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# A Curriculum Design Using Mnemonic-Type Techniques to Aid Recall in Low/Average Achievers in the Fifth Grade

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A CURRICULUM DESIGN USING  
MNEMONIC-TYPE TECHNIQUES TO AID RECALL  
IN LOW/AVERAGE ACHIEVERS IN THE FIFTH GRADE


by

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## ABSTRACT

Children in the Duval County School System in Jacksonville, Florida, who are low/average achievers have to compete in a multi-graded classroom atmosphere. These students are passed along supported by low minimum-based competency test scores. The purpose of this project was to show teachers how they can present mnemonic procedures to these students in an effort to help these students raise test scores, boost self-esteem, and provide a self-help study device that can aid their progress in subsequent grades, aid morale, and thus avoid potential drop-outs in the system. This curriculum design is offered in the subjects of health and science. The research reviewed shows that mnemonic procedures can be used in all subject areas in the fifth grade.

## CHAPTER ONE

### INTRODUCTION

There is no such thing as memory in a sensory aspect. It cannot be touched, smelled, tasted, heard or seen, yet we know it exists when as teachers we ask students to read, close their books, then recite what has been read or pass a test on the subject. If the students can do that successfully, then we deduce that they have a memory to recall what was read. We have offered the students an opportunity to learn something and then asked them to demonstrate their ability to recall it. We have observed what they did and how it was recalled. We now know that what we observed is not an object but an activity. We have not observed memories at work but an activity of remembering.

In order to assess children's learning abilities, a massive testing program is provided in the school system in Duval County, Florida. This testing program consists of the pretesting of growth curves using devices like Developmental Indicators for Assessment of Learning (DIAL). If weaknesses in concepts, communication, or gross/fine motor skills are noted, a prescriptive program follows where auditory, visual perception, or memory deficiencies surface in further testing. A remedial

prescriptive program follows using special classroom techniques with specialists. If a child shows no progress, the Child Study Team determines if the child should be in an exceptional child program. Children missing testing steps are assessed through inventory tests and placement tests. Based on the various types of testing to place children, it would seem all their needs would be assessed and remediated. However, the system also administers three minimum-based competency tests, the Florida State Assessment Test, the Stanford Achievement Tests, and the Essential Skills Test. Progress is assessed throughout the academic year with the use of Instructional Management Skills testing which has a minimum-skill base.

With all the widespread testing for academics, schools still cannot assess what is going on in children's total worlds--the social, emotional, and economic environment in which the children live. Schools can only assess what is going on in children's academic worlds. Even though these environmental variables can indeed become stop-gaps to learning and retention, the school is obligated to focus primarily on the academic dimension.

There is a definite need to help children who are passed on by screening and low-passing scores on minimum-based competency testing. These children are not

successful and need devised tools to help them retain knowledge which they are not advanced enough academically to retain. Fifth grade is the most critical time to do this because if children are not academically processed by fifth grade, they may advance in the system but will no longer be as likely to receive remedial attention. In secondary school, they are "on their own," so to speak.

The use of mnemonic-type learning devices may facilitate recall and the retention span of these students. Such procedures may also help them utilize their study-time efforts to be more effective recallers of the materials learned. The foundation of this project was to help the low/average achiever to remember, recall, and retain academic materials mnemonically so that these students would have a self-help device which could help them study more efficiently.

Hunter (1959) feels memory follows four basic steps--learning, remembering, forgetting, and retaining. The purpose of this study was to concentrate on the remembering or recall aspect of memory since some memory specialists say in long-term memory nothing is forgotten (Woolfolk & McCune-Nicolich, 1980). This project approached this subject on the assumption that memory has only two necessary phases--learning and recall.



Through the use of visual-symbol mnemonics, this study devised a technique involving the current day-to-day activities of low/average achievers in fifth-grade classrooms. The study developed a potential self-help method to help boost test scores and self-esteem. Hopefully, low/average achievers using this method in the study will have an option to save themselves from being drop-outs in the school system as these students advance in the system.

## DEFINITION OF TERMS

Memory--the mental capacity or faculty of retaining and receiving impressions, or of recalling or recognizing previous experiences.

Long-term memory--information that has been thoroughly and deeply processed or learned. This information can be retrieved.

Metamemory--the relationship of memory retrieval tasks to one's memory storage and retrieval capacity.

Mnemonic--derived from the Greek work for memory. The word mnemonic is associated with the retention capability of the brain.

Mnemonic devices--methods which one can employ to help one retrieve items from one's memory.

Mnemonic strategies--how the mnemonic devices are to be applied to help the recall factors in the brain.

Short-term memory--memory traces that will spontaneously decay unless refreshed by active rehearsal. These memory traces last for twenty seconds.

## CHAPTER TWO

### REVIEW OF RELATED LITERATURE

Visual-symbol systems mnemonics, according to Cicero, started around the year 500 B.C., when the Greek poet Simonides devised the earliest system under dramatic circumstances (Hunter, 1959; Montgomery, 1979). It seems a certain Greek won a wrestling victory in the Olympic Games and gave a banquet to celebrate. Simonides was invited to provide a recitation as part of the entertainment for the banquet. After delivering his eulogy, two men called Simonides outside to speak with him. Moments after leaving, the banquet room floor collapsed, killing everyone inside. The bodies were so mutilated that they were unrecognizable. While Simonides was giving his speech, he had noted where everyone was positioned in the room so he was able to identify the bodies. He remembered who was present by recalling where each sat.

Simonides pondered after this incident and surmised that if such were the case with places and people, surely names, objects, and even ideas could be better memorized by assigning them fixed positions in space. He began to vividly imagine, with as much detail as possible, a room. Each item he wished to recall, he would visualize as being placed in a certain part of this room. For instance,

the first item would always be placed, say, on the middle of the far wall, the second on top of the left-hand corner of the window, and so on. To recall these items, he would systematically peruse this imaginary room and find each item as to its position.

