EFFECTS OF GUIDED LECTURE NOTES
ON SIXTH GRADERS' SCORES ON DAILY SCIENCE QUIZZES

A Thesis
Presented in Partial Fulfillment of the Requirements for the degree Master of Arts
in the graduate School of The Ohio State University

by
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*****

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FIELD OF STUDY

Major Field: Developmentally Handicapped
ABSTRACT

Twenty-three sixth-grade students were involved in this study. Five of the students were classified as learning disabled (LD) and 18 were regular students. The teacher gave a 15-20 minute lecture, during which students took notes on their own or completed guided notes. The following day students took a quiz over the lecture. The results showed improvement in daily quiz scores when guided notes were used. In addition to using guided notes, extra help was given by the resource room teacher (reviewing guided notes with the students). This resource room help plus the guided notes increased academic achievement of LD-students. None of the students had any negative comments about using guided notes. In summary, guided notes were effective in increasing student achievement for the subjects in this study. Guided notes can be used again with other students, therefore many teachers would consider the time spent making guided notes to be worthwhile.
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CHAPTER I

INTRODUCTION

Educators have long been interested in the question "How do teachers bring about desirable student outcomes?" Many researchers indicated that "time on task" is associated with achievement gains (Anderson, 1981; Good, Thomas, & Backerman, 1978; Reith, Polsgrove, & Semmel, 1981; Rosenshine & Berliner, 1978). The more time a student spends actively engaged in tasks related to certain content, the more he or she achieves on a test over that content. Good and Beckerman (1987) found that high achievers were more involved and spent more time on task.

But how can we increase the time students actually are involved in learning activities? According to Justiz (1984) "......we lose 55% of the time we allocate for learning in our elementary and secondary schools. Why don't we try to make better use of the time that we now have instead of creating longer school days and years?......." If we want students to benefit as much as possible, from the time they spend in school, we should provide them with many opportunities to respond during instruction. Opportunity to respond (OTR) is related to a similar concept, academic learning time (Rosenshine & Berliner, 1978). However, in contrast to academic learning time, opportunity to respond is viewed as the rate or frequency at which students engage in specific academic responses.
Research findings have consistently indicated a positive association between the time that students spend attending to relevant learning tasks and subsequent achievement. Increases in academic learning time are associated with increases in student achievement. Greenwood, Delquardi, and Hall (1984) define OTR as the interaction between the materials presented, prompts, questions asked, signals to respond and their success in establishing the academic responding desired or implied by the materials.

There are many ways to increase OTR. One of the ways is the use of guided notes. Carrier (1983) found that students who take notes during a lecture will learn more than those who simply listen. Fisher and Berliner (1981) found that structuring the lesson and giving directions on task procedures were positively associated with high student success. Students sometimes do not know what they are supposed to be doing or how they are supposed to mark a particular worksheet. Clarifying activities by the teacher can help raise student achievement. Appropriateness in prescribing learning activities relates to student achievement. Guided notes can fulfill this function.

**Purpose of the Study**

Guided notes, a handout highlighting the key points and organizing the content, is an effective strategy for learning disabled students who experience difficulty in organizing academic information. Previous research has shown that using guided notes increases LD students' achievement in content areas. Only a few researchers have studied the effects of the use of guided notes during science instruction (Lovitt, Rudsit, Jenkins, Pious, & Benedetti, 1985, 1986). The present study was conducted to compare the effects of guided notes to student produced notes.
on academic achievement in science. A middle school regular science class was the setting for this study. Five LD students were mainstreamed into the science class. A second purpose of this study was to compare the effects of guided notes on the academic achievement of LD mainstreamed students and regular class students.

**Review of Literature**

"Mainstreaming involves the need to modify certain aspects of the educational environment, particularly for mildly handicapped youngsters of secondary school age who are mainstreamed into classes such as science, social studies, and language arts." (Lovitt 1986, p.31). Various instructional methods have been adapted in order to meet the needs of LD students and to increase their academic achievement. There are a variety of methods which have been used by educators to increase LD students' academic performance. In this study, the review of literature will be presented in four sections: 1) teacher variables—presentation of materials, reinforcement, and efficient use of feedback, 2) opportunity to respond and achievement, 3) notetaking, and 4) guided notes.

**Teacher Variables**

Many findings suggest that if teachers incorporate effective teaching strategies within the framework of academic tasks, they could effectively increase the amount of time allocated to instruction and thus increase students' academic achievement (Broughton, & Lahey, 1978; Cobb, & Hops, 1972; Gettinger, 1983; Rosenshine & Berliner, 1978). A student's success on a particular academic task is intimately related to how the teacher teaches.

Following is a discussion of different teacher behaviors that are related to students' academic performance.
Presentation of Materials

Most teachers depend on the textbook as their primary instructional tool. Teachers explain, ask questions, and finally tell students to read the context and work the exercises. Vargas (1984) pointed out that the basic pattern of explanation plus exercises persists from the elementary grades through high school. Instructional materials sometimes are used to replace teacher explanation and the student responds almost entirely to the text or the materials. In order to increase students' academic performance it is important for teachers to use different strategies to present the materials.

Overhead projectors. Almost all schools have overhead projectors. Overhead transparencies can be a valuable instructional aid for the teacher. There are many advantages of using transparencies in teaching activities. Cooke and Test (1985) pointed out that using transparencies can focus student attention, provide opportunities for student responses, and enable the teacher to provide immediate feedback.

Boswell (1980) compared test scores of a class that received critical information on a transparency accompanying a lecture with those of a class that received the lecture alone. The results showed that the lower third of the class benefited from having the information presented on a transparency, while the upper two-thirds did not. This suggested that the students who have difficulty extracting the main idea, benefit from the additional help (cited in Baker & Lombardi, 1985).

Visual Response System (VRS). Heward, Heron, Cooke and Test (1983) found VRS instructional programs to be an effective teaching method for LD students. Initially, the VRS was used for increasing language and writing skills of deaf children. Heward et al. (1983) wrote, "The three most powerful
instructional features of the VRS are active student response, immediate feedback, and student-student interaction." (p. 17)

In fact, active student response, immediate feedback, and student-student interaction are not limited to the VRS, but are characteristics of effective instruction that can be produced by a variety of teaching strategies. Kepler (1980) observed that an environment in which students cooperated on academic tasks was associated with higher achievement.

**Direct instruction.** Despite the humanistic appeal of child-centered inquiry approaches in instruction, these approaches do not appear to maximize student academic progress. Solomon & Kendall (1976) conducted a study of classrooms in which students chose their own activities and followed their own interests, were responsible for class planning, and were not teacher dependent. The result showed that students who have a great deal of choice about the activities in which they participate have lower academic engaged time and lower achievement. Recently much research has focused on the relationship between class management and pupil achievement. This research has led to the development of a model of teaching termed direct instruction (cited in Rosenshine & Berliner, 1978).

According to Reith, Polsgrove, & Semmel (1981) the direct instructional model refers to an instructional pattern that stresses specifying and ordering objectives, accurate placement, continuous monitoring, matching teaching procedures, providing corrective feedback, organizing time, and structuring administrative arrangements. Remedial specialists and clinicians indicate that incorporating teaching principles such as training to mastery, providing repeated and distributed practice, and emphasizing a teacher-paced, teacher-structured
approach is especially important for learning disabled (LD) children who often lack specific, task-oriented behaviors.

Gettinger (1982), in research on improving classroom behaviors and achievement of learning disabled children, used direct instruction. There were eight LD children (4 boys and 4 girls) involved in this study. Although results should be interpreted with caution due to the small number of children involved, the results do demonstrate that school consultants can train teachers in the use of direct instruction procedures for small-group instruction. The outcome of this intervention showed the percentages of occurrence of two behaviors (non-academic and impulsive) were reduced when direct instruction teaching procedures were employed. Following the direct instruction intervention, children were able to read, on the average, 84% of the training words correctly (compared to only 45% during the baseline) and 63% of the novel transfer items correctly (compared to 29% transfer items during baseline).

Prevailing evidence indicates that to maximize a student's success at a particular academic task, teachers should first assess a student's ability to perform the task, choose materials or procedures appropriately, teach directly, set instructional goals, and continually monitor the student's progress on the task.

Reinforcement

Reinforcement, in the form of social praise, is an effective intervention technique used to increase appropriate behavior. Although some studies indicate that there is a relationship between on-task behaviors and academic performance, Ferritor, Buckholdt, Hamblin, and Smith (1972) found that reinforcement contingencies for attending behavior alone were consistently effective in decreasing disruptions and increasing attending behavior, but seemed to have little effect on correct academic work.
Research suggests that reinforcement programs which target correct academic responding rather than off-task behavior produce marked improvements in both academic and off-task disruptive behavior (Broughton & Lahey, 1978). The effectiveness of reinforcement techniques for increasing response classes has been well documented. Only limited data are available to support the hypothesis that increases in rates of such behavior should produce changes in academic performance and achievement.

