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JMB PREPARATION PROGRAMME

Training Manual



© The Consulting Group, Inc., 10975 Torreyana Road,
Suite 101, San Diego, California 92121 (714) 455-6261

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JMB PREPARATION PROGRAMME
TRAINING MANUAL

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INTRODUCTION TO THE JMB PREPARATION PROGRAMME

The JMB Preparation Programme is a community-based resource programme designed to help students prepare for the Joint Matriculation Board Examination. The Programme is based on proven educational techniques and carefully constructed materials designed to develop the skills and competencies necessary to pass the highest level examination. Therefore, it can be considered a university preparation programme, it is not a basic skills programme.

A number of prerequisite skills and assumption underlie the JMB Preparation Programme. The prerequisite skills are generally based on the Syllabus through standard Eight. The curriculum base for the JMB Preparation Programme Study Guides parallels the standard Nine and Ten Syllabus.

There are also five major assumptions that underlie this Programme. These are:

- Larger numbers of black South Africans are taking leadership roles in South Africa.
- Post-matriculation training at universities is one way to increase opportunities available to black South Africans.
- The JMB Examination is a critical barrier that prevents black South Africans from pursuing university level training.
- The Bantu Education System will not by itself provide the educational training necessary for large numbers of black students to pass the JMB.
- The South African black community wants to provide an alternative educational experience that will help the members of the community pass the JMB Examination. This alternative educational experience must be under community control.

These five assumptions guided the development of the JMB Preparation Programme. The Programme involves the extensive use of instructional materials and a community-based support system of Resource Aides, Peer Aides, a study centre and a programme to reach specific goals. The materials are based on an extensive analysis of actual forms of the JMB Exam. The Exams were analysed by expert instructional developers. They analysed each of the test items using the process of content task analysis and learning hierarchy analysis that are discussed in Chapter 5 of this training manual.

The result of these analyses define a number of fundamental concepts necessary to answer many of the questions on the JMB Exam. Other results of these analyses include a taxonomy of item formats and strategies for solving items within each of the formats. These concepts, formats and strategies are incorporated into the design of the JMB Preparation Programme Study Guides.

The collection of fundamental concepts in three major content areas, (English, maths and physical sciences) have been organised into the JMB Preparation Programme Study Guides for the initial pilot programme. Each Study Guide is designed to help students master the fundamental concepts necessary for success on the JMB.

The evaluation of the JMB Exam was also based on the type of problems necessary to be solved on the examination. Therefore, the Study Guides attempt to imitate or simulate the conditions under which students take the JMB. The practice problems are therefore parallel to the JMB Exam problems.

Each Study Guide provides a clear statement of objectives, i.e., statements of skills that the Study Guide is designed to help students master. Each Study Guide also contains a series of exemplory problems and outlines a solution procedure for students to master. There are example problems using each item format that is likely to be found on the JMB Exam. The steps involved in solving these problems are carefully delineated.

Finally, Study Guides include reference to textbooks that explain more about each concept. Each Study Guide, therefore, contains a study procedure for students to follow, including a number of practice problems to solve.

The JMB Preparation Programme Study Guides are designed to be a supplement to the required South African high school curriculum. They are designed to accompany the JMB community-based support programme. They are, however, also designed to be independent and available for self study. For maximum effectiveness, the materials are part of a formal Keller Plan tutorial system, also known as the Personalised System of Instruction (PSI). The fundamental idea of the PSI Instruction is to use tutoring efficiently to help students achieve mastery in specific content areas. In the PSI System, students are required to master the material in one Study Guide before they move on to the next Study Guide. Most of the instructional activity is provided by the actual exercises in the Study Guides.

Important components of a PSI Programme are the Peer Aides and Resource Aides who act as tutors and mastery test evaluators. Although the Peer Aides act as tutors and are available to help students, they do not "teach" in the way most people think of teaching or tutoring. They do not present new material in a lecture format. Rather, because the JMB Preparation Programme stresses independent learning, the Peer Aides only provide tutoring when students cannot obtain

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answers that they need from the study materials.

After students work independently, another important function of Peer Aides is to mark the Study Guide Mastery Tests in the presence of the student. This activity is the primary way students receive feedback about mastery of the materials they are studying.

In addition to Peer Aide resources for students, the JMB Preparation Programme utilises Resource Aides. Each group of five to ten Peer Aides in a PSI Programme work with a Resource Aide who has the responsibility for organisation and serves as a master teacher. The Resource Aide is available to work with Peer Aides and students in the event Peer Aides cannot adequately answer students questions.

The system upon which the JMB Preparation Programme is based has proven to be a very successful instructional method in countries throughout the world. There is every reason to believe that a well-executed programme will be very successful in preparing students for the JMB Exam. This training manual is designed to prepare Peer Aides and Resource Aides to implement a successful programme. The training manual is based on proven techniques for building successful programmes and is based on fifteen years of accumulated experience with PSI Programmes and other tutorial systems.

Chapter 1 of this training manual provides an introduction to the concepts of individualised instruction with Peer Aides. This chapter traces the development of educational concepts through recent developments of individualised instructional programmes. Chapter 2 provides a more concrete discussion of how the JMB Preparation Materials can be used in the JMB Preparation Programme. Chapter 3 concentrates on the development of skills that are necessary to be an effective Peer Aide. Chapters 4 and 5 provide an introduction to task analysis, instructional objectives, and the use of these concepts in the identification of student learning difficulties. Chapter 6 is an overview of the methods that can lead to more positive interpersonal relationships between Peer Aides, Resource Aides, and students. Chapters 7 and 8 deal with questioning techniques and problem solving strategies. These chapters are designed to help Peer Aides improve their skills as tutors and help students to be more efficient problem solvers.

The last chapter outlines procedures for monitoring and evaluating the entire programme. This is a vital aspect of building successful programmes. One part of programme evaluation requires information about student performance on the Study Guide Mastery Tests. A collection of solutions to Study Guide Mastery Tests has been developed to help the Peer Aides mark Mastery Tests with students. This compendium is entitled the JMB Preparation Programme Mastery Test Solutions.

Another important Programme function is the provision of feedback from Resource Aides to Peer Aides on their tutoring and Mastery Test Evaluation Behaviour. A final, and most crucial aspect of evaluation is the collection of data on the types of people who use the Programme, and the ways in which they use the Study Guides. This information is absolutely essential for continued funding of development of these materials and other basic skills materials in the future. The collection of this data depends on the individual study centre programmes. The step by step procedures for data collection and evaluation are provided in this manual. Working together we can accomplish the necessary evaluation and ensure the success of the JMB Preparation Programme to the individual benefit of large numbers of students.

INTRODUCTION TO INDIVIDUALISED INSTRUCTION
WITH PEER AIDES

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OBJECTIVES

When you have completed this chapter, you will be able to:

1. State the three major characteristics of individualised instruction.
2. Describe the three major benefits students derive from individualised instruction.
3. State from memory the five distinguishing characteristics of Keller's Personalised System of Instruction (PSI).

SUGGESTED PROCEDURES

Read the questions below. Then read the text, keeping these questions in mind. Find answers for the questions as you read, and write the answers in the spaces provided at the end of the text material. Writing down the answers will help you achieve mastery of the reading assignment.

1. According to the authors, the three basic stages in a teaching situation are: (1) presentation of instruction; (2) student responses during learning; and (3) the consequences that follow these responses. Which stage gets most attention in a typical lecture course? (Objective 1)
2. What are three characteristics of a successful individual course? (Objective 2)
3. Individual courses stress small steps, active response and positive consequences. How do small steps benefit the student? (Objective 2)
4. How does active responding benefit the student? (Objective 2)
5. How does the Personalised System of Instruction (PSI) encourage an active (vs. passive) approach to learning? (Objective 2)
6. Name at least one reward available to students in PSI and other systems of individualised instruction. (Objective 2)
7. What are the five defining features of a PSI course as outlined by Keller? (objective 3)

TEXT

Effective teaching takes into account the three stages in learning: the initial presentation of instruction, the student responses during learning, and the consequences that follow these responses. In the language of psychological learning theory, the effective teacher attends to stimulus, response, and response consequences in learning.

In conventional college teaching, instructors often concentrate their attention on presenting material, and neglect the later stages in learning. Many college teachers spend too much time lecturing, and too little time arranging for student response and feedback. In individualised classrooms, the teacher does not neglect any stage in learning. If an individualised class is to succeed, (1) learning tasks must be clearly presented; (2) each student must have ample opportunity for response; and (3) each student must be rewarded for every positive step.

In the past few years, individualised teaching methods have been widely discussed. It is sometimes forgotten that these teaching methods have a long history. A brief sketch of this history provides a useful introduction to the concepts of individualised instruction.

Early Developments

At the turn of the twentieth century at a day-care center in a poor district of Rome, Maria Montessori developed one of the first fully individualised systems of instruction. First, Montessori defined a series of clear steps that would bring her pupils the competencies she felt they must have. Next, she devised self-corrective teaching materials that pupils could work on by themselves with little or no verbal instruction. Finally, she built into these materials features that gave pupils a continuing sense of accomplishment as they moved toward mastery of the learning tasks.

Clear Learning Tasks

Montessori's work on "spontaneous" writing provides a good example of her approach. She believed that children would learn to write quickly and easily if they were properly prepared for the task. She started by separating the task of writing into simple elements, and then set children to work on each element individually.

What skills does a child need for writing? First, Montessori noted, the child must be able to hold and use a pencil. The child must develop muscle control, lightness of touch, and an ability to keep within the limits of space available for writing. Second, the child must

know the shapes of the letters and the sounds that they represent. Finally, the child must be able to compose words from letters. Montessori believed that children who mastered these skills one at a time would write naturally and spontaneously.

Active Responding

Montessori next prepared teaching materials for each of the three skills. First, she designed simple metal stencils to help with the development of mechanical writing skills. Children learned to make outlines from these stencils, and learned to fill in the figures neatly with their pencils. Most four-year-olds found this exercise interesting, and through it learned to hold and use pencils. For the second task, teaching children to associate sounds and shapes of letters, Montessori used sandpaper letters mounted on small wooden plaques. She told a child the sound of a letter and encouraged the child to trace the form of the sandpaper letter with the writing finger. As soon as the child knew some of the vowels and consonants, Montessori began work on the third task, teaching the child to compose words from letters. She placed before the child a box containing all the vowels and consonants the child knew. By saying a simple word ("mama") very slowly and distinctly, Montessori was usually able to make the children understand what component words were needed. Once children understood, they progressed rapidly in learning to form words from letters.

Positive Consequences

Montessori felt that the most effective reward for all their efforts was the children's own sense of accomplishment. She worked therefore to devise teaching situations that would make the children's progress self-evident. In teaching children to write, she was especially successful:

One December day when the sun shone and the air was like Spring, I went up on the roof with the children. They were playing freely about me and a number of them were gathered about me. I was sitting near a chimney and said to a five year old boy who sat next to me: "Draw me a picture of this chimney," giving him a piece of chalk. He got down obediently and made a rough sketch of the chimney on the tiles which formed the floor of this roof terrace. As is my custom with the littler children I encouraged him, praising his work. The child looked at me, smiled, remained for a moment as if on the point of bursting into some joyous act, and then cried out: "I can write, I can write," and kneeling down again on the pavement he wrote the word "hand" (mano). Then full of enthusiasm, he wrote also "chimney," "roof" (camino, tetto). As he wrote he continued to cry out, "I can write, I know how to write." His cries of joy brought the other children, who formed a circle about him, looking down at his work in stupefied amazement. Two or three of

them said to me, trembling with excitement, "Give me the chalk. I can write too." And indeed they began to write various words. mama, hand, John, chimney, ADA (in Italian of course). Not one of them had ever taken chalk or any other instrument in hand for the purpose of writing. It was the first time they had ever written, and they traced an entire word, as a child when speaking for the first time speaks an entire word. (Montessori, 1912/1964, p. 287)

Montessori's pupils learned to write at an early age in a short period of time. But even more remarkable, the children felt that they had learned to write by themselves! The accomplishment was theirs, not their teacher's. One Montessori teacher described a little boy who--on the day of his "explosion into writing"--went around saying excitedly to everyone, "I can write, I can write!" He then added quickly and emphatically: "But nobody told me how! Nobody told me how!"

Later Developments

There was a brief flurry of interest in Montessori when American educators first heard about her methods three-quarters of a century ago. But the interest soon died down. On closer examination, Montessori's ideas seemed too discordant with popular concepts in American education, and Montessori was soon all but forgotten by American educators. In the 1920s however, there was a second burst of interest in individualised instruction. Systems of individualised instruction dating from this period are: the Dalton plan, used at the University of Chicago Laboratory School; and the Winnetka plan, developed by Carlton Washburne for the public schools of Winnetka, Illinois.