Simonides found that this technique was indeed of considerable assistance in recalling. He formulated a system and taught it to others. Quintilian and Cicero found themselves indebted to Simonides' system and prepared their speeches by visualizing each division in connection with a specific locality. These speakers had only to imagine each locality to recall each division in its correct sequence. This system is called a topical system or locality and comes from the Greek word for "a place." We still speak of "topics" in connection with discourses and such expressions as "in the first place" are believed to have originated from Simonides' system.

Down through history, many mnemonists have employed variations of this topical/locality system. Rooms, houses, public buildings, the human body, the back and palm of the hand--all have been broken into distinctly visualized localities so that items to be learned in sequence can be associated with them.

Henry Herdson, a Cambridge man in the seventeenth century, devised what might be regarded as a logical development of the topical/locality system (Montgomery, 1979). Herdson dispensed with the spatial aspect of the model and employed the images themselves. The vast variety of images used by mnemonists argues that nothing is magical about Herdson's selection. One symbol is as appropriate as another, and it matters little which is used. The important aspect of a system is that one definite code should be decided upon and should be completely familiar before being put into use.

Mnemonic-type devices are a means to retain or recall learned material that is patterned differently than the steps to the normal flow of learning (Hunter, 1959). There are as many mnemonics systems as there are mnemonists. Regardless of the system, there are three basic underlying types, namely: the visual-symbol type, the digit-letter type, and the successive-comparison type. Hunter, also, emphasizes that one symbol should be decided on and one definite code should be completely familiar.

According to Brown(1987), the visual-symbol system involves the representation of a sequence by a succession of predetermined visual symbols. It is these symbols

which are associated with the items to be recalled. Mnemonists offer one all important aspect as part of the visual association procedure: it is to visualize only two objects together as vividly as possible and never to compare more than two items at a time. These items should be brought into a definite relation to each other--the more ridiculous and far-fetched the relation, the better. When the first two are then visualized together, a person is free to attend to the next pair.

According to Hunter (1959), the second type mnemonic system is the digit-letter system which dates back to a German, von Winckelmann, in 1684. This is a system using the alphabet to replace numerals and helps one to remember important dates. We could apply this approach in the following way. In 1957, Sputnik was launched by the Russians. B might be a symbol for 1, Q for 9, I for 5, and M for 7. By learning "B.Q. 'barbecue in me' made the Russians launch Sputnik," one can always remember that the event happened in 1957. This system, however, might be totally inappropriate for students because educational trends have moved away from rote memorization and the importance of learning dates as such.

According to Montgomery (1979), the third system is called the successive-comparison system. While it does

not involve the mastery of a code, it has been used as a device to facilitate the application of the other two systems. It is used mostly for learning lists of unrelated words and has shown very little popularity among mnemonists.

How can mnemonics work? Mnemonics would help an individual understand the material to be learned. The more meaningful the material is to an individual, the more easily it is learned. It is meaningful when it fits into a framework of accumulated past experiences. It derives its meaning from a schema from which it makes sense. Hunter (1959) states:

The first necessity in efficient learning is to relate the material to what is already familiar, to start by surveying and understanding what is to be learned. . . .The wider range of past experience and the greater the variety of our completed learning, the easier it becomes for us to learn yet more and more new material.

(p. 172)

To further explain, one takes what one already knows, called one's schemata or world knowledge, and introduces new ideas which cause an expansion of one's original schemata or world knowledge (Rude & Oehlkers, 1984). As Howe (1970) states, "active rehearsal of

retained information facilitates future retrieval. Efficient remembering occurs when an individual can relate and link the material he perceives to what he already knows" (p. 95).

Research by Anderson and Bower (1980) shows that instructing low/average achievers to search for and remember meaningful relations through the visual-symbol mnemonic learning of pairs of items enhances their learning considerably so that individual differences between low and high achievers can be reduced, though not eliminated. The general rule seems to be that students who learn and remember a lot do so because they use more efficient and powerful encoding strategies. If mnemonic strategies can be balanced by formal instruction and tutoring, the individual differences will be reduced, if not eliminated.

Levin, Dretzke, McCormick, Scruggs, McGivern and Masgropieri (1983) found in three different experiments that middle school children using mnemonic strategies performed better than those children who used simple rote rehearsal activities. The researchers found that the children using mnemonic strategies achieved in their recall of materials higher levels than the control children who were left to their own devices during a free-study



period. Similar experiments done by Baddeley (1986) showed mnemonic learning strategies increased recall from 66 per cent in the rote condition to 92 per cent.

Research done by Baine (1986) with kindergarten through sixth-grade children suggests that the nine to ten-year-old child has a better decoding/encoding foundation to use mnemonic strategies than the younger-aged child. Baine also studied mnemonic strategy research conducted from 1950 until 1980 and found a basic flaw. The flaw, according to Baine, is that the children who are introduced to the mnemonic strategy retention method are only introduced to it in one subject area with one idea and then the children are asked immediately to give retention feedback. Baine's research indicates a need for children to be tested in mnemonic strategy techniques in many subject areas. Baine suggested that immediate retention feedback and subsequent later recall tasks need to be tested in order for the research to be more accurate.

Researchers say memory tasks require some of the same functions used for learning tasks (Howe, 1970). Memory and learning are part of a complex function which seems to be carried out by a series of cognitive processes. Because we have this complex function, it is probable that learning tasks and memory tasks use some mechanisms in common.

To know this does not deny the utility of investigating memory and learning separately. It is only to know that memory is not a faculty that operates independently of, and in isolation from, other cognitive processes.

Howe suggested that if a bit of information is in long-term memory, it is not forgotten. In short-term memory, information may be lost completely and leave no permanent record. However, even if nothing is lost in long-term memory, it may take a combination of factors to be able to retrieve something from long-term memory. Factors such as the precise information that is stored, the characteristics of the retrieval system and the retrieval cues available to the subject for locating the information determine whether remembering is possible. Information is not lost from long-term memory; it is just misplaced in the complex associative structure of the memory rather than being dropped out and forgotten. This loss can be compared with the loss of a favorite toy; the toy still exists but the owner cannot find it.

