K-12. [Permission is granted to reproduce for instructional purposes.]

Competencies

Planning Space

1: EXPLORE/IDENTIFY THE NEED FOR INFORMATION

- A. Identify the assignment or other purpose for which information is needed.
- B. Identify general types of questions or other information needs.
- C. Begin a research process log/journal.
 - 1. Generate ideas using individual and group brainstorming strategies, e.g., discussion, quickwrite.
 - 2. Use cluster and map techniques to organize brainstorming notations.

2: FORMULATE THE CENTRAL SEARCH QUESTION

- A. Use a variety of questioning strategies (yes/no, open-ended, probing) to create possible questions related to the identified need for information.

Competencies**Planning Space**

- B. Focus the purpose of the research by formulating a specific question to be answered.
- C. Develop a preliminary central question or thesis statement.

3: RELATE QUESTION TO PRIOR KNOWLEDGE; IDENTIFY KEY WORDS, CONCEPTS, AND NAMES

- A. Record previous knowledge relating to the central question.
 - 1. Quickwrite.
 - 2. Brainstorm ideas and information about the central question by recalling previous experiences.
 - 3. Note key words, concepts, and names related to the search question.
 - 4. Demonstrate the ability to use strategies such as the following to organize known information: list, cluster, traditional outline, mind map, radial outline, other organizing strategies.
- B. Review research process journal to determine missing elements.
- C. When previous knowledge is limited, use general sources of information to focus on relationships and key terms for overview of topic:

Competencies

Planning Space

1. Skim chapters in books, encyclopedia articles, outlines, or summaries on the topic.
 2. Use video or other technology resources that presents general overviews of the topic.
 3. Interview a knowledgeable person.
- D. Re-state phrases/concepts in searcher's own words.

4: IDENTIFY POTENTIAL RESOURCES

- A. Identify potential resources.
1. List types of resources for seeking desired information: e.g., experts in the field of the search, newspapers, magazines, books, maps, electronic databases, audio and visual resources.
 2. Identify specific resources in each category that may be relevant to the search.
- B. Identify availability of resources; group according to where resources can be found.
- C. Use broad, general resources if more basic information about the search subject is needed.
1. Use information from dictionaries, encyclopedias and other general resources to identify major/significant sources of information regarding the central question.
 2. Recall words, terms, methods, facts, concepts, or specific items, by using broad, general information resources.

Competencies

Planning Space

5: DEVELOP GENERAL SEARCH STRATEGIES TO ORGANIZE THE SEARCH

- A. Use previously compiled terms and add subject headings and database descriptors which relate to the central question or thesis.
- B. Summarize in simple sentence form the main ideas regarding the central question.
- C. Ask further questions to clarify meaning.
- D. Construct sub-questions about the central question.
- E. Discriminate between more important and less important questions and exclude the least important questions.
- F. Create a plan for the search based on the resulting questions.
- G. Organize key words, phrases, and subject headings into Boolean and other relevant search strategies (See pp. 47-53, for further explanation).
- H. Reanalyze search strategies as success or failure is experienced.

Competencies

Planning Space

6: LOCATE AND EXPLORE PREVIOUSLY IDENTIFIED RESOURCES

- A. Identify and locate available resources from those previously listed.
 - 1. Recognize and use library media center resources, including the consulting role of the library media specialist.
 - 2. Reconsider general resource materials previously identified. Examine other resources such as periodicals, newspapers, special encyclopedias, non-print materials, also identified earlier.
 - 3. Consider resources outside the school: e.g., other libraries, museums, community resources, experts, electronic media.
- B. Use information access skills.
 - 1. Recognize that most information sources are indexed and that indexes may be in a variety of formats (e.g., card, list, microform, electronic).
 - 2. Recognize that information is arranged in one or a combination of ways: e.g., by subject, location, alphabetically, chronologically, or on a continuum.
 - 3. Locate the index for each information source and interpret all information in index entries.