Cobb and Hops (1973) found that reinforcing behaviors which precede academic responding have a significant positive effect on academic achievement. Walker and Hops (1976) attempted to increase students’ achievement by directly reinforcing academic performance and facilitative nonacademic responses. Effects of three intervention procedures were compared in increasing academic achievement and levels of appropriate behavior for children with relatively low rates of appropriate behavior. Group 1 subjects were reinforced for behaviors facilitative of academic performance, Group 2 for correct academic performance, and Group 3 for both. No significant differences were found between the three types of experimental treatment. The results suggest that multiple strategies are available to the classroom teacher for maximizing conditions that facilitate academic achievement.

**Efficient Use of Feedback**

Feedback has been extremely useful for increasing performance in many areas. Kulhavy and Hill (1985) pointed out that feedback facilitates criterion performance primarily because it acts to "correct" inaccurate information obtained during instruction. McLaughlin, Laffey, and Malaby (1984) examined the effects of a performance feedback system (consisting of prompt feedback, public posting, and teacher praise) on the academic performance, on-task behaviors, and self-esteem of a regular
eighth-grade English class. The results of the study indicated that the spelling scores, completion of reading and writing assignments, and percentage of students' on-task behaviors increased when a performance feedback system was introduced to one of the academic activities. Numerous studies have demonstrated the efficacy of the performance feedback system in improving students' performance. Van Houten and McKillop (1977) used the performance feedback system to increase students' writing rate. The results demonstrated that timing with simple and differential feedback increased the rate of composition writing.

Many studies of behavior change on the use of feedback to teachers have demonstrated dramatic results with both immediate and delayed feedback. A study was conducted by Lewis (1978) to compare the effects of immediate and delayed feedback to teachers regarding their contingent praise of students' on-task behaviors. The results of this study indicate a consistent pattern of increase in both the teachers' social praise and the students' on-task behavior during feedback as opposed to baseline conditions.

In summary, providing feedback following a response to written instruction increases the amount of correct information that the student remembers from the target materials.

Opportunity to Respond and Achievement

This section focuses on students' behaviors. Researchers have moved from a primary concern with teacher behaviors to consideration of student variables. Academic Engaged Time

Justiz (1984) reported that American students spend much less time on schoolwork than do students in other nations. Time is lost in the process of organizing the class and through distractions resulting from student conduct,
interruptions, and administrative processes. It is important to efficiently use the time allocated for a school day. However, providing more time for instruction doesn't guarantee that students will become more skilled. If the time that students are actually engaged in academic pursuits is limited, students' achievement will be restricted.

Fisher, Berliner, Filby, Marliave, Cahen, and Dishaw (1978) found a positive relationship between the amount of time that teachers set aside for instruction in an academic area during the school day and the measured academic growth of students in that content area. The amount of time allocated by a school district or a teacher for instruction represents an important predictor of student achievement. We should make better use of the time that we have, rather than creating longer school days or a longer school year.

Academic engaged time refers to the time which a student spends engaged in academically relevant materials. It should be emphasized that academic engaged time is quite different from the amount of time which is allocated for study in a particular subject area.

Fisher et al. (1978) reported that the correlation between engaged time and pupil achievement is characteristically higher than that between allocated time and achievement, suggesting that students who pay attention and who work more at academic tasks are also those who learn more (cited in Reith et al. 1981). Stallings (1980) also pointed out that student learning depends more on how the available time is used. Thus teachers must provide adequate lengths of time for instruction in key academic areas.
Opportunity to Respond

A teaching style which allows students frequent opportunities to express their own ideas and then incorporates these ideas into the learning activities results in more positive attitudes and higher academic performance.

Stallings, Needels, and Staybrook (1979) reported that less academic gain occurred in classrooms in which more than average amounts of time was spent on class management, written assignments, and silent reading. Anderson (1981) indicated that teachers should gain information about student responses through observation and questioning. In fact, many researchers have focused on students' immediate responses to instruction. Teachers can help students learn by arranging the classroom environment to make attention and initiative more likely so that students actively respond to instruction.

Notetaking

The ability to take thorough and accurate lecture notes is highly related to academic performance. In recent years, educational researchers have begun to study notetaking behavior. Carrier (1983) presented five conclusions as a result of his study of student notetaking. The five conclusions are: 1) students who take notes during a lecture will learn more than those who simply listen. 2) students will learn more from a lecture if they both record and review their own notes. 3) review of notes will lead to improved performance. 4) lecturers can facilitate student notetaking by highlighting important information and by providing a clear organizational framework. 5) students with different ability and levels of prior knowledge may require different notetaking strategies.
Kiewra (1984) pointed out the completeness of notes is related to achievement and students who take more notes achieve more than do students who record fewer or briefer notes. However, most students are poor notetakers. They capture only a small portion of a lecturer's main idea. There are notetaking methods that will enable students to take better notes. Palmarier (1973) suggested that in choosing a notetaking method, the procedure must provide sufficient flexibility in order that any material from reading or lectures can be recorded.

Most research on notetaking indicates its usefulness for effective recall of academic information. However, little literature exists on notetaking techniques for learning disabled students who often have problems organizing information (Saski, Swicegood, & Carter, 1983). Learning disabled students experience difficulty in organizing academic information. A specific format for notetaking, which accounts for varying complexity of material presented, would be an effective strategy for them. Saski et al. (1983) suggested a notetaking format for LD students and general instructional guidelines for notetaking. Basically, the format is to divide the paper into three columns. The first column contains material which will be needed on future tests or reports. The second column contains related or interesting information, and the third column includes unclear information or information in need of elaboration. Although students may have a good method for taking notes, this doesn't guarantee that they will take complete notes from a lecture.

Kiewra (1985) found that students' own notes are generally incomplete and therefore inadequate for reviewing the lecture. Consequently, students who review a detailed set of lecture notes from the instructor generally achieve more on exams than do learners who review their own notes. Learners who review both their own notes
and detailed lecture notes written by the instructor perform best of all. Kiewra (1985) suggested that the teacher can facilitate student learning by providing skeletal notes for notetaking prior to the lecture to maximize student achievement.

**Guided Notes**

Heward (1987) defined guided notes as a handout which "guides" students through a lecture, presentation, or demonstration by providing a format that includes basic information and cues students to note key points which can be incorporated into a wide range of curriculum areas and can be adapted for use with a wide range of students. Guided notes are designed to create a memorable and quickly comprehensible record (Driskell, 1977, cited in Kline, 1986).

Lovitt, Rudsit, Jenkins, Pious, and Benedetti (1985) researched two methods for adapting science materials for learning disabled students. One method was Precision Teaching (PT). Specially designed see-to-say and see-to-write practice sheets were used featuring the important words and definitions of a chapter. The other method was the Study Guide (SG) method. Sheets emphasizing the sequenced main ideas of a chapter were developed. The results showed that youngsters who received either treatment did better than those who received no treatment.

The use of guided notes was found to be more effective than having students listen to the lecture and take their own notes (Kline, 1986). In a study to compare the effects of guided notes on the academic performance of learning disabled students during an American History class, Kline compared a traditional lecture-take notes method with guided notes. Results showed that when guided notes were used students improved their daily quiz performance and their scores on unit tests were higher. In order to replicate the effect of guided notes, this researcher
made slight changes. The procedure used was similar to the procedure used by
Kline, however, this study was conducted using a different student population
and in a different curriculum area.

Research Questions

1. Will the use of guided notes during science lectures improve the student's
   scores on daily science quizzes?

2. Will the use of guided notes during science lectures improve both
   handicapped and nonhandicapped students' achievement?

3. Will tutoring by the LD teacher using guided notes supplied by the LD
   students increase academic achievement as measured by the daily science quiz?

4. What is the students' opinion of the use of guided notes to increase
   academic achievement?
CHAPTER II

METHOD

This chapter describes the methods used to conduct the study.

Subjects

There were 23 sixth-grade students in this experiment. Five were LD students and 18 were regular students. The students ranged in age from 11-13 years. Table 1 provides the age, IQ, and reading and spelling grade level scores for each of the 5 LD students. Table 2 shows when each student entered the LD program, and the number of years of previous special education placement. In addition to being mainstreamed into the regular sixth-grade science class, the 5 LD students also participated in art, history, and music classes. They each spent 3 periods daily in the school's LD resource room program for reading, English, and math.

Setting

The study was conducted in a sixth-grade science classroom in a public suburban middle school. Seating arrangements in the class consisted of six groups, each made up of three or four desks. The study was conducted during a daily science class that met during the third period of the day from 9:50 to 10:35 a.m.

Experimenter

The experimenter was a full-time graduate student pursuing the M.A. degree at The Ohio State University in special education with an emphasis on developmental handicaps. When this study began, the experimenter had already completed all required course work and had completed a student teaching practicum in a high
**TABLE 1**

Background Information on LD Students

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<td>6.5</td>
</tr>
</tbody>
</table>
school DH class. Prior to coming to The Ohio State University, the experimenter received a B.ED. degree at National Taiwan Normal University and taught English in a Taiwan junior high school for 3 years. During her 3 years of teaching, the experimenter also worked in the school counselor’s office as a director. This experience gave the experimenter the opportunity to work with many students who had problems in behavior or in learning.