Memory would be burdened with enormous items of information without general laws to follow (Furst, 1972). The perfect mnemonic system helps one to use laws by practical application. Furst (1972) draws the following conclusions;

1. Memory works through association. We can remember a new idea only by connecting it with something we already know.
2. The question is not whether or not we form associations. The question is whether we form these associations consciously or subconsciously.
3. Association is formed either by intellect or by imagination. With most of us, imaginative association is stronger than intellectual association.
4. The forming of associations--both imaginative and intellectual--can be trained. (p. 39)

Furst invented a mnemonic strategy which he called the chain method. He also referred to a system called the hook system. Both are forms of visual-symbol mnemonics which involve a digit-letter system as well. The chain method uses cue words and emphasizes the continuity of these cue words. This method links the cue words together in such a way that one of the words unfailingly recalls the next cue word, thus forming a chain. The chain method helps with permanently remembering items over a long period of time. The hook method is a series of words memorized to replace other numbers or words. There are no connecting cues or thoughts. It is used for short-term memory of playing cards, pages of magazines, and for lists of part

items. The only advantage of the hook method over the chain method is that the hook method enables us to remember any item out of sequence whereas the chain method does not.

When material is meaningful and important to a person, such as information retained over a long time, its retention becomes increasingly less dependent upon the conscious functions of the memory system. This retention becomes increasingly more dependent upon the perceived importance of the material, the person's interests, and comprehensibility of the material; all of these are involved with the person's background, knowledge, interests, personality, attitudes, temperament, and prejudices (Howe, 1970). Whether a person remembers a joke or a rumor will depend upon factors associated with individual frames of reference. All the aforesaid are important determinants of what is remembered, and they interact with the storage and coding mechanisms in complex ways to determine what will be recalled. Personality, past experience, and all the aspects that make people different from each other influence what a person remembers; no attempt to explain remembering can ignore them. Howe (1970) summarizes this perspective:

Certainly memory research cannot now provide a complete answer to the question "Why can't John remember his history lesson as well as Sammy?" But it has enabled us to point out that the difference cannot be explained solely in terms of memory mechanisms or differences in efficiency among similar mechanisms. The value of research on memory does not stand or fall on its ability to provide simple answers to questions which are enormously more complex and difficult than they appear. (p. 77)

What takes place during memorization? Memorizing is the deliberate systematic activity undertaken with the explicit intention of being able to reproduce given matter with the greatest possible exactness (Hunter, 1959). Hunter notes that memorizing follows the same variables that affect learning. These variables are the nature of the material to be learned, the conditions under which the learning is to take place and through which the learning is conducted, and the personal characteristics of the one who is doing the learning. Memory span is also affected by fatigue, distraction, excitement, drugs, and illnesses.

Hunter (1959) and Montgomery (1979) view memorization as it is related to applied mnemonics in several ways. To help teachers who are helping students to use mnemonic

strategies, they offer several guidelines: 1. Utilize existing motivation by integrating tasks into activities which are interesting. 2. Put items to be remembered together in sequence by presenting them together and keeping them in that sequence. 3. Use short easy lessons to combine whole parts, while giving special attention to difficult parts. 4. Correct errors immediately as they appear. 5. Use meaningful, colorful, and rhythmic material. 6. Make learning sessions short and stop immediately at signs of fatigue. 7. Review frequently and then over longer intervals. 8. Try to integrate the learned material into further activities when learning takes place. Assimilation takes place when these steps are followed.

The use of jingles, songs, and poems can also interplay in the mnemonic-type learning which is called acrostic (Montgomery, 1979). The old "Thirty Days Hath September" verse has helped scores recall the number of days in each month of the year. Acrostics, a form of visual-symbol mnemonics, is at least as old as Psalm 119. Medical students use this method to remember intricate medical terminology.

Hunter (1959) noted that when children are given a technique like a mnemonic system device, they will be able

to better organize materials. Once they have satisfactorily learned the device or reorganization, they will have a body of information which is both easier to learn and easier to refer to because each part is integrated into a coherent whole instead of being in isolation. Mnemonic devices would furnish students with a framework which could be filled out with appropriate details, a framework in terms of parts which can be reconstructed more satisfyingly than if the parts had to be recalled on their own. Hunter's (1959) metaphor is helpful here: "our learning capacities are like a suitcase. The size of the case may be limited but we can pack more by packing more systematically (p. 159)."

Hunter (1959) cited an example of a classroom teacher stressing neatness to children in a mathematics lesson. The teacher noticed that neatness in other subjects improved at the same time even though neatness was not stressed in the other subjects. This example illustrates a point about learning to learn that shows up frequently. It shows that laying the groundwork of instruction in the general principles of learning techniques can be transferred if the guidelines are set out specifically beforehand. In other words, students must learn not only that rules can be used but also how to use them. This is an aspect that individuals

must apply themselves. Memorizing in itself is useless and inefficient, but efficient methods of applied mnemonic techniques promote learning. Individuals can gain practice in applying these methods to everyday learning activities. Glover, Timme, Deyloff, Rogers, and Dinell (1987) found the above to be true in their five experiments using mnemonic and paraphrase conditions in the learning of a long set of oral directions. Those children using mnemonic conditions were able to improve retention more satisfactorily than those children using paraphrase conditions.

One negative side of mnemonics would be to suggest that mnemonics are ineffective since sometimes students might recall the device but not the items that were intended to relate them together. There is a fallacy here because this argument overlooks the point that the device might not help but it does not hinder either (Hyde & Jenkins, 1974). It is reasonable to conclude at this point that the students, based on their previous academic backgrounds, would not have learned without the devices either. The instances of failure based on research seem to be offset by the many successes revealed in improved test scores.

