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**Writing to learn science in first grade**

**Prassas, Lea, M.A.**

**The University of Arizona, 1992**

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WRITING TO LEARN SCIENCE IN FIRST GRADE

by

Lea Prassas

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A Thesis Submitted to the Faculty of the  
DEPARTMENT OF LANGUAGE, READING AND CULTURE  
In Partial Fulfillment of the Requirements  
For the Degree of  
MASTERS OF ARTS

In the Graduate College  
THE UNIVERSITY OF ARIZONA

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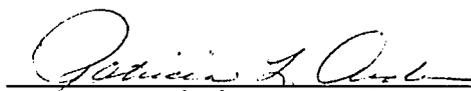
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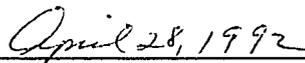
## APPROVAL BY THESIS DIRECTOR

This thesis has been approved on the date shown below:



Patricia L. Anders  
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For my parents George and JoAnn Prassas  
The first of many for your shelves

## TABLE OF CONTENTS

	Page
LIST OF TABLES.....	6
LIST OF ILLUSTRATIONS.....	7
ABSTRACT.....	8
1. INTRODUCTION.....	9
2. REVIEW OF RELATED LITERATURE.....	23
The Inquiry Cycle.....	23
The Reading and Writing Connection.....	26
Writing to Learn Activities.....	29
The Writing Process.....	47
Collaborative Learning.....	50
Reflective Teaching.....	54
3. STUDY DESIGN.....	57
Setting and Participants.....	57
Methods.....	59
Data Sources.....	59
Procedures of the Analysis of the Data.....	60
4. ANALYSIS OF DATA.....	63
5. CONCLUSIONS.....	80
Purpose of the Study.....	80
Findings.....	82
Implications.....	86
Future Research Questions.....	86
APPENDIX A: LESSON PLANS.....	88
APPENDIX B: QUESTIONS FOR STUDENT INTERVIEWS.....	101
REFERENCES.....	103

## LIST OF TABLES

Table	Page
1 Concept development.....	67
2 Writing Activities and Teacher's Planning.....	69
3 Collaborative Versus Independent Writing.....	72
4 Writing Activities and the Writing Process...	74
5 Students' Opinions on Freewriting.....	75
6 Reading and Writing Versus Direct Instruction.....	78

## LIST OF ILLUSTRATIONS

Figure	Page
1 Inquiry Cycle.....	16
2 Writing to Learn Activities.....	20
3 Semantic Mapping.....	37
4 Venn Diagram.....	37
5 Inquiry Cycle.....	81
6 Writing to Learn Cycle.....	82

### ABSTRACT

The purpose of this study was to determine if first graders could learn how to write while writing to learn. An inquiry cycle was developed to guide the students as they learn content area material. Writing to learn activities were selected that promote, or facilitate, the thinking process of the inquiry cycle. The writing to learn activities are: freewriting, brainstorming, questioning, graphic organizers, review writing, and elaboration writing. Twenty-five first graders learned about our solar system and plans by engaging in these writing to learn activities. Finding: The writing to learn activities provided the students with opportunities to go through the steps in the writing process of composition, as well as provide opportunities to go through the steps in the inquiry cycle to learn new information about the topic. In addition to writing and concept development, the writing to learn activities encouraged collaborative learning and reflective teaching practices.

## CHAPTER 1

### INTRODUCTION

As a graduate student I have experienced how writing has helped me to learn new material, mix new information with existing schemata, and apply concepts and ideas to my real life experiences. My writing is an extension of my thoughts, Writing allows me to put ideas on paper, play with them, and learn and grow from them. I use writing as a vehicle for learning in the content areas of education. My writing to learn serves a valuable purpose for me as it shapes my thinking and learning.

As a first grade teacher I have experienced the challenges of teaching young children how to read and write. Early childhood educators strive not only to teach these processes, but to teach the purpose, values, and functions of these skills, or do we?

An examination of my own teaching practices and attitudes, and those of my colleagues and school district, leads me to the conclusion that we view writing as a subject area in the language arts curriculum, rather than as a vehicle for learning in the content areas at the primary level. In addition, my interpretation of the professional and scholarly literature suggests that this is a common trend across school districts and across time.

To investigate this point, an observational study (Sunflower & Crawford, 1985) was designed to answer the questions: How frequently are students writing in elementary school and what forms of writing occur? Data were collected in 75 elementary classrooms in 25 midwestern schools during a 15 day period. The findings included the following: One-third of the teachers were doing some writing activities, one or more a week, with their students. Two-thirds of the teachers were doing little, less than once a week, or no instruction in writing. Sixty-four percent of the writing activities were associated with language arts. Only 9% of the observed writing were associated with subjects across the curriculum. Twenty-seven percent of the writing was for the sake of learning to write. Composing was limited to only a few forms--sentences, stories, and letters. Graves (1978) did a similar study and found similar results. Six years later, not much improvement in the frequency or quality of writing in our elementary schools is evident. This is happening despite the fact that teachers are being trained to teach writing and its values across the curriculum (Sunflower & Crawford, 1985).

Further, Sunflower and Crawford (1985) looked into the reasons why writing instruction was not incorporated into the majority of the elementary schools' curricula. They found that teachers viewed writing as some extra thing that

needed to be added to a full and demanding day. This perception of writing could give researchers and the planners of inservices a new angle to approach training and educating teachers on how to use writing to learn across the curriculum how to incorporate writing activities across the curriculum.

To look into the 1990's, I examined the mandated writing curriculum of my school district. First graders are required to use the writing process to write poems, letters, and personal experience narratives. These types of writing activities are associated with language arts. In addition, the first graders are required to participate in IBM's Writing to Read Program. This program consumes approximately three to five hours of instructional time per week, depending on how often a class is required to attend by the building principal. Here is another example of writing instruction being viewed as a subject area, another program or piece of curriculum to be worked into a jam-packed schedule. Writing to learn in the content areas is not promoted by the writing curriculum that all teachers in the district are expected to follow. As a result, writing is viewed as a piece of instruction, one more thing to do, to add to a busy day.

However, elementary level teachers have the opportunity to incorporate writing across the curriculum. Doing so would allow and promote the values of writing to enhance the learning and discovering of content areas, as well as provide students with opportunities to strengthen their writing proficiency. What are the values of writing to learn in the content areas?

A review of the literature (Goggin, 1985) indicated that a major obstacle in promoting writing in the content areas is convincing teachers that writing will help students learn the subject matter. Writing is an extension of the writer's thoughts. Writers need something to write about; they need content. Promoting writing to learn in a content area gives a student the opportunity to think about the subject matter, to clarify their thinking about the subject (Goggin, 1985). This theory suggests that content area teachers view writing as a way of learning and thinking instead of something extra to add to what is already being done in the classroom.

There is a difference between writing in the content area and writing to learn in the content area. Writing in the content area is often viewed as a means of evaluation. The focus is on the product and may be in the form of an essay or term paper that is handed in at the end of the course of study. This is the type of writing that teachers

may view as an extra assignment to grade. On the other hand, writing to learn activities are designed to help the students learn the content material. Isn't this a goal of the content area teacher? The writing is a vehicle for learning and thinking about the subject matter (Leahy, 1989).

Theories also suggest that writing can shape thinking. A writing activity can be designed to shape the student's thinking as they go through the learning process (Langer & Applebee, 1987). For example, Leahy (1989) credits James Britton with identifying two main functions of writing to promote learning: expressive and transactional writing. Expressive writing is an informal style of writing. The writer is thinking on paper and letting the ideas flow. Transactional writing represents the finished product of expressive writing. Term papers, proposals, and reports are examples of transactional writing. Expressive and transactional writing focus on the process the students go through as they think, write, and learn.

In addition to shaping thinking, writing to learn activities may give teachers valuable information for planning instruction. The theories behind reflective teaching suggest that writing to learn activities will help the teacher assess what the students already know, what they want to know, and how the students are progressing through

the inquiry process. This information is valuable to the teacher's lesson planning and instruction (Goggin, 1985; Leahy, 1989).

Theoretically, the concept of writing to learn is well founded, but there is little in the literature to inform the first grade teacher. What are the values of writing to learn in first grade?

The purpose of this study is to engage first graders in writing to learn activities while studying science content. This study is a descriptive participant observation with the teacher as the researcher. First graders were chosen for this study for two reasons. First grade is a time when most subject areas are formally introduced for the first time. This is a time when they are learning how to learn in school for the rest of their lives. Teaching them a pattern of writing to learn activities will, theoretically, shape their thinking in a positive way. These young children may take these skills with them through their school years as they use them and develop them. Secondly, traditionally primary grades are viewed as a time to learn how to read and write, and intermediate grades a time to read and write to learn. This study investigated whether or not first graders could indeed learn to write as they write to learn.

One of the beginning steps in planning this study was to select the writing to learn activities. The literature offers many different types of activities that may be used in a variety of ways. I realized at this point that I needed to make some critical decisions as I selected my activities. Realistically, teachers have to limit the time spent on all subject areas to accommodate an overwhelmingly loaded curriculum. The writing activities needed to serve their intended purposes, yet be manageable and easy to incorporate in studying a content area. If not, these activities may end up on a shelf collecting dust along with other unpractical programs.

My goals in incorporating writing to learn activities into the curriculum were to: help teach the content area objectives, shape the students' thinking through the inquiry process, and to improve writing proficiency.

To begin the writing to learn selection process, I examined my adaptation of the inquiry cycle (Harste, Short, & Burke, 1991), the process that I intended to teach the students in my class. In addition to the inquiry cycle, I examined D. Ogle's (1986) K-W-L strategy for accessing appropriate knowledge when reading expository text. This strategy encourages the reader to think about what they know, what they want to know and, after reading, what they

learned. This interpretation is presented graphically in Figure 1.