The system of instruction developed by Washburne is, in many respects, typical of the work of this period. When Washburne became superintendent of schools in Winnetka in 1919, he asked his teachers to spend a week at the end of the school year preparing materials for individualised instruction in arithmetic. Like Montessori before him, Washburne was committed to clarity of instruction, opportunities for responding, and positive instructional consequences.

Clear Learning Tasks

To achieve clarity, Washburne and his teachers broke down all lessons into a series of small steps. For example, multiplication problems were divided into several steps:

Step 1: No zeros, no carrying, e.g.,
$$\begin{array}{r} 41 \\ \times 2 \\ \hline \end{array}$$

Step 2: Zero at end of multiplicand, e.g.,
$$\begin{array}{r} 20 \\ \times 4 \\ \hline \end{array}$$

Pupils worked on one step at a time. They did not take the small step from 1 to 2 until they could demonstrate that they had thoroughly mastered Step 1.

Active Responding

Essential to Washburne's method were the self instructional materials that teachers at Winnetka developed. After a simple explanation of procedures in a step, a child would be given a first group of exercises (group A) to complete. Children who found errors when they checked their work against an answer key were directed to complete further exercise groups B or C. Some children would master a given step without using exercises B and C; others needed the full set of exercises to reach mastery. Both routes to mastery were equally acceptable, but mastery was necessary so that the next step in learning would not be confusing. No child was supposed to move on to the next step without completing an error-free A, B, or C assignment.

Children were thus able to work on their own arithmetic lessons by themselves and at their own rates. While working, each child was free to ask for help from other children or from the teacher. The teacher continuously circulated among the children, helping and encouraging them. Slow children who did not finish a year's work in a year simply began the next autumn where they had left off. Most children, however, finished at least a year's work, and many did a good deal of the work for the following year.

Positive Consequences

In the Montessori classroom, step-by-step mastery of tasks was essential. But testing for mastery was unobtrusive. The teacher simply observed the child's use of the self-instructional materials. If observation showed that the child was ready for a further step, Montessori or her assistant might introduce a new lesson. In the Winnetka schools, testing for mastery was more formal. At the end of a series of steps, there was a diagnostic test over all steps in the series. The test was made in five forms, all of the same difficulty and all constructed in the same way. Three of these forms were in the child's book with an answer sheet for self-correction. A child who had completed one of the practise tests without error could ask the teacher for a "real test." If the child made an error on a real test, a second form of the test was available. Washburne never accepted a test with any errors; the child must pass it 100 percent before going on to new assignments.

These diagnostic tests were used to chart the landmarks that children passed in their individual development. Tests were not used to compare children, and at Winnetka students were not graded. Instead of report cards, Winnetka students had cumulative Goal Books, in which the teachers checked off the competency levels a child had reached.

Individualised Instruction Today

Individualised instruction continued after the twenties but with a lower level of visibility. A few schools were established which followed the lead of the Winnetka and Dalton plans, but individualised instruction did not become a movement. In the early sixties, there was a third wave of interest in individualised teaching methods. Flanagan's Project Plan and Glaser's Individually-Prescribed Instruction were developed for elementary and secondary level education. Montessori schools were established once again in all parts of the country. In the form of Postlethwaite's Audio-Tutorial Method and a variety of contingency-management approaches to education, individualised instruction finally came to college.

The Personalised System of Instruction, or PSI, or the Keller Plan, is a development of this period. First used at the University of Brasilia in 1964, PSI was originally developed by psychologists Fred Keller, J. Gilmour Sherman, Carolina Martuscelli Bori, and Rodolfo Azzi. The system devised by Keller and his colleagues has five defining features. PSI courses are (1) individually paced, (2) mastery-oriented, (3) student-tutored courses, which (4) used printed study guides for communication of information, and (5) include a few lectures for stimulation and motivation of students.

A student beginning a PSI course finds that course work is divided into topics or chapters, typically between ten and twenty. At the start of a course, the student receives a printed Study Guide to direct work on the first chapter. The student may work anywhere, including the classroom, to achieve the objectives outlined in the study guide. The student can come to class during regular class hours to receive individual help or, when he or she feels adequately prepared, to take a quiz on the chapter.

After taking a quiz, the student has it evaluated immediately by a Peer Aide, usually an undergraduate student who has studied course material in the previous semester. There is no penalty for failure to pass a first, second, or later quiz on a chapter in a PSI course. But the student must demonstrate mastery before going on to the next chapter. A student thus moves through a PSI course at his or her own pace. Some students meet all course requirements before the term is half through, but others require a full term or even longer to complete a course.

In many respects, PSI is like other methods of individualised instruction. It shares with other approaches a commitment to clearly defined learning tasks, active student responding, and positive instructional consequences.

Clear Learning Tasks

Just as Montessori divided a task into component skills and Washburne divided a lesson into steps, Keller and his associates divided courses into units of work, which the student completes in order. Students who have mastered Unit 1 are ready to master Unit 2, which serves as preparation for Unit 3. Students encounter new course material only when they are prepared to understand it.

Active Responding

Keller and his colleagues believed that well-designed study guides might free students for a more active role than they played in conventional classrooms. In PSI courses, students are given Study Guides to use along with conventional reading material. The Study Guides indicate what is expected of the learner. They clearly state the course requirements, pose questions and suggest study procedures for students who need help. Each student decides how to reach the stated objectives in his or her own individual way.

Positive Consequences

When PSI students feel ready, they take unit quizzes to demonstrate their mastery of course objectives. In a real sense, there are only two grades on a quiz: "excellent" and "not yet". Students often pass unit quizzes on the first attempt. Students who do not demonstrate their mastery on a first try can get help from a Peer Aide before taking another form of the quiz. There is no penalty attached to repeating a quiz. The unit quizzes are not competitive exams; they are never used to compare students with one another.

The unit quizzes are designed instead to make the student's progress tangible. They make the student's achievement self-evident. The importance of this built-in payoff in PSI courses should never be underestimated. The sense of advancement, unit by unit, is highly rewarding to most students.

In PSI courses, the Peer Aide (called a proctor by Keller) plays an important role in seeing that the student is reinforced for his progress:

The proctor is the greatest agent of reward. He is the source of several generalized reinforcers--attention, approval, and even affection, as well as the token reward of "A" that he hands out with the passing of every unit test. He never punishes the student for anything he does, and he often cues him (provides the discrimination stimulus) to behave in a manner that will guarantee some academic gain. He may help extinguish the anxiety or fear which the testing-grading situation arouses in the student. Finally, the proctor is the one who provides the early feedback from the student's test performance and permits him to defend his answers. No wonder students say, "the proctors are the greatest!" (Keller, 1974c, p. #55).

Conclusion

While there are some differences among the approaches of Montessori, Washburne, and Keller, the similarities are more pronounced. In each system students move through course material in small steps. They work with special self-instructional materials which promote activity and choice. Students get encouragement all along the way, and are never punished for failures in learning. At the end, when requirements are met, there is the same success for everyone.

Progress in small steps is a key feature in all three systems of individualised instruction. When students are prepared for each new step in learning by a series of preceding accomplishments, learning becomes more efficient, and students seem to enjoy learning when material is broken down into small, comfortable jobs.

There are equally sound reasons for making active responses a crucial feature in individualised systems of instruction. In classrooms where students respond actively, there is a concrete basis for judgment about next steps in learning. The student can see whether more study or practise is necessary, and the teacher can tell when further guidance is needed. In classrooms where students are passive listeners, on the other hand, confusion about how much students know is commonplace. In lecture situations students often feel a false sense of security about their command of course material. Active responding is important in another way. Students usually feel better about their work when they are making their own decisions and choices while learning. Boredom is less likely in an active classroom.

Finally, the three systems of individualised instruction embody the same concept of educational reward. Montessori, Washburne, and Keller all disliked the idea of classroom competition, which they found demanding to students. They felt that winners in

such competitions came to depend on external prizes, and that losers eventually stopped trying. Pioneers in individualised instruction also agreed that students should not be punished for errors in learning. They wanted to see a natural system of classroom rewards, in which student progress was visible to both the student and the instructor. They felt that this sense of accomplishment, of getting ahead step by step, would be rewarding to most students.

The thread of small steps, active response, and a sense of progress runs through individualised approaches to instruction developed over the past seventy-five years. Today, these features describe a method of instruction that represents an important alternative to conventional practises in education.

EXERCISE 1

DIRECTIONS: As you read the text, write the answers to the questions in the spaces provided.

1. According to the authors, the three basic stages in a teaching situation are: (1) presentation of instruction; (2) student responses during learning; and (3) the consequences that follow these responses. Which stage gets the most attention in a typical lecture course? (Objective 1)

2. What are three characteristics of a successful individualised course? (Objective 2)

3. Individualised courses stress small steps, active response and positive consequences. How do small steps benefit the student? (Objective 2)

4. How does active responding benefit the student?
(Objective 2)

5. How does PSI encourage an active (vs. passive) approach to learning? (Objective 2)

6. Name at least one reward available to students in PSI and other systems of individualised instruction.
(Objective 2)

7. What are the five defining features of a PSI course as outlined by Keller? (Objective 3)

8. Peer Aides play three important roles in personalised instruction courses: quiz evaluator, tutor, and course assistant. What rewards does a Peer Aide provide for PSI students? (Objective 4)

9. When does a Peer Aide act as a tutor? (Objective 4)

INSTRUCTIONAL PROCEDURES
WITH THE JMB PREPARATION PROGRAMME
STUDY GUIDE

3

OBJECTIVES

When you have completed this chapter, you will be able to:

1. Explain the concept of mastery.
2. Explain the concept of self-pacing.
3. Identify the major sections of individualised study guides and describe the functions of each in your own words.
4. Describe three characteristics of a good Mastery Test.
5. Give written examples of difficulties in an individualised learning situation, identify the possible reasons why they might occur.
6. Describe how to use the Mastery Test answers and solutions.

SUGGESTED PROCEDURE

Read the questions below. Then read the text, keeping these questions in mind. Find answers for the questions in the exercises at the end of the text material. Writing down the answers will help you achieve mastery of the reading assignment.

1. Students may ask questions about the mastery requirement in the JMB Preparation Programme. What is meant by the term "mastery?" (Objective 1)
2. What are two reasons why some students may not achieve mastery in some of the Study Guides? (Objective 1)
3. What should you do when a student asks you to bend the mastery rule? (Objective 1)
4. If you suspect that a student is cheating, what should you do? (Objective 1)
5. What three signs show that a student lacks study skills or prerequisites for a course? (Objective 1)

6. All students are required to master material in the JMB Preparation Programme, but not all students reach mastery in the same amount of time. How would you explain the term "self-pacing?" (Objective 2)
7. Why is self-pacing necessary? (Objective 2)
8. What can Peer Aide or a Resource Aide do to encourage students to work at their best pace in the JMB Preparation Programme? (Objective 2)
9. What might a Peer Aide do to discourage student procrastination? (Objective 2)
10. The Peer Aide or Resource Aide uses the Study Guide primarily to communicate with students. What are the two basic functions of the Study Guide? What sections are designed for each function? (Objective 3)
11. What does an instructional objective specify? (Objective 3)
12. What three words describe a good set of objectives? (Objective 3)
13. In what section of the Study Guide does the instructor point out difficulties that a student may encounter while trying to master a Study Guide? (Objective 3)
14. Peer Aides or Resource Aides use Mastery Tests to improve student performance. What are three characteristics of a good Mastery Test? (Objective 4)
15. What are some of the consequences of a Mastery Test that takes too long to complete? Why should Mastery Tests items not be identical in wording to the objectives and questions in the Study Guide? (Objective 4)
16. If several students are far behind and have expressed frustration about the difficulty of the programme, what are the possible causes? (Objective 5)
17. Imagine that a number of the students are having difficulty learning because they have trouble remembering material covered in an earlier Study Guide. What are the possible causes? (Objective 5)
18. Several students have complained about a particular item on the Mastery Test. They claim the reason they didn't study for it was that they didn't know that material was important. What are the possible causes? (Objective 5)

TEXT

Course Policies and Material

Mastery and *self-pacing* are two of the most distinctive features of PSI courses. When students raise questions about the JMB Preparation Programme, they may focus on these two features. To explain these features, you will need to know the rationale behind them.

MASTERY

In a PSI course, like the JMB Preparation Programme, students may make as many attempts as necessary to master course material--but learning the material is required. Students are required to score very high, as high as 80-90%, on their Mastery Tests before going on to the next Study Guide. Students scoring lower are asked to continue working until they reach mastery. Without a mastery requirement, many students would find their errors compounding as they tried to build on a foundation of inaccurate information and incomplete concepts.