To facilitate the use of mnemonic strategies satisfactorily, metamemory must be understood. Metamemory is defined as the knowledge about one's personal memory



storage and retrieval capacity in relation to particular memory tasks and to mnemonic strategies that may be applicable to the memory task. Baine (1986) offers direction to teachers attempting to use mnemonic strategies in the classroom:

While metamemory is not predictably related to the use of age-appropriate strategies during elementary school, there is a positive relationship. The failure to observe a strong relationship between metamemory and the use of mnemonic strategies could lead to the abandonment of efforts to improve metamemory in an effort to improve recall. Such an action would be regrettable. If knowledge of mnemonic methods is necessary but not sufficient to induce related memory behavior, then training should focus not merely on teaching knowledge of mnemonic methods, but also on the application of that knowledge. (p.110)

Part of the actual training of elementary school children in mnemonic strategies, therefore, should include methods of application. With a variety of tasks, strategy use may be taught in multiple settings that require application and adaptation of the strategy. Teachers need to provide prompts to indicate when and how to apply a strategy. The learner will have the prompts gradually removed when the

learner is able to function without assistance.

Teachers must know and understand students' perceptions and previously learned strategies in order to teach mnemonic strategies and understand how students will respond to the method (Wittrock, 1986). Wittrock suggests that teachers influence what students think, believe, feel, say, and do. This influence affects students' cognition, learning, achievement, and thought processes. Teachers have a definite effect on the self-concepts and abilities of students.

In conclusion, the review of related literature indicates that mnemonic devices can be successful learning devices in the classroom. The material has to be organized, and relationships have to be found within it. Not over two themes at a time can be used to build the schema. These themes are better utilized when they are bizarre, vivid, and colorful, even if they are uncomplimentary to the object under scrutiny. With practice, these techniques take less and less time to perform. Through this characteristic of organizing, a system of selective observation arises which helps students attend to certain aspects and ignore irrelevancies (Buzan, 1984). Techniques of this sort help students develop more efficient types of learning. This efficient learning emerges as a significant by-product of attempts to understand and reorganize material.

## CHAPTER THREE

### PROCEDURES

"C" students in Room #21 at Holiday Hill Elementary School No. 209, Duval County, Florida, in 1987-88, consistently made lower grades in the science/health areas of the curriculum. These students were instructed in all models of teaching by the same instructor in all subject areas. The students were low/average achievers based on their Florida State Achievement Test scores, past accumulative records, and test scores. The students were taught using the Duval County Curriculum Guide for Fifth Grade (1987) and the Holiday Hill Southern Association of Colleges and Schools Self-Study for Continuing Accreditation (1987) objectives. These objectives are addressed in the adopted Heath Science Series and the Scott, Foresman Health Series which offer a teacher varied teaching models and ways to implement the material.

The Holiday Hill SACS Self-Study for Continuing Accreditation Manual for 1987 states:

The characteristics of pupils as individuals, as subgroups, and as a community group will help determine what programs and learning experiences are needed.

School programs should be designed to provide both developmental and remedial opportunities

for improved learning. A dynamic program should promote the progress of pupils of various abilities, aspirations, and goals. (p. 9)

The Holiday Hill School philosophy promotes preparing students with ways and means to develop healthy minds. Holiday Hill School objectives include helping children apply the processes of problem solving which help them to understand and accept themselves.

Teachers are provided guidelines by the Duval County School Board in areas of curriculum. The teachers are given wide latitude in the development of curriculum to meet the needs of pupils in various classrooms. Teacher input is encouraged in regard to the desirability of implementing special programs and projects to be used with pupils. The Holiday Hill procedures for making decisions in curriculum are adapted from the Duval County School Board guidelines and the Florida State Department of Education guidelines, which permit individual teachers to decide the methods of teaching. The teachers are given the support of the various principals involved.

The Holiday Hill School SACS Manual, 1987, guidelines for teaching science and health state:

1. The assessment of the educational needs of individual children provide the framework for the

area of learning.

2. The educational program reflects the principles of child growth and development.

3. The learning practices and objectives provide for different pupil needs, abilities, and interests, both present and future.

4. The daily experiences provide opportunities for each child to achieve success with dignity.

5. Opportunities are provided for each child to obtain an understanding and appreciation for the value, worth, and dignity of himself and others.

6. The learning experiences enhance the opportunities for children to develop integrity, responsibility, initiative, leadership, cooperation, and self-direction.

7. Opportunities are provided for parents to be involved in the planning and evaluating of the program.

8. Children participate in planning, developing, evaluating, and learning experiences.

9. There is a systematic plan for continuous evaluation of each pupil's progress and achievement as it relates to his aptitude, abilities, and interests.

10. Children are grouped for instruction according to their diagnosed learning needs.

11. The method and style of instruction is consistent with the size and purpose of the group.

12. Optimal utilization is made of the school's media services.

13. There is a plan for continuous evaluation of this area of learning. (pp.75-76)

As mentioned in Chapter Two, Baine (1986) argued that children need exposure to mnemonic devices as another strategy to retain learned material. With these objectives in mind, the curriculum presented here incorporates teaching of visual-symbol mnemonics to low/average achievers, and the curriculum follows the day-to-day logged unit planning as prescribed in the Duval County School Curriculum Guide using Heath Science by Barufoldi, Ladd, and Moses (1981) and You and Your Health by Richmond and Pounds (1981). Both areas of the curriculum involve the critical thinking skills of comparisons, classifying data, identifying ideas, analyzing situations, and making judgments. These critical thinking skills were selected to match those emphasized in standard achievement tests. Further, the skills learned in both series are supposed to help students define, describe, explain, discuss, state, contrast, differentiate, observe, and calculate.