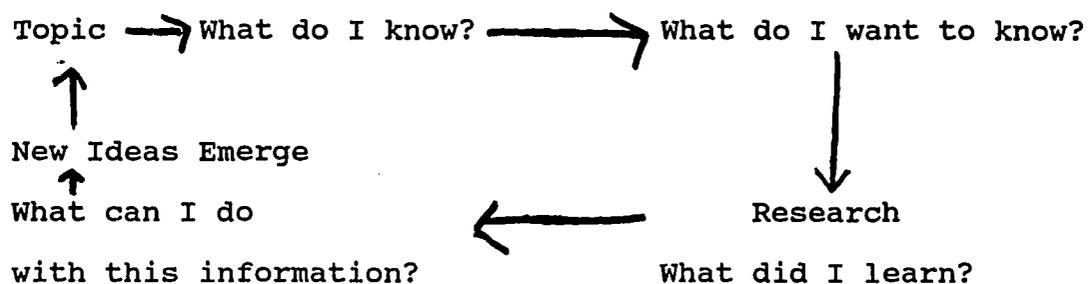


Figure 1. Inquiry Cycle

Next, I looked at the writing process used in my school district and described by Donald Graves (1983). These processes are:

1. prewriting
2. writing
3. revise
4. proof-reading
5. final copy

This study was designed to help students learn both writing and content by offering first graders the following writing activities: freewriting, brainstorming, questioning, graphic organizers, review writing, and elaboration writing. These activities were selected because they help to promote, facilitate, or enhance the thinking

that goes on in an inquiry cycle.

Given a curricular topic, the student engaged in individual freewriting and brainstorming. These types of expressive writing are related to the prewriting step of the writing process, and the first step of the inquiry process. Theoretically, freewriting provided students the opportunity to think about what they knew about the topic, to tap prior knowledge and formulate questions for investigation. An all class brainstorming session gave the students a chance to share prior knowledge about the topic. As the theory would predict, this sharing time allows one student's comment to trigger thoughts in other students. In addition to activating prior knowledge, theoretically freewriting and brainstorming served two other purposes: allows the teacher to assess what the group knows about the topic, and empowers students with their knowledge.

After the class brainstorming session, the class was given the opportunity to form questions and to write those questions. This activity addressed the "what I want to know" step in the inquiry cycle.

During the research phase, the learner will learn how to use graphic organizers. Graphic organizers are designed to help the learner organize information to promote

comprehension of relationships among ideas and concepts (Cassidy, 1989).

The next type, review writing, is designed to provide students an opportunity to review new material about the topic. This took place after the students had studied about the topic to investigate answers to their questions. While students learned new information, they accommodated or assimilated it with their prior knowledge about the topic. This content area writing, or transactional writing, took on a variety of forms from one page text to hang on the wall to writing and illustrating content area books. The content area writing was done either individually by the students or in collaborative groups. As theories would predict, collaborative learning allowed students to share their ideas, and language, about the topic and showed how learning can be a social activity.

In addition to developing schemata about the content areas, review writing helped to show the reading and writing connection. By writing content area books, the children were involved in the process of writing informational books. They gained practice in writing with the structure of expository text. This transactional writing gave the students the opportunity to go through the steps of the writing process as they went from thinking about their topic to presenting their writing in a final form for sharing.

The third type of writing engaged the students in using higher order thinking skills to solve problems. This type of writing was called elaboration writing. The children used content area information to answer "What if. . .?" situations. Again, as the children engaged in this type of writing they had the opportunity to go through all the stages of the writing process.

Throughout all the different types of writing to learn activities, the students were exposed to a variety of content area materials. These materials included literature (fiction and non-fiction), field trips, filmstrips, etc. The children learned how to use a variety of graphic organizers to sort and digest all the information that was presented to them as they investigated in the content area. These graphic organizers included a variety of webs, charts, and diagrams. In the inquiry cycle, these activities and materials supported the research step.

In summary, the writing to learn cycle (Figure 2) was developed to shape thinking through the inquiry cycle, as well as teach the steps in the writing process.



show how well the students were able to synthesize and analyze the content area material as they make decisions and problem solve. By examining all the writing to learn products and processes the teacher was able to learn what the students know, want to know, how they are processing information, and how the instructor can meet the students' needs.

Students' attitudes about the writing activities and teaching methods were probed during this study. During taped recorded interviews, the students were asked about their feelings, likes and dislikes, and learning process during various aspects of this study.

All of these activities served as data sources to answer the following research questions:

1. In examining the freewriting and the review writing, did the students show signs of concept development?
2. How did the writing to learn activities adapt the teacher's planning and instruction?
3. What are the benefits of students' collaborative learning versus working independently?
4. How did the writing to learn activities fit into the writing process that Graves (1983) and others suggest that a person goes through when composing?

5. Do first graders prefer reading and writing to learn as an alternative to teacher's direct instruction? Why?

This study includes a description of methodology, the classroom, students, and teacher, in Chapter 3. Chapter 4 will present an analysis of the data to answer the question. Chapter 5 will conclude with a discussion of the findings in Chapter 4.

## CHAPTER 2

### REVIEW OF RELATED LITERATURE

The first part of this review will discuss the principles behind an inquiry cycle and the reading and writing connection. Next, information will be provided on the writing to learn activities used to promote an inquiry cycle and the writing process. This chapter will conclude with a look at the roles of the reflective teacher, and collaborative learning in the content area classroom.

Before promoting writing to learn while learning to write, one must decide on a method of teaching students how to learn and acquire knowledge. Inquiry cycles offer a perspective on how students may learn in the content area classroom.

#### The Inquiry Cycle

The main focus of an inquiry cycle is the process of learning new information. A teacher who teaches the inquiry cycle is teaching a process of learning new information.

Why teach a process of learning? Inquiry cycles promote content literacy, an ability to use reading and writing for the acquisition of new content in a given discipline. Content literacy helps students extend their knowledge even after a course had ended (McKenna & Robinson, 1990).

Inquiry cycles may come in different formats, depending on the needs of the learner. An example of an inquiry cycle is one designed by Anders (1991). This cycle is a negotiated curriculum between the students and the instructor. It starts with questions to investigate. Next, the students make a plan for finding the answers to the questions. The plan helps the learners to gather and organize data. The next step is to interpret the data through evaluation, analysis, categorizing, mapping, charting, and graphing. After interpreting the data, the students present their findings. This presentation includes explanations of thinking to create new understandings. The cycle integrates content learning with the language arts to create meaningful, authentic work. Mini-lessons are taught throughout the cycle whenever needed (Anders & Pritchard, 1991).

Another example of an inquiry cycle was designed by Carolyn Burke (1988). This cycle begins with a topic that surfaces from experiences, questions are formulated and research begins. Collaboration with other inquirers is an element promoted by this cycle. Students think about their learning through writing, peer editing, and publishing. Inquirers reflect on their knowledge with others. The cycle continues as new questions and experiences come into focus (Harste, Short, & Burke, 1988).

Although there are a variety of inquiry cycles, they share common characteristics: (a) They depend on the learner having some prior knowledge on the topic to build on (McKenna & Robinson, 1990). The inquiry starts when the students want to expand this knowledge. (b) Inquiry cycles involve stages with thinking processes. The learners use reflection to monitor their learning through metacognitive strategies (Anders & Pritchard, 1991; Anstey, 1988; McKenna & Robinson, 1990). (c) Reading and writing are complimentary tasks (Anders & Pritchard, 1991; Anstey, 1988; McKenna & Robinson, 1990). They are used to gain knowledge, write to review, synthesize, and evaluate (McKenna & Robinson, 1990). (d) Inquiry cycles involve problem solving and problem posing. There are no predetermined solutions or ways to arrive at solutions (Anstey, 1988). (e) Inquiry cycles teach students how to become independent learners (Anstey, 1988) because they are using a process that can be applied to learning any content. (f) Inquiry processes are recursive. The learner may revert back to, or advance to, any phase whenever it is appropriate (Anders & Pritchard, 1991; Anstey, 1988).

In addition to similar characteristics, inquiry cycles work best within a particular learning environment. This environment allows the students the freedom of movement and the freedom to design their own study. This environment is

rich with resources and materials to aid with the process. Finally, the environment and teacher encourages the students to be risk takers and make decisions about the course of learning (Anstey, 1988).

As stated earlier in this chapter, the inquiry cycle promotes content literacy, an ability to use reading and writing for the acquisition of new content in a given discipline (McKenna & Robinson, 1990). Now we will take a deeper look into the reading and writing connection. An understanding of how we learn to read and write, and the reading and writing connections, will help us to understand how they facilitate the learning process.

#### The Reading and Writing Connection

How do we naturally learn how to read and write? Literacy is learned through a natural process (Harste, Short, & Burke, 1988; Teale, 1982) when people interact with the environment and each other (Goodman & Goodman, 1983; Teale, 1982). Our environment offers meaningful and purposeful reasons for people to learn how to read and write for communication. Children learn to recognize signs (Goodman & Goodman, 1983), and labels on cereal and toy boxes. Children use in writing what they observe in reading. For example, beginning writers may use capital letters primarily because that is what they observe in sign reading (Goodman & Goodman, 1983). Children will experiment

with the print they are reading (Shanahan, 1988). Family members may also model reading and writing behavior for young children. When children are exposed to demonstrations and materials, they can learn how to read and write without being taught (Teale, 1982).

In addition to being a social, interactive process of learning, reading, and writing are gradual, developmental processes. The stages of development may take years, or a lifetime to develop (Shanahan, 1988; Smith & Dahl, 1984). We build our knowledge of reading and writing through experiences. As Piaget suggests, we use the processes of accommodation and assimilation to learn the complexity of the reading and writing process (Teale, 1982).

An understanding of how children naturally acquire reading and writing has valuable implications for classroom instructional practices. First, both reading and writing instruction should start in the early years and both skills should be explicitly taught (Shanahan, 1982). In this context, "explicitly taught" means to intervene and provide instruction for the students. Next, reading and writing should be taught through meaningful, purposeful experiences (Goodman & Goodman, 1983; Harste, Short, & Burke, 1988; Shanahan, 1988). For example, children should learn to read by reading literature, and learn to write in order to communicate or learn. Finally, reading and writing share

several connections and one process can be used to teach each other (Shanahan, 1988).

How are the processes of reading and writing connected? A review of scholarly and professional research suggests that reading experiences influence writing. Good writers are usually good readers (Stotsky, 1983). Why? Books are literary models for writers (Stotsky, 1983). We learn writing rules unconsciously by reading. Reading helps a writer learn style, tone, construction, and a sense of audience (Smith & Dahl, 1984).

Understanding the reading and writing connection has valuable implications for classroom instructional practices. Teachers need to make the connections explicit to the students (Shanahan, 1988). For example, teachers are encouraged to use expository text and informational books to teach expository writing (Stotsky, 1983). Using these materials help students build the bridges between reading and writing. For example, discuss the process a writer goes through to create a book (Shanahan, 1988). Reading and writing can teach each other.