**Definition and Measurement of Dependent Variable**

Three kinds of data were obtained during the study: daily quiz scores, students’ guided notes and quiz comparison, and students’ opinion regarding the use of guided notes.

**Daily Quiz Score**

A 10-item quiz was administered at the beginning of each science class following a 3-minute study period. The quiz questions were based on the previous day’s science lecture outline. However, not every item or concept included in the lecture outline and presented by the teacher the previous day was included in the quiz. The 10-point quiz included 5 short answer questions (recall questions) and 5 multiple choice questions (recognition question) [see Appendix A]. The quizzes were scored daily by the experimenter and each student’s score was posted before the next day’s science class began.

**Students’ Guided Notes and Quiz Comparison**

The experimenter chose the last 4 guided notes and the last 4 quizzes in each of the two phases in which guided notes were used. The total possible quiz score would be 80 points based on 10 points on each of 8 quizzes. The experimenter recorded how many correct answers each student got out of 80 points. Then the experimenter
compared each student's correct answer on the quizzes with the student's guided notes to determine the percentage of correct information that the student had written on the guided notes. This would show the percentage of correct answers on the quiz and the percentage of correctly written information on the guided notes. For example, if a student got 60 points correct on 8 quizzes, the experimenter compared these 60 items with the student's guided notes to see how many of those items he/she also wrote correctly on the guided notes. If the student wrote 40 items correct in the guided notes, a percentage of 67% (40/60) would be obtained. The experimenter also made a comparison between the incorrect answers and the guided notes to determine the percentage of correct information on the guided notes for quiz questions to which the student had responded incorrectly. This would show the percentage of items for which the student wrote incorrect answers on the quiz but wrote the correct information on the guided notes. For example, if the student got 20 items incorrect in 8 quizzes the experimenter compared these 20 items with the student's guided notes to see on how many of these items he had recorded the correct information on the guided notes. If he wrote 5 items correct in the guided notes, a percentage of 25% (5/20) would be obtained.

**Student Opinion Interview**

The students' opinions about using guided notes were obtained by means of an exit interview. There were two different exit interviews (see Appendixes B&C) because in the last phase the procedure for the LD students was slightly different from the procedure for the regular students. In the last phase, the resource room teacher reviewed the guided notes for the LD students every day before they took the quiz.
Reliability of the Data

Independent Variables

The experimenter was in the science class to audio record the lecture when the teacher taught. The tapes were listened to by the experimenter to check carefully whether the teacher followed the lecture outline and covered all of the facts or concepts. The experimenter randomly chose 2 lectures in each phase and listened to each lecture 2 times while following the lecture outline. A record was kept--checking off items on a lecture outline from the lecture recorded on the tape. First, the experimenter marked the total items in the lecture outline, and then she listened to the tape to check the number of items presented in the lecture. A percentage of how closely the teacher followed the correct procedure was obtained.

Daily Quiz Scores

All student quiz papers were scored by the experimenter. When the study was completed, an independent scorer randomly chose two quiz papers from each phase to rescore these quiz papers. Interobserver agreement was calculated by dividing the number of agreements by the number of agreements plus the number of disagreements and multiplying by 100 to determine the percentage of agreement.

Materials

The experimenter prepared all lecture outlines, guided notes, and quizzes in advance. The following materials were used to conduct this study.


Oceanography and Our Future, by Ozenhom and Goldfeld (1986) was used in this sixth grade science class.
2. Lecture Outline.

Using the textbook, the experimenter constructed the lecture outline for the teacher to follow (see Appendix D).

3. Guided Notes.

Using the lecture outline, the experimenter constructed student guided notes which included many blank lines and spaces for students to fill in with information obtained during the science lecture (see Appendix E). The experimenter duplicated the guided notes before each science class so that each student would have a set of guided notes to complete.

4. Daily Quiz.

The experimenter constructed a 10-items quiz which included 5 short answer questions and 5 multiple choice questions (see Appendix A). The quiz questions were related to the content in the lecture outline. All the daily quizzes were duplicated before the class by the experimenter.

5. Quiz Scores Poster.

A poster was made in order to present each student's daily quiz score. The poster was 35"x22" and covered with acetate.

6. Overhead transparencies.

The experimenter made a copy of the teacher's lecture outline on transparencies. An overhead projector was used daily by the teacher in the presentation of the science lecture.

**Experimental Design and Program Evaluation**

A reversal design (ABAB) was used to evaluate the effects of the guided notes on each student's daily quiz score. The baseline condition consisted of a traditional teacher lecture without guided notes. In the absence of the independent variable, it is
predicted that the behavior would continue at the same level. During the first
intervention phase, guided notes were introduced and used during each science class.
Guided notes were then discontinued in an effort to verify the effects of guided notes.
In the final phase of the study, guided notes were used again in an attempt to replicate
the effects of guided notes on daily quiz scores.

Procedure

General Procedure

This study was conducted for 10 weeks during which material from chapter
1 through 17 of the science textbook was used. (The textbook contained 26 chapters.)
On 3 or 4 days each week, the teacher gave a 15-20 minute lecture closely following
the lecture outline prepared by the experimenter. Students took notes on their own or
with guided notes depending upon the experimental phase, and the following day took
a quiz which covered the lecture. The students were given 10 minutes to complete the
quiz. The experimenter graded the quizzes and posted the scores on the chart the next
school day before the class began. Occasionally, the teacher would remind students to
look their daily quiz scores presented on the chart. A total of 35 sessions were
conducted over the 10-week period of the study.

Baseline 1

During baseline 1, a lecture-take-notes method was used. At the beginning of
the first three sessions of the lecture, the science teacher encouraged the students to
take their own notes by telling them their notes would help them in studying for the
next morning's quiz. During this phase, the teacher did not use the overhead projector
or any supplemental materials, he only gave the lecture. The next school day,
students took a 10-item quiz which covered the material presented the
previous day at the beginning of the third period class. The students
take-their-own-notes method continued for 7 sessions.

Guided Notes 1

Beginning with session 8, the students were given guided notes to use during
the science lecture. For the first three days of this phase, as in Baseline 1, the
students were encouraged by the science teacher to complete their guided notes. As
during baseline, the teacher gave the lecture by following the lecture outline and
students filled in the guided notes by following the teacher's lecture.

Beginning with Session 12 and continuing for the remainder of the study, the
teacher used an overhead projector to project a transparency of the lecture outline. The
teacher used progressive disclosure, to project each successive part of the transparency,
as his lecture progressed. As the material was presented to the class, students not only
listened to the teacher but watched the screen. Then the students filled in the guided
notes. Students were actively participating in taking notes using the guided notes.

Beginning with Session 16 and continuing for the remainder of the study,
students were given 3 minutes to study their notes before taking the daily quiz.

Baseline 2

During Baseline 2 the students were no longer provided with guided notes and
had to take their own notes as in Baseline 1. During Baseline 2, the science
teacher continued to use the overhead projector to progressively show the lecture
outline and students were given 3 minutes to study before taking each day's quiz.

Guided Notes 2

Procedures were exactly the same as during Guided Notes 1, except that the LD
teacher reviewed the guided notes with the group of five LD students. During this
phase, the LD teacher reviewed the guided notes with LD students during the first period and then the LD students took the quiz in the third period science class. The LD teacher spent 10-15 minutes reviewing the guided notes for the LD students by asking questions over the guided notes filled in by the LD students.

In this review procedure, each student would respond individually to the teacher's questions. If the student answered correctly, the teacher praised, then reworded the same item for a choral response. If a student answered incorrectly, the teacher called on another student until a correct response was given. If no one could supply the answer, the resource room teacher went on to next item on the guided notes. The most important procedure in the review process was that LD teacher should not reteach. When the students did not know the answer, the teacher left that question and went on to the next question. In this way, the experimenter could determine whether the guided notes along with the teacher's review helped LD students increase their daily quiz score.

After the last session (Session 35), the experimenter passed out to each student an exit interview sheet (see Appendix B&C) to be completed by the student. The experimenter told students to express their opinion freely, and students could raise their hands if they had questions about the exit interview sheet.
CHAPTER III

RESULTS

This chapter presents the results of the study. Data are reported including the interobserver agreement for the scoring of quizzes, the results of each student's performance on the daily quizzes, the percentage of correct and incorrect quiz answers matched by correct or incorrect information on the guided notes, and the students' opinions about the use and the effectiveness of guided notes.

Interobserver Agreement

Dependent Variables

Reliability checks were conducted by the experimenter and by an independent scorer. These checks were made twice per phase on the permanent product, the daily quiz. The formula, agreements divided by agreements plus disagreements multiplied by 100 was used to calculate interobserver agreement. The experimenter and the independent observer agreed on 85 out of a total 88 occasions. This yielded a reliability coefficient of 96%. Table 3 shows interobserver agreement percentages of each student whose quizzes were checked.