Students' needs, which influence the nature of the curriculum, were determined based on professional teacher observation of children's performances in the classroom

The curriculum was designed for all the children in Room #21 of the fifth grade at Holiday Hill Elementary in 1987-88 who were achieving below the "C" level.

The content was selected and organized as suggested in the curriculum guide of Duval County. From these curriculum guidelines, each subject is to be taught by directed-teaching activities involving five steps:

- 1) review of skills requiring necessary steps to new learning;
- 2) introduction of the new lesson to set the purpose;
- 3) inclusion of definitions, examples, questions and answers, discussions, and hands-on experiences;
- 4) evaluation to assess the degree of mastery;
- 5) reteaching to provide instruction for remediation.

The material presented in this project suggests that the teacher will take the day-to-day science/health lesson plans and design mnemonic devices suitable to help students recall the subject matter. The students are to be instructed in how to search the science/health literature themselves. The teacher assists the students in forming outlines and listing categories using mnemonic procedures. During the four-week unit on the Human Body, the acquired knowledge of how to use mnemonic devices can aid the students in their study of the content of the literature in preparation for tests on the various systems in the

human body. These tests involve multiple-choice questions, true/false questions, and the listing of categories. The allotted lesson time will be thirty to forty-five minutes, four days a week.

The Duval County Curriculum Guide states that the curriculum for science and health on the human body can be integrated. Supporting this integration, in Chapter Two, Baine (1986) suggests that mnemonic procedures should be used on more than one subject for the self-help devices to be retained for future use. The primary idea of the four-week unit on the Human Body is that the systems of the body work together to maintain a delicate internal balance of good health. Through the use of visual-symbol mnemonics, the teacher helps students devise self-help mnemonic devices to assist them in meeting the objectives.

The needs, objectives, content selection and organization, learning experiences/activities, and evaluation were all selected from the science/health textbooks adopted for the fifth-grade curriculum in Duval County. The mnemonic devices should help the low/average achiever to increase his/her comprehension level and retain the material presented in such manner that will enhance self-esteem and, hopefully, promote higher achievement on the unit. This curriculum approach can be evaluated by use in the field to prove



its effectiveness after approval from the administrators working in curriculum guidance for the Duval County School System. It is important for the low/average achievers in the fifth grade to understand how to set up and use visual-symbol mnemonic strategies as devices to help facilitate recall as an aid to improve study habits, self-esteem, and grade averages. In this way, the students can acquire the knowledge to help themselves learn material in science and health studies.

CHAPTER FOUR  
CURRICULUM PLAN

A nine-day lesson plan can focus on the topic of the Human Body Systems based upon the Heath Science Series (1981) and You and Your Health (1981). The Duval County Curriculum Guide for science and health permits teachers to combine these texts on the human body unit. The nine-day plan can be taught as suggested in the curriculum guides from both texts and Duval County.

Prior to administering the formal posttest for this topic, the teacher reviews the material presented with the class. At this point, the teacher introduces the mnemonic procedure to the science students with less than a "C" average as a self-help study device to raise these low/average students' test scores. The remaining students proceed with a normal review as suggested by the texts. It is here in the instructional process that the focus of this project becomes apparent: the use of appropriate mnemonic procedures as a review mechanism for lower achieving students.

The interests and trends of the low/average students determine the type mnemonic procedure to be used. An example of a mnemonic procedure study device is enclosed to help students review the five systems of the body, the

five parts to the heart, and the major parts of the blood. The mnemonic approach which follows is thus only suggestive of what a teacher would present to these students.

#### Rationale of the Lesson Plan

In the nine-day sequence outlined here, students will learn the concept of a system and how systems work together to perform certain functions. The circulatory, respiratory, excretory, nervous, and endocrine systems will be emphasized. The daily lesson plans, derived from texts and curriculum guides, are presented here so that teachers may examine carefully the material which the mnemonic procedures will later review.

#### Objectives for the Human Body Systems

The students should . . .

identify the structures and functions of the five body systems.

describe how blood flows through the circulatory system.

trace air through the respiratory system.

describe the nervous system impulse path.

describe how the excretory system gets rid of body wastes.

state the role of the endocrine system glands.

Lesson Plan, Day One

OBJECTIVE: The students should be able to define tissue and system.

TOPIC: Tissues, Organs, and Systems--Heath Science, pages 288-291.

INTEGRATED SUBJECT MATERIAL: Language Arts Listening Skill Background information read from the Teacher's Manual, Heath Science, page 288.

PROCEDURE: The lesson will be introduced having the students view pictures of children playing team sports such as softball, football and soccer. Questions and possible answers follow: "What makes a good team?" "Each player does his/her job well." "What do you mean by that statement?" "All work together." "What jobs do football players do as a team?" "Some players play offense and some defense but the team works together." "How is the human body systems like a team?" "They all work together as a team but each system has its own jobs."

The teacher will read the chapter background information. The students will briefly review the Marine Science Center's study done by the students earlier on plankton. The teacher will then introduce pages 290-291. Using the overhead projector, the teacher will introduce human organs (tissues joined

together) using different colors for each word to be defined. The students will take notes.

**ENRICHMENT ACTIVITY:** The Science Learning Center will feature plaster models of the heart and the blood vessels. A real stethoscope will be featured for the students' use.

**HOMEWORK:** Duplicating Master #71 (See Figure 1.)--A Parent Involvement Sheet on the pulse rate. Duplicating Master #72 (See Figure 2.)--A brief activity on the circulatory system.

Parent Involvement Sheet

Name \_\_\_\_\_

**Human Body Systems**



Figure 1. Parent Involvement Sheet

**Activity**

Objective: To relate vocabulary terms identifying parts of the circulatory system to a diagram.

Name \_\_\_\_\_

**Human Body Systems**



Figure 2. Vocabulary Terms

Lesson Plan, Day Two

OBJECTIVE: The students should be able to name the parts of the circulatory system, describe blood functions, and name the blood's components.