How does the reading and writing process promote learning? Reading and writing requires similar mental processes (Harste, Short, & Burke, 1988). Both are used to construct knowledge and create meaning for the reader or writer (Harste, Short, & :Burke, 1988; Smith & Dahl, 1984).

For example, as a reader reads a text he or she must think about and process the material to comprehend it. Writers go through a similar process as they think about and process information to write. Both the reader and the writer are interacting with the text and are formulating ideas as they interact with the text (Smith & Dahl, 1984). Readers do not act like a sponge and soak up knowledge, they formulate it by bringing their prior knowledge to the text and perhaps, elaborating on it. Reading and writing help to process information for the learner (Smith & Dahl, 1984). Due to this very nature of reading and writing, they can be used as a vehicle for learning (Harste, Short, & Burke, 1988).

#### Writing to Learn Activities

Writing activities were chosen to enhance, or promote, each phase of the inquiry cycle. These writing to learn activities were selected from activities presented in books and journal articles. Each activity will be described in four ways: how the activity relates to the writing process, the procedures involved for doing the activity, the theoretical rationale for how this activity promotes learning, and when the activity might be used in the classroom.

The first type of writing to learn activities are classified under James Britton's expressive writing (Leahy, 1989) because they are a writer's way of thinking on paper.

These two writing to learn activities are freewriting and brainstorming.

How does free writing fit into the writing process? Freewriting can be part of prewriting within the writing process described by Donald Graves (1983). The freewriting may be used when the writer is creating a finished product to share with others.

What is the procedure of this activity? To begin, freewriting procedures and purposes must be explained to a group of students. Due to the nature of this activity, students need permission to experiment with their writing and make errors (Graves, 1979). The idea behind freewriting is to let the ideas flow. The students write for five to ten minutes without stopping to concern themselves with correct punctuation, spelling, or grammar (Goggin, 1985; Lindemann, 1987; Thompson, 1983). The freewriting is never graded or judged for its content or composition (Lindemann, 1987).

There are three types of freewriting: focused, unfocused, and recall. Focused freewriting is freewriting on a given topic, for example, when the students are learning about a specific concept, idea, or topic in a content area. Unfocused freewriting is freewriting about whatever comes to mind, there is no direction to the initial assignment (Tompkin & Camp, 1988). This type would help a

writer in choosing a topic on which to write. The third type, recall freewriting, follows a learning experience and helps the writer summarize new learnings (Stewart-Dore, 1988).

How does freewriting promote learning? Freewriting is expressive writing. It is relaxing and conducive to thinking on paper. The writer is able to concentrate on connecting ideas, rather than worry about a flawless finished written product (Leahy, 1989). Freewriting encourages writers to play with their thoughts on the paper about a topic (Graves, 1979). They can make explicit their personal views about an issue and elaborate on it. This is a step to critical thinking (Gmuca, 1987). The freewriting may tap prior knowledge about the topic (Thompson, 1983) and synthesize new learnings for the writer (Goggin, 1985). This writing involves both hemispheres of the brain, creativity plus cognitive skills (Thompson, 1983).

When might freewriting be used in the classroom? Freewriting may be used any time during the inquiry process. Basically, it can occur whenever ideas need to flow (Tompkins & Camp, 1988), and to help minimize writer's block. When a new topic is being explored, freewriting may be used to record the writer's prior knowledge (Gmuca, 1987; Stewart-Dore, 1988). Freewriting is helpful during literature studies because it helps readers explore their

personal perspectives. This helps students understand a text in light of their own experiences (Gmuca, 1987). Freewriting may be used as a pretest before a lecture, or lesson, to assess what the students know and as a post test to synthesize new learning (Goggin, 1985).

How does brainstorming fit into the writing process? Brainstorming is part of prewriting in the writing process described by Donald Graves (1979). It is a particularly helpful for gathering and organizing ideas about a topic (Tompkins & Camp, 1988).

What is the procedure of brainstorming? To begin a brainstorming session, the teacher explains the purpose and rules for the brainstorming activity. The teacher should have an abundant supply of paper and pencils during this activity to encourage the flow of ideas. When the brainstorming is a class activity, the teacher acts as a scribe to record all the students' responses (Lindemann, 1987). Given a topic, the teacher quickly lists all the ideas and phrases that come to the students' minds (Tompkins & Camp, 1988). All classmates should feel free to participate without criticism from others (Lapp, Flood, & Farnan, 1989). The students may want to work in groups (Gamberg, Kwak, Hutchings, & Atheim, 1988). The teacher and students can discover relationships among ideas after the brainstorming session (Stewart-Dore, 1988).

How does brainstorming promote learning? Brainstorming taps prior knowledge about the topic (Lapp, Flood, & Farnan, 1989; Noyce & Christie, 1989). When a group of students brainstorm together they increase the group's prior knowledge because they are sharing what they know (Lapp, Flood, & Farnan, 1989). When these ideas surface they become explicit (Tompkins & Camp, 1988) and may be recorded for future use (Gamberg, Kwak, Hutchings, & Altheim, 1988). Once ideas are generated and recorded, the group can make connections and show relationships among the ideas (Stewart-Dore, 1989). Brainstorming does not promote critical thinking due to the fast pace of the activity, the fact that students say and record whatever comes to mind, and that they do not take the time to analyze what they are saying (Noyce & Christie, 1989).

When might brainstorming be used in the classroom? Brainstorming may be used any time a writer or learner needs ideas to flow (Gamberg, Kwak, Hutchings, & Altheim, 1988). It may be used to remedy writer's block (Tompkins & Camp, 1988), and help the writer focus on a topic (Gamberg, Kwak, Hutchings, & Altheim, 1988). In addition to helping students, brainstorming can give an instructor insight to what the group of students know about a topic.

After tapping prior knowledge on the topic with freewriting and brainstorming activities, the students will

begin to formulate and write questions to answer through research. These questions will be written down for future reference. As new questions emerge they will be added.

How does writing questions fit into the writing process? Writing questions is expressive writing (Leahy, 1989) because it is a way of thinking on paper. As we study about a topic we want to not only think about what we know, but what we want to know. The act of writing down the questions encourages the learner to think about his or her curiosities and interests about the topic. In the writing process (Graves, 1983) this type of writing is part of prewriting. These questions may help to facilitate thoughts and ideas as the writer engages in expository writing in the future.

What is the procedure of this activity? Initially, teachers should demonstrate how to ask research questions. This may be done by using the think-aloud technique (Lapp, Flood, & Farnan, 1989). The teacher goes through the process with the students and verbalizes the thought process involved in asking questions. Eventually the students will be able to do self-questioning independently (Graves, 1983; Lapp, Flood, & Farnan, 1989). The teacher may act as a scribe for the students, or the students may do the writing. This list of questions may be added to as new questions emerge from reading and learning.

How does questioning promote learning? The student generated questions set a purpose for reading and studying about the topic (Lapp, Flood, & Farnan, 1989; Noyce & Christie, 1989; Stahl, Henk, Brozo, & Sickele, 1985). The questions motivate students to seek knowledge because the questions come from their interest (Stahl, Henk, & Brozo, 1985). As old questions are answered, new questions emerge and students actively read on to find more answers (Walker, 1988). Questions keep the inquiry process alive.

When might this activity be used in the classroom? Formulating questions may begin a study and continue throughout the learning cycle.

After the students formulate questions to investigate, the research begins. The students will go to a variety of reference materials to gather information on the topic and, hopefully, answer their questions. Content area materials contain vocabulary, ideas, and concepts to understand in order to comprehend and learn. Using graphic organizers is a way to help the learner make connections among vocabulary, ideas, and concepts. Graphic organizers are designed to help the learner overcome possible barriers in comprehending the complexity of content area information (Simmons, Griffin, & Kameenui, 1988).

How do graphic organizers fit into the writing process? Graphic organizers are a form of expressive writing (Leahy,

1989) because they help the writer think on paper. In order to create the graphic the writer needs to make the connections among the ideas and concepts (Stahl, Henk, Brozo, & Sicklele, 1985; Tierney, Readence, & Dishner, 1990). Graphic organizers may be used during prewriting in the writing process (Graves, 1983) because they help to organize information that a writer may use while composing content area text.

What is the procedure involved in creating graphic organizers? There are a variety of graphic organizers and each type has its own purpose and procedure. Basically, the learner may use a graphic organizer before conducting research to tap prior knowledge about the topic (Cassidy, 1989; Prater & Terry, 1988) or to pre-teach technical vocabulary (Cassidy, 1989; Tierney, Readence, & Dishner, 1990). A graphic organizer may be used during research to make new connections and to combine new information from a variety of sources (Cassidy, 1989; Cronin, Sinatra, & Medow, 1990). After conducting the research, graphic organizers may be used to combine new findings and old learnings (Cassidy, 1989). For example, semantic mapping helps the reader understand concept relationships in a text. The main idea is written in a circle. Coming from the topic are the main ideas and coming from the main ideas are the details (Figure 3).

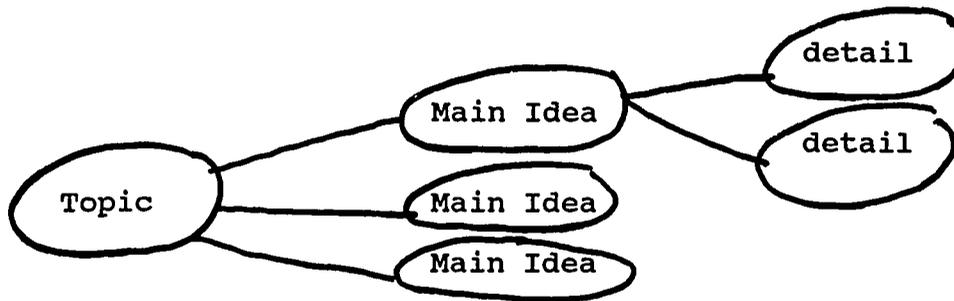


Figure 3. Semantic Mapping.

The semantic map is constructed by the students as information is extracted from the text, or other resource materials (Cronin, Sinatra, & Medows, 1990; Stahl, Henk, Brozo, & Sickele, 1985).

Another type of graphic organizer is the Venn Diagram. Venn diagrams help to illustrate similarities and differences between two concepts. This diagram consists of two overlapping circles. The overlapping portion contains the similarities between the two things being compared (Figure 4).