Although mastery is required of all students on each Study Guide, not all students will learn the same amount of material in the JMB Preparation Programme. There are several reasons for this. First, not all students will finish all Study Guides. Second, even though they have mastered all the Study Guides, some students do not integrate or retain all that they have learned.

There are several problems related to mastery that you may encounter on occasion:

Sometimes a student may be indifferent toward the Programme. For example, some students may be in the Programme because they feel that they have to participate. Because the JMB Preparation Programme is very difficult, the students may not like the mastery rule, and would be happy with much less. Some students may ask Peer Aides to bend the mastery rules. What should the Peer Aide do?

Be sympathetic and friendly. Show enthusiasm when the student does well on a Mastery Test and point out the good points of performance that is not perfect. Do not lower your standards. Let the student complete fewer Study Guides than other students. If you accept less than mastery, students will expect you to do it all of the time. With a little encouragement, students will find themselves learning the material and liking it.

Another reason you may encounter resistance to mastery is that some students may want to pass the Mastery Tests with a minimum amount of work. For example, let's say Mary is a bright student. She is highly verbal, and can talk circles around almost everyone. Whenever she misses

an item in practice she tries to convince her Peer Aide that she really knew the right answer. She goes on and on about how she mistakenly chose an incorrect answer until the Peer Aide is totally confused. Should the Peer Aide pass Mary even though she has not demonstrated mastery?

No. Don't let Mary unsettle you. Make sure she knows why mastery is important. Tell her that if she does not master the Study Guide, later units will be harder to learn. Remind her that she won't be able to defend her answers on the JMB. If you think she may know the material, give her a chance to demonstrate mastery on a question from another Mastery Test. Do not lower your standards or you will find more verbalisation and less study for future units.

Academic Difficulties. You should pay special attention to students:

--who repeat the Mastery Test several times before passing each Study Guide.

--who need to study an inordinate amount of time in order to pass a Mastery Test.

--who need excessive help from the Peer Aide.

These students could lack study skills or prerequisites for the material in the Study Guide. You should check to make sure that such students are using the Study Guides correctly. If you find that basic skills are lacking (e.g., arithmetic ability, reading skills, etc.), notify the Resource Aide as soon as possible so that additional help can be arranged. Some students with academic deficiencies are hesitant to ask for help themselves. The Peer Aide must therefore take the initiative to see that they get the help they need. At no time should you be demeaning or uncomplimentary. Be encouraging, patient and helpful, but do not accept less than mastery. These students developed academic deficiencies because someone did not take the time to require excellence and help them develop skills necessary for success.

Cheating. The JMB Preparation Programme is set up so the pressure to cheat is minimal, but in every programme, no matter how well planned, a few students may try to beat the system. If at any time you suspect cheating on a Mastery Test, notify the Resource Aide as soon as you can.

Self-Pacing

Students differ from one another in many ways. Some are well-prepared, others are not. Some are quick to understand, others are slow. Some have their studies interrupted by illness and personal problems, others are able to work steadily. In the JMB Preparational Programme, all

students are required to master the course material, but it stands to reason that not all students will reach mastery in the same amount of time. Individual student paces are an inevitable consequence of a uniform mastery requirement and diverse group of students.

While flexible pacing is a characteristic of all PSI Programmes, Peer Aides should discourage complete freedom of pace. You should require student to finish each Study Guide with a reasonable, but liberal, time frame. This is important for several reasons: (1) students who don't finish usually compound their problems by interrupting their studies in the middle and they often lose the thread of the material; (2) when they begin another unit they face an overload as they try to do regular studying plus what is left over; (3) they often have inadequate morale to cope with the difficult challenge.

To avoid having a large number of your students hopelessly behind, Peer Aides should provide Study Guide deadlines or schedules for the students to follow.

Procrastination. The JMB Preparation Programme should be set up in such a way that procrastination will be minimal (e.g., a pacing chart is provided that shows the students where they should be on any day, etc.) There are a few additional things you as a Peer Aide can do. Make Mastery Test evaluations and other student-Peer Aide contacts rewarding and helpful. If you see a student that has not been to class for some time, be friendly and show concern. Let the student know that he or she has been missed. For example, you could say,

"Hi, Noni, how are you doing
in your mathematics? I haven't
seen you for a long time."

If she is having a problem, encourage her to come for help. The next time you see her, go out of your way to show that you are aware she is there and you are glad she came.

If the pattern of test taking shows that a student is going to have trouble finishing in the prescribed time period, you might consider one of the following:

--point out exactly how much time is
left and how many units per week
the student must pass in order to
finish in time.

--if the student agrees, help her
design an explicit schedule, in-
cluding times for home study.

At all times be encouraging and communicate to the student that you think he or she can do it.

Giving Feedback to the Resource Person.

As a Peer Aide you should be completely familiar with the function served by materials. One of your jobs is to help students use material well. Another responsibility is to let the Resource Aide know about problems in course materials so that revisions can be made at a later date.

The two features of the JMB Preparation Programme that have taken a great deal of time to construct are the Study Guides and the Mastery Tests. In order to give useful feedback you will need to understand the function and format of these materials.

Study Guides

In a conventional course the lecture is the instructor's primary vehicle for communicating with students. As a Peer Aide, you will use the Study Guide to communicate with students. A good Study Guide promotes student activity and choice in learning situations.

The basic function of the Study Guide is to tell the student where to go and how to get there. The learning goals for the student are stated in a list of objectives for the unit. The study procedures are commonly used to tell the student which resources he can use to accomplish the objectives.

An instructional objective describes what a successful learner is able to do as a result of instruction. Instructional objectives frequently look like these:

You will be able to state Mendel's Law of Independent Assortment.

Given several numbers, you will be able to select those which are rational and those which are irrational.

The set of objectives have been carefully selected, and carefully written. While books have been written about the task of defining objectives, the Peer Aide who keeps in mind a single rule has a good yardstick for evaluating objectives: a good set of objectives is complete, simple, and useful. They will be simple if they cover what is required for the JMB and nothing more. To be useful, they will be concrete enough so that the student can tell when he or she is able to satisfy them.

A good objective not only points to a topic that is important, it indicates what the student must do with the topic. The objectives listed below are poorly written.

Become familiar with Mendel's Law of Independent Assortment.

Know the chapter on irrational and rational numbers.

These objectives may point to important topics, but they do not tell what students must be able to do to demonstrate mastery.

Well-stated practise items can do the work of instructional objectives. They are most effective for use in courses where the material generates a large amount of information that cannot be condensed into a short list of objectives. Compare the following practise items to the instructional objectives given earlier.

What is Mendel's Law of Independent Assortment?

Which of the following numbers are irrational?

$\frac{2}{3}$, 2, $\frac{1}{2}$, 0.15, pi

What is a rational number?

When there is a great deal of informational content, 25 to 35 study questions may define a unit of work.

The criteria for adequate practise items is similar to those for instructional objectives. Practise items should cover as much of the relevant material as possible, but no more. Practise is useful if it provokes thought; it is not useful if it requires only mechanical responses (e.g., if the student can copy answers to them directly from the readings). The more thought-provoking these items are, the better. But students must be able to reach and recognise the correct answers.

Suggested Procedures

The Study Guides provide reading material on the concepts and suggested background references for the unit. Given the objectives, concept section and the practise items in their Study Guides, there is usually no need for a separate set of suggested procedures.

Remember: the objectives give the end point; the Study Guides help the student to get there. If these suggested procedures are adequate, they will be complete (asking all the questions and assigning all the problems necessary for the student to achieve mastery of the objectives) and simple (covering only the material related to the objectives). Suggested procedures will be most useful if they point out difficulties that a student might encounter while trying to master a unit.

Mastery Tests

"Test anxiety" is a common phenomenon. Most students are at least a little afraid of examinations, and some students are terrified of them. JMB Resource

Aides and Peer Aides can take a constructive approach to tests. You can use the Mastery Tests to improve student performance, not to intimidate.

There are three important characteristics of a good Mastery Test. First, an adequate test is brief. Each test should take between thirty minutes and one hour to complete. The student should have time to talk to a Peer Aide before taking a test, and should be able to get help immediately afterward, if necessary.

Second, each of the test items should have an explicit answer. Peer Aides should not be placed in the position of evaluating complex essay questions unless they are qualified to do so and are comfortable with this job. Time is a major factor in the JMB Preparation Programme, and it should not be wasted by having students waiting in line while a Peer Aide corrects a long and complex Mastery Test.

Third, items on the Mastery Tests have been chosen fairly. They cover material indicated in the objectives, procedures, practise questions. When instructional objectives are specified, there is usually a one-to-one relationship between objectives and Mastery Test questions. In that way, students come to trust the usefulness of the objectives.

Mastery Test items are not identical to the objectives and practise items in the Study Guide. The objectives and practise sections are there to help a student master general skills. It is usually best to test with a new question or problem to see whether the student actually understands a point or has a skill. Peer Aides should do more than encourage rote memorisation of answers to specific questions.

The Mastery Test Answers and Solutions

Each Study Guide contains a Mastery Test. The answers and solution procedures are provided separately. The Peer Aide uses the answer key to mark a test and then instructs the student to reread the sections of the Study Guide that correspond to the items he or she did not master. It is also a good idea for the student to rework the practise problems and retake the Mastery Test items that were not completed correctly.

Common Problems And Their Causes

Some problems in PSI courses can be traced to the circumstances of individual students. A student may fall behind because she got sick, or had other school work to complete, or had to work at a job, etc. But some problems are created by the way the course is designed, and Resource Aides or Peer Aides need to know about these. If several students fall behind at once or if many students are confused by a question, then something may need to be changed in the Study Guide.

Procrastination can be a problem in PSI courses. Encouraged to work at their own paces, students may put off work in the JMB Programme Study Guides, and concentrate instead on other pressing problems. Peer Aides can use two methods to keep students working properly: Study Guide deadlines and recommended schedules. If a significant number of students continue to fall behind, it may be because the deadlines and schedules need adjustment.

Procrastination is an especially common problem when the Study Guide contains too much material or if there are too many Study Guides. Since mastery is required for each Study Guide, both number of Study Guides and amount covered must be reasonable. It is especially important that the first Study Guides are scheduled properly. If students will get off to a good start, they will develop positive learning attitudes.

Students may possibly be overwhelmed by the material from a particular Study Guide and may need an inordinate amount of help. In your discussion with students, keep in mind possible shortcomings of Study Guide material. A Study Guide may be too large, contain too much material, or the Study Guides may be poorly sequenced so that earlier guides do not adequately prepare students for later ones. Problems also arise in later guides when the level of mastery required in earlier Study Guides is set too low. Materials may also be at fault. When objectives are vague or procedures unclear, students will waste time trying to master irrelevant points. If these types of problems arise, the Guides will have to be reorganised. In a later chapter, we will discuss a system for revising the Study Guide.

Students can also forget previously learned information or skills. If you often have to refresh students on materials from earlier units, the standards on the Mastery Tests may be so low that students learn superficially without long-range retention or learn only some of the material.

Students are sometimes confused about what to do. If too many students ask what they must do to master a Study Guide, look for flaws in the course material. Objectives or procedures may be unclear, ambiguous, or incomplete.

You may find that students have trouble writing an answer for a certain Mastery Test question, but upon questioning, they can easily show a mastery of the objectives tested by the question. First check your Mastery Test answer key. If it is not in error, check the wording of the Mastery Test question for clarity. Students may give wrong answers because they cannot tell what question is being asked.

In this JMB Preparation Programme, students will "trust" the Mastery Tests and accept them as fair measures of important objectives. Students will develop this trust when they learn that the Mastery Tests measure stated objectives, if the items are clear, and if each test question has an explicit answer. As they learn to trust the tests, students will no longer fear them. They will see them instead as a valid way to measure their progress through the programme.

EXERCISE 2

DIRECTIONS: As you read the text, write the answers to the questions in the space provided.