Competencies

Planning Space

4. Use subject headings and cross references to find additional resources.
 5. Access relevant records in electronic databases.
 - a. Determine the possible databases to be searched.
 - b. Design the search strategy, narrowing or expanding the search parameters as needed.
 - C. Revise or redefine the central question as necessary.
- 7: SELECT THE MOST USEFUL RESOURCES FOR FURTHER EXPLORATION AND FORMULATE SPECIFIC STRATEGIES FOR USING THEM**
- A. Select the most useful resources from those available.
 1. Skim the article, media abstract, or text print-out to find a word, name, date, phrase, idea, or general overview of the resource.
 2. Scan/search materials in electronic or other non-print formats.
 - B. Conduct primary research as needed.
 1. Plan and complete an interview, experiment, or observation.
 2. Plan and conduct a survey/questionnaire.

Competencies

Planning Space

3. Write a letter of inquiry.
- C. Revise or redefine the central question or statement by narrowing or broadening as necessary.

8: SEARCH FOR RELEVANT INFORMATION

- A. Locate the sections of each resource that are useful in answering the search questions.
 1. Use indexes, tables of contents, headings within chapters, and topic sentences of paragraphs.
 2. Use skimming skills to extract information from selected resources.
 3. Find and make effective use of the relevant sections in non-print media, such as videotapes, films, and audiotapes.
- B. Continue to compile and organize information.
- C. Compare information with search questions.
 1. Identify gaps in information collected.
 2. Determine if additional sources are needed.
- D. Compile bibliographic information for each resource.
- E. Review, evaluate, update research process log/journal.

**9: EVALUATE, SELECT, AND ORGANIZE
INFORMATION**

- A. Screen the potential bits of information.
 - 1. Choose those that contribute to the search questions.
 - 2. Record the chosen information in an organized way.
- B. Evaluate for currency of information.
 - 1. Identify copyright date.
 - 2. Identify the actual date, era, time period the ideas were created.
 - 3. Understand the significance of dated vs. current information, or whether dating is significant at all.
- C. Establish authority.
 - 1. Identify the contributor/producer of the sources being used.
 - 2. Evaluate the contributor's/producer's work for motive, point of view, bias, scholarship, intended audience, etc.
- D. Distinguish among fact, opinion, and propaganda.
- E. Select information that is most useful in meeting the needs of the central question. Eliminate irrelevant information.

Competencies

Planning Space

- F. Take notes, using one or more of a variety of note-taking strategies, e.g., highlighting photocopies, electronic note pad, note cards.
 - G. Organize notes and ideas and develop outline or graphic organizer.
- 10: ANALYZE INFORMATION RETRIEVED:
INTERPRET, INFER AND INTEGRATE
- A. Read, view or listen to sources, identifying main ideas, opinions and supporting facts. Inconsistencies are noticed and questioned.
 - B. Interpret graphic sources for information: maps, charts, pictures, diagrams, graphs, tables, etc. Inaccuracies are discovered and rejected.
 - C. Derive valid inferences from information sources. Substitute new ideas when information is inaccurate.
 - D. Summarize and paraphrase important facts and details that support the central question. Compile notes/information according to the outline previously developed. Create new conclusions about facts from different perspectives.
 - E. Review compiled information to bring personal meaning and understanding to the original problem, topic, or question.

Competencies

Planning Space

- 11: DETERMINE HOW TO USE/PRESENT/
COMMUNICATE INFORMATION;
ORGANIZE INFORMATION FOR INTENDED
USE; USE INFORMATION
- A. Determine the most effective method of presentation.
1. Identify and use appropriate media technologies.
 2. Consider presenting thoughts, feelings, and creative ideas through student-produced media: books, posters, transparencies, slide shows, puppets, audio and video tapes, hypermedia, etc.
- B. Plan the project, e.g., dramatization, debate, writing, multimedia slide show, videotape presentation, demonstration, exhibit.
1. Decide purpose; e.g., to inform, persuade, entertain, etc.
 2. Select an appropriate organizational style.
 3. Determine main points to be made or arguments to be developed and adapt working outline.
 4. Use the composition process; including prewriting, rough draft, writing/designing/scripting, etc. (Most forms of presentation require some written planning.)

| Competencies | Planning Space |
|--------------|----------------|
|--------------|----------------|

- 5. Prepare a bibliography or list of all references used.
- C. Make a clear, well-supported presentation which answers the central question, or solve the problem by applying search information.
- D. Draw conclusions based on search information.