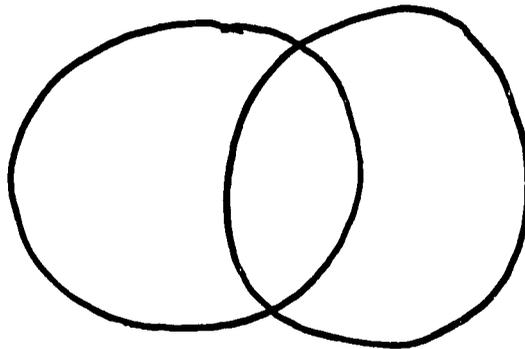


Figure 4. Venn Diagram.

How do graphic organizers promote learning? Each type of graphic organizer promotes a particular type of learning. The students will need to choose the appropriate organizer to meet their needs. In general, graphic organizers help to make relationships among concepts more concrete (Noyce & Christie, 1989). They break down the comprehension barriers that exist with content area texts (Stahl, Henk, Brozo, & Sickele, 1985). They help the students combine information about the topic that is gathered from a variety of sources (Cronin, Sinatra, & Medows, 1990). Graphic organizers may help to pre-teach technical vocabulary in a content area chapter (Tierney, Readence, & Dishner, 1990).

Graphic organizers help to develop critical thinking skills, as described in Bloom's Taxonomy. These thinking skills include analysis, synthesis, and evaluation (Cassidy, 1989). In order to construct the graphic, the reader must read analytically to find the relationships (Stahl, Henk, Brozo, & Sickele, 1985).

Students must be able to comprehend content area text and write expository text to be successful in school (Taylor & Beach, 1984). Graphic organizers, such as semantic maps, may act as a scaffolding mechanism for facilitating writing (Prater & Terry, 1988). The students read, create their maps, use the maps to help rewrite the text. This is an example of thinking through writing because the writer is

organizing ideas and concepts encountered in the reading (Cronin, Sinatra, & Medows, 1990).

Creating a graphic organizer as a group project has several learning benefits. As a pre-reading activity, the oral discussion among the students will help to activate prior knowledge because everyone is sharing ideas (Prater & Terry, 1988). Group mapping will allow students to share ideas as they sharpen their skills in mapping (Stahl, Henk, Brozo, & Sicklele, 1985).

When might graphic organizers be used in the classroom? Graphic organizers may be used throughout the inquiry process to organize information. These graphic organizers will become another reference, or source of information, to facilitate the writing process as students engage in writing expository text.

After the students have the opportunity to research a topic, to attempt to answer their questions and learn new information, they are ready for review writing. During review writing the students write expository text about the topic. This writing may lead to a book, chart, or display poster. Its purpose is to inform other readers about the topic, while giving the writer the opportunity to integrate old and new information.

How does this activity fit into the writing process? This activity has the potential to touch on every aspect of

the writing process (Graves, 1983). The writer will want to publish, or share, this finished product with other readers. The students will use their reference books and graphic organizers to facilitate the writing process (Noyce & Christie, 1989) in pre-writing as they compose expository text while reflecting upon their knowledge and work out emerging ideas (Wason-Ellam, 1987). Next, the students will edit and proofread with their teachers and peers (Flem & Feather, 1986; Hennings, 1982; Noyce & Christie, 1989). Finally, the students will produce a finished copy to share with other readers.

What is the procedure of this activity? Initially, students should be exposed to a variety of expository writing, informational books, in order to experience the structure of this type of writing (Clem & Feathers, 1986; Fisher, 1990; Hennings, 1982). For beginning writers the teacher often demonstrates how to write by conducting guided group writing. During this process the teacher shows the students how to use their graphic organizers to compose sentences around a main topic. The teacher can demonstrate the reading and writing connection using informational books as examples (Hennings, 1982). The students need to be given the freedom to take charge of their writing and be a part of the decision making. They should be given the opportunity to work together and share ideas, while the teacher provides

guidance and encouragement (Clem & Feather, 1986). The teacher should treat the students' texts and published text in the same manner (Shanahan, 1988). Perhaps the teacher could add the students' books to a shelf with professionally published reference books.

How does this activity promote learning? Review writing enhances learning in two ways. Based on the theory that writing is thinking on paper, review writing gives the learner the opportunity to rethink and to clarify new learning (Goggin, 1985; Langer & Applebee, 1987; Noyce & Christie, 1989). It promotes metacognitive awareness as the students reflect upon their knowledge and work out emerging ideas (Clem & Feathers, 1986).

These assumptions have a strong theoretical base. For example, review writing provides an opportunity to transfer experiences into knowledge through the adaptation processes described by Piaget as accommodation and assimilation. Through assimilation the students will incorporate new learnings with prior knowledge. Through accommodation the students' conceptions of the world are modified as a result of new learning. This process forms, develops, and changes our schemas (Biehler, 1976; Clem & Feather, 1986; McKenna & Robinson, 1990). Review writing helps the students think through these processes as they review and consolidate what is known and what is learned (Langer & Applebee, 1987).

Writing will help the learners organize all the information and bring order, understanding and meaning to their thoughts (Clem & Feathers, 1986).

In addition to schemata development, review writing encourages vocabulary and language development. As the students study and read about a topic they are exposed to technical vocabulary and the language structure of informational text. Review writing gives students the chance to use the vocabulary and language of the content. When students read content area books they are exposed to the language and content simultaneously (Clem & Feathers, 1986). The students will learn to model what they see in informational books (Fisher, 1990). To maximize content vocabulary and language development, students should be encouraged to review writing collaboratively with their peers. The collaborative writing allows students the opportunity to orally use the vocabulary and language, as well as share ideas (Clem & Feathers, 1986).

When might this activity be used in the classroom? Review writing is appropriate after students have had the opportunity to activate prior knowledge about a topic, formulate questions to investigate, research, and read about the topic. Review writing may also be used by the teacher to evaluate students' progress (Goggin, 1985). This type of

writing will give the teacher insight into how the students are processing information.

After the students do review writing to integrate the new and old information, they move easily and naturally towards elaboration writing. Elaboration writing requires more complex reasoning than review writing (Langer & Applebee, 1987) because it encourages the students to apply content knowledge to solve problems through creative thinking.

How does this activity fit into the writing process? All aspects of the writing process (Graves, 1983) may be used with elaborative writing. The writer will want to publish or share this finished product with other readers. During prewriting students may use their reference materials and oral discussion to facilitate thinking (Thaiss & Suhor, 1984). Next, students may write independently or collaboratively (Hennings, 1982) as they expand and elaborate on their ideas. The students will edit and proofread with their teachers and peers (Hennings, 1982; Noyce & Christie, 1989). Finally, the students will produce a finished copy to share with other readers.

What is the procedure of this activity? Elaboration writing requires active mental processing. Initially, teachers should go through these thinking strategies with the students. This is done by verbal interaction between

the students and the teacher. This social dialogue teaches young students how to think about experiences. Through this dialogue teachers may demonstrate to students how to categorize information, connect knowledge to students' own experiences, and explicitly show relationships among concepts and ideas. Thus through this interaction, scaffolding is provided that will eventually help students to internalize the processes necessary to problem solve and do critical thinking (Thaiss & Suhor, 1984). Graphic organizers, such as the Venn Diagram and semantic mapping, are helpful tools for teaching critical thinking steps (Cassidy, 1985).

Elaboration writing includes a variety of critical thinking activities, such as "What if. . .?" (Hennings, 1982; Rockcastle, 1986), facts versus fantasy (Armes & Sullenger, 1986), synthesizing and judging information, expanding a view point (Hennings, 1982), hypothesizing (Wason-Ellam, 1987), forming opinions, drawing conclusions, and finding a cause and effect relationship (Smith & Dahl, 1984). The teacher and students will need to choose the appropriate type of activity to promote a deeper understanding of the content material. Students may work independently or collaboratively while writing. The role of the teacher is to provide guidance and encouragement (Clem & Feathers, 1986). The teacher should treat the students'

text and professionally published text in the same manner (Shanahan, 1988). Some teachers add the students' books to a shelf with other published books.

How does this activity promote learning? Elaboration writing helps to promote critical thinking, a deeper understanding of the material (Langer & Applebee, 1987). This includes higher level thinking skills as described in Bloom's Taxonomy: using imagination, using logic, and coming up with the why questions that keep the inquiry cycle in motion.

Higher level thinking skills on Bloom's Taxonomy include synthesizing, analyzing, judging/evaluation (Cassidy, 1989). Elaboration writing encourages students to engage in these thinking skills. The process of synthesizing requires students to bring together parts to form a whole. A writing assignment that has the students compare and contrast ideas or concepts is an example of synthesizing. Analyzing is the process of beginning with the whole and then breaking it into parts. A writing assignment that asks the students to take a point of view and expand on it is an example of analysis. Judgement thinking requires the students to predict what might happen in a particular situation, based on the facts. Asking the students to write and answer to a "What if . . .?" question

will encourage the students to evaluate and make judgement (Cassidy, 1989; Hennings, 1982; Smith & Dahl, 1989).

In addition to synthesizing, analyzing and judging, elaboration writing may require the students to tap their imaginations. This type of writing can explore the difference between fact and fiction, fantasy and reality. Students can write a story based on facts, but with a touch of science fiction (Armes & Sullenger, 1986; Rockcastle, 1986). Role playing is another way to use the imagination (Goggin, 1985). Students may be asked to take on the role of a scientist and write about what this occupation might be like.

Elaboration writing may develop the logical reasoning abilities. Piaget describes logical reasoning as the arguments we have with ourselves (Thaiss & Suhor, 1984). The writer can bring these arguments on to the paper. Writing about a cause and effect relationship requires the writer to make logical connections between events (Smith & Dahl, 1984).

Elaboration writing has a tendency to bring out the why questions (Thaiss & Suhor, 1984). These why questions have potential to lead the students to further research. Why questions keep the inquiry cycle alive.

When might this activity be used in the classroom?  
Elaboration writing should take place after the students

have the opportunity to research information and been given time for discussion (Armes & Sullenger, 1986; Rockcastle, 1986). Depending upon the content, elaboration writing activities should be designed to promote critical thinking, tap the imagination, develop logical reasoning, and generate future questions to study (Armes & Sullenger, 1986; Rockcastle, 1986; Smith & Dahl, 1984; Thaiss & Suhor, 1984).