1. Students may ask questions about the mastery requirement in the JMB Preparation Programme. What is meant by the term "mastery?" (Objective 1)

2. What are two reasons why some students may not achieve mastery in some of the Study Guides? (Objective 1)

3. What should you do when a student asks you to bend the mastery rule? (Objective 1)

4. If you suspect that a student is cheating, what should you do? (Objective 1)

5. What three signs show that a student lacks study skills or prerequisites for a course? (Objective 1)

6. All students are required to master material in the JMB Preparation Program, but not all students reach mastery in the same amount of time. How would you explain the term "self-pacing?" (Objective 2)

7. Why is self-pacing necessary? (Objective 2)

8. What can a Peer Aide or Resource Aide do to encourage students to work at their best pace in the JMB Preparation Programme? (Objective 2)

9. What might a Peer Aide do to discourage student procrastination? (Objective 2)

10. The Peer Aide or Resource Aide uses the Study Guide primarily to communicate with students. What are the two basic functions of the Study Guide? What sections are designed for each function? (Objective 3)

11. What does an instructional objective specify? (Objective 3)

12. What three words describe a good set of objectives? (Objective 3)

13. In what section of the Study Guide does the instructor point out difficulties that a student may encounter while trying to master a Study Guide? (Objective 3)

14. Peer Aides or Resource Aides use Mastery Tests to improve student performance. What are three characteristics of a good Mastery Test? (Objective 4)

15. What are some of the consequences of a Mastery Test that takes too long to complete? Why should Mastery Test items not be identical in wording to the objectives and questions in the Study Guide?
(Objective 4)

16. If several students are far behind and have expressed frustration about the difficulty of the programme, what are the possible causes?
(Objective 5)

17. Imagine that a number of the students are having difficulty learning because they have trouble remembering material covered in an earlier Study Guide. What are the possible causes?
(Objective 5)

18. Several students have complained about a particular item on the Mastery Test. They claim the reason they didn't study for it was that they didn't know that material was important. What are the possible causes? (Objective 5)

HOW TO BE AN EFFECTIVE PEER AIDE

4

OBJECTIVES

When you have completed this chapter, you will be able to:

1. Describe, in your own words, how to identify specific problems when students come for help
2. Describe three ways to use the Study Guides to help students overcome learning problems.
3. Describe three elements of effective teaching that should be included when you use direct instruction to overcome difficulties.
4. Give a written example of a Peer Aide session identify appropriate and inappropriate Peer Aide behaviors.
5. Critique written examples of a dialogue between a Peer Aide and a student during a tutoring session.
6. Use the suggested Peer Aide techniques from this chapter in a role-play of a Peer Aide session.
7. Explain the difference between the role of the Resource Aide and that of a Peer Aide.

SUGGESTED PROCEDURE

Read the questions below. Then read the text, keeping these questions in mind. Find answers for the questions in the exercises at the end of the text material. Writing down the answers will help you achieve mastery of the reading assignment.

1. Why is it important for Peer Aides to find specific problems when students ask for tutorial help? (Objective 1)
2. When a student knows exactly where he is having difficulty, how should a Peer Aide respond? (Objective 1)
3. When a student can only identify a general or vague area of difficulty, how should the Peer Aide respond? (Objective 1)

4. How would you use a Study Guide to isolate a student's specific problem? (Objective 1)
5. After using a Study Guide to locate student difficulties, how can you further pinpoint the problem? (Objective 1)
6. What are three advantages of using the Study Guide while helping a student? (Objective 2)
7. How can giving hints or prompts help a student? (Objective 2)
8. What three elements of teaching are necessary for effective direct instruction? (Objective 3)
9. If you feel uncomfortable about providing instruction, what should you do? (Objective 3)
10. What are three reasons why you should require a response when providing instruction? (Objective 3)

TEXT

Some students encounter real problems in trying to prepare for Mastery Tests by themselves. This chapter introduces you to a set of tutoring skills that will help you help these students. You will learn to identify student problems and then use the Study Guides and tutoring (instruction) to help students overcome their difficulties. Subsequent chapters will help you improve your skills in identifying student problems and tutoring.

Finding the Difficulty

Before you can begin to help a student, you have to find out what the student knows and what the student does not know. When you have isolated the difficulty, you can build on what the student knows to overcome the obstacle. You will thus avoid giving a lecture on a whole Study Guide, and you will not deprive the student of the sense of accomplishment that comes with solving a problem.

Different students come to Peer Aides with different problems. Some students know exactly where they are having trouble:

Student: I keep getting "affect" and "effect" mixed up. Is there any rule that tells you when to use "affect" and "effect?"

Other students point out general areas of difficulty:

Student: I guess I just don't understand the order of arithmetic operations. Problems like this one look so simple, but sometimes my answers come out right and sometimes they don't.

Finally, some students can describe only vaguely the source of confusion:

Peer Aide: Hi, Eriz, Did you run into a problem?

Student: Math is my problem. I just don't understand this stuff.

As a Peer Aide you should respond to students individually. When the student knows exactly what the difficulty is, you can immediately help him solve the problem. There is no need to waste time on further diagnosis. When the student can describe a difficulty only vaguely or generally, however, you should spend some time in isolating the source of trouble. Two strategies are important in moving from vague or general statements to precise definition of difficulties.

Use the Study Guide

How you use the Study Guide depends on the clarity of the student's statement of his difficulties. When the student is able to identify a general area of difficulty you can turn to Study Guide exercises to isolate specific problems:

Peer Aide: So, the order of arithmetic operations is causing you problems. Let's see which of the exercises assigned in the Study Guide gave you trouble. Did you bring your solutions?

When a student has a general sense of uneasiness and confusion on a unit, you can use the Study Guide for a more systematic review of the unit. In the JMB Preparation Programme, Study Guides list objectives and practise items. Since these are good reference points defining what the student has to learn, use them to identify problems:

Peer Aide: OK. You feel comfortable about Objectives 1 and 2, I can see. How about Objective 3? Are you able to form class intervals in a frequency distribution?

Student: I could follow the example in the book, but the items that were assigned used negative numbers and decimals, and I couldn't work them.

Peer Aide: That gives us something to work on.

Ask Additional Questions

When you have located Study Guide procedures relevant to the student's difficulty, you have taken the first important step in tutoring. You may further pinpoint the student's difficulty by asking additional questions about Study Guide exercises. Ask questions that encourage students to say what they know. Have them attempt to formulate answers. Sometimes students know more than they suspect. They just need to "think out loud" to organise their thoughts.

Specific kinds of questions to ask are:

- Ask the student for a definition of terms used in the problem.
- Ask the student for the characteristics of a concept that causes trouble.
- Ask the student to work a problem for you while you watch.

Using the Study Guides to Help Students Overcome Difficulties

Once isolated, problems can often be solved by focusing attention on the Study Guide. The Peer Aide who emphasises Study Guides while tutoring accomplishes a number of goals. First of all, this is an approach that students can follow in solving their own problems. They, too, can often solve problems by paying careful attention to Study Guide objectives and procedures. The Peer Aide who relies on the Study Guide in tutoring also leaves students with a written record to consult after the session is completed.

Use Objectives

In the JMB Preparation Programme, objectives are listed on the Study Guides. Students often encounter difficulties because they do not keep an overall objective in mind. By directing students toward overall unit objectives, you can sometimes help them solve problems:

Peer Aide: This problem relates to Objective 2-- to be able to recognise situations where the z-ratio is appropriately used, and to apply the test in these cases. Is the z-ratio appropriate here?

Student: No, you can't use it here. Now I see my problem. I was trying to use the z-ratio where it can't be used.

Use Suggested Procedures

Difficulties may exist because the student has given too little attention to procedures and solution strategies suggested in the Study Guide. Sometimes all you have to do is identify the section in the Study Guide that relates to the student's problem.

Student: I just can't keep straight this information on prehistoric man. I mix up the chronological order of "Homo erectus" and "Homo africanus," and the differences between those two groups and the "Neanderthals" is impossible to remember.

Peer Aide: I had the same kind of problem when I took the course. But this table mentioned in the Study Guide really straightened it out. Look, it has a time line with names of types of man, distinguishing characteristics, and sketches of what they looked like.

Give Hints or Prompts

Sometimes a student has completed the entire Study Guide. He has a base of knowledge from which to work, but is unable to organize the information in order to reach a solution. The Peer Aide can often give hints or prompts that will reduce the number of possible answers and will help the student organize his thoughts. This strategy allows the student to get the answer from the information he has already learned. Some examples of this type of prompting are:

Peer Aide: No, punishment and negative reinforcement are not the same thing. Negative reinforcement has something in common with positive reinforcement--can you tell me what that is?

Peer Aide: Try applying the early dadaist concept of a "found object," covered last week, to this recent painting by Rauschenberg.

Peer Aide: Answering this is dependent upon remembering from the previous unit what Simmel meant by the term "sociation." Can you see where that concept is relevant?

Using Direct Instruction to Overcome Difficulty

You can perform your best service as a Peer Aide by helping learners figure out answers by themselves. Sometimes instructional materials are not complete, however, and you must resort to supplying information. In such cases, you should take into account the three elements of effective teaching: providing instruction, requiring a response, and giving feedback. Present the needed information briefly, have the student respond and talk about the material and let the student know when answers are correct or incorrect.

You may sometimes feel uncomfortable about providing instruction. You may be unsure about the help the student needs or about your command of the material. In either case, refer the student to the Resource Aide or another Peer Aide.

Provide Instruction

There are several ways to provide instruction, depending on the task or the cause of the student's difficulty. Some of the things a Peer Aide can do when instructional assistance is necessary follow.

Using Examples. A student may be having difficulty with a task that requires the identification or the generation of examples of a concept:

Peer Aide: Distinguish between velocity and acceleration by identifying everyday phenomena illustrating large and small magnitudes of each.

Peer Aide: Examine the specimens on the lab table and decide which are igneous rocks and which are sedimentary.

Peer Aide: Give examples of the four types of scales: ordinal, ratio, interval, and nominal.

One way to help a student with this kind of problem is by presenting identified examples and non examples side-by-side and arranging them so that critical attributes can be identified by the student. You can thus help the student actively discover the concept. Emphasise the distinctive or defining characteristics of the concept. Start by giving simple, exaggerated examples; gradually increase the difficulty; and then proceed with examples that cover the full range of the concept with all its peculiarities and exceptions.

Using a Rule or Procedure. Sometimes a student may have trouble applying a rule or formula in solving a problem. Here are some samples of problems that require application of rules.

Use the analytical balance to determine the weight of a solid sample.

Calculate the birth rate of a given population.

The following sentences contain active verbs; make the sentences passive in form.

It is also important for the student to know when to apply a rule. You can demonstrate application of the rule or procedure by showing the student how to solve the problem. Break the procedure into parts or steps and teach them one at a time. Then have the student solve a problem of the same type. Another way is to give the student a problem to see if he or she knows whether the rule is appropriate for the case given. Remember, however, the student must be able to show you how to use the rule by solving the problem, not just by describing how it is used.

Aiding Recall. Sometimes the student may have difficulty remembering facts, lists of names or dates, definitions or rules. You can best insure recall by helping students understand the meaning behind the information to be learned. Do not encourage rote memorisation when organisation of the materials or a relationship or context can be used to aid the retention of the information.

When memorisation is necessary, mnemonics are useful. You may want to help the student make up acronyms, rules, jingles, or rhymes that will help him remember information. Drilled practise using flash cards is also helpful. You may want to suggest that the student break up the information into smaller groups and work on each group separately. To avoid confusion between items, their distinctive features should be emphasised. Similar items can also be separated into different groups to avoid mistaking one for another.

Require a Response

By narrowing the number of possible answers and requiring a response, you will encourage the student to make use of what he or she knows. If you must give information, requiring a response will allow the student to try out the new knowledge. Requiring a response serves three functions: (1) it lets the Peer Aide know that the instruction provided has been understood, (2) it reassures the learner that, in fact, something has been learned, and (3) it assists in the retention of knowledge.

You must be careful about the kind of responses you require. "Do you understand that?" will often bring a "yes" even when the student is not sure of the material. The answer to "What is another example of the process?" will let you know immediately if the student needs more help.

For many types of learning the Peer Aide should require the student to apply the knowledge to unique and different situations. If the learning task involves examples of a concept, require the student to use the new information to identify or generate new examples. If the task involves learning and applying rules to solve a problem, the student should be asked to solve a new problem that requires the rule.

If the student is having trouble memorising facts or lists, periodic practise will help. By giving the student a chance to recall the information from time to time, you will help the student retain the information.

Give Feedback

It is important for the student to receive feedback. If a particular problem has presented difficulty in the past, it is important to let the student know whether he or she is on the right track.

If the student is trying to identify examples of a concept, give feedback in terms of the concept definition. If the answer is correct, be specific about what makes it a correct answer. If it is incorrect, indicate what is missing, or what is there that shouldn't be. With problem-solving it is important to give the student an idea of what a right answer looks like. When possible, give the student a set of self-checks which can be used to tell if a solution is correct.

In general, provide praise and encouragement for positive steps. Be warm and positive. Allow the student to feel the sense of satisfaction that comes with learning something that at first presented difficulty.