Independent Variables

At the completion of the study, the experimenter randomly chose two lectures from each phase and listened to the tape two times to see whether the teacher followed the lectures outline. The total number of items in the lecture outlines was 272 and the number of items presented in lecture by the science teacher was 242. The teacher followed the correct procedure on 242 items out of a possible 272
TABLE 3

Interobserver Agreement Percentages for Daily Quizzes from Randomly Selected Sessions

<table>
<thead>
<tr>
<th>Student</th>
<th>Baseline Quizzes (4)</th>
<th>Guided Notes Quizzes (4)</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD Students</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
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</tr>
<tr>
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<td>100</td>
<td>100</td>
</tr>
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<td>100</td>
<td>87.5</td>
</tr>
<tr>
<td>5</td>
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<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Non-LD Students</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>75</td>
<td>100</td>
<td>87.5</td>
</tr>
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</tr>
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<td>Group Mean</td>
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<td>96</td>
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<tr>
<td>Group Range</td>
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<td>87.5-100</td>
</tr>
<tr>
<td></td>
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<td>Guided Notes</td>
<td>Overall</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------</td>
<td>----------------</td>
<td>----------------</td>
</tr>
<tr>
<td></td>
<td>104 / 120 (86.6%)</td>
<td>138 / 152 (90.7%)</td>
<td>242 / 272 (88.9%)</td>
</tr>
</tbody>
</table>

**TABLE 4**

Percentages that the Teacher Followed the Lecture Outline During the Experiment
items. This is a reliability coefficient of 88.9%. Table 4 shows the percentages of items on which the teacher followed the lecture outline during the baseline phase, guided notes phase, and overall.

**Daily Quiz Score**

A 10-point quiz covering the science material presented in the previous day's lecture was given at the start of each session. Daily quiz scores were graphed for all 23 students. Breaks in the data paths on the figures represent student absences. Students 1-5 were learning disabled students who were mainstream into the science class and students 6-23 were regular class students.

**Student 1**

Figure 1 shows Student 1's daily quiz scores. During Baseline 1 Student 1 obtained an average of 2.4 correct responses on the daily quiz, with a range of 1-4. During Guided Notes 1 the average number of correct responses was 3.9, range 2-7. During Baseline 2 Student 1 obtained an average of 1.4 correct responses on the daily quiz, range 0-3. During Guided Notes 2 the average number correct was 5.3, range 4-6.

**Student 2**

Figure 2 shows Student 2's daily quiz score. During Baseline 1 Student 1 obtained an average of 4.2 correct responses on the daily quiz, range 2-6. During Guided Notes 1 the average number of correct responses was 5.7, range 3-8. During Baseline 2, the average number of correct responses was 2.5, range 1-4. During Guided Notes 2 the average number correct was 8, range 4-9.
Student 1

Figure 1: Number of Questions Answered Correctly on Daily Quiz.

Arrow above Session 12 indicates when students were given 3 minutes to study notes before taking quiz; arrow above Session 16 shows when teacher began to use overhead projector.
Figure 2: Number of Questions Answered Correctly on Daily Quiz.

Arrow above Session 12 indicates when students were given 3 minutes to study notes before taking quiz; arrow above Session 16 shows when teacher began to use overhead projector.
**Student 3**

Figure 3 shows Student 3’s daily quiz score. During Baseline 1 Student 3 obtained an average of 4.2 correct responses on the daily quiz, range 2-6. During Guided Notes 1 the average number of correct responses was 5.7, range 3-8. During Baseline 2 Student 3 obtained an average of 5 correct responses on the daily quiz, range 3-6. During Guided Notes 2 the average number correct was 7.4, range 6-8.

**Student 4**

Figure 4 shows Student 4’s daily quiz score. During Baseline 1 Student 4 obtained an average of 3.7 correct responses on the daily quiz, range 1-5. During Guided Notes 1 the average number of correct responses was 5, range 3-8. During Baseline 2 Student 4 obtained an average of 3.1 correct responses on the daily quiz, range 2-4. During Guided Notes 2 the average number correct was 6.2, range 4-8.

**Student 5**

Figure 5 shows Student 5’s daily quiz score. During Baseline 1 Student 5 obtained an average of 1.6 correct responses on the daily quiz, range 1-2. During Guided Notes 1 the average number of correct responses was 3.9, range 1-7. During Baseline 2 Student 5 obtained an average of 1.5 correct responses on the daily quiz, range 0-3. During Guided Notes 2 the average number correct was 4.3, range 3-7.

**Student 6**

Figure 6 shows Student 6’s daily quiz score. During Baseline 1 Student 6 obtained an average of 5.4 correct responses on the daily quiz, range 3-7. During Guided Notes 1 the average number of correct responses was 8.3, range 5-10. During Baseline 2 Student 6 obtained an average of 5.5 correct responses on the daily quiz, range 3-7. During Guided Notes 2 the average number correct was 8, range 4-9.
Figure 3: Number of Questions Answered Correctly on Daily Quiz.

Arrow above Session 12 indicates when students were given 3 minutes to study notes before taking quiz; arrow above Session 16 shows when teacher began to use overhead projector.
Student 4

Figure 4: Number of Questions Answered Correctly on Daily Quiz.

Arrow above Session 12 indicates when students were given 3 minutes to study notes before taking quiz; arrow above Session 16 shows when teacher began to use overhead projector.
Figure 5: Number of Questions Answered Correctly on Daily Quiz.

Arrow above Session 12 indicates when students were given 3 minutes to study notes before taking quiz; arrow above Session 16 shows when teacher began to use overhead projector.
Figure 6: Number of Questions Answered Correctly on Daily Quiz.

Arrow above Session 12 indicates when students were given 3 minutes to study notes before taking quiz; arrow above Session 16 shows when teacher began to use overhead projector.
Student 7

Figure 7 shows Student 7's daily quiz score. During Baseline 1 Student 7 obtained an average of 4.7 correct responses on the daily quiz, range 4-7. During Guided Notes 1 the average number of correct responses was 7.8, range 5-10. During Baseline 2 Student 7 obtained an average of 4.3 correct responses on the daily quiz, range 1-8. During Guided Notes 2 the average number correct was 8, range 7-10.

Student 8

Figure 8 shows Student 8's daily quiz score. During Baseline 1 Student 8 obtained an average of 7.3 correct responses on the daily quiz, range 6-10. During Guided Notes 1 the average number of correct responses was 8.9, range 7-10. During Baseline 2 Student 8 obtained an average of 6.8 correct responses on the daily quiz, range 5-8. During Guided Notes 2 the average number correct was 9.1, range 7-10.

Student 9

Figure 9 shows Student 9's daily quiz score. During Baseline 1 Student 9 obtained an average of 6.2 correct responses on the daily quiz, range 3-8. During Guided Notes 1 there was no improvement, and the average number of correct responses was 5.9, range 4-7. During Baseline 2 Student 9 obtained an average of 4.7 correct responses on the daily quiz, range 3-7. During Guided Notes 2 the average number correct was 6.1, range 4-9. The graph shows that guided notes had little effect on improving student 9's academic performance.

Student 10

Figure 10 shows Student 10's daily quiz score. During Baseline 1 Student 10 obtained an average of 5.7 correct responses on the daily quiz, range 4-7. During Guided Notes 1 there was no improvement, and the average number of correct
Figure 7: Number of Questions Answered Correctly on Daily Quiz.

Arrow above Session 12 indicates when students were given 3 minutes to study notes before taking quiz; arrow above Session 16 shows when teacher began to use overhead projector.
Figure 8: Number of Questions Answered Correctly on Daily Quiz.

Arrow above Session 12 indicates when students were given 3 minutes to study notes before taking quiz; arrow above Session 16 shows when teacher began to use overhead projector.
Student 9

Figure 9: Number of Questions Answered Correctly on Daily Quiz.

Arrow above Session 12 indicates when students were given 3 minutes to study notes before taking quiz; arrow above Session 16 shows when teacher began to use overhead projector.
Figure 10: Number of Questions Answered Correctly on Daily Quiz.

Arrow above Session 12 indicates when students were given 3 minutes to study notes before taking quiz; arrow above Session 16 shows when teacher began to use overhead projector.
responses was 4.3, range 2-7. During Baseline 2 Student 10 obtained an average of 3 correct responses on the daily quiz, range 1-7. During Guided Notes 2 the average number correct was 5.1, range 2-7. The graph shows that guided notes had little effect on improving student 10's academic performance.

**Student 11**

Figure 11 shows Student 11's daily quiz score. During Baseline 1 Student 11 obtained an average of 7.9 correct responses on the daily quiz, range 6-10. During Guided Notes 1 the average number of correct responses was 8.9, range 7-10. During Baseline 2 Student 11 obtained an average of 7.7 correct responses on the daily quiz, range 6-10. During Guided Notes 2 the average number correct was 8.4, range 7-10.*The graphs for Student 12 through Student 15 show very high performance during the guided notes phases.