As seen in the previous section, the writing to learn activities are capable of promoting the learning and writing process. The following section will discuss the process that Graves (1983) and others suggest writers journey through while composing text.

#### The Writing Process

Writers go through a process when they are writing. Whether the writers are six years old or adults, they seem to go through the same process (Graves, 1979). The process approach to writing instruction focuses on this process rather than just the finished product. Graves and others suggest the writing process consists of prewriting, drafting, editing and proofreading, and publishing.

Prewriting is a time for developing ideas and exploring prior knowledge about the topic (Noyce & Christie, 1989; Smith & Dahl, 1984). This is a rehearsal time as the writer prepares to write (Graves, 1983). Prewriting activities include reading, talking, drawing, brainstorming,

freewriting, writing questions, and experiencing life (Graves, 1979; Graves, 1983; Harste, Short, & Burke, 1988; Noyce & Christie, 1989).

After engaging in prewriting activities, the writer moves on to drafting. The writer's main focus is getting ideas down on paper (Graves, 1979; Graves, 1983; Noyce & Christie, 1989; Smith & Dahl, 1984). The writer will use this time to organize ideas and information and formulate a main idea (Smith & Dahl, 1984).

The writing process also involves editing and proofreading (Graves, 1979; Graves, 1983; Noyce & Christie, 1989; Smith & Dahl, 1984). Editing is the process of going through the text to make revisions, proofreading corrects grammatical and spelling errors. The purpose is to prepare the text for the intended audience, to make the communication more effective (Smith & Dahl, 1984).

There are a variety of ways to accomplish the tasks of editing. Editing and proofreading may be done independently, with peers, or with a teacher/student conference. Peer editing involves students getting together to help each other with the editing process (Noyce & Christie, 1989). Students should be trained to constructively help one another so the potential of ridicule is minimized (Graves, 1983). Peers may work together in an Author's Circle (Harste, Short, & Burke, 1988). The

Author's Circle consists of a group of peers that go over a student's rough draft to offer suggestions for revision. Teachers may offer suggestions for revision during a teacher/student conference. The teacher may use scaffolding techniques to teach the students how to become more effective writers (Graves, 1983). In addition to receiving help for the teacher and peer group, a writer will want to be able to help self-edit and proofread his or her own draft.

The final part of the writing process may be publishing. Publishing involves a finished copy of the text to be shared with the intended audience (Graves, 1983; Noyce & Christie, 1989). One way to share a finished piece of writing is by using the Author's Chair (Harste, Short, & Burke, 1988; Noyce & Christie, 1989). The author sits on a special chair and reads his or her text to the group. After the reading, the group may ask questions about the author and make constructive comments about the writing. Children's books and professionally published books should be treated in the same manner (Shanahan, 1988). Valuing children's writing helps the students develop a pride of authorship.

The writing process is recursive. Throughout the process the writer may revert back to earlier parts of the process. The writing process is a personal journey for each

writer. Sometimes writers need to distance themselves from their writing to gain objectivity. The writer must consider the voice and the audience of the writing throughout the process. Writing should have meaning and purpose and the writer must be aware of this at all times (Graves, 1983).

Throughout the literature discussing the inquiry cycles, writing to learn activities, and writing process, one learning style was consistently promoted: Collaborative Learning. The next section will look at the benefits of collaborative learning in the content area classroom.

#### Collaborative Learning

"Geddinagrupe" is a popular word that is being spoken in classrooms across the country. It really means "get into a group" and it is a popular way to learn (Power, 1989). Collaborative learning is gaining popularity because students are finding it to be a fun, productive way to learn.

How does collaborative learning enhance the learning process? Collaborative learning shows students that learning is a social activity (Crouse & Davey, 1989; Gamberg, Kwak, Hutchings, & Altheim, 1988; Power, 1989). Collaborative learning gives the students the opportunity to communicate with each other. They share ideas, language, vocabulary, and knowledge (Clem & Feathers, 1986; Gamber, Kwak, Hutchings, & Altheim, 1988; Power, 1989; Prater &

Terry, 1988). As students pool their knowledge they gain multiple perspectives that may aid in problem solving and decision making (Crouse & Davey, 1989; Prater & Terry, 1988). Students need to learn how to think with other people. Sharing experiences and knowledge leads to critical thinking skills and effective problem solving (Thaiss & Suhor, 1988). Teacher and student collaboration is an effective instructional technique (Hennings, 1982). For example, teachers can teach students how to write expository text by writing it with them.

In addition to productive learning, working collaboratively is enjoyable. Students have reported that working with their peers makes them feel secure, comfortable and valued (Crouse & Davey, 1989; gamberg, Kwak, Hutchings, & Altheim, 1988).

Teachers need to set up an environment conducive to collaborative learning (Clem & Feathers, 1986). The students need freedom in order to engage in collaborative learning: freedom of movement (Crouse & Davey, 1989), freedom to choose materials (Power, 1989), freedom to choose to work collaboratively with peers over independent learning (Crouse & Davey, 1989). Freedom of movement means that the room should be set up to accommodate groups of students working and communicating together. Tables and movable desks work better than desks and chairs that are bolted to

the floor. Freedom to choose materials means that students will be provided with a variety of materials to help reach their goals. Due to divergent thinking and creative problem solving, each group may require a different set of materials. Freedom to choose collaboration over independent learning means that the students are free to initiate working together. When children are given the freedom to choose, they usually initiate collaborative learning (Crousle & Davey, 1989). During collaborative learning the role of the teacher is an encourager, supporter, and assistant when needed.

Collaborative learning may play an active role for a writer during the writing process. During prewriting, students may work together to discuss ideas and activate their prior knowledge. Sharing information and ideas produces more learning while students are teaching each other (Gamberg, Kwak, Hutchings, & Altheim, 1988). During drafting, students may work together to organize information, share language and vocabulary and pool their knowledge. Editing and proofreading may be done with peers at the Author's Circle (Harste, Short, & Burke, 1988), or with the teacher during conferencing (Graves, 1983). Students may enjoy sharing published work at the Author's Chair (Harste, Short, & Burke, 1988; Noyce & Christie, 1989).

Another process that involves collaboration is the inquiry cycle and the writing to learn activities designed to promote it. Collaborative brainstorming helps students tap their prior knowledge and their peers' prior knowledge (Gamberg, Kwak, Hutchings, & Atheim, 1988; Prater & Terry, 1988). Formulating questions may also be done collaboratively (Stahl, Henk, & Sickele, 1985). One student's curiosities may trigger questions in another student's mind. Students enjoy the security of collaborative research (Crouse & Davey, 1989; Gamberg, Kwak, Hutchings, & Atheim, 1988). Creating graphic organizers collaboratively may help students combine information about a topic from a variety of sources (Cronin, Sinatra, & Medows, 1990), and group mapping helps to share ideas and knowledge (Stahl, Henk, Brozo, & Sickele, 1985). Collaborative writing between teachers and students teach students how to combine old and new learnings (Hennings, 1982). Students who review write together, share ideas, knowledge and language (Clem & Feathers, 1986). Elaboration writing may require critical thinking skills and problem solving. Collaborative groups will benefit by discussing ideas and view points before writing (Rockcastle, 1986). Collaborative groups may offer multiple perspectives while synthesizing, analyzing, and evaluating information to make judgments (Hennings, 1982). Teacher and student

collaboration will help students develop active mental processing. Teachers can help students think through processes involved in critical thinking so that, eventually, students can do it independently (Thaiss & Suhor, 1984).

While collaborative learning seems to be the popular learning style, reflective teaching seems to be the appropriate teaching practice for writing to learn in the inquiry cycle. The last section of this chapter will discuss the art of reflective teaching.

#### Reflective Teaching

Reflective teaching is a teaching practice that encourages teachers to think about their instructional practices in the classroom. This metacognition process allows the teacher to grow through critical inquiry, an analysis self-directed evaluation of the what and whys of instructional practices (Adler, 1991; Calderhead, 1989).

Why is reflection an important practice for teachers? There are so many ways to teach, there is no one "best way" (Adler, 1991; Calderhead, 1989). Teachers need to make choices about instructional practices (Adler, 1991). Are we making instructional decisions based on our own beliefs, and theoretical perspectives (Calderhead, 1989), or are we teaching to a hidden agenda based on social or political pressures? (Adler, 1991). Analyzing one's own teaching practices may lead to the answers to these questions.

Reflective teachers not only analyze their instructional practices, they adapt them to meet students' needs. Reflective teachers look at student progress to determine if teaching strategies are working (Adler, 1991). If a student or group of students are not showing progress or signs of learning, the reflective teacher will search for another method of instruction. The teacher looks at what the students know and can do and takes them from that point for further learning. Reflective teachers monitor the progress of learners in order to design further intervention (Fisher & Sommerwill, 1990). Reflective teaching does not rely on pre-prepared, routine, ways of teaching (Rudney & Guilloume, 1990). For example, programs or curriculum that pre-plan a month's worth of lesson plans would not be appropriate for the reflective teacher. In fact, lesson plans are usually only tentative and will be changed or implemented depending on the students' needs for that day.

Reflective teachers need administrative support, as well as the freedom to make choices in the classroom. An administrator who expects teachers to follow a pre-planned set of lessons would not work well with the reflective teacher. Administrators need to understand and support the reflective teacher's methods. Reflection takes time and busy teachers need to set aside this time for reflection and collaboration with their peers (Rudney & Guilloume, 1990).

This collaboration among professionals provides security, friendship, shared knowledge, and support (Crouse & Davey, 1989). Finally, the reflective teacher may find a journal an effective tool for recording classroom observations, personal insights on students' progress and successes, and plans for future instruction (Rudney & Guilloume, 1990).

### CHAPTER 3

#### STUDY DESIGN

This chapter describes the classroom, students, teacher, and the methodology used in this study. Finally, there will be a description and explanation for the format used to construct Chapter 4.

#### Setting and Participants

I would describe my classroom as a process-oriented classroom. The writing process is taught and encouraged throughout the curriculum. The students started the IBM Writing to Read Program in kindergarten and continue working in it through the first grade. In the classroom is a "Young Authors" center. This center supplies paper, pencils, markers, story starter folders, dictionaries, and other materials for story writing and book making. The children's writing is not graded; rather, a writing folder is kept that goes home at the end of the school year. Occasionally, the first graders are paired up with a fifth grade class for story writing. A first grader will work with a fifth grader to write and publish original stories.