REMEMBER

When a Student Needs Help

Find the Difficulty

Use the Study Guide
Ask additional questions

Use the Study Guide to Overcome Difficulties

Use objectives
Use suggested solutions
Give hints or prompts

If Instruction is Needed

Provide instruction
Require a response
Give feedback

EXERCISE 3

DIRECTIONS: As you read the text, write the answers to the questions in the space provided.

1. Why is it important for Peer Aides to find specific problems when students ask for tutorial help?
(Objective 1)

2. When a student knows exactly where he is having difficulty, how should a Peer Aide respond?
(Objective 1)

3. When a student can only identify a general or vague area of difficulty, how should the Peer Aide respond?
(Objective 1)

4. How would you use the Study Guide to isolate a student's specific problem? (Objective 1)

5. After using the Study Guide to locate student difficulties, how can you further pinpoint the problem?
(Objective 1)

6. What are three advantages of using the Study Guide while helping a student? (Objective 2)

7. How can giving hints or prompts help a student? (Objective 2)

8. What three elements of teaching are necessary for effective direct instruction? (Objective 3)

9. If you feel uncomfortable about providing instruction, what should you do? (Objective 3)

10. What are three reasons why you should require a response when providing instruction? (Objective 3)

EXERCISE 4

DIRECTIONS: Identify the Peer Aide behaviour in the following dialogues. State whether the behaviour is appropriate or inappropriate for a tutoring session. If a dialogue is inappropriate, write a brief statement saying what the Peer Aide should have done.

Peer Aide: I agree, figuring out the square root is hard to do, but here in the Study Guide it says you can use the square root table in the back of the book. Let's see if you can find the square root by using the table.

What is the Peer Aide doing?

Appropriate or Inappropriate (Circle One)

Peer Aide: This objective requires you to apply the Kinetic Theory of gasses to explain Dalton's Law. Can you explain that theory to me?

What is the Peer Aide doing?

Appropriate or Inappropriate (Circle One)

Student: It's easy to see how it's done when you do it. I think I understand it now.

Peer Aide: Good. You're ready to take the Mastery Test.

What is the Peer Aide doing?

Appropriate or Inappropriate (Circle One)

Student: I just don't understand anything in this whole Study Guide. Can you start from the beginning and explain what they are talking about?

Peer Aide: Sounds like you're having trouble with Study Guides-04. It is a hard unit. Do you have your Study Guide with you? Were you able to answer any of the questions?

What is the Peer Aide doing?

Appropriate or Inappropriate (Circle One)

Peer Aide: The examples on this page are all trapezoids while the examples on this one are not. Do you see what the trapezoids have in common that the others do not have?

What is the Peer Aide doing?

Appropriate or Inappropriate (Circle One)

Peer Aide: That is a good example of negative reinforcement, where the removal of an aversive stimulus increases the preceding behaviour.

What is the Peer Aide doing?

Appropriate or Inappropriate (Circle One)

EXERCISE 5

DIRECTIONS: Read and evaluate the following interaction referring to the suggestions in this unit.

Peer Aide: Hi, Desmond. I see you're already working on Study Guide M-06. That's really great.

Student: I'm really sick about this unit. I worked on it all last night and couldn't figure it out.

Peer Aide: What's the problem?

Student: I'm not sure what I'm doing wrong. Here, maybe you can figure it out.

Peer Aide: (After examining student's Study Guide) I think I know what's giving you trouble. With these problems Dr. Kambuie wants you to be able to determine the magnitude of the resultant of a number of forces acting on an object. Now in this kind of problem, the resultant is the hypotenuse of the triangle formed by these two vectors. How do you determine the hypotenuse of a triangle?

Student: That's the Pythagorean Theorem: The square root of the sum of the squares of the other two sides.

Peer Aide: Right. So what is the magnitude of the resultant for these two forces?

Student: (Figuring) The square root of 80.

Peer Aide: Good, that's right. Is there anything else I can help you with?

Student: I think I've got things straight now.

Peer Aide: Good luck. See you.

TASK ANALYSIS
AND
INSTRUCTIONAL OBJECTIVES

5

OBJECTIVES

When you have completed this chapter, you will be able to:

1. Develop a task analysis of a particular skill to be taught in the JMB Preparation Programme.
2. Define the three components of well-written instructional objectives.
3. Write objectives for specific skills which include the three component parts of a well-written objective.

SUGGESTED PROCEDURES

Read the questions below. Read the text, keeping those questions in mind. Find the answers for the questions in the exercises at the end of the text material. Writing down the answers will help you achieve mastery of the reading assignment.

1. As you move from one task to the next in a task analysis what question do you always ask? (Objective 1)
2. How long do you keep asking that question? (Objective 1)
3. What do you establish as you place tasks in order in a task analysis? (Objective 1)
4. What is the one question that needs to be asked at each level to determine the immediately preceding tasks in the hierarchy? (Objective 1)
5. What are the differences between goals and objectives? (Objective 2)
6. The word "what" represents a particular part of a well-written objective. Which part does it represent? (Objective 2)
7. What are the other two components and the key words that help us to remember them and what do they represent? (Objective 2)

TEXT

Knowing about a concept, understanding it, being able to demonstrate it, and teaching it, are all statements about learning. To understand a presentation about a concept is one level of learning. To be able to demonstrate mastery of a concept requires deeper understanding. This is why it is often said that the best way to learn something is to teach it. Many of us have had the experience of learning while teaching. How many times have we noted that we really didn't understand the concept as well as we thought until we had to present it to someone else?

It is clear that students who are doing well in their studies may not always be able to teach that information to someone else. A primary reason for developing the JMB Preparational Programme is to provide an opportunity for additional learning. But knowing content is not enough. In addition to knowing the content, Peer Aides must be able to present information in a way that can be learned. This requires a deeper level of understanding than usually results from learning something for the first time.

The two techniques described in this session, hierarchical task analysis and specification of instructional outcomes, will help Peer Aides who are learning to teach for the first time. These techniques enable them to analyse the material they are going to teach and state clearly what they expect of the learners. These expectations need to be expressed in terms of how the learners must demonstrate they know the material.

There are many reasons why learning outcomes need to be specified in this way. First stating how the information is organised provides a framework in which concepts can be related and recalled. It helps to show why the teaching is sequenced as it is. In addition, setting clear expectations for students for performance tells students and tutors how they will know when the material has been learned.

Task Analysis

Task analysis is essentially a method where prerequisite skills and concepts are identified for a learning event. The methodology for the task analysis is very straightforward. There are three considerations when developing a task analysis: (1) state the end result (terminal behaviour) for the instruction; (2) specify the prerequisite skills and knowledge necessary for understanding; and (3) build the prerequisite skills by working backwards until the beginning instructional point is determined.

Once the terminal behaviour has been identified, the task analysis continues backwards, asking the same question repeatedly: "What do I have to know or be able to do in order to demonstrate that I understand the concept?" That question is repeated until all pre-requisite skills are identified. When the entry level skills, those skills that the learner should have acquired from their past learning experience, are identified, the task analysis is complete.

Instructional Objectives

The second procedure for analysing and organising information is writing instructional objectives. Objectives clarify for students what they will have to do to demonstrate mastery of the subject matter. For each level in a task analysis, specific instructional objectives need to be written. These objectives serve as a guide to the instructor, a guide to the learner, a means for evaluating the instruction, and a means for evaluating the learner.

Instructional objectives contain three parts: (1) the behaviour which will be required to demonstrate learning; (2) the conditions under which this behaviour will be performed; and (3) the level of performance that is required of the learner. When an instructional objective contains these three parts, very little ambiguity remains for the learner. This kind of guidance provides the structure necessary for a practical step-by-step learning that corresponds to the levels in the task analysis.

Three questions serve to help write objectives. WHAT is the behaviour that will be required? WHEN (under what conditions) will this behaviour be required? HOW WELL will the behaviour need to be performed? What?, When?, How well?, are the three key questions that should be used as guides for writing good objectives. Answers to these questions provide:

A description for what the student should be able to do or produce.

A statement of the conditions under which the student should be able to do it.

A statement of the criteria that will be used to judge what the student has done.

Together these elements provide a clear picture of what you are trying to teach. Let's examine how you would go about writing objectives.

What? Your first task is to clearly specify what you want your students to do. One well-meaning instructor wrote the following to indicate one of her goals for an educational measurement course.

The student should understand the concept of validity.

Unfortunately, this goal did not communicate very much. That is because goals are not operational or sufficiently precise. Objectives are. For example, exactly what is meant by the word "understanding?" Should the student simply be able to define validity? Should the student be able to apply this concept in some way? We are not too sure what the instructor means here. Since the purpose of an objective is communication, the language must be clear and concise. Words such as "know," "understand," and "appreciate" are open to various interpretations. (See Figure 1). What you need is a specific statement of the behaviour you want from your students. Here is the same goal rewritten more precisely as an objective with this last point in mind. We think you will agree it is clearer:

The student should distinguish between different types of validity: face validity, predictive validity, concurrent validity, and construct validity.

Remember that your objective need not deal solely with content. You may want to focus on the process of what your students should be able to do. This objective, taken from the same course, demonstrates that point.

When presented with a hypothetical description of a research design problem, the student should be able to select correctly from all the statistical procedures treated in class that technique most appropriate for the treatment of the data in the problem.

Finally, remember that you cannot peek into your students' minds to measure what they know. You can only gauge what they know by observing what they do. Be sure to make it clear in your objectives just what behaviour you are after.

Figure 1²

WORDS OPEN TO MANY INTERPRETATIONS	WORDS OPEN TO FEWER INTERPRETATIONS
to know	to write
to understand	to recite
to really understand	to identify
to appreciate	to differentiate
to fully appreciate	to solve
to grasp the significance of	to construct
to enjoy	to list
to believe	to compare
to have faith in	to contrast

When? (Under what conditions?) Your second task is to state the conditions under which the student can demonstrate learning. What will your student be given to work with? What limits will be imposed? The following are examples of such situations.

Given a list of...
 Given any reference material of the students' choice.....
 Given a diagram of...
 Given a problem involving...
 Without any reference materials...
 Without the aid of a slide rule...

Here are some examples of what objectives look like when this second piece of information has been added.

Without the aid of an English-Latin Dictionary, the student will translate selected passages from Ovid's The Art of Love.

Given a series of prepared slides, the student will identify the following examples of muscle tissue. (List given)

You can see why the addition of this condition is important. It goes one step further in clarifying what behaviour you are looking for.

²Figure from Robert F. Mager, Preparing Objectives for Programmed Instruction.

How Well? Your third task is to state the criteria you will use to judge whether your students have achieved the stated objectives. What standards will you use? Do they involve accuracy, speed, or working within very specific limits? Now is the time for you to state what you feel is the minimum acceptable performance for your objectives. The following are examples of criteria statements.

....and the student must be able to solve seven out of ten problems in a period of thirty minutes.

....and the student will be able to diagram at least 75% of the items.

....and the student must be able to use the chemical balance well enough to weigh materials accurately to the nearest milligram.

And now we can take a look at some finished objectives. The three parts of an objective give us a clear picture of what is required to demonstrate mastery.

Given a legal contract and a list of contract laws, the student should be able to indicate which of the laws are violated by the wording of the contract. The student should be able to cite seven out of ten instances correctly as minimum performance.

The student should be able to translate a magazine article of his/her own choice from German to English from any of the following magazines (list given). The article should be approximately 500 words in length. The student may not use a dictionary or any other reference and has a two hour period in which to complete the assignment.

As a final note, remember that the three parts to objectives serve as guidelines to help you and your students. These guidelines help you know if you have communicated your intentions. You may feel that you can convey your purpose without including all these points. The choice is yours, but the clearer your objectives, the more valuable they are to you and your students.

EXERCISE 6

DIRECTIONS: Arrange the following tasks in the order necessary to accomplish the last task, working backwards from the last task to the first. (Objective 1)

TASKS

- | | |
|-----------------------------|--|
| Find the car | Last task: 12. <u>Drive away from curb</u> |
| Release hand brake | 11. _____ |
| Start car | 10. _____ |
| Drive away from curb | 9. _____ |
| Select door key | 8. _____ |
| Press accelerator | 7. _____ |
| Close door | 6. _____ |
| Insert ignition key | 5. _____ |
| Open door | 4. _____ |
| Check side and rear traffic | 3. _____ |
| Check gauges | 2. _____ |
| Fasten seat belt | First task: 1. <u>Find car</u> |

2. As you moved from the last task to the first task, what question did you ask? (Objective 1)

3. How long did you keep asking that question? (Objective 1)

4. What were you establishing as you placed the tasks in the proper order? (Objective 1)

5. What is the one question that needs to be asked at each level to determine the immediately proceeding tasks in the hierarchy?