TOPIC: Bringing Cells What They Need--Heath Science, pages 292-293.

INTEGRATED SUBJECT MATERIAL: Language Arts: (Vocabulary Building) tissues, organs, systems, fibers, hemoglobin, nerves, vessels, circulatory; and, (Dictionary Skills) of location, syllabilization, definition and application. Picture Essays from You and Your Health, pages 140-145 on muscles, fibers and tissues.

PROCEDURE: After briefly reviewing with the students topics covered in Lesson Plan, Day One, the teacher will write the vocabulary-building words on the chalkboard as the students read silently the pages presented. Following a questions and answers session using the You and Your Health text, the students will proceed to the dictionary work assigned. The students may go to the Science Learning Center following the recording of the assigned dictionary work into the students' notebooks.

ENRICHMENT ACTIVITY: In the Science Learning Center a chart will be displayed with the overhead projector material of Day One featured. Microscopes are present to view a variety of slides of blood smears.



Lesson Plan, Day Three

OBJECTIVE: The students should be able to identify the heart's parts, state what heart valves accomplish, and describe blood flow through the circulatory system and the heart.

TOPIC: The Heart and Blood Vessels--Heath Science, pages 294-296.

INTEGRATED SUBJECT MATERIAL: Math: Have the students write each other's heartbeat rates and determine the average rate for the class. Picture Essays from You and Your Health, pages 209-211, on the heart.

PROCEDURE: The teacher will introduce the lesson by letting the students listen to each other's hearts through cardboard tubes made from construction paper. The students will record their partner's heartbeats per minute, then record the heartbeats again after the students have run in place for one minute.

The teacher will request the students to read page 294. Using the diagram on page 294, the teacher will help students describe blood flow through the heart.

The teacher will divide the class into four groups and the groups will do the following activity to show how the heart pumps. The activity is on page 295.

Equipment needed: water, a straight pin, and an

eyedropper. Proceed with page directions. The teacher will engage the class in a discussion on what causes heart attacks (blocked arteries causing oxygen supply to the heart to stop).

Lesson Plan, Day Four

OBJECTIVE: The students should be able to describe the function and the major parts of the respiratory system.

TOPIC: Letting Oxygen In and Carbon Dioxide Out--Heath Science, pages 297-298.

INTEGRATED SUBJECT MATERIAL: Picture Essays from You and Your Health, on the lungs, pages 220-222, and on the vocal cords, page 219.

PROCEDURE; The teacher will go over Duplicating Master Sheets #71 and #72 and record a daily classwork grade on the sheets while the students read page 297 in the Heath Science text. The teacher will return #71 and #72 to the students for them to make the necessary corrections. These sheets are to be placed in the students' notebooks with the other notes on the lesson. The teacher will request the students to feel their windpipes and larynx rings. The students are to hum high and low to feel how the voice box bobs up and down. A discussion is to follow on the glottis (the trapdoor at the top of the windpipe) and its uses. The teacher will call attention to the diagram of the air sacs. Using Duplicating Master #73 (See Figure 3.), the students will trace the path of air through the respiratory system. This paper will be

collectively checked in class to be included in the notebooks.

ENRICHMENT ACTIVITY: Science Learning Center: The activity on page 298 in Heath Science will be set up to help students visibly see their lung capacity. Equipment needed: water, a pail, some tubing, two straws, masking tape and a grease pencil.

HOMEWORK: The students are requested to share what they have learned today with a parent or friend.

**Activity**  
Objective: To identify parts and apply information learned about the respiratory system.

Name \_\_\_\_\_

**Human Body Systems**



Figure 3. An Identifying Activity

Lesson Plan, Day Five

OBJECTIVE: The students should be able to describe the function of and identify the major parts of the excretory system.

TOPIC: Getting Rid of Wastes--Heath Science, pages 299-300.

INTEGRATED SUBJECT MATERIAL: Picture Essays from You and Your Health, pages 178-179 showing how the entire set of systems works.

PROCEDURE: The teacher and students will read the first two paragraphs on page 178. Using a hands-on plaster model of the human body with removable parts, the teacher will help the students realize that the excretory system actually involves several body systems: the urinary (kidneys), the respiratory (lungs), and the digestive (intestine) systems. The class will then read the remaining paragraphs to find other ways waste is removed from the body.

The teacher will instruct the students to select a partner to perform the activity on page 300, Heath Science, on perspiration. This activity involves partners using plastic bags tied with string on each other's hands and watching what happens after ten minutes has passed. The students will discover that water droplets in the bags show perspiration from skin pores.

A question and answer period will conclude the lesson by using materials gathered from the students' notes.

ENRICHMENT ACTIVITY: The Science Learning Center will include books and magazines from the school library featuring articles of interest on the human body systems.

Lesson Plan, Day Six

OBJECTIVE: The students should be able to name the major parts and functions of the nervous system and describe how a message goes from a nerve cell in the skin to the brain and back to a muscle.

TOPIC: Receiving and Sending Messages--Heath Science, pages 301-305.

INTEGRATED SUBJECT MATERIAL: Math--the use of the metric ruler for reaction times and the use of the second hand on the clock with addition and subtraction skills  
Picture Essays from You and Your Health, page 74, showing the nervous system network in the body.

PROCEDURE: The teacher will have the students read page 301 in Heath Science to learn about the nervous system. The teacher will emphasize that the nervous system is the control system of the body. The teacher will show the similarity of the nervous system by using an illustration of an air-traffic controller and the work he/she must do.

The students are instructed to read page 302 in Heath Science. The teacher will demonstrate for the students, by using a plaster hands-on model of the brain and spinal cord, the major parts of the nervous system and the functions of the spinal cord.

The students are to read pages 303-305 in Heath



Science and then participate in a partner activity using the second hand on the clock and centimeter rulers to discover reaction time.