12: EVALUATE RESULTS; EVALUATE PROCESS

- A. Evaluate the project and the research process.
 - 1. Reflect on the process as a whole.
 - 2. Reflect on the information sources that were used.
 - 3. Review the research process log/journal.
 - 4. What is the quality of the product created?

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Index



Index

- Access (to information), vi
Active learning, 110, 132
Agencies - evaluation of, 24
American Association of School Librarians, vi
Arguments, 109
Art and culture, 116
Arts, The, 114-15
Assessment, 96-97
 procedures (for students), 127
 process of, 24
 questions for, 40-41
Assignments
 practice, 54
 task-oriented, 31
Association for Educational Communications and Technology, vi
Attitudes - student assessment of, 24
Authentic assessment models, 40
Authority of information, 21, 22
Ayson, Veronica, ii
- Behaviors (characteristic of student researchers), 15
Berkowitz, Robert E., 10, 11
Bibliographies, 21, 23
Bilingual education, 99
Biography, 73-75
Birds, 58-59
Boole, George, 51
Boolean logic, 44-45, 46, 51
Boolean operators, 45
Boolean searching, 18
Brainstorming, 16, 26, 44, 57
Brainstorms and Blueprints, 10
Business education, 34
Businesses, 128, 139
- California Curriculum Frameworks, 92-94
California Department of Education, 87
California history, 99
California Media and Library Educators Association.
 Curriculum Committee, ii, 87
California Task Force Reports, 89-118
Categorizing, 111
Caught in the Middle, 90
CCSSO, 128
Central questions, 16, 24
 revision and redefinition of, 19
Character values, 107
Children, 131
Citations, 19
Clustering, 17, 44
CMLEA. *See* California Media and Library Educators Association
Collaboration, 31
Collaborative groups, 111
Collaborative learning, 117
Collaborative planning, 26
Colleges, 128, 140
Communicating, 15, 90, 111
Communities, 116, 128, 131, 139
Community resources, 117
Community service, 60-61
Comparing, 111
Composition process, 23
Concepts, 17
Conceptual models, 99
Conclusions, 24, 93
 drawing of, 22
 formulation of, 23
Consistency of information, 21
Consumer education, 34
Content objectives, 27
Context clues, 22
Controversial issues, 102-3
Cooperative grouping, 57. *See also* Groups
Council of Chief State School Officers, 128
Copyright dates, 22
Creative thinking, 98
Creativity, 23, 24
Critical thinking, 127, 136
 skills, 137
Cross references, 19
Culture, 105
Cultures, 114-16
Currency of information, 21
Current events, 117
Curricular assessment, 127, 134
Curricular objectives, 127, 134
Curricular Partnership Planning Model, 27, 29
Curricular units
 brainstorming of, 26
 development of, 27
- Data
 analysis of, 90
 synthesis of, 90
Database descriptors, 18
Databases, electronic, 19
Decisionmaking, 137, 140
Delphi research, 122
Democratic values, 107
Dialog Information Services, Inc., 52
Diaries, 117
Doyle, Christina, ii
- Ecology, 58-59, 83-85
Economics, 105
Editing, 55
Eisenberg, Michael B., 10, 11
Engaged learning, 110