**Student 12**

Figure 12 shows Student 12's daily quiz score. During Baseline 1 Student 12 obtained an average of 7.9 correct responses on the daily quiz, range 6-10. During Guided Notes 1 the average number of correct responses was 9.8, range 9-10. During Baseline 2 Student 12 obtained an average of 8.5 correct responses on the daily quiz, range 6-10. During Guided Notes 2 the average number correct was 9.8, range 8-10.

**Student 13**

Figure 13 shows Student 13's daily quiz score. During Baseline 1 Student 13 obtained an average of 8 correct responses on the daily quiz, range 6-9. During Guided Notes 1 the average number of correct responses was 9.5, range 8-10. During Baseline 2 Student 13 obtained an average of 8.3 correct responses on the daily quiz, range 7-10. During Guided Notes 2 the average number correct was 10, range 10.
Figure 11: Number of Questions Answered Correctly on Daily Quiz.

Arrow above Session 12 indicates when students were given 3 minutes to study notes before taking quiz; arrow above Session 16 shows when teacher began to use overhead projector.
Figure 12: Number of Questions Answered Correctly on Daily Quiz.

Arrow above Session 12 indicates when students were given 3 minutes to study notes before taking quiz; arrow above Session 16 shows when teacher began to use overhead projector.
Figure 13: Number of Questions Answered Correctly on Daily Quiz.

Arrow above Session 12 indicates when students were given 3 minutes to study notes before taking quiz; arrow above Session 16 shows when teacher began to use overhead projector.
Student 14

Figure 14 shows student 14's daily quiz score. During baseline 1 student 14 obtained an average of 5.6 correct responses on the daily quiz, range 1-8. During guided notes 1 the average number of correct responses was 8.6, range 6-10. During baseline 2 student 14 obtained an average of 5.3 correct responses on the daily quiz, range 2-8. During guided notes 2 the average number correct was 10, range 10.

Student 15

Figure 15 shows Student 15's daily quiz score. During Baseline 1 Student 15 obtained an average of 5.4 correct responses on the daily quiz, range 3-9. During Guided Notes 1 the average number of correct responses was 8.8, range 7-10. During Baseline 2 Student 15 obtained an average of 6 correct responses on the daily quiz, range 4-7. During Guided Notes 2 the average number correct was 9.4, range 8-10.

Student 16

Figure 16 shows Student 16's daily quiz score. During Baseline 1 Student 16 obtained an average of 5.4 correct responses on the daily quiz, range 1-7. During Guided Notes 1 the average number of correct responses was 6.5, range 3-9. During Baseline 2 Student 16 obtained an average of 4.3 correct responses on the daily quiz, range 4-7. During Guided Notes 2 the average number correct was 8.8, range 7-10.

Student 17

Figure 17 shows Student 17's daily quiz score. During Baseline 1 Student 17 obtained an average of 6.3 correct responses on the daily quiz, range 4-8. During Guided Notes 1 the average number of correct responses was 7.8, range 5-10. During Baseline 2 Student 17 obtained an average of 5.7 correct responses on the daily quiz, range 5-7. During Guided Notes 2 the average number correct was 8, range 6-10.
Figure 14: Number of Questions Answered Correctly on Daily Quiz. Arrow above Session 12 indicates when students were given 3 minutes to study notes before taking quiz; arrow above Session 16 shows when teacher began to use overhead projector.
Figure 15: Number of Questions Answered Correctly on Daily Quiz.

Arrow above Session 12 indicates when students were given 3 minutes
to study notes before taking quiz; arrow above Session 16 shows
when teacher began to use overhead projector.
Student 16

Figure 16: Number of Questions Answered Correctly on Daily Quiz.

Arrow above Session 12 indicates when students were given 3 minutes to study notes before taking quiz; arrow above Session 16 shows when teacher began to use overhead projector.
Figure 17: Number of Questions Answered Correctly on Daily Quiz.

Arrow above Session 12 indicates when students were given 3 minutes to study notes before taking quiz; arrow above Session 16 shows when teacher began to use overhead projector.
Student 18

Figure 18 shows Student 18's daily quiz score. During Baseline 1 Student 18 was absent from the class. During Guided Notes 1 the average number of correct responses was 9.1, range 8-10. During Baseline 2 Student 18 obtained an average of 7 correct responses on the daily quiz, range 5-9. During Guided Notes 2 the average number correct was 9.2, range 8-10.

Student 19

Figure 19 shows Student 19's daily quiz score. During Baseline 1 Student 19 obtained an average of 5 correct responses on the daily quiz, range 4-7. During Guided Notes 1 the average number correct was 6.5, range 4-9. During Baseline 2 the average number correct was 4.5, range 1-7. During Guided Notes 2 Student 19 obtained an average of 6.7 correct responses on the daily quiz, range 5-9.

Student 20

Figure 20 shows Student 20's daily quiz score. During Baseline 1 Student 20 obtained an average of 5.5 correct responses on the daily quiz, range 2-8. During Guided Notes 1 the average number correct was 6.8, range 5-9. During Baseline 2 Student 20 obtained an average of 4.5 correct responses on the daily quiz, range 3-6. During Guided Notes 2 the average number correct was 7, range 6-9.

Student 21

Figure 21 shows Student 21's daily quiz score. During Baseline 1 Student 21 obtained an average of 4.3 correct responses on the daily quiz, range 3-6. During Guided Notes 1 the average number correct was 6.6, range 4-9. During Baseline 2 Student 21 obtained an average of 5 correct responses on the daily quiz, range 4-7. During Guided Notes 2 the average number correct was 6.8, range 5-8.
Student 18

Days

Figure 18: Number of Questions Answered Correctly on Daily Quiz.

Arrow above Session 12 indicates when students were given 3 minutes to study notes before taking quiz; arrow above Session 16 shows when teacher began to use overhead projector.
Figure 19: Number of Questions Answered Correctly on Daily Quiz.

Arrow above Session 12 indicates when students were given 3 minutes to study notes before taking quiz; arrow above Session 16 shows when teacher began to use overhead projector.
**Student 20**

**Figure 20**: Number of Questions Answered Correctly on Daily Quiz.

- Arrow above Session 12 indicates when students were given 3 minutes to study notes before taking quiz; arrow above Session 16 shows when teacher began to use overhead projector.
Student 21

Figure 21: Number of Questions Answered Correctly on Daily Quiz.

Arrow above Session 12 indicates when students were given 3 minutes
to study notes before taking quiz; arrow above Session 16 shows
when teacher began to use overhead projector.
Student 22

Figure 22 shows Student 22’s daily quiz score. During Baseline 1 Student 22 obtained an average of 5.9 correct responses on the daily quiz, range 3-8. During Guided Notes 1 the average number correct was 7.4, range 5-9. During Baseline 2 Student 22 obtained an average of 6.7 correct responses on the daily quiz, range 4-9. During Guided Notes 2 the average number correct was 7.9, range 7-9.

Student 23

Figure 23 shows Student 23’s daily quiz score. During Baseline 1 Student 23 obtained an average of 4.8 correct responses on the daily quiz, range 2-8. During Guided Notes 1 the average number correct was 6.7, range 5-8. During Baseline 2 Student 23 obtained an average of 5 correct responses on the daily quiz, range 1-8. During Guided Notes 2 the average number correct was 6.4, range 3-8.

Group Summary

Table 5 shows the average daily quiz score for each student during each phase of the study. The entire class' group mean quiz score during Baseline 1 was 5.4, during Guided Notes 1, it was 7.1, during Baseline 2, the group mean quiz score was 5.1, during Guided Notes 2, it was 7.7. The five LD students' group mean score during Baseline 1 was 3.5, during Guided Notes 1, the mean score was 5.1, during Baseline 2, the mean score was 2.7, during Guided Notes 2, it was 6.2. The non-LD students' group mean score during Baseline 1 was 6, during Guided Notes 1, it was 7.7, during Baseline 2, the mean score was 5.7, during Guided Notes 2, it was 8.1. Table 6 shows the number of Non-LD students (n=18) achieving at various letter-grade equivalents of daily quiz scores during each phase of the study.
Figure 22: Number of Questions Answered Correctly on Daily Quiz.

Arrow above Session 12 indicates when students were given 3 minutes to study notes before taking quiz; arrow above Session 16 shows when teacher began to use overhead projector.
Figure 23: Number of Questions Answered Correctly on Daily Quiz.