ENRICHMENT ACTIVITY: The teacher will distribute drinking straws and scissors. The student partners will cut a drinking straw in half and cut a pointed tip on each half. One partner will rest a hand on a desk, palm up, and close his/her eyes. The other partner will ask if one point or two is felt as he/she touches the other partner's palm holding the points about 2 cm apart. The demonstrating partner is to keep moving the points closer together until only one point is felt. The students will discover how far apart the straw tips are at this point. The experiment can be tried on the arms and lips also. This is to find out where the nerve cells are the closest.

HOMEWORK: Duplicating Master #74 (See Figure 4.) is to be used as a review to the parts of the various systems.

**Activity**

Objective: To reinforce the connection between a part and its job.

Name \_\_\_\_\_

**Human Body Systems**



Use with page 302.

74

Figure 4. Jobs in the Body Activity

Lesson Plan, Day Seven

OBJECTIVE: The students should be able to state that hormones affect some body functions and be able to name and describe the functions of the pituitary and adrenal glands.

TOPIC: A Control System--Heath Science, pages 306-308.

INTEGRATED SUBJECT MATERIAL: Picture Essays from You and Your Health, page 73 on the pituitary gland.

Art: a graphic illustration.

PROCEDURE: The teacher will request the students to read 306-308 in Heath Science. The words glands, hormones, and endocrine system will be introduced by the teacher from the chalkboard. The teacher will distribute 12" by 18" manilla construction paper to the students to draw the illustration on page 306 of the endocrine system. The teacher will help the students label each gland to establish its function. This will help the students in their review of the human body systems.

The teacher will discuss the effects of adrenaline and explain that it is often called the "fight or flight" hormone. Using the illustration on page 307, the teacher will have the students discuss how adrenaline may affect the runners in the picture. The teacher will have other pictures (prize fight, car wreck, angry child,

Olympic competition, and a car race) to help illustrate the "fight or flight" idea.

HOMEWORK: Duplicating Master #75 (See Figure 5.) to be used with page 307. This sheet is used to reinforce the terminology of the human body systems.

Vocabulary

Name \_\_\_\_\_

**Human Body Systems**



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Figure 5. Vocabulary Activity

Lesson Plan, Day Eight

OBJECTIVE: The students should be able to successfully review the material covering the human body systems in Heath Science and You and Your Health.

TOPIC: The human body systems covered in pages 289-308 in Heath Science and the illustrations covered in the picture essays found in You and Your Health, pages 74, 93-95, 140-145, 170, 178-179, 209-211, and 220-222. Duplication Masters from Heath Science, Numbers 71-75.

PROCEDURE: The teacher will instruct the average to above-average students to divide into groups of four to play Trivial Pursuit with the questions and answers found in the material covered. They will be encouraged to study for the test using these methods.

As a teacher-directed group activity involving the less than "C" average students, the teacher will conduct an introduction to mnemonic procedures. The teacher will suggest to the students that with this self-help device, they will be able to study for this science test as well as use the procedures in other subjects. The teacher will mention a mnemonic procedure (See page 56.) used in math class to successfully teach the concepts of increase, decrease, precede, horizontal and vertical. (Acknowledging the use of

mnemonic procedures in other content areas reinforces for the students and the teacher their wide applicability.) The teacher will help the students devise a mnemonic procedure to review and retain information about the five parts of the heart, the five body systems, and the parts of the blood.

HOMEWORK: The teacher will instruct the whole class to scan the material covered in the lessons. The teacher will further instruct the less than "C" average students to practice the mnemonic techniques devised during the teacher/student review group activity.

Sample Mnemonic Procedures

To Learn Five Systems In The Human Body  
(for the review during lesson eight)

Procedure A

Step 1: Put the five systems in alphabetical order.

- a. Circulatory    b. Endocrine    C. Excretory
- d. Nervous    e. Respiratory

Step 2: The teacher will help the students devise some catchy story involving the above systems using wild, bizarre, vivid, colorful characters. The idea of mnemonic procedures is remembering the original terminology and being able to recall the terminology when it is displayed visually and verbally in a mind's-eye version.

Step 3: A Sample Story Version

The H. B. System

Old H. B. had a railroad line with connecting cities. The system was called the C., Double E., N. & R. Line. The system was better known as "Sneer" for H. B. was an operator of sorts--a real sleeze-bag of a fellow.

H. B. named his "Sneer" system after his kid's names.

1. A girl named Circle Tory--her face was like a circle.
2. A boy named Into Crime--he was a real juvenile deliquent.



3. A girl named X Tory--Old H. B. could not think of a name.
4. A boy named Nervo--an egomaniac bully who thought he knew it all.
5. Rest Tory--Old H. B. admitted this one was the rest-of-the-story.

Procedure B: A Sample Phrase using Mnemonic Procedure  
Circus Endophants Excite Nervous Respectable Human  
Bodies.

Sample Mnemonic Procedure

To Learn The Five Parts Of The Heart  
(for the review during lesson eight)

Procedure: This is a type of mnemonic procedure using a bizarre story and setting it to the music of a familiar tune.

Story

The "Smarts" of General Heart

A drill instructor had three lazy, stupid recruits to teach how to march in the inspection parade to be viewed by General Heart. One was named Venni Trickle, one was named At Rium, and the other was named Val V.

The drill instructor spent days on end on the parade ground shouting out as these soldiers marched.

Left Ventricle march! Right Ventricle march!

Left Atrium march! Right Atrium march!

Valve march, too!

March your part for General Heart!

After weeks of marching, the three were given medals for superb performances while marching to the D. I.'s Song. The song can be done to the old ditty called "The Royal Duke of York."