Reading instruction is done through the use of the basal, supplemented with many other types of literature. The room is filled with fiction and non-fictional books of

many genres. Each month a set of content area books are brought into the classroom to enhance the unit of study. The books in the classroom represent a wide range of reading levels. I read to the children at least once a day. Children are encouraged to read to the class during story time. Prior to this study, my students received science content by way of reading fiction and non-fiction literature and by direct teacher instruction.

The 26 first graders in this study are in my self-contained classroom. They come from middle class backgrounds. The class is composed of 20% minority (black and Hispanic) and 80% white children. Most of the children come from two income families, however; there is a high level of parent support for school work at home. Fifteen percent of the children come to first grade from a developmental first grade, which is designed with a whole language philosophy. The other 85% of the children came from an academic kindergarten program.

I have six years teaching experience in the first grade. My credentials include a Bachelor of Science degree in Child Development and Family Relations, Master of Education degree in Elementary Education, and I am currently working on a Master of Arts degree in Language, Reading, and Culture in the College of Education. In this study, I took on the roles of both teacher and researcher.

### Methods

This study took approximately two months while studying two science units: space/solar system and plants. These topics and objectives are district mandated in the science curriculum. Although I have objectives to cover, the students were able to investigate their questions and shape the study to meet their interests.

During the first month, space and the solar system was studied. For each concept or subtopic, writing to learn activities were used as a vehicle for learning. Plants were studied during the second month. Again, writing to learn activities were incorporated to learn about the various concepts and subtopics within the unit of study. Science instruction was taught approximately three times a week for one hour per day. Example lesson plans are in Appendix A.

### Data Sources

Data were collected and analyzed from the following sources: lesson plans, observations, teacher's journal, students' products, students' attitudes, and process tools.

I wrote lesson plans designed to teach and encourage children to freewrite, brainstorm, question, use graphic organizers, review write, and write to elaborate. The lesson plans were also designed to cover the mandated content area objectives.

I wrote down observations of how the lesson plans and writing activities were accomplished.

I kept a journal and wrote in it after each lesson addressing three areas: looking back, summarizing, and reflections. Looking back included perceptions on how the writing went, such as the teacher and students' strengths and weaknesses, and how the students responded. The summary included short evaluation statements that reveal the writing process and children's participation in it. Reflections commented on future writing assignments, how they may be adapted in the future, and what will be used again and why.

The students' work was collected after each writing assignment for future analysis and the students' attitudes were captured by tape-recorded interviews.

A record and description of activities and process tools that were used to facilitate and guide the children through the writing process were collected. Process tools include: brainstorming charts, questions charts, content area literature, and graphic organizers.

#### Procedures of the Analysis of the Data

Chapter 4 will present an analysis of the data used to answer the five research questions posed in Chapter 1.

The following section will restate the questions and give the procedures involved in analyzing the data to answer the question.

Question #1. In examining the freewriting and review writing, did the students show signs of concept development?

All of the freewriting activities and their proceeding review writings were compared. This consisted of a freewriting and review writing on the sun and one on roots. If the child showed at least one additional piece of information in the review writing as compared to the freewriting, I coded it as showing signs of concept development. A percentage of children showing concept development for each subtopic was determined and represented in a Table. The data sources analyzed were the students' writing samples and teacher's observations. My observations were used to elaborate on the significance of the percentages of students showing concept development in their writings.

Question #2. How did the writing to learn activities adapt the teacher's planning and instruction?

A domain analysis (Spradley, 1980) of my reflective journal and observations was conducted to determine how the writing to learn activities influenced my planning and instruction. A matrix was created to show these relationships. On the left side of the matrix the writing to learn activities were listed: freewriting, brainstorming, questioning, review writing, and elaboration writing. An analysis of my observations and reflective

journal brought out ways in which the activities helped to influence my planning and instruction. These ways are listed across the top of the matrix. Check marks are made throughout the matrix to show which writing to learn activities helped me in which way. Specific examples are cited from my observations and the reflective journal to support the information in the matrix.

Question #3. What are the benefits of students' collaborative learning versus working independently?

A domain analysis (Spradley, 1980) of my observations, my reflective journal, and taped students' interviews were analyzed to determine the benefits of collaborative learning versus independent learning.

The first domain analyzed was the students' interviews. After the first unit of study on space, a random sample of 12 students were interviewed about the writing to learn activities, collaborative learning, reading and writing to learn, and using reference materials. A copy of the interview questions are in Appendix B:. Four students were called up to be interviewed at the same time. I asked the questions and each child was given the opportunity to respond. One question asked was, "Did you like working in a group to write about astronauts, and why?" The responses to this question were categorized as: preferred working collaboratively, or preferred working independently. The

numbers are presented in a Table. The children's responses to the "Why?" question were written and searched for patterns.

My observations and reflective journal were analyzed to find evidence to support the benefits of collaborative learning versus independent learning. Specific examples from the interviews, observations, and reflective journal are cited.

Question #4. How did the writing to learn activities fit into the writing process that Graves (1983) and others suggest that writers go through when composing?

A domain analysis (Spradley, 1980) of the students' work, the students' interviews, my observations, and my reflective journal were conducted to see how the writing to learn activities fit into the writing process.

A matrix was constructed with the writing to learn activities listed down the left side of the matrix and the steps of the writing process were written across the top of the matrix. The students' work, my observations, and my reflective journal were examined to determine how each writing to learn activity fits into the writing process. Checkmarks were made in the matrix to coordinate the writing activities with the writing process. Specific examples from the observations and journal were cited to support the information in the matrix.

In addition to an analysis of the student's work, my observations and reflective journal, the taped students' interviews were analyzed. The procedure for this student interview is described in the analysis of Question #3. During the interviews the question, "How did you feel when I asked you to write down every thing you knew about the sun?" "Did you like freewriting, and why?" The responses to these questions were analyzed to see if they gave evidence to how freewriting fits into the writing process. The responses were categorized and placed in a Table.

Question #5. Do first graders prefer reading and writing to learn as an alternative to teacher's direct instruction, and why?

A domain analysis (Spradley, 1980) was conducted of the students' taped interviews, my observations, and my reflective journal.

During the student's taped interviews I asked the question "Do you prefer reading and writing to learn or having the teacher give you the information?" The responses were categorized as: teacher lecture only, reading and writing to learn, both. The number of each response is represented in a table. The responses to the question, "Why?" were also analyzed for patterns.

Next, my observations and reflective journal were analyzed to find evidence of children preferring writing and reading to direct instruction. Specific examples are cited.

Chapter 5 presents conclusions about this study. The problem, or purpose of this study is restated. The findings and implications of this study are summarized. Finally, Chapter 5 will end with future research questions that emerged from this thesis.

CHAPTER 4  
ANALYSIS OF DATA

This section will state the research questions and present an analysis of the data I used to answer the questions.

Question #1. In examining the freewriting and review writing, did the students show signs of concept development?

Analysis a. Freewriting and review writing were examined from the subtopic study of the sun and roots. If the students showed at least one additional piece of information in the review writing as compared to the freewriting, I coded it as showing concept development.

A sample of eight freewritings were compared with the same students' review writings. As seen in Table 1, 75% of the students showed evidence of concept development about the sun. Only eight students consented to donating their sun review writing to my data collection. The rest of the students wanted to take their books home. The eight students represented: two of my brightest students who enjoy writing on a daily basis: five students who will write when given an assignment to do so, but do not usually choose to write on their own and one student that seldom writes in class. I feel confident that the eight students were a good representation of the class.

Table 1

Concept development

	Sun N=8	Roots N=25
Percent of students showing concept development	75	44

A similar analysis method was used to ascertain students' learning of concepts about plants. Table 1 shows that 44% of the students showed concept development in their review writing about roots. When I asked the students to draw a picture of a plant and show what is above and below the ground, 48% of the students included roots in their pictures. In the review writing, 92% of the students indicated an understanding of roots. This shows that 44% of the students showed signs of concept development from freewriting to review writing.

Question #2. How did the writing to learn activities adapt the teacher's planning and instruction?

Analysis b. A domain analysis (Spradley, 1980) of my reflective journal and observations was conducted to determine how the writing to learn activities influenced my planning and instruction.

The freewriting guided my instruction in two ways. I could assess what each person knows about the topic. For example, during freewriting about the sun, all 22 students knew that the sun was hot and yellow, five students knew the location of the sun, and six students listed functions of the sun. I had a knowledge base of the group and could elaborate on this knowledge. It was also found that freewriting revealed students' misconceptions. For example, four out of twenty-two students believed that the sun was made of fire. I could clear up these misconceptions as part of the instructional lessons about the sun.

According to Table 2, brainstorming activities guided my instruction in two ways. The students pooled their prior knowledge about the topic, giving me insight regarding the groups' knowledge base. I planned instruction to elaborate on what the children know about the topic. For example, the brainstorming session on March 5, about the earth, showed me that the students did have conceptions about this planet. My observations stated, "Knowing prior knowledge of my students really helped to focus my lesson and discussion. I made reference back to the brainstorming chart to tie in what they already knew. I spent my teaching time filling in the gaps and extending the knowledge."



Second, brainstorming also revealed students' misconceptions. For example, during the brainstorming session about astronauts, one student said that astronauts were men. I was able to clarify this misconception during instructional time.

According to Table 2, questioning guided my instruction in two ways. The students' questions focused the study. For example, the questions about the moon showed a wide variety of curiosities about the moon, such as, "What is the moon made of?" "Why is the moon some times half?" "Is the moon a planet?" I gathered books and materials that would answer these questions. These questions also suggested the students' interests. The questions are generated by the students so they are interested and anxious to find the answers to them.

According to Table 2, review writing guided my instruction in four ways. It can tap students' prior knowledge and misconceptions. For example, during the review writing about plants' parts, if a student wrote that the roots have seeds, I could reteach and clarify this misconception. Review writing also provided me with insights regarding how the students used the content's vocabulary and language. For example, when writing about the function of a leaf, one student wrote, "The leaf is the stomach of a flower because it holds the food." The review

writing could be used to determine if there was concept development for a student. For example, in examining the freewriting and review writing about the sun, 75% of the eight students in the sample showed signs of concept development.