Arrow above Session 12 indicates when students were given 3 minutes to study notes before taking quiz; arrow above Session 16 shows when teacher began to use overhead projector.
### TABLE 5

Average Daily Quiz Score for Each Student and Group Mean Score During Each Phase

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<thead>
<tr>
<th>Student</th>
<th>Baseline 1 (7)</th>
<th>Guided Notes 1 (13)</th>
<th>Baseline 2 (6)</th>
<th>Guided Notes 2 (9)</th>
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</thead>
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</tr>
<tr>
<td>1</td>
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<td>1.5</td>
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<td>LD Students Mean (5)</td>
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<td>Non LD Students</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>5.4</td>
<td>8.3</td>
<td>5.5</td>
<td>8.6</td>
</tr>
<tr>
<td>7</td>
<td>4.7</td>
<td>7.8</td>
<td>4.3</td>
<td>8.0</td>
</tr>
<tr>
<td>8</td>
<td>7.3</td>
<td>8.9</td>
<td>6.8</td>
<td>9.1</td>
</tr>
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<td>9</td>
<td>6.2</td>
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<td>4.7</td>
<td>6.1</td>
</tr>
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<td>18</td>
<td>-a</td>
<td>9.1</td>
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<td>5.0</td>
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<td>7.9</td>
</tr>
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<td>23</td>
<td>4.8</td>
<td>6.7</td>
<td>5.0</td>
<td>6.4</td>
</tr>
<tr>
<td>Non LD Students Mean (18)</td>
<td>6.0</td>
<td>7.7</td>
<td>5.7</td>
<td>8.1</td>
</tr>
<tr>
<td>Whole Group Mean (23)</td>
<td>5.4</td>
<td>7.1</td>
<td>5.1</td>
<td>7.7</td>
</tr>
</tbody>
</table>

Note. a = no data; student absent throughout phase
**TABLE 6**

Number of Non-LD Students \((n=18)\) Achieving at Various Letter Grade Equivalents of Daily Quiz Scores During Each Phase of the Study:

<table>
<thead>
<tr>
<th>Letter Grade Equivalent</th>
<th>Baseline 1</th>
<th>Guided Notes 1</th>
<th>Baseline 2</th>
<th>Guided Notes 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>A's (90-100)</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>B's (80-89)</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>C's (70-79)</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>D's (60-69)</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>E's (59 and below)</td>
<td>11</td>
<td>2</td>
<td>11</td>
<td>1</td>
</tr>
</tbody>
</table>

* In Baseline 1 there were 17 students.*
Comparison of Quiz Answers and Completion of Guided Notes

Table 7 shows the percentage of correct and incorrect quiz answers that corresponded to correctly recorded items on the guided notes. Students 1-5 are LD students. Students 6, 7, and 8 are regular class students whose graphs showed that guided notes improved their daily quiz scores significantly; that is, there was a large change from Baseline 1 to Guided Notes 1 and from Baseline 2 to Guided Notes 2. Students 9, 10, and 11 are also regular class students but their graphs showed that the guided notes had little effect; that is, during baseline 1 and 2 or the guided notes 1 and 2 phases the results were quite similar.

As a group, the five LD students had 90% of the content covered by the quiz items they answered correctly accurately recorded in their guided notes, as compared to 78% of the quiz items they missed. The same figures for the six non-LD students show 97% and 89% respectively.

The only exception was student 6, who had accurately recorded every item on each of the eight guided notes that were checked. All students had a higher percentage of correct quiz items corresponding to accurately recorded items in the guided notes than they did for missed quiz items.
**TABLE 7**

Percentage of Correctly Recorded Items on Eight Sets of Guided Notes to Correct and Incorrect Quiz Answers.

<table>
<thead>
<tr>
<th>Student</th>
<th>Correct Quiz Answers</th>
<th>Incorrect Quiz Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LD Students</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>90% (36/40)</td>
<td>87% (35/40)</td>
</tr>
<tr>
<td>2</td>
<td>84% (51/61)</td>
<td>58% (11/19)</td>
</tr>
<tr>
<td>3</td>
<td>91% (50/55)</td>
<td>84% (21/25)</td>
</tr>
<tr>
<td>4</td>
<td>90% (45/50)</td>
<td>67% (20/30)</td>
</tr>
<tr>
<td>5</td>
<td>93% (38/41)</td>
<td>92% (36/39)</td>
</tr>
<tr>
<td>LD Average (5)</td>
<td>90%</td>
<td>78%</td>
</tr>
</tbody>
</table>

| **Non-LD Students** |                       |                        |
| 6       | 100% (73/73)         | 100% ( 7/ 7 )          |
| 7       | 100% (66/66)         | 86% (12/14)            |
| 8       | 100% (72/72)         | 75% ( 6/ 8 )           |
| 9       | 94% (50/53)          | 74% (20/27)            |
| 10      | 89% (34/38)          | 76% (32/42)            |
| 11      | 100% (70/70)         | 80% ( 8/10 )           |
| Non-LD Average (6) | 97%                  | 84%                    |

| **Total Average (11)** | 94% | 81% |
Students' Opinion of the Use and Effect of Guided Notes

A written questionnaire was given to each student and they responded to five questions (for LD students there were seven questions) by writing their own answers or choosing from answers. On the written interview the students were asked which way of taking notes that they liked better. All students said that they liked guided notes better, with the exception of student 4 who liked taking her own notes. When asked which set of notes produced better quiz scores, 21 students thought guided notes produced better quiz scores for them. Only students 4 and 19 thought that taking their own notes produced better quiz scores. Evidence showed that guided notes produced better quiz scores for both students 4 and 19.

When asked what they liked about using guided notes, most students thought guided notes highlighted the important points, were well organized, and helped them prepare for the quizzes. They also said that guided notes were easier to complete when compared to taking their own notes. When asked what they didn't like about guided notes, most students expressed no opinion. Some felt the oceanography unit was too long and boring since the study proceeded for 35 school days. One of the students thought that guided notes could be improved by making them more interesting with pictures and some students thought guided notes should not be too long.

Four of the LD students liked having the resource room teacher review the guided notes with them. Student 4 did not like the review. Students 1, 4, and 5 thought that their scores improved a little with the help of the teacher's review. Student 3 thought there was no change, and Student 2 thought his quiz scores improved a lot. Table 8 summarizes the students' opinions about the guided notes.
TABLE 8
Students' Opinion of the Guided Notes

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Did you like guided notes?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD students (5)</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>Non-LD students (18)</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>Whole class (23)</td>
<td>96%</td>
<td>4%</td>
</tr>
<tr>
<td>(2) Did the guided notes help you get higher scores?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD students (5)</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>Non-LD students (18)</td>
<td>94%</td>
<td>6%</td>
</tr>
<tr>
<td>Whole class (23)</td>
<td>91%</td>
<td>9%</td>
</tr>
<tr>
<td>(3) Did you like having the teacher review the guided notes for you?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD students (5)</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>(4) Did the teacher's review help you improve your quiz score?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD students (5)</td>
<td>80%</td>
<td>20%</td>
</tr>
</tbody>
</table>
CHAPTER IV

DISCUSSION

In this chapter the limitations of the study, effects of guided notes on student performance, implications for classroom practice, and suggestions for future research are presented. The purpose of this study was to compare the effect on daily science quiz scores of guided notes to the notes that students take on their own.

Limitations of the Study

There were several limitations to this study. The first limitation was the fact that the subjects were all sixth-grade students. The study was conducted in a suburban middle-school science classroom. We do not know the effects of using guided notes in inner city or urban schools, or with students in other grades or for other content areas.

The second limitation to this study was the science teacher's method of presentation of the curriculum. Teacher style influences students' learning, and is highly related to students' academic performance. Most students in this study did improve on their daily quiz scores during the intervention. However, we cannot conclude the results will be the same if another teacher attempts to replicate this experiment.

The third limitation was the student absences. This study began in winter quarter and was completed at the end of spring quarter. The students' absence rate tended to be higher during spring quarter as shown on the graphs. Student graphs show that 15 students were absent at various times during this experiment. Student 3 was absent 9 times, Student 21 was absent 6 times, and Student 20 was absent 4
times. Student 18 transferred to the class during the Guided Notes 1 phase of this experiment. The other students were absent 1 or 2 times.

The fourth limitation was that the experimental procedure was not consistent. Initially there was little difference between baseline and intervention. The experimenter changed the procedure in order to work with a more robust variable. From day 12 to the conclusion of the experiment, students had 3 minutes to study before they took the quizzes. The results showed some improvement, but not a great deal. Therefore from day 16 through the final day, the science teacher used overhead transparencies in the presentation of the daily science lesson. A better experimental design would have been to introduce the 3-minute study period prior to each quiz and to have the teacher use overhead transparencies beginning on the first day of the intervention.

The fifth limitation was the fact that LD students were tutored by the resource room teacher during the last phase. During this final phase, the experimenter added one independent variable which was LD tutoring help by the resource room teacher. The results did show an increase in academic performance for the LD students due to the combination of tutoring and guided notes. However, we could not measure to what degree the guided notes helped students increase their daily quiz scores.

The sixth limitation was the format or style of the guided notes. When the experimenter transferred the materials from the textbook into guided notes, she first wrote the teacher's lecture outline, then following the lecture outline, she wrote the guided notes leaving blank spaces for important information. We can not sure of the format that is best for guided notes and whether students' quiz scores will vary when a different format is used.
Effects of Guided Notes on Student Performance

Comparison of the Results with Other Studies

Lovitt (1986) adapted science materials by using vocabulary exercises and framed outlines. These adapted materials were used with regular and learning disabled seventh graders. The results showed that the scores of both the learning disabled and the non-handicapped students improved as a result of the use of the adapted science materials.