Index

- Engaging activities, 98
Engaging problems - student-generated, 37-38
English education, 35
English-Language Arts Framework, 92
Equipment - purchase of, 117
Evaluation (of units of instruction), 27-28
Evaluation - criteria of, 27-28
Evidence, 109
Experimentation, 20, 90, 110
- Facts, 22
 supporting, 22
Feelings, 23
 student assessment of, 24
Films - viewing of, 22
Final draft, 55
Fire-safe containers, 80-82
Flexibility, 137
Flow charting, 57
Focus statements, 98-99
Foreign language, 35
Formats - comparison of, 136
Frameworks, 30
Fund raising projects, 65-66
Funds - allocation of, 117
- Garbage, 83-85
Gardner, Howard, 33
Geography, 105
Goal 1, 124, 125-27, 130-31
Goal 3, 124, 132-37
Goal 5, 124, 127-28, 138-40
Goals 2000, v, 120
Gossard, Jenne, 53
Graphic organizers, 22, 57
Groups, 135, 137
Guide and Criteria for Program Quality Review Elementary, 95
Guide and Criteria for Program Quality Review Middle Level, 95
- Hands-on-activities, 118
Harlan, Nancy, ii
Haycock, Carol-Ann, 30-31
Headings, 20
Health education, 35
Higher-order thinking skills, 94. *See also* Thinking
Historians - students as, 103-4
Historical role playing, 70-72
History, 35
 use of literature to understand, 104-5
History-social science, 116-17
History-social science criterion, 101
History-Social Science Framework, 92
Homemaking education, 34
- Homes, 131
- I-Search Paper, 53-55
- Ideas
 new, 22
 study of, 115
- Implementation (of instructional units), 27
Improving Student Performance Through Learning Technologies, 128
- Independent learning, 90
Indexes, 19, 20
Industrial education, 36
Inferences, 22, 111
- Information
 access to, 2
 accuracy of, 137
 acquisition of, vi
 actual date created, 22
 analysis of, 22-23
 application of, 23
 arrangement of, 19
 authority of, 21, 22
 choice of, 21
 communication of, vi, 23-24
 consistency of, 21
 currency, 21
 dated versus current, 22
 evaluation of, vi, 3, 21, 22
 extraction of, 20
 gaps in, 21
 gathering of, 21
 inferences from, 22
 integration of, 22
 interpretation of, vi, 21, 22
 irrelevant, 22
 judgment of, 93
 needs, 15-16
 new, 91
 objectivity of, 21
 organization of, 17, 20
 presentation of, 23-4
 problems, 2
 production of, 135
 recording, 21
 relevancy of, 20-21
 screening of, 21
 understandableness, 21
 use of, 2, 23-4
 usefulness, 21
 variety, 134, 136
- Information Age, 2
Information literacy, vi, 30, 39, 88
 definition of, 2, 123
 instructional strategies for, 42-55
 integration of, 34-38