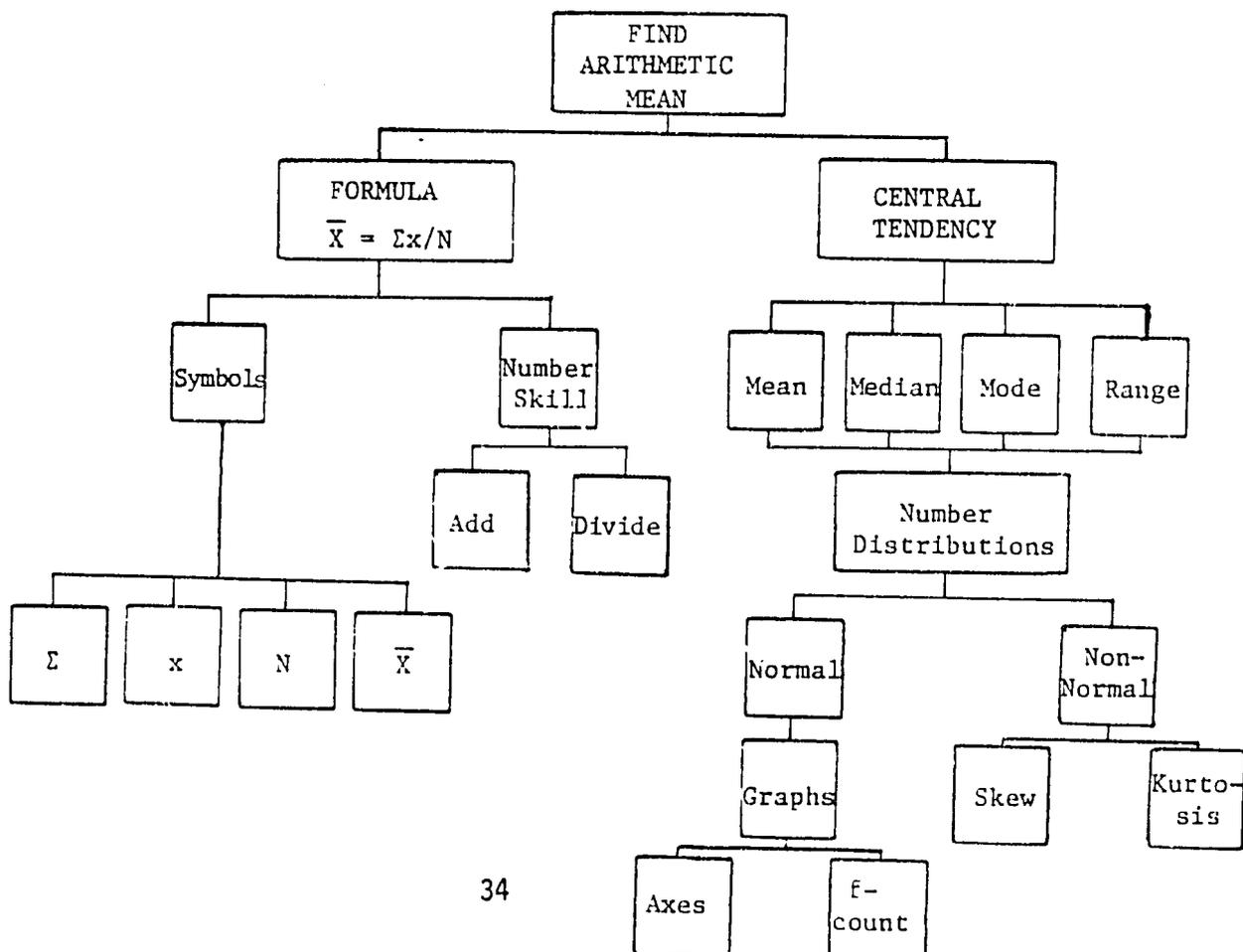
EXCERSISE _____

DIRECTIONS: As you complete a learning hierarchy or task analysis, you employ three basic strategies:

1. Start at the final task (terminal goal) and work backwards.
2. Establish all prerequisite and interrelated skills (or tasks) necessary to complete more advanced tasks.
3. Continue working backwards and establishing interim behaviors until the entry level has been reached.

1. What is the one question that need to be asked at each level to determine the immediately preceding tasks in the hierarchy?

Note in the example below how each prerequisite can be isolated by asking the question you wrote in #1 above.



EXERCISE _____

DIRECTIONS: Select an academic concept that is familiar to all members of your team. This should be a concept that a tutor could reasonably expect to encounter. In the space below, complete a task analysis of that concept. (Examples: Pythagorean theorem, long division, well-written paragraph, balance a chemical solution, causes of World War II, etc.)

--

TERMINAL
GOAL

EXERCISE ____

DIRECTIONS: Answer the following questions about instructional objectives.

1. What are the differences between goals and objectives? (Objective 2)

2. The word "what" represents a particular part of a well-written objective. Which part does it represent? (Objective 2)

3. What are the other two components and the key words that help us to remember them and what do they represent? (Objective 2)

Key word: _____ Represents _____

Key word: _____ Represents _____

For any one of the boxes in your task analysis (see Exercise 6), write a series of correctly written objectives. (Objective 3)

Objective 1

When _____

What _____

How Well _____

Objective 2

When _____

What _____

How Well _____

Objective 3

When _____

What _____

How Well _____

Objective 4

When _____

What _____

How Well _____

Objective 5

When _____

What _____

How Well _____

USING TASK ANALYSIS
TO DIAGNOSE
STUDENT LEARNING DIFFICULTIES

6

OBJECTIVES

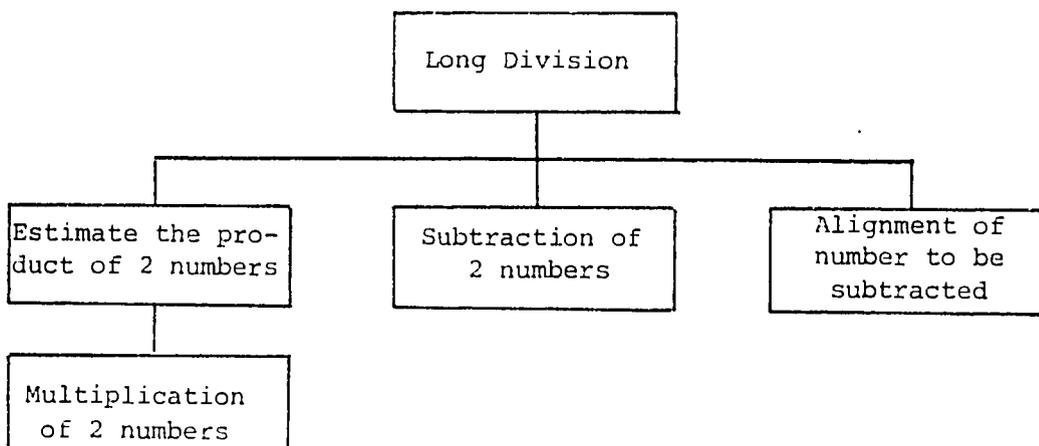
When you have completed this chapter, you will be able to:

1. Use task analysis to diagnose a particular learning difficulty for a student who is unable to solve a problem.
2. List five reasons that a student may fail to accomplish a task that is part of a learning hierarchy.
3. Describe how you would determine which of the five reasons for failure applies to a specific learning situation.
4. Develop an alternate diagnosis, given a learning hierarchy and an attempted diagnosis that failed.

SUGGESTED PROCEDURES

Read the questions below. Read the text, keeping these questions in mind. Find answers to the questions in the exercises at the end of the text material. Writing down the answers will help you achieve mastery of the reading assignment.

1. Given the following schematic hierarchy for long division, write a list of questions you would ask to diagnose the reason a student is unable to complete a long division problem. (Objective 1)



2. List five specific reasons why the student may be unable to complete a long division problem and relate these reasons to the learning hierarchy given in Exercise 8. (Objective 2)
3. List the questions you would ask to determine which of the five reasons for failure listed in Exercise 9 is most likely true for a particular student. (Objective 3)
4. Suppose that a student is unable to do the following long division problem:

$$95 \overline{)4675}$$

Assume you have proposed the learning hierarchy given in Exercise 8. You have asked the student to multiply 76 by 8 and to subtract 643 from 785. In each case the student has provided the correct answer. What additional questions would you ask the student in an attempt to determine the student's difficulty? (Objective 4)

TEXT

If an analysed task cannot be accomplished by a student, it is likely that the student lacks one or more of the prerequisite skills. For a given task, it is possible to illustrate the dependence of the task on these prerequisite skills. This idea provides the basis for a system of diagnosis using a learning hierarchy.

A learning hierarchy is an informal task analysis that can be used for diagnosing specific learning deficiencies. Usually, we do not have a previously constructed learning hierarchy for every problem. Therefore, when a student is unable to solve a problem, the first step is to construct a rough task analysis, or learning hierarchy, for the task. This is most easily accomplished by imagining each step in the solution to the problem.

At each step, in the learning hierarchy, note which skills are necessary to accomplish that step. Once you have a good idea of the sequence of steps leading to solution of the problem, you can begin asking the student a series of questions. Each question should be designed to see if the student possesses the skills necessary to accomplish that step. Once you have completed the hierarchical analysis, you can start again with questions corresponding to the first step in the solution to the problem and work through all the steps necessary to solve the problem. If a student is unable to answer questions at any given level, lack of the skill corresponding to that level is the reason for the student's failure to do the problem.

When a learning hierarchy used for diagnosis is constructed on the spot, it will not be as sophisticated as if it were constructed with more time and validated by testing. Consequently, the first set of questions asked for diagnostic purposes may fail to pinpoint the student's difficulty. There are several possible reasons for this:

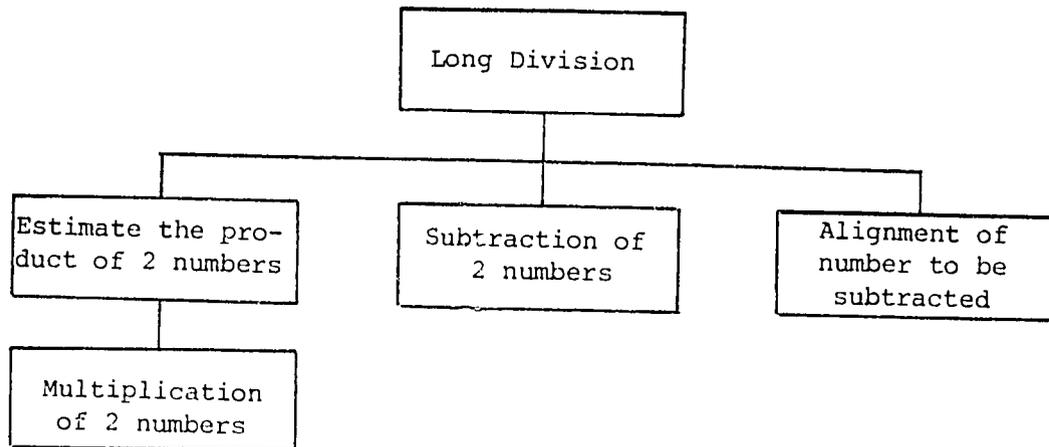
1. The question asked may not cover the full range of skills necessary to do each step. For example, one step in the problem may require that a person multiply two numbers. If the diagnostic question involves simple multiplication, but the problem requires more complicated multiplication (e.g., multiplying two or three-digit numbers) the diagnostic question may fail to tap the skill actually required. The diagnostic question, therefore, would not have been formulated properly. If the initial series of diagnostic questions does not pinpoint the problem, then the next series of questions should be more carefully constructed to ensure that the questions relate to the exact skills needed at each step of the problem.
2. A student may fail to see the next step in the problem-solving process. Sometimes a student can carry out each step required to solve a problem, but is unable to determine the correct sequence and link the steps to solve a problem. In this case, practise with the sequence of steps required to solve the problem will be helpful.
3. A student may be able to do each step, but is so slow that the problems are not finished fast enough. The speed with which a student completes the steps in a problem can be increased by practise. Drilling the student on the skills required in each step will increase the student's speed.
4. A student may occasionally fail at random on particular tasks. That is, students make errors (careless or otherwise) on steps of a problem when they actually have the skills necessary to complete the steps. If you suspect this is a student's problem, repeated practise on a number of exercises with emphasis on accuracy, is a useful strategy.

5. A student may fail to follow through on all the steps of a problem, even when he/she knows what to do. In this case, confidence can be a major problem. One solution is to build the student's confidence by helping him/her to demonstrate success in completing problems.