The posttest scores of the 10 LD students who received extra resource room help on the chapters that were taught using the adapted science materials were 37 percent higher (mean difference of 4.17) than were their scores on the chapters taught without the adapted science materials. The 7 SLD youngsters who did not receive extra help in a resource room scored only 5 percent higher (mean difference of .76) on the chapters taught using the adapted science materials. The means of the handicapped students during intervention and baseline conditions were 57.54 and 44.76, whereas the means were 72.88 and 66.05 for the regular pupils. The differences for handicapped and nonhandicapped youngsters were 12.78 and 6.83, and their percentage differences were 22% and 9%.

By looking at the results in table 5, we find that the means of the 5-LD students for each phase in the ABAB design were 3.5, 5.1, 2.7, and 6.2. The mean difference for LD students between Baseline 1 and Guided Notes 1 was 1.6, while it was 3.5 between Baseline 2 and Guided Notes 2. The percentage differences were 31% and 56%. The means of the regular students for each phase in the ABAB design were 6.0, 7.7, 5.7, and 8.1. The difference for these 18 regular students between Baseline 1 and Guided Notes 1 was 1.7, while it was 2.4 between Baseline 2 and Guided Notes 2. The percentage differences were 22% and 29%.
Kline (1986) found a significant difference between baseline and intervention. The students' mean scores on daily quizzes in the ABAB phase were 62, 92, 68, and 91. Kline administered daily quizzes after the lecture. She also administered unit tests after four days of lecture. The results showed that the class averaged a 12% increase on their unit test scores when guided notes were used.

In these three studies, the use of guided notes increased the daily quiz scores for the LD students. Tutoring by the resource room teacher can increase student academic performance, especially when guided notes are used during the tutoring sessions. The results of guided notes plus tutoring by the resource room teacher made a significant difference in daily quiz scores. The use of guided notes may generalize to academic improvement in other subject areas. Kline (1986) found that academic gains in U.S. History maintained as students scored higher on unit tests when they used guided notes as opposed to taking their own notes. In order to answer the question of how guided notes help students maintain the knowledge gained during the daily science lecture, a follow-up study would have to be conducted.

Effects of Guided Notes on Non-handicapped Students

The regular class students who took part in using guided notes during Guided Notes 1 had scores which ranged from 4.3 to 9.8, with an average score of 7.7. This is higher than during Baseline 1 when the average score was 6.0, with a range of 4.3 to 8.0. The use of guided notes produced an increase of 1.7 over the students taking their own notes. During Guided Notes 2, the scores ranged from 5.1 to 10, with an average score of 8.1. This is significantly higher than during Baseline 2 when the average score was 5.7 and ranged from 3.0 to 8.5.
For most students, daily quiz scores increased during the guided notes phases. In this study, there was more improvement during the Guided Notes 2 phase than during Guided Notes 1 phase. For phase 2, the experimenter added two independent variables, a 3-minute study period prior to the daily quiz and the use of overhead transparencies during the lecture.

In addition, the experimenter chose 6 regular class students to make a comparison of quiz answers and completion of guided notes. Table 7 shows Students 6, 7, 8, and 11 scored 100 percent which means that they recorded correctly, on their guided notes, the questions which they answered correctly on the quiz. Student 6 completed her notes with 100 percent accuracy but missed some questions on the quiz. This results indicate that Student 6 could perhaps improve her daily quiz scores by spending more time studying her guided notes since she completed the guided notes with 100 percent accuracy.

Students 7, 8, 9, 10, and 11 wrote some incorrect items on their guided notes, consequently, this influenced their daily quiz scores. Even though they might have responded correctly on some items of the quiz, they wrote some incorrect information on the guided notes. This is especially obvious for Students 9, 10, and 11 who showed little improvement with the use of guided notes. Students 6, 7, and 8 whose daily quiz scores improved significantly, wrote almost 100% correct responses on the guided notes. Students 7 and 8 wrote only 2 incorrect items on their guided notes. Students 9, 10, and 11 wrote many correct items on the guided notes but answered questions incorrectly on the quiz. Their quiz scores might have improved had they spent more time studying their guided notes.

Table 6 shows that the number of students' making failing grades in science decreased when the teacher used guided notes. During Baseline 1, there were 11
students failing, however during Guided Notes 1, there were only 2 students failing. During Baseline 2, there also were 11 students failing, however, during Guided Notes 2, only one student made a failing grade. Guided notes appear to be an effective teaching strategy for increasing the academic performance of regular students.

**Effects of Guided Notes on 5-LD Students**

On the average students scored higher when using guided notes than when taking their own notes. Students increased their academic performance from Baseline 1 to Guided Notes 1 with the exception of Students 9 and 10. All students increased their quiz scores from Baseline 2 to Guided Notes 2.

Looking at Baseline 1 in Table 5, the 5-LD students' scores ranged from 1.6 to 5.6, with an average score of 3.5. During Guided Notes 1, the average scores was 5.1, with a range of 3.9 to 7.0. During the use of Guided Notes 1, students scored an increase of 1.6 over Baseline 1 in which the students took their own notes. During Guided Notes 2 the scores ranged from 4.3 to 8.0. The average score during Guided Notes 2 was 6.2. This is much higher than during Baseline 2 when the average score was 2.7 and the range was from 1.4 to 5.0. An increase of 3.5 was scored from Baseline 2 to Guided Notes 2. The results are not as outstanding as were the results produced by the study conducted by Kline in 1986. However, guided notes do appear to be effective for promoting increased academic achievement when measured by daily quizzes.

The 5-LD students showed increases in daily quiz scores. The achievement gain from Baseline 1 to Guided Notes 1 was 31%; however, it was 56% from Baseline 2 to Guided Notes 2. During Guided Notes 2, the resource room teacher
reviewed the guided notes for the 5-LD students. The LD students' daily quiz scores showed a significant increase when guided notes were combined with a review of the guided notes by the resource room teacher.

Table 5 shows that all 5 LD students made failing grades in both baseline phases. During Guided Notes 1, only Student 2 passed earning a letter grade of C. However, in the last phase, the resource room teacher's review along with guided notes increased the scores of the 5 LD students. Students 2, 3, and 4 earned letter grades of B-, C, and D- in the last phase.

Table 7 shows the percentage of correct answers is much higher for students who wrote correct information on their guided notes than for students who wrote incorrect information on their guided notes. Sometimes students might guess on the quiz. If they wrote incorrect information on the guided notes, it would be difficult to answer correctly on the quiz. In short, the students need to record the correct information and spend time studying their guided notes.

Although guided notes improve quiz scores, students still have to spend time studying the material in their guided notes. Table 7 shows that Students 1, 2, 3, 4, and 5 recorded many correct items on the guided notes but answered incorrectly on the quiz. This infers that despite the guided notes being an effective teaching strategy, the students still have to spend some time studying their guided notes.

**Students' Opinions on Guided Notes**

Each student was given a written questionnaire to respond to five or seven questions. All the regular class students preferred the guided notes to taking their own notes. Four of the 5-LD students liked the guided notes, but Student 4 did not. Most students were disappointed when the transition from
Guided Notes 1 to Baseline 2 was made. The students wanted to continue with guided notes and were very disappointed when the use of guided notes was discontinued.

When asked their comments about the use of guided notes, none of the students had any negative comments. Students 6, 8, 12, 13, 14, and 15 thought guided notes were well organized and could help them prepare for the daily quiz. Table 5 shows that these students did better during the intervention phase. When compared with other students, there was significant improvement made by these students when using guided notes.

The 5-LD students received resource room teacher help. The teacher reviewed the guided notes for them in the last phase. Four of the 5-LD students liked the resource room teacher's review of the guided notes. Student 4 did not like the review of the guided notes.

Ninety one percent of the students felt they did better on their daily quizzes when they had guided notes. Students 4 and 19 thought taking their own notes produced better quiz scores, although the evidence showed that guided notes produced better quiz scores for both students. Sometimes, some of the students would ask "Do we have to take the quiz every day ?" in the class. The study took place over 35 school days. Although the students liked having guided notes, taking a quiz every day was not something that many of them enjoyed.

All but Student 4 preferred the use of guided notes. The experimenter noticed that Student 4 concentrated on taking notes in the class. Although she didn't like the experiment, the guided notes helped improve her quiz scores and enabled her to concentrate more fully on the subject matter at hand.
Implications for Classroom Practice

Teachers Should Consider Making and Using Guided Notes

The results of this experiment indicate that guided notes aid in increasing students’ quiz scores. Most students scored higher on their daily quizzes during the intervention phase. Although there were some students who showed no improvement, most students benefited from guided notes, regardless of whether they were regular students or LD students. Effective teachers would want to make and use guided notes in their daily teaching. However, guided notes require a considerable amount of time for the teacher to prepare and duplicate. Guided notes are a valuable teaching tool and they can be used repeatedly, therefore many teachers would consider it worth spending time making the guided notes.