Index

- Information literacy models, 4-11
Information Literacy Outcome Measures Project
 members, 141-42
 organizations, 142
Information literacy skills, 128
Information literate person, 2
Information Power, vi, 88
Information Problem Solving, 10
Information process models - comparison of, 11
Information Skills Curriculum Guide, ii
Information Skills for an Information Society, 10
Information society, vi
Information sources - evaluation of, 24
Information-rich resources, 131
Inquiry, 30
Inservice, 133
Instructional activities - planning for, 39
Instructional materials, 112
Instructional partnerships, vii
Instructional strategies, 8-9
 for information literacy, 43-55
 model, 7
Interdisciplinary education, 37
Interpersonal skills, 23
Interviewing, 17, 20, 57, 117
Investigations, 30, 118
Irving, Ann, 10, 11
It's Elementary! Elementary Grades Task Force Report,
 89
- Japan, 67-69
Job training, 139
Journals, 21, 43, 57, 117
 evaluation of, 24
Justiniano, Gloria, ii
- K-W-L, 44
Key Word Searching, 44, 46-50
Key words, 17, 18
Knowledge
 existing, 24
 student assessment of, 24
Korobkin, Marsha, ii
Kuhlthau, Carol, 10, 11
- Language arts, 35
Language arts criterion, 99-101
Language skills, 23
Lathrop, Ann, ii
Lazear, David, 33
Learning
 facilitators of, 31
 students and, 94
Learning activities - design of, 31
Learning environment, 30, 32
 structure of, 30-31
- Learning process, 30
Learning resources, 32
Learning strategies, 90
Learning styles, 108
Learning to learn, 90-91
Learning opportunities, 135
Letters (of inquiry), 20
Libraries, 131
 evaluation of, 24
Library media centers, 92, 100, 126, 127, 133, 135
 resources of, 19
Library media specialists, 117, 127, 134
 and assessment, 40
 consulting role of, 19
 partnership role of, 26-29
Lifelong learners, 124, 128, 132, 138
Listening, 22
Lists, 17
Literacy club, 13
Literature, 117
 use for history education, 104-5
Local history, 117
Loertscher, David, ii, 29
Logs, 43, 117
Los Angeles County Office of Education, ii
- Macrorie, Ken, 53
Main ideas, 18, 22
Main points, 23
Manipulative materials, 109
Map reading, 22
Mapping, 44, 57
Materials, 133
 purchase of, 117
Mathematics criterion, 109-110
Mathematics education, 36, 98
Mathematics Framework, 93-94
Meaning
 clarification of, 18
 personal, 23
Meaning-centered curriculum, 43, 87
Metacognition, 45
Miller, Karen Chemlir, ii
Mind mapping, 17
Mind over Media, 10
Multicultural education, 102
Multimedia, 107, 110
Multimedia resources, 99
Multiple intelligences, 33
Multiple Intelligences Tool Box, 33
My search form, 48-50
- Naisbett, John, v
*Nation Prepared: Teachers for the 21st Century: The
 Report...*, v

Index

- National Education Goals of 1990, v, 121, 124
National Educational Goals of 1990, 120
National Forum on Information Literacy, 121, 128
National governments, 126, 128, 131, 133, 139
Needs, 136
Note taking, 21, 22, 23, 45, 117
Notes - classification of, 23
- O'Brian, Bonnie, ii, 30-31
Objectives - writing of, 27, 30
Objectivity of information, 21
Observation, 17, 20, 111
Ongoing assessment, 28
Ongoing demonstrations, 127, 135
Open-ended approaches, 118
Opinions, 22
Oral communication, 137
Oral history, 117
Ordering, 111
Organizational style, 23
Outcome Measures for Information Literacy Within the National Educational Goals of 1990, ii, 121-42
Outlining, 17, 21, 23, 45
- Paraphrasing, 17, 21, 22
Parental support, 126
Parenting classes, 131
Parents, 130, 131, 133
Partnerships, instructional. *See* Instructional partnerships
Performance-based assessment, 40-41
Performing arts education, 36, 114
Personal experiences (of students), 100
Perspective, 22
Persuasion, 110
Photographs - study of, 22
Physical education, 35
Pitts, Judy M., 10, 11
Points of view, 17, 137
Pollution, 58-59
Portfolios, 40, 96-97, 108-9
PQR. *See* Program Quality Review
Presentations, 23, 55
 methods of, 23
 well supported, 24
Previous experience, 16
Prewriting, 23
Primary research, 20
Problem solving, 90, 93, 118, 127, 135, 140
Problems
 clarification of, 92
 definition of, 92
 formulation of, 98
 real, 14
- Process (term), 13
 assessment of, 40
 evaluation of, 24, 27-28
 logs, 21
 objectives, 27
Process oriented research, 13
Products, 14
 evaluation of, 27
 quality of, 24
Professional practices, 116-18
Program Quality Review, 95-118
 criteria for, 98-118
 process of, 96-97
Projects
 evaluation of, 24, 109
 planning, 23
Propaganda, 22
Public libraries, 139
Purpose, 23
Purucker, Mary, ii
- Questioning techniques, 91
Questioning, 137
 strategies, 16
Questionnaires, 20
Quickdraw, 43
Quicktalk, 43
Quickwrite, 16, 43
- Radial outlining, 17
Rea, Zhita, ii
Reading, 22, 117, 136
Reasoning, 90
Reference sources, electronic, 17
Reflective thinking, 90, 91
Relating, 111
Religion, 105
Reporting, 54
Reports - written, 23
Research, 118
 assessment of, 40
Research as a Process, ii, 9
Research/Evaluation Perspectives, 89
Research planning sheet, 28
Research process, vii, 13-14, 33
 as a performance, 40
 evaluation of, 24
 stages of, 34
 stages of (model), 6
Research process competencies, 144-55
Research process log, 24
Research process model, 57
Research process stages, 8-9, 15-24
Research scenarios, 57-85