In summary, the process of diagnosing student learning problems includes isolating the problem a student cannot solve, analysing that problem via task analysis (constructing a learning hierarchy), and determining which prerequisite skills(s) the student lacks. The five suggestions above offer further refinement to this diagnostic process.

EXERCISE ____

DIRECTIONS: Given the following schematic hierarchy for long division, write a list of questions you would ask to diagnose the reason a student is unable to complete a long division problem. (Objective 1)



Question 1 _____

Question 2 _____

Question 3 _____

Question 4 _____

EXERCISE ____

DIRECTIONS: List five specific reasons why the student may be unable to complete a long division problem and relate these reasons to the learning hierarchy given in Exercise 8.

1. _____

2. _____

3. _____

4. _____

5. _____

List the questions you would ask to determine which of the five reasons for failure listed above is most likely true for a particular student. (Objective 3)

- Question 1 _____

- Question 2 _____

- Question 3 _____

- Question 4 _____

- Question 5 _____

EXERCISE _____

DIRECTIONS: Suppose that a student is unable to do the following long division problem:

$$95 \overline{)4676}$$

Assume you have proposed the learning hierarchy given in Exercise _____. You have then asked the student to multiply 76 by 8 and to subtract 643 from 785. In each case the student has provided the correct answer. What additional questions would you ask the student in an attempt to determine the student's difficulty? (Objective 4)

Question 1 _____

Question 2 _____

Question 3 _____

Question 4 _____

Question 5 _____

7

CREATING A POSITIVE LEARNING ATMOSPHERE

OBJECTIVES

When you have completed this chapter, you will be able to:

1. Describe, in your own words, four ways in which Peer Aides can help to create a relaxed and friendly atmosphere in a Peer Aide session.
2. Given a written description of a Peer Aide session, identify those Peer Aide statements which help create a friendly atmosphere.
3. List three ways in which a Peer Aide can respond appropriately to expressions of student feelings.
4. Given a written description of a Peer Aide session, identify those Peer Aide statements which are appropriate responses to expressions of student feelings.
5. Critique examples of Peer Aide student dialogues using guidelines suggested in this chapter.
6. Use the behaviours recommended in this chapter in a role-play situation.

SUGGESTED PROCEDURE

Read the questions below. Then read the text, keeping these questions in mind. Find answers for the questions in the exercises at the end of the text material. Writing down the answers will help you achieve mastery of the reading assignment.

1. What four behaviours should you include in every Peer Aide-student interaction? (Objective 1)
2. Why are personal greetings and friendly "goodbyes" important? (Objective 1)
3. When are praise and encouragement most effective? (Objective 1)

4. How do course-related questions establish an atmosphere of helpfulness? (Objective 1)
5. Describe three ways you can respond to a student when feelings are expressed. (Objective 3)
6. When a student expresses feelings, why is it important for a Peer Aide to respond? (Objective 3)

TEXT

A Peer Aide plays three significant roles in the JMB Preparation Programme: Mastery Test evaluator, tutor, an instructional assistant. In each of these roles, the Peer Aide helps "personalise" the educational process by providing students with attention, approval, and support. In addition to discussing specific Peer Aide roles, it is important to review ways in which the Peer Aide contributes to a relaxed, supportive atmosphere. In this chapter, therefore, we present: (1) four ways to put students at ease during every Peer Aide-student interaction; and (2) a procedure that you can use when students express feelings (positive or negative) during tutoring sessions.

Social Behaviours

When students first begin working with the JMB Study Guides, some may feel apprehensive about meeting with a Peer Aide. It is the Peer Aide, after all, who evaluates student work, and for many students any evaluation causes anxiety. Students are also expected to go to a Peer Aide when they need help, and it is sometimes embarrassing to say, "I just can't understand this."

This chapter includes four things that you, as a Peer Aide, can do to put students at ease and communicate your willingness to help.

Give a Friendly Greeting

You should begin every Peer Aide-student interaction with a friendly greeting. This will immediately contribute to a good social atmosphere conducive to learning.

The best greetings include using first names. If you know a student, greet her by name: "Hi, Simone." If you haven't learned a student's name yet, open with a greeting and an introduction: "Hi, I'm Thalso."

Use Praise and Encouragement

Praise or encouragement can be given in every tutoring situation. If you are impressed by a student's progress, hard work, or thoroughness, tell the student. Praising students on their work demonstrates that you care. It lets them know how important their work is to you. Your recognition helps motivate students to continue doing good work.

Peer Aide: You've really done a very good job on this Study Guide.

-or-

This is an excellent Mastery Test.

-or-

I see you are ready for the next Mastery Test. You're making very good progress.

To be effective, praise and encouragement should be connected to real achievements. You need not reserve praise for perfect performance, however. If a student has mastered only one objective in a Study Guide, that may be progress for that particular student. Compare a student's work only with his or her previous work. Forget about how small progress may seem when compared with the achievement of other students. And never compare your students with yourself.

Examples:

Peer Aide: You've done a very good job on these four objectives. A little more work on Objective 5 and you'll have completely mastered this Study Guide.

Peer Aide: You have a good example in number 4. It shows that you really understand that theorem.

Ask Course-Related Questions

Peer Aides can show their interest in students by asking them for their opinions and point of view. Whenever possible, you should include questions about some aspect of the material not discussed in the Peer Aide session.

Examples:

Peer Aide: Do you have any question about the next Study Guide?

Peer Aide: How does this relate to what you have learned in school?

Peer Aide: Is there anything else I can help you with?

Such questions help establish an atmosphere of concern and helpfulness.

Give a Friendly "Goodbye"

A friendly closing of a Peer Aide session is as important as a friendly opening. When the student leaves the session, you should end with a social farewell. Again, the closing will be most effective if you use the student's first name.

Examples:

Peer Aide: Have a good weekend, Joe.

Peer Aide: See you next week, Ernest.

Remember: To promote a social atmosphere conducive to learning the Peer Aide should always:

- Give a friendly greeting.
- Use praise and encouragement.
- Ask course related questions.
- Give a friendly "goodbye"

Responding to Student Feelings

Students invest time and effort in their studies. Their self esteem often depends on their doing a good job. It is not surprising that they often have strong feelings about their work. Students will occasionally express these feelings of frustration and joy to their Peer Aides. As a Peer Aide, you can show that you listen to the student, and that you care. Listed below are three ways in which you can effectively respond to feelings.

Restating Feelings

You can show that you have listened by stating what you have heard. Your restatement of a feeling should have three characteristics: (1) It should include a word synonymous with the feeling expressed, (2) it should relate to a situation, and (3) it should be tentative. By using a synonym and referring to the relevant situation, you assure the student that you are listening to what he says. By making your statement tentative, you acknowledge that you may not understand completely.

This may encourage the student to explain more fully. Here are two examples of a feeling statement and acceptance:

Examples:

Student: I don't like this Study Guide.

Peer Aide: It sounds like you've been having some problems with circles and graphs.

Student: I never thought I'd get this, but I did!

Peer Aide: You sound relieved.

Sharing Your Feelings

In some situations, you may feel uncomfortable restating a student's feeling and doing nothing else. You may be afraid that your concern will seem condescending. In such cases restatement is probably not enough. If you feel the same way as the student, sharing will build rapport and friendship.

Example:

Peer Aide: So you like these Study Guides. I've learned from them, too, and I think they are great!

Helping the Student Deal with the Feelings

You may be able to suggest something that will help the student.

Examples:

Peer Aide: I sense the pressure of these deadlines is getting to you. Is there anything I can do to help?

Peer Aide: It sounds like you're upset because you're being asked to learn material that's pointless to you. Let me explain why these problems are so important.

Remember: Whenever students express feelings, show that you listened by:

Restating the feelings.
Sharing your feelings.
Helping the student deal with his feelings.

EXERCISE _

DIRECTIONS: Write the answers to the questions in the spaces provided.

1. What four behaviours should you include in every Peer Aide-student interaction? (Objective 1)

(A) _____

(B) _____

(C) _____

(D) _____

2. Why are personal greetings and friendly "goodbyes" important? (Objective 1)

3. When are praise and encouragement most effective? (Objective 1)

4. How do course-related questions establish an atmosphere of helpfulness? (Objective 1)

EXERCISE ____

DIRECTIONS: Examine the social behaviours in the interaction below and answer the questions in the spaces provided.

1. Peer Aide: Hi, John! What did you think of the movie you saw on elephant behaviour?

Student: I enjoyed it---it was really relevant to this Study Guide.

Peer Aide: Oh, are you on Study Guide M-06?

Student: Yes, will you check my Mastery Test?

Peer Aide: Sure...

Peer Aide: (After correcting Mastery Test)
This is a good test. I can see where the movie yesterday influenced some of your answers. That's good - it was meant to reinforce what you learned in the readings.

Student: I wish we would have more movies of that calibre. Thanks for checking my test.

Peer Aide: Sure! Have a good weekend, John.

2. Describe three ways you can respond to a student when feelings are expressed? (Objective 3)

(A) _____

(B) _____

(C) _____

3. When a student expresses feelings, why is it important for a Peer Aide to respond?
(Objective 3)

4. Identify the way in which the Peer Aide responds to the student's expression of feelings in the following examples:

Student: This Study Guide is difficult! I have to put in too much time on it.

Peer Aide: It sounds like you are having trouble. Maybe I can help you.

Comment: _____

Student: I think this last part of the Study Guide is extremely difficult! I can't see why we are asked to learn it.

Peer Aide: It is difficult. I felt that same way when I first studied trigonometry. When I saw how it fits in with the other maths, I could see how important it was to master trigonometry first.

Comment: _____

EXERCISE _____

DIRECTIONS: Evaluate the following Peer Aide-student interactions. Take into account all of the appropriate social behaviours and different ways of responding to feelings as suggested in this chapter.

Peer Aide: Hi, Ernest. Is this your Mastery Test for Study Guide M-04?

Student: Yes, I'm really anxious to see how I did.

Peer Aide: Well, let's see. (Looking at answer key)
Good...good...good...good...good...
good...good...good...good...good.
Great! You got them all right! You can go on to Study Guide M-05.

Comment: _____

Student: Hi. Will you check my Mastery Test?

Peer Aide: Sure. (Silence while checking) You missed number 3 and number 5. You'll have to do this test over.

Comment: _____

Student: I need some help on this unit. I just can't figure it out.

Peer Aide: Sure, Bess. It sounds like it's really getting you down.

Student: It is. I read the Study Guide over twice and it's not clear to me how this quadratic function was derived.

Peer Aide: Actually, you don't need to know how it's derived, only how to apply it.

Student: Oh, great.

Peer Aide: That's not very clear though, now that I look at the objectives. Let me talk to Mr. Stevens about that. By the way, what do you think of the programme so far?

Student: I really like going at my own pace. It gives me better control of my time.

Peer Aide: That's great. Learning to control your own time is important for university study.

Comment: _____

EXERCISE ____

DIRECTIONS: Find another Peer Aide to role play a tutoring session with you. Have the other person ask to have a test checked or ask for assistance. Practise the social behaviours covered in this chapter. (Mastery Test scoring and tutoring behaviours are covered in other chapters.) Interact with the "student" for about two or three minutes practising the various social behaviours. When you are finished, discuss these questions with the other person.

- (A) Did the "student" feel comfortable during the session?
- (B) What behaviours contributed to this feeling?
- (C) Did you use praise and encouragement? How did the "student" feel about the way it was done?
- (D) Did the "student" express feelings? Did you respond to them? How?
- (E) How did the "student" feel about your response?

Comments: _____

PROBING SKILLS
AND
QUESTIONING TECHNIQUES

8

OBJECTIVES

When you complete this unit you will be able to:

1. Describe how probing skills are used as an important tool in Peer Aide Sessions.
2. Correctly identify five different types of probes when they are presented.
3. Generate examples of five probing skills.
4. Demonstrate use of probing skills.
5. Conduct a workshop for Peer Aides on probing skills as part of a Peer Aide training course.

SUGGESTED PROCEDURE

Read the text material below and participate in the activities as directed by the exercise at the end of the text material. Keep the following questions in mind as you read the text material. Writing down the responses will help you achieve mastery of the concepts in this unit.

1. Define the term "probe" and give an example. (Objective 1)
2. Define the term "teacher question" and give an example question. (Objective 1)
3. Define a "clarification probe" and give an example. (Objective 1)
4. Define a "critical awareness probe" and give an example. (Objective 1)
5. Define a "refocus probe" and give an example. (Objective 1)
6. Define a "redirect probe" and give an example. (Objective 1)

TEXT

Probing Techniques

Probing consists of asking penetrating questions in response to a student's initial response. Probing leads a student to discover the relationships, similarities, and differences that distinguish new concepts from

old ones. When probed, a student is required to describe the more subtle attributes of the topic, thereby reinforcing the connections between new material and previously learned material (Brown, 1979).