According to Table 2, elaboration writing guided my instruction in one way. It showed whether or not the students were using critical thinking skills. These critical thinking skills included analysis, synthesis, evaluation, and judgment. For example, on March 7 the students were asked to elaborate on the statement, "What if there was life on the sun?" My observations indicated that several students listed "what if's" instead of elaborating on one and using critical thinking skills. I then demonstrated how to elaborate on one "What if. . .?" statement using their knowledge about the topic. The next time the students were asked to do a "What if. . .?" was on March 15. They were asked to elaborate on "What if I were an astronaut?" The students were able to complete this assignment by synthesizing their knowledge about astronauts to make evaluations and judgement.

Question #3. What are the benefits of students' collaborative learning versus working independently?

Analysis c. During a group interview with a random sample of children, I asked the following question, "Did you

like working in a group to write about astronauts on the spaceship, and why?

Table 3 shows that nine students preferred working collaboratively for the following reasons: "We shared ideas." "It was fun." "Working by yourself is lonely." "There are more answers and questions." Of the three children who preferred working independently, one reported that it was easier to concentrate working alone, two could not tell me why.

Table 3

Collaborative Versus Independent Writing

	Collaborative	Independent
Number of Students	9	3

My reflective journal and observations indicated that the children favored collaborative writing. For example, on March 14 the students worked in groups to review write about astronauts. My observations indicated, "The kids loved this time to do risk-free writing! They worked well in cooperative groups. They took turns writing and sharing ideas. There was a lot of discussion among group members,

and they were all on task." On April 4, my reflective journal reads, "I am always impressed and pleased to see how well my kids work in small groups." March 14's journal entree reads, "When students have a motivating task they can work well in groups and tap available resources." On April 11, my reflective journal indicated, "The partners worked well together, they seemed to enjoy working together, sharing ideas, and being creative."

Question #4. How did the writing to learn activities fit into the writing process that Graves (1983) and others suggest a writer goes through when composing?

Analysis d. According to Table 4, freewriting and brainstorming helped the students with prewriting in the writing process. There is evidence of this from an analysis of the interviews with the students, my reflective journal, and my observations.

During the student interviews I asked the question, "How did you feel when I asked you to write every thing you knew about the sun? Did you like freewriting? Why? The results of this question are in Table 5.

According to the interviews, all 12 students reported that they enjoyed freewriting. When asked why, the students responded: "It was fun." "It was like a game." "They got to think." "They got to color." "It felt good because I

Table 4

Writing Activities and the Writing Process

		<i>Prewriting</i>	<i>Drafting</i>	<i>Editing</i> <i>Proofreading</i>	<i>Publishing</i>
Writing to Learn Activities	Freewriting/ Brainstorming	X			
	Questions				
	Graphic Organizers	X	X		
	Review Writing	X	X		X
	Elaboration Writing	X	X		X

Table 5

Students' Opinions on Freewriting

	Yes, I liked it.	No, I didn't like it.
# of students	12	0

knew a lot." These responses are the things we do when we are thinking or prewriting.

An analysis of my reflective journal and observations indicated that the freewriting and brainstorming helped the students think about the topic on the prewriting step. For example, during a brainstorming session on astronauts on March 14, my reflective journal stated, "Great vocabulary words surfaced and I commented on them. Kids should be encouraged to use descriptive words. Throughout the brainstorming, we were able to discuss terms such as spaceship and explorer." These vocabulary words were later used in a review writing and elaboration writing.

Another example of freewriting as a prewriting activity is when the students drew pictures of plants and their roots. My observations stated that the pictures helped to

tap prior knowledge that would later be used to write about plant parts.

According to Table 4, the questioning did not play a role in the writing process. I could not find specific evidence in the data to support the role of questioning in the writing process.

According to Table 4, graphic organizers helped the writer in prewriting and drafting. My reflective journal summarized on April 4, "Making webs on a topic may help the learner tap prior knowledge and review new information. The learner will learn to use graphic organizers, incorporate it in his or her writing process over time." In this example, webs were used to organize information that would later be used for a review writing assignment. The graphic organizers were also used during the drafting step. For example, my observations on April 5 show that the students used plant diagrams and webs to help them draft during elaboration writing. I observed the students looking at and studying these graphic organizers on the walls.

According to Table 4, review writing involved prewriting, drafting, and publishing. An analysis of my reflective journal and observations indicated that the students went through the prewriting step of composing as they referred to the brainstorming charts, reference books, and graphic organizers to help organize their thoughts on

the topic. For example, my observations show that on April 4 the students used the webs while writing about plant parts; on April 5 the students were observed looking at the graphic organizers and brainstorming charts while doing an elaboration writing; and on April 9 the students referred to a chart used to classify fruits and vegetables while working on a project.

Review writing involved drafting and publishing expository text about a topic being studied. An analysis of the lesson plans, my observations and students' work indicated that the students were able to draft and publish information about the sun, earth, moon, astronauts, constellations, plant parts, and plants we eat.

According to Table 4, elaboration writing involved prewriting, drafting, and publishing. An analysis of my observations and reflective journal indicated that the students went through the prewriting as they referred to brainstorming charts, reference books, and graphic organizers to help organize their thoughts on the topic. For example, an analysis of my observations shows on March 15, that the students made a vocabulary web on astronauts before writing about being an astronaut. Making this web was a prewriting, information organizer.

Elaboration writing included drafting and publishing. An analysis of the lesson plans, my observations, and

reflective journal indicated that the students drafted and published texts on the following topics: (1) What if there were life on the sun? (2) What if you were an astronaut? (3) What is the most important part of a plant? (4) What plant parts do we eat?

Question #5. Do first graders prefer reading and writing to learn as an alternative to teacher's direct instruction and why?

Analysis e. During student interviews I asked groups of students, "Do you prefer reading and writing to learn, or having the teacher give you the information?" The responses are summarized in Table 6.

Table 6

Reading and Writing Versus Direct Instruction

	Teacher Lecture Only	Reading/Writing	Both
# of students	1	8	3

According to Table 5, the majority, eight students, preferred reading and writing for the following reasons: "It was fun." "You can learn to write new words." "It

helps you to remember." One child preferred only lectures and did not know why. Three students liked reading and writing to learn, but also enjoyed the teacher's input.

An analysis of my reflective journal showed evidence of children enjoying their writing and showing pride of authorship. For example, on March 8, the students completed their books on space. Sixteen out of twenty-five students chose to take their spacebooks home rather than donate them to my research data. The journal states, "There was such a sense of ownership/authorship. Perhaps this comes from children creating their own text using their own language and knowledge." On March 14, the students did review writing on a paper spaceship to hang on the classroom wall. My observations indicated that the students again showed a sense of pride in authorship. This was evident by their nonverbal communications such as enthusiastically reading their work with smiles on their faces!

To summarize, Spradley's (1980) domain analysis was used to analyze the data. The domains are defined as teacher's observations, teacher's reflective journal, student's work, and students' interviews, and lesson plans. These data sources provided adequate information to answer the research questions.

## CHAPTER 5

### CONCLUSIONS

#### Purpose of the Study

My observations of the role that writing played both in my classroom and in my school drove this study. Teachers and administrators seemed to perceive writing as a subject area to be worked into a school day that is already consumed with content area curriculum. The professional and scholarly literature suggested that this was a common trend among classrooms across the country, and a trend over time. Teachers were found to be doing little writing with their students and when they did, it was a creative writing/ language arts experience (Sunflower & Crawford, 1985).

The problem is that writing is classified as a subject area, not a vehicle or process to help learning in the subject areas. A proposed solution to this problem would be to teach children how to write while writing to learn. Writing instruction and development could be interwoven into other subject areas, such as science. The children would learn how to write while learning the role writing has to shape their thinking and learning.

A challenging dimension to this proposal was, Can first graders learn how to write while writing to learn? Are these young minds and beginning writers capable of doing

both tasks simultaneously? The research on writing across the curriculum offers little information on this topic for first grade students. Therefore, the purpose of this study was to determine if first graders are capable of learning how to write while writing to learn science.

The first step of this project was to design an inquiry cycle of learning that is appropriate for first graders. Figure 5 shows the cycle used in this study.

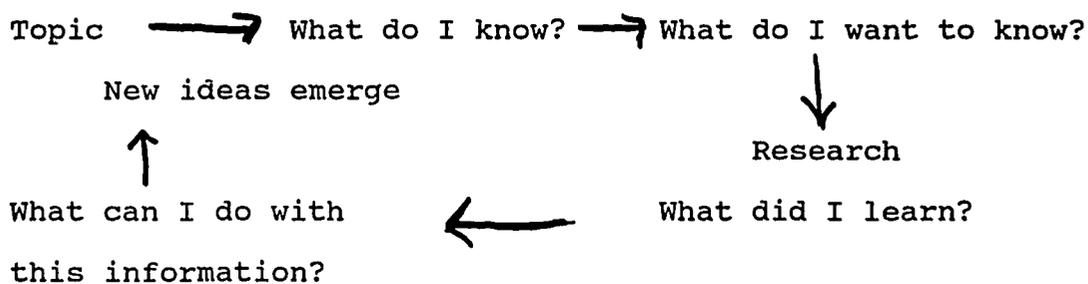


Figure 5. Inquiry Cycle

Next, writing to learn activities were selected to promote, enhance, or facilitate the phases of this inquiry cycle. These activities were selected from a thorough search for writing activities that promote thinking and learning. Figure 6 shows the writing to learn cycle.



to learn activities influence my instruction? How did they influence the course of study? How did collaborative writing and learning influence the writing and learning? Is it an effective learning style? How did the students view reading and writing in their learning process? Did they see value in using them to learn? Finally, how did the writing to learn activities incorporate the writing process writers go through when they compose? Will the students learn how to write while writing to learn?

When freewriting and review writings were compared there were signs of concept development. In the two examples presented in Chapter 4, 75% and 44% of the students did show signs of learning the information on the topic. The review writing contained the students' prior knowledge, as well as information discussed during the research and class discussions.

In addition to concept development, the first graders demonstrated the ability to write expository text with their review writing. They used new vocabulary words in correct context and their text structure modeled that of professionally published informational books. After writing the text they were able to reread it to a group with expression and accuracy. During classroom free choice time, students would choose to write an informational book and put it on the table with the other content area library books.

This illustrated that the students have an understanding of the reading and writing connection.