The Original Lyrics To The Song

"The Royal Duke of York"

The Royal Duke of York,  
He had 10,000 men,  
He marched them up to the top of the hill,  
And marched them down again.  
So when they're up, they're up,  
And when they're down, they're down,  
But when they're only halfway up,  
They're neither up nor down. (Author Unknown)

The Adaptation Of The Lyrics For Mnemonic Procedure

"The D. I.'s Version"

The drill instructor said,  
I have 10,000 men,  
I march them up to the top of the hill,  
And march them down again.  
Left Ventricle march, Right Ventricle march,  
Left Atrium, Right Atrium, Val V. march!  
So when they're up, they're up,  
And when they're down, they're down,  
But when they're only halfway up,  
They're neither up nor down.

Sample Mnemonic ProcedureTo Learn The Major Parts Of The Blood  
(for the review during lesson eight)

Procedure: List the parts of the blood. They are the veins, arteries, red blood cells, white blood cells, hemoglobin, and plasma.

Plan a new sport. Call it Blood Cell Bell.

The teams: The Red Blood Cells and The White Blood Cells.

The pitchers for the teams are Arti Veins and Plasma Hemoglobin.

The students are then left on their own to write or tell a story about the win/lose side of the story as if the students were television newscasters.

Sample Mnemonic Procedure

To Be Used In Conjunction With Math Terminology  
(to demonstrate further application of the approach)

A fifth grade low/average math class, in pretesting of graphing, could not determine successfully what horizontal, vertical, precede, increase or decrease really meant in written problems. By taking a survey of current automobile fads, it was determined that the class liked a Ferrari automobile the best. The class all boarded this imaginary, hugely (increased), extended car by (decreasing) themselves to a smaller version of themselves so "the car" could accommodate all thirty students. There was a tremendous input into how the car could be increased in size for the accommodation and how the students could be decreased in size for the ride. Once that was accomplished, the class went on an imaginary trip to the beach to get there before the sun came up (preceding the sun). They talked about the fact that the night also precedes daybreak. Since they looked extraordinary in their stretched car, the class decided to try innovative ways to go to the beach to draw less attention to themselves (they did not want a crowd to spoil their special day at the beach). Once precede was ridiculously handled, the class finally arrived at the beach. They looked out over the purple water where it met the green sky noticing the line drawn by the colors meeting (horizon

line or horizontal was introduced by the instructor). As they were looking over this phenomenon of their colorful imaginations, they saw the sun come up from the horizon and climb the sky (brown sun, going straight up), and vertical was introduced. Before the day was over the sun went down again (straight up and straight down) (vertical). The lesson was concluded for the day with the students in a highly, interested, motivated attitude.

Lesson Plan, Day Nine

OBJECTIVE: The students in the fifth-grade science class will successfully pass the test on the human body systems with 80% accuracy or better. The less than "C" average students will increase their test-score records by raising their scores one letter grade.

TOPIC: Duplicating Master #76 (See Figure 6.) of the Heath Science Series (1981). A teacher-made test consisting of the five parts of the heart, the five body systems, and the parts of the blood.

PROCEDURE: The teacher will hand out Duplicating Master #76 and go over the test with the students, while making sure all of the students understand the directions. The students are to turn the test over and answer the teacher-made test on the back of the sheet. The teacher will display the teacher-made test from the overhead projector using the same color technique used when the human body system was introduced.

EVALUATION: The teacher will grade the test, scoring 1 point each for the questions on Duplicating Master #76 and give 5 points each for the systems covered in the teacher-made test portion. The total score will be 25 points. Each point is to count 4 points on a scale of 100.

TEST

Name \_\_\_\_\_

Human Body Systems



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Figure 6. The Evaluation Test



Teacher-Made Portion Of The Test

1. Name the five parts of the heart.
2. Name the five body systems.
3. Name the parts of the blood.

## CHAPTER FIVE

### CONCLUSION

This project focused on fulfilling a need identified in the fifth-grade classroom. Low/average achievers who have been passed by minimum-based competency tests have had to achieve grade-level work in a multi-graded classroom environment and are constantly struggling academically. This struggle can eventually cause apathy on the part of the low/average achiever, lowering his/her self-esteem, and can lead to a potential drop-out student at the secondary achievement level.

Based on what research says about mnemonic procedures and the potential for using them with fifth-graders, the examples devised will assist fifth-grade teachers in helping low/average achievers study. Mnemonic procedures are useful in all subject areas and seem to work both for the teacher and the students. Research on mnemonic procedures indicates that they work, but very little has been done to help students use them as self-help study devices in the fifth grade.

The purpose of this study was to develop a self-help device to help teachers help students help themselves raise their test scores. With the knowledge of mnemonic procedures and their uses, it is hoped low/average

achievers can gain competence as they advance through the grades.

Research shows mnemonic devices work. Research also shows a need for further study using mnemonic devices on two or more subject areas. Researchers argue that if this need is met, students will be able to transfer the knowledge of mnemonic procedures and use them in a broader spectrum of study as the students advance academically.

Providing fifth-grade low/average achievers with a self-help study device using mnemonic procedures will not only improve their self-esteem but will improve their retention and recall of the material learned. The students will be more likely to succeed academically and with less failure, thereby forming a more positive attitude toward advanced schooling.

The mnemonic procedures presented in the lesson plans in Chapter Four were adapted from Furst's (1972) suggestions. They offered invaluable hints on using mnemonic procedures in everyday life as well as in the school environment.

It is recommended that mnemonic procedures be used in various subject areas to enhance interest in studying subject matter, in reviewing it, and in demonstrating competence through test-taking. This process will help

students raise scores and self-esteem in interesting, innovative, creative, enjoyable ways.

The mnemonic procedures listed have only been given as guides; some have been tried with success, others are still to be tried. Every individual, whether teacher or student, needs to proceed with developing mnemonic procedures using examples of interest and emphasizing the environment and the trends of the day.

The specific mnemonic procedures presented here as self-help study devices for low/average achievers in the fifth grade in two or more subject areas have not been thoroughly field-tested as of this writing. A careful implementation from a research and evaluation perspective would determine the continued validity of mnemonic procedures as self-help study devices in the classroom.

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