Index

- Resource sharing, 126
Resource-based learning, 30-32, 125, 133, 135
 model, 32
Resources, 112, 116, 140
 allocation of, 118
 availability of, 18
 beyond the classroom, 91
 beyond the school, 19, 57
 choice of, 137
 identification of, 17
 lists of, 136
 location of, 19
 potential, 17
 selection of, 20
 specific, 18
Responsibilities (of teachers and library media specialists), 27

Restating, 17
Restructured schools, 30
Results - evaluation of, 24
Revising, 54-55
Rough drafts, 23, 54

Scanning, 20, 45
SCANS Report, 127, 128
Schematics - reading, 22
School goals, 126
Schools, 134
 restructured, 30
Science - integration of, 112-13
Science criterion, 110-14
Science education, 36, 98
Science fair, 62-64
Scientific investigators, 111
Scripting, 23
Search (term), 13
Search question. *See* Central search question
Search strategies
 development of, 46
 general, 18
Search worksheet, 52
Searcher's thinking, 8-9
Searcher's thinking process model, 5
Searching, 53
 electronic, 17
 plan for, 18
 strategies of, 18
Second to None, 91
Secretary's Committee on Achieving Necessary Skills (SCANS) Report, 127
Seeking Meaning, 10
Service, 60-61
Sharing (as part of the search process), 54
Skills development - teacher monitoring of, 24

Skimming, 17, 20, 45
Smith, Frank, 13
Social sciences, 35
Sources (for research), 117
Sources
 access to, 19
 additional needed, 21
State Departments of Education, 126, 133
State governments, 126, 128, 133, 139
Statistical data - reading, 22
Strategies, 17, 90, 108
Stripling, Barbara K., 10, 11
Student learning
 facilitation of, 32
 guiding, 31
 tracking and assessment of, 32
Student objectives, 27
Student work, 99-116
Student-produced media, 23
Students, 136
 guidelines for, 27
 role of, 30
Study and Information Skills across the Curriculum, 10
Study skills, 90, 92
Subject headings, 18, 19
Subquestions, 18
Summarization, 18, 21, 22
Surveys, 20

Tables - interpretation of, 22
Tables of contents, 20
Teacher - role of, 30
Teacher objectives, 27
Teacher-generated tasks, 34-37
Teachers, 127, 135
 and assessment, 40
 partnership role of, 26-29
Teaching strategies, 127, 135
Team-teaching, 26
Techniques - variety of, 136
Technology, 23, 108, 109, 117, 136
 use of, 17
Technology education, 36
Themes in Four CA Task Force Reports, 89
Thesis statement, 16, 18
Thinking, 21, 90, 93
Thinking process, 24. *See also* Searcher's thinking process model
Thinking-centered curriculum, 43, 87
Thoughtful research, 26
Thoughts, 23
Time lines, 57
Toffler, Alvin, v
Topic - selection of, 53
Topic sentences, 20