Guided Notes Could be Expanded to Any Subject Area

While guided notes could be used in many subject areas, they are probably more beneficial for middle school or high school aged students. In middle school or high school, the teachers are not accustomed to grouping youngsters according to ability levels. Teachers of science or social studies do not have the option of choosing a text or workbook at a lower grade level for certain students. However, teachers of science, social studies, etc. can create guided notes to fit the needs of their students by modifying existing textbooks or workbooks.

Suggestions for Future Research

1. Use guided notes on other grade levels, or in other subject areas such as math, English, physics, or social studies.
2. Compare whether the use of guided notes improves retention in science by replicating this study but also giving unit tests in addition to the daily quizzes.
3. Conceive another format for guided notes and make a comparison of the effects of the different formats.

**Summary of the Study**

Various instructional methods have been adapted in order to meet the needs of LD students and to increase their academic achievement. The main purpose of this study was to help LD students take notes and retain the knowledge which should increase their academic achievement.

There were 23 sixth-grade students involving in this study. Five were LD students and 18 were regular students. The students ranged in age from 11-13 years. This study was conducted in a sixth grade science classroom in a public suburban middle school. The whole study was conducted over a period of 35 school days. The teacher gave a 15-20 minute lecture, during which students took notes on their own or completed guided notes. The following day students took a quiz over the lecture. The students were given 10 minutes to complete the quiz. The quiz scores were posted on a chart the next school day before the class began.

The results showed improvement in daily quiz scores when guided notes were used. However, some students' daily quiz scores showed little improvement. When making a comparison between guided notes and quizzes, the researcher found that many of the items missed on the quizzes were written correctly on the guided notes. The results indicate that guided notes were effective in promoting students' learning, however, students need to study their guided notes to receive high scores.

In addition to using guided notes, extra help given by the resource room teacher (reviewing guided notes with the students) increased academic achievement of
LD-students. Table 5 indicates that all 5 LD students made failing grades in both baseline phases. In Guided Notes 1, only Student 2 passed with a letter grade of C. In the last phase during which the resource room teacher's review accompanied guided notes the 5 LD students' grades increased. Students 2, 3, and 4 got B-, C, and D- in the last phase.

Most students preferred the use of guided notes. Only Student 4 liked to take her own notes; however, guided notes enabled her to earn higher quiz scores. Some students thought guided notes were well organized and could help them prepare for the quizzes. None of the students had any negative comments about using guided notes. Guided notes are effective for increasing student achievement and they can be used again, therefore many teachers would consider it worth spending time making guided notes.
REFERENCE


Heward, W.L., Cooke, N.L., Test, D.W., & Courson, F.H. (1987). *Strategies and tactics for increasing the level of active student response during group instruction.* (Student guided notes for 772). Columbus : The Ohio State University, Department of Human Services Education.


Score: ___/10

Name: ________________
Period: ________________
Date: ________________

Oceanography Quiz 23

1. "Survival of the fittest" among living organisms means that
   a. the weaker organisms get more food.
   b. the better adapted organisms win out over the weaker ones.
   c. both strong and weak organisms survive.
   d. no weak organisms survive.

2. If the population becomes too large for the food supply,
   a. the food supply will increase.
   b. the predators will decrease.
   c. food supply will stay the same.
   d. the food supply will tend to run out.

3. Green seaweeds cannot live in deep water because
   a. oxygen is not present.
   b. water temperature is too cold.
   c. proper light cannot reach them.
   d. animals would feed on them.

4. Which of following is biotic factors?
   a. Temperature.
   b. Pressure.
   c. Population.
   d. Light.
Oceanography Quiz 23

5. Fiddler crabs
   a. will change color one time a day.
   b. are dark at sunrise.
   c. are brown at sundown.
   d. are not affected by light.

6. The __________-___________ relationship is nature's way of controlling animal population so that overcrowding does not take place.

7. ___________ ___________ is the branch of oceanography that studies the relationships of living to nonliving and living to living things.

8. List one thing that living things compete for? ____________.

9. What is abiotic factors?
   __________________________________________________________________________

10. What do predator and prey mean?

   *Predator means: ___________________________________________________________________

   *Prey means: _____________________________________________________________________
Exit Interview

Student ___________________________ Date __________________

Interviewer ___________________________

Circle the best answer for each question based on your own opinion.

1. Which way of taking notes do you like better?
   - Take Own Notes
   - Guided Notes

2. Which set of notetaking produced better quiz scores for you?
   - Take Own Notes
   - Guided Notes

3. What did you like about using guided notes?
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________

4. What did you not like about using guided notes?
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________

5. How could guided notes be improved or made better?
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
Exit Interview

Student ___________________________ Date ____________

Interviewer ____________________________

Circle the best answer for each question based on your own opinion.

1. Which way of taking notes do you like better?
   - Take Own Notes  Guided Notes

2. Which set of notetaking produced better quiz scores for you?
   - Take Own Notes  Guided Notes

3. What did you like about using guided notes?
   __________________________________________
   __________________________________________
   __________________________________________

4. What did you not like about using guided notes?
   __________________________________________
   __________________________________________
   __________________________________________

5. How could guided notes be improved or made better?
   __________________________________________
   __________________________________________
   __________________________________________

6. Did you like it when Mrs. White reviewed the guided notes with you?
   - Yes  No

7. Did Mrs. White’s review of the guided notes help improve your quiz scores?
   - Yes, my quiz scores improved a lot.
   - Yes, my quiz scores improved a little.
   - My quiz scores did not change with the review.
   - No, my quiz scores got worse with the review.
Appendix D
Lecture outline : Day 25 (pp98-101)

1. Living things are limited :
   a. All living things are confined to certain environments which are called habitats.

   b. Factors in the environment that determine how and where an organism lives are called limiting factors.

      * Some forms of fish are found only in very deep water, and others can be found only in shallow bays.

   c. To meet the environment, the organism must develop adaptations. If the organism can adapt, it survives.

2. Physical and chemical environment :
   a. All plants and animals of our land and water live together. They live in a narrow sphere called the biosphere.

   b. The biosphere is made up of living things and their nonliving environment. We call this the ecological system or Ecosystem.

   c. A large area ecosystem is called a Biome.

   d. Ecologists have divided the world into six land biomes and two water biomes.

      * The two water biomes are the freshwater biome of rivers and lakes and the marine biome of oceans, bays, and seas.

3. Where does the living organism live ?
   a. The surface on which the marine organism lives is called the substrate.
If we examine a rocky shore at low tide, we may find many animals hiding under the rocks.

When the tide is out, animals burrow into the wet sand to escape the drying effects of the air.

b. The marine biome is both at the edge of the sea and inside the waters of the sea.

Most marine life is found close to the shore, where conditions change rapidly from hour to hour as the tides rise and fall.

Farther out on the continental shelf and in the shallower water, conditions are again different.

The presence of green plants provides large amounts of foods.

In the deep, cold ocean, the food supply drops sharply. The general marine population is small. There are two exceptions to this:

@Many fish are found in or near the currents.

@Below the ocean there are some regions called banks, which are high-level ground. Because the water is more shallow, these areas are the home of many fish. One example of this is the Grand Banks of Newfoundland, which are visited by many commercial fishermen.

4. Zoning it off:

a. Try walking along a rocky shore, you would find many examples of living things attached to the rocks.

Many of these organisms would probably be living in groups. We call such a group a population. This is what the ecologist calls an example of zonation of organisms clustered in a particular zone.

b. When we study zonation, we must look at the area under water. This means we must wait for low tide to uncover the ground below.

Twice a day the bottom is covered and uncovered. This is the intertidal zone. The animals living here must adapt to periods of wetness and dryness.
1. Food for the future:
   a. As the world's population continues to grow, we may soon have to look for food in the ________.
   b. The use of seaweed for food is not new; many people in ________ eat it.

2. Seaweed at the seashore:
   a. Go down to the seashore, you will see some large marine plants which are called ________ attached to rocks or floating in the water.
   b. Examine a seaweed, you will find its ________ are made of ________ cells.
   c. Unlike land plants, seaweeds are simple plants belonging to the ________ group.
      *Seaweeds do not have ______ ____, ______ _____, ________, and ______ ________.
      *They do not reproduce by _______ and ________.
      *In order to reproduce, some seaweeds send out tiny swimming structures called ________.
       These are single cells that can move on their own.
      *The ________ separates from the parent to produce a ______ ________. Thousands of spores from a single plant produce ________ of plants.
3. Nicknames or scientific names:
   a. Plants and animals often have ______ names or ______.

   b. But plants' and animals' real names are ______ and ______. Every organism is given ______ scientific names.
      *The first is the name of the ______, or the large group.
      *The second is the ______ name.

   c. Human belong to the genus______, species______
      The house fly is Musca domestica; the tiger is Felis tigris;
      the cat is Felis domestica. Similar organisms are placed in the same grouping if they have the ______ ______.

   d. Why use scientific naming?____________________
      ________________________________
      ________________________________

4. Grouping by colors:
   a. Seaweeds are ______. They have_______ and can make their own food. However, some of the ______ mask the green.

   b. We classify the seaweeds according to the_______ of their pigments.