The writing to learn activities shaped the course of the study and my instruction in several ways. Freewriting and brainstorming taps and pools the group's prior knowledge. This information gives the teacher a sense of where to start the instruction. The student-generated questions give great insight regarding the students' interests on the topic. The teacher can plan experiences that will, perhaps answer these questions. The graphic organizers helped the students graphically show connections among ideas and concepts. The teacher may assist the children in making these connections if needed. The review writing helps to measure concept development. Ideally, the review writing is a time when students combine prior topic knowledge with newly learned information. The elaboration writing helps the teacher determine how the students are using critical thinking skills. Throughout all the writing to learn activities, the teacher can determine whether or not to intervene to promote better writing or concept development. The writing to learn activities will hopefully mirror the student's thinking.

Throughout the writing to learn activities, the common experience is collaborative writing. Theoretically, this form of learning promotes the sharing of ideas and talents,

as well as showing students that learning can be a fun, social process. The findings of this study support these notions. The students indicated during group interviews that collaborative learning is fun and that they do have the opportunity to share and learn from each other. I also noticed a sincere enthusiasm for learning as the children worked together. They were cooperative and productive when working in small groups or with a partner.

It is not only important that students benefit from reading and writing activities, but that they realize these benefits. During the taped interviews, groups were asked to compare reading and writing to direct teacher instruction. They were asked which method they liked better for learning and why. Seventy-five percent of the children expressed preference for reading and writing because it helps you to write better and to remember the information better. The consensus seemed to be that writing and reading are fun, as well as helpful ways to learn. My observations and reflective journal entries confirmed these attitudes. The students chose to read content area books and engage in writing to learn activities during classroom free choice time. When they were assigned to do a writing to learn activity, the children did them with effort and enthusiasm.

In addition to concept development, the writing to learn activities facilitated the writing process that a

writer goes through when composing. The findings in this study indicated that freewriting, brainstorming, and graphic organizers helped the students with their thinking in prewriting. The freewriting and brainstorming activities helped bring out ideas to write about and the graphic organizers were used as notes from our readings and lessons. During the drafting phase of the writing process, the students were often observed using their webs and diagrams to help remember information. Review and elaboration writing give the writer the opportunity to go through the entire writing process as they write expository text to publish and share with others.

#### Implications

This writing to learn cycle provides constant opportunities for students to write. The writing to learn activities do teach the writing process while causing concept development, therefore first graders are writing to learn while learning to write.

In addition, writing to learn helps to shape the learning to meet students needs. Writing to learn shapes learners' thinking so that they can internalize the inquiry cycle and use it independently in and out of the classroom.

#### Future Research Questions

With the conclusion of this study, many new questions emerged. These questions include: Can first graders learn

or internalize the inquiry cycle as a result of using the writing to learn activities? Does writing shape thinking for first graders? Compared to a non-writing to learn group, will the writing to learn group have better concept development? Will first graders use the graphic organizers learned in class during independent learning? Over time, will the writing to learn students show better writing skills over the non-writing to learn group?

These questions encourage me to continue with the writing to learn cycle, and explore the various contributions it can make to learning and writing development. As stated several times, the writing to learn cycle is flexible and recursive in nature. I am anxious to see how these activities can be adapted to meet the needs of my students.

APPENDIX A  
LESSON PLANS

### Lesson Plans

The first group of lesson plans and observations are for the space/solar system unit of study.

Day 1: The Sun

#### Freewriting

Each child was given a piece of paper and a pencil. The instructor asked the children to think about the sun and what they know about the sun. The students were given a few minutes for thinking time. Next, the students were asked to write down everything they know about the sun. When they were finished writing they drew a picture until the class was ready to move on to the next activity. This freewriting activity took approximately 5-10 minutes.

The purpose of this introductory activity was to give each student an opportunity to think about what they knew, and perhaps, what they don't know about the topic to be studied. To complete this activity, the students needed to stimulate their prior knowledge and get in touch with their existing schemas for the sun.

#### Lesson and Discussion

The instructor read a book entitled, What is the Sun? by Franklyn M. Branley. This book is geared for young readers and stimulated a class discussion about the sun. The teacher was able to meet the objectives that were set to

cover about the topic. This information may be prior knowledge, or new information, for the students.

Next, we took one piece of information about the sun: we need the sun to live, and elaborated on what this concept means. The children cut out pictures from magazines and made a collage that represented who or what needs the sun in order to survive.

#### Review Writing

This writing activity will, hopefully, give the students the opportunity to combine prior knowledge with newly acquired knowledge about the sun. Through the writing process the students may accommodate and assimilate to develop their schema for sun.

The children were given materials to start a booklet about space. Today they wrote and illustrated a section about the sun. As a starter, the teacher wrote a few sentences on the board about the sun to demonstrate. The students were encouraged to write additional information using their own words and language.

Day 2:

### The Earth

#### Brainstorming

The purpose of this brainstorming activity was to give the children time to think about what they know about the earth, to activate prior knowledge and probe their schema for the concept of earth. The instructor asked the class the question, "What do we know about the earth?" The children responded after some thinking time. All the responses were written on a large sheet of chart paper by the teacher for future reference.

#### Lesson and Discussion

Through a lesson and discussion format the students learned about the earth, its relationship with the sun, rotation to make day and night and the four seasons. The brainstorming chart was hanging on the chalkboard for a reference.

#### Review Writing

Each student was given the materials to write and illustrate a page about the earth for their space book. This time the teacher did not write sentences on the board, all text was generated by the students.

There were several process tools available to help the students with their writing. These process tools included

content area books and the brainstorming chart. Key words and information generated during the lesson were left on the board.

Day 3:

Sun and Earth-Elaboration Writing

The purpose of this activity is to take the content area information, the knowledge, and use it to solve problems. This type of activity encourages students to use higher level thinking skills as they learn to apply what they know.

Pre-Writing Activity

The teacher and the students had a review session on information learned about the sun and earth. On the chalkboard, the teacher wrote key phases and vocabulary words about the sun that were generated by the students. The same procedure was done when reviewing the information about the earth.

In first grade, the difference between fantasy and reality is frequently discussed. We applied these concepts with our review session. We discussed how this information represents facts or reality about the sun and earth. This discussion led us into "What if. . .?" activities.

What if. . .?

We took facts about the sun and earth and discussed their implications. We extended, perhaps unrealistically, ideas. For example: We know that life does not exist on the sun and we know why. The students were asked, "What if

there were life on the sun? What would those creatures look like?" We discussed several other What if. . .? situations and wrote a few on the chalkboard.

Day 4:

### The Moon

#### Brainstorming

The students were asked the question, "What do we know about the moon?" The students' responses were written on a large sheet of chart paper. The teacher took this opportunity to assess what the students already know, and clear up any misconceptions. The brainstorming chart was hung in the classroom for future reference.

#### Questions

Next, the class was asked, "What do you want to know about the moon?" These questions were written on a sheet of chart paper and hung in the room for future reference.

#### Lesson

With the help of the brainstorming and questions chart, the teacher was able to gear the lesson to extend on what the students already knew and to address their interests about the moon. Pieces of key information and key concepts were written on the board.

#### Review Writing

The students were given materials to write and illustrate a moon page for their space book. The students generated their own text for the book. There were several process tools available to help the children with their

writing: brainstorming and question charts, information on the board generated during the lesson, and content area books.

Day 5:

Field Trip-Planetarium

The class went on a trip to the planetarium. The program was primarily about constellations. This topic was not discussed in class prior to the trip, therefore; prior knowledge of the children was not known by the teacher or the planetarium director. The program was designed for kindergarten through second grade.

Lesson

After the field trip the class and teacher discussed the concept of the constellation. We made many references to the planetarium's program and provided additional examples.

Review Writing

The following question and statement were written on the chalkboard: What is a Constellation?

My favorite Constellation is. . . .

Each student wrote an answer to the question and elaborated on the statement. Students were encouraged to illustrate their favorite constellation.

The students were given the opportunity to read and share their stories with the whole class. The children's writing and illustrations were collected and displayed on the wall in the classroom.

Day 6:

### The Astronauts

#### Freewriting

Each student was given a piece of paper and a pencil. The teacher wrote the question, What is an astronaut? on the chalkboard. Each student wrote an answer to this question. This activity took about 5 minutes.

#### Brainstorming

The students brought their freewriting responses to a class brainstorming session on, What is an astronaut? All responses were written on a large sheet of paper. At this time the students were able to share their knowledge and misconceptions were addressed.

#### Lesson

The teacher and class had a discussion on astronauts, based on information generated during the brainstorming session. Ideas were elaborated on and additional vocabulary and information was written on the board for future reference.

#### Review Lesson

The teacher made a large paper spaceship. It was cut into three sections. Each section was placed in a writing center. The children worked in small groups to write information about astronauts on the sections of the spaceship. Each center had only one pen, so the group had

to work as cooperative groups. The children had to interact, share ideas, and decide what to write. The children had several references and process tools to assist them: brainstorming charts, freewriting responses, information on the board generated during discussion, and content area books on astronauts.

After this writing assignment, the spaceship was reassembled and hung on the wall of the classroom.

Day 7:

Astronauts-Elaboration Writing

Content Area Reading Activity

The teacher read two books, What Is The Moon Like, by Franklyn M. Branley and Is There Life In Outer Space? These books reviewed characteristics of the moon and space, and discussed the roles of astronauts.

Using Graphic Organizers

The class made a vocabulary web about astronauts. This graphic organizer aided the children in recalling vocabulary, key terms and phrases about astronauts. The web was written on the chalkboard, in addition each child made a web for his or her future reference.

Elaboration Writing

The class was given the incomplete sentence, If I were an astronaut. . . . Each student wrote a response to the statement. The class was encouraged to use several references and process tools: vocabulary webs, content area books, and other text that they previously wrote.

While the children were writing their individual responses/stories, each student was called up to dictate a page for the class book, If I Were An Astronaut. . . . Individual stories and class books were illustrated.

APPENDIX B  
QUESTIONS FOR STUDENT INTERVIEWS

### Questions for Student Interviews

1. How did you feel when I asked you to write everything you knew about the sun? Did you like freewriting? Why?
2. Did you like writing your own words in your spacebook, or did you like copying my words off the board? Why?
3. Did you like working in a group to write about astronauts on the spaceship? Why?
4. Did the reference books on the space table help you to learn about space? Why?
5. Do you prefer reading and writing to learn or having the teacher give you the information? Why?

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