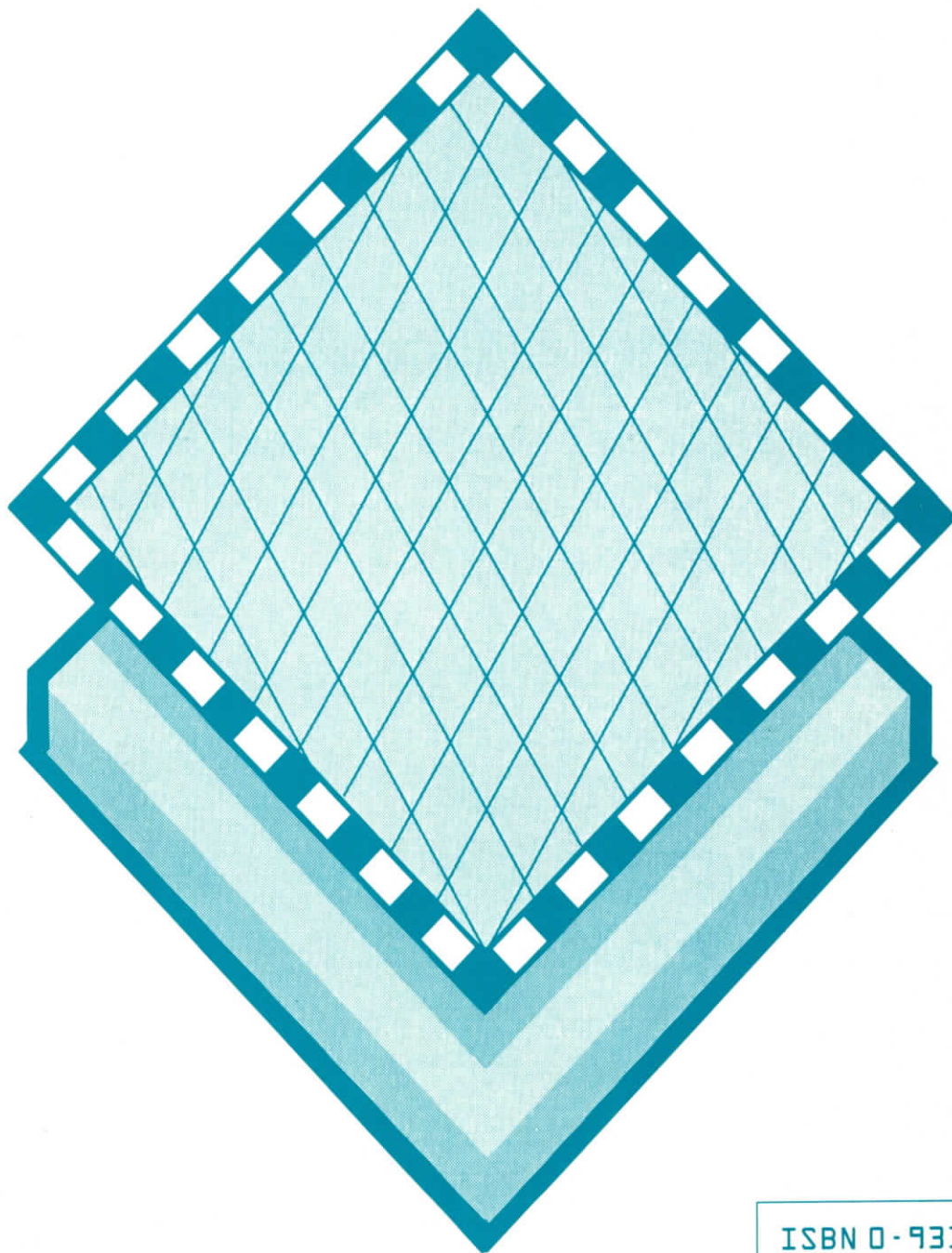
Index

- U.S. History - Revolution, 73-75
- Understanding, 23
- Units of instruction - evaluation of, 27-28

- Venn diagrams, 44-45, 51, 57
- Verbal skills, 23
- Video, 17
- Vietnam War, 76-79
- Viewing, 22
- Visual and performing arts criterion, 114
- Visual and Performing Arts Framework*, 94

- Visual arts, 36, 114
- Visual skills, 23
- von Wodtke, Mark, 10

- Washington. Office of Superintendent of Public Instruction, ii
- Waste disposal, 83-85
- What Work Requires of Schools*, v, 127, 128
- Writing, 117
 - structure of, 22
- Writing process, 101
- Written communication, 137



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