Question-asking has long been recognised as an essential teacher skill. Questions provide students with practice in discrimination and generalization, and teach them to think in more abstract principles and concepts. Probing takes question-asking a step further because the focus of the probe is the student's response.

Although probing skills were initially designed with the teacher/student interaction in mind, probing skills are appropriate and, it could be argued, essential in any situation where a student's active participation is desired. Probing skills are especially appropriate for Peer Aides and tutors who help other students acquire problem-solving skills. As Peer Aides probe, they focus discussion, they offer practice in critical thinking, and they present a role model for problem-solving.

Peer Aide Questions

The skillful Peer Aide raises a series of questions designed to lead the student to describe the network of relationships and associations pertinent to the subject. An economics tutor might ask: "What is marginal cost?" or "What should be the relationship between marginal cost and marginal revenue when a firm wants to maximize profit?"

The student's response to each of these questions can be probed further. For example, the economics tutor who receives an answer that "Marginal cost is the cost of producing an additional output," could probe further by asking, "Why is it called marginal?" or "What do you mean by additional?" to ensure the learner fully understands the concept of marginal cost and is not just repeating a memorised phrase.

Types of Probes

The five types of probes to be discussed are: (1) clarification; (2) critical awareness; (3) refocus; (4) prompt; and (5) redirect (Miezitis and Orme, 1977).

The first three probes represent an unfolding or hierarchy of concerns. Clarification is the term that describes a question a teacher asks the student to restate a response in a slightly different way. "What do you mean by...?" "Be more specific." "In what way?" "Anything else?" All are examples of clarification probes, and are appropriate when the student's answer is judged to be vague or unclear.

When the Peer Aide either suspects that the student does not fully understand or wants the student to reflect upon an answer, the Peer Aide might ask: "Why would that be so?" "How would you do that?" "What are you assuming?" "How can you be sure?" These probes are labeled critical awareness. They have as their goal the justification of answers.

The third type of probe in this series is labeled refocus. This type of probe focuses the student's attention on relationships. A Peer Aide might ask, "How is this related to..?" or "If that is true, then what would happen if..?" or "What would (another person or group) say about it?" This type of probe is called a refocus because it causes the student to see the concept from another perspective. When a student can approach a topic from an entirely different point of view, objectivity is enhanced and demarcations are clearer.

The fourth type of probe is called a prompt. Often students respond to teacher questions with lowered heads and mumbled "I don't know." In classrooms where "right" answers are stressed, students may avoid answering even when they may know the answer. When the teacher hints or prompts, however, the students have the benefit of hearing the question rephrased and having their hypothesis partially confirmed. Prompting demonstrates and Peer Aides interest in hearing from the student, as well as reinforcing the search for answers and willingness to try, as opposed to relying solely on memory and requiring absolute certainty before responding.

The fifth probe, a redirect, is used when there is more than one student, to include others in the process. Student #2 is invited to comment or add to Student #1's answer: Tom, do you agree with what Vera said?" or "Barry, can you give us another example?" The content of a redirect probe could actually be any of the first three probes, but if it is directed to a student other than the person who initially responded, it is called a redirect.

Practice

In this session, you will view a videotape which presents definitions and examples of each type of probe, followed by a tutoring segment which demonstrates the probe. A second videotape portrays a group tutorial session. This second tape is used as a stimulus for you to practise categorising tutor comments according to the various types of probes.

After viewing the videotape, you will have the opportunity to role-play a Peer Aide, a student, and an observer in a small group. Peer Aides concentrate on probing; students are requested to be cooperative but naive;

and observers practise categorising tutor responses. Group discussion focuses on feedback from the "observer" to the "tutor" on the number and types of probes used, and the appropriateness of the probes.

In analysing the probing patterns generated by Peer Aides learning to probe, it should be noted that most people have routine speech patterns that make acquisition of new verbal skills, such as probing, difficult. Even when the Peer Aide is consciously trying to generate different types of probes, there may be a pattern of overuse of one type. The opportunity to observe others and to practise probing are essential to the acquisition of probing skills.

As you exchange roles and discuss probing categorisations, there is clarification of the probing process. Peer Aides, for example, often begin by lecturing because that is their usual learning experience. Practise with probing, however, will demonstrate that lecturing is not as effective utilizing this direct question technique.

Probing skills would appear to be fundamental to the Peer Aide (JMB Preparation Programme). When practised correctly, they ensure student participation as well as demonstrate the tutor's analysis of a situation. They are a powerful tool in the perennial quest for the answer to the question, "How do you teach people how to think?" Peer Aides will need to be observed from time to time to ensure mastery and continued use of this questioning technique.

Summary of Probing Techniques and Selected Examples³

Basic Rules

1. Any Peer Aide response which immediately follows a student response is either a NON PROBE or a PROBE.
2. A PROBE is a Peer Aide response which requires a student who has just responded to go beyond that first response--to clarify it, justify it, further explain it, relate it to another idea, etc.

Types of Probes and Examples of Probing Responses

<u>I. Clarification:</u>	(Peer Aide asks the student for more information or <u>meaning</u> .)
	"What do you mean by _____?"
Examples of Clarification	"Tell us more..."
	"What else did they do?" "Anything else?"
	"Be more specific;" "In what way?"

II. Critical Awareness: (Peer Aide student to justify the answer, to reflect on it.)

Examples of Critical Awareness

"What are you assuming?"

"Why would that be so?"

"How can that be?"; "How would you do that?"

"Are you sure?"; "Give an EXAM-
PLE of that."

"What do we need to know in order to solve the problem?"

III. Refocus: (Peer Aide asks student to relate the answer to another idea or topic.)

"How is that related to...?"

"Can you SUMMARISE the discussion up to this point?"

"PRETEND (suppose) you are...then what?"

"How does your response tie into..?"

"If that is true, then what would happen if...?"

"What would _____ (another person, group) say about it?"

"How is your answer (point of view) different from _____?"

IV. Prompting: (Peer Aide gives student a hint or else Peer Aide rephrases the question to help student respond: Peer Aide has questioned student, but student can't or doesn't answer. Peer Aide therefore rephrases, or makes the probe easier to answer.)

1. Giving a hint.
2. Asking for an example, etc.

V. Redirect: (Peer Aide changes the direction of interaction from Student 1 to Student 2. Peer Aide is asking Student 2 to respond to the first student's response.)

³Adapted from M.E.J. Orme, Probing Skills.

EXERCISE _____

DIRECTIONS: As you read the text and complete the practice activities, write down the answers in the space provided. Watch practice tape 1 and refer to the text. In your own words, define the following and give an example.

1. Define "probe" and give an example. (Objective 1)

2. Define "teacher question" and give an example.
(Objective 1)

3. Define "clarification probe" and give an example.
(Objective 1)

4. Define "critical awareness" and give an example.
(Objective 1)

5. Define "refocus probe" and give an example.
(Objective 1)

6. Define "redirect probe" and give an example.
(Objective 1)

EXERCISE _____

Observation Coding Form 1

TEACHER RESPONSE	P R O B E S					NON-PROBE
	CLARIFY	CRITICAL AWARENESS	REFOCUS	PROMPT	REDIRECT	
Sue, what are two systems?						
what systems involve						
define vital						
general meaning						
Necessary for what?						
clarify why necessary						
any function Mike forgot						
relate circulatory to respiratory						
What are you assuming?						
What does Mike's answer assume?						
Mike, see what you assume?						
Where does transport occur?						
what if it didn't						
does it only deliver?						
which gas expelled						
what molecule						
tie to vital						
summarize						

9

A STRATEGY TO HELP STUDENTS SOLVE PROBLEMS

OBJECTIVES

When you complete this unit, you will be able to:

1. Define "problem type."
2. Define "relevant variable."
3. Define "empirical relationship."
4. Explain the relationship among problem type, relevant variable, and empirical relationship.
5. Explain the importance of problem type, relevant variable, and empirical relationship.
6. List the six steps in problem-solving that depend on relevant variables, problem types, and empirical relationships.
7. Use a study technique to identify relevant variables, a problem type, and empirical relationships.
8. Use problem-solving methods to solve simple empirical problems.

SUGGESTED PROCEDURE

Read the questions below. Read the text, keeping the questions in mind. Find answers for the questions and write the answers down. Writing the answers down will help you achieve mastery of the reading assignment.

1. What is a problem type? (Objective 1)
2. What is a relevant variable? (Objective 2)
3. What is an empirical relationship? (Objective 3)
4. What do problem types tell you about relevant variables for that type of problem? (Objective 4)
5. What do problem types tell you about empirical relationships? (Objective 4)
6. Why are problem types important in problem-solving? (Objective 5)
7. Why are relevant variables important in problem-solving? (Objective 5)

8. Why are empirical relationships important in problem-solving? (Objective 5)
9. What are the six steps in problem-solving? (Objective 6)
10. How do you determine the empirical relationships for a problem type from a textbook passage? (Objective 7)
11. How do you determine the relevant variables for a problem type from a textbook passage? (Objective 7)

TEXT

Quantitative problem-solving has a special place in mathematics and science education. Modern philosophers of science, such as T. S. Kuhn (1970), have pointed out that knowledge of scientific theories has a special character. Few scientists would acknowledge that someone understands a scientific theory unless they are able to state the theory and use it to solve problems. Thus, education in science emphasises both the theory and the classic problems that the theory is able to solve. The emphasis on problem-solving in homework assignments and tests stems from this perspective.

Every scientific theory has three aspects which are essential to a model of problem-solving. First, each theory has a range of application, a group of problems for which that theory is useful. That is, each theory defines the kind of problems that the theory can solve. Problem types are important because the type of problem indicates which theory should be used to solve the problem.

Second, every theory selects certain variables which are relevant. By definition, all variables other than relevant variables are irrelevant to the theory. This is important for problem-solving because the theory identifies a small set of variables which are relevant to the problem and all other variables may be ignored. Since different theories usually have different relevant variables, knowledge of the relevant variables (e.g., information given in a problem) may also suggest the appropriate theory.

Third, every theory specifies empirical relationships among the relevant variables. These empirical relationships usually consist of equations or formulae, where each of the symbols in the formula represents a relevant variable. These empirical relationships are the most obvious components of a scientific theory. From the perspective of problem-solving, these empirical relationships enable one to determine the value of unknown relevant variables from known relevant variables. This is the final step in solving a problem.

These three aspects of scientific theories provide the basis for a problem-solving method that can be used to solve virtually any scientific problem. This problem-solving method consists of six steps. These steps are listed below:

Step 1. Determine the type of problem. Sometimes the type of problem will be obvious from the description of the problem. In some cases, the information presented in the problem will be a cue to the relevant variables which in turn suggest the problem type. Identification of the problem type is essentially identification of the theory that can be used to solve the problem.

Step 2. List all the relevant variables for problems of this type. Once the problem type is identified, the problem solver should list all relevant variables specified by the theory used to solve that type of problem.

Step 3. Determine the relevant variables whose values are known or can be determined directly from information given in the problem. Determine the relevant variables whose values constitute the answer to the problem. The values of some of the relevant variables are always given in the problem. Similarly, the values of other relevant variables always determine the answer to the problem.

Step 4. List all the empirical relationships for problems of this type. This step consists of listing the relationships between variables which are defined by the theory used to solve problems of this type.

Step 5. Pick an empirical relationship(s) which contains both the relevant variables whose values are known and also the relevant variables whose values are to be determined.

Step 6. Solve the equation(s) algebraically to obtain the value(s) of the relevant variables(s). The values of the relevant variables will be determined from the given or known variables.

It is easier to understand the problem-solving method when you see it applied to a real situation. Read the following passage as if you were studying the material to solve problems of this type. You should find the empirical relationships first, and then the relevant variables can be identified as the variables that are used in the empirical relationships. Note the section heading "One dimensional motion-constant acceleration" gives you a description of the problem type. You will also notice that you can identify

the empirical relationships by the last sentence in the passage, which says "Equations 9.1, 9.3, 9.4, and 9.5 are a complete set of equations for motion along a straight line with constant acceleration." The relevant variables are simple the variables that occur in the empirical relationships. If you were actually studying this material you would make a list of those relevant variables, their definition, and the empirical relationships.

EXAMPLE TEXTBOOK PASSAGE

One-Dimensional Motion-Constant Acceleration

Let us now further restrict our considerations to motion which not only occurs in one dimension (the x -axis) but for which $a_x = a$ constant. For such *constant acceleration* the *average* acceleration for any time interval is equal to the (constant) instantaneous acceleration a_x . Let $t_1 = 0$ and let t_2 be an arbitrary time t . Let v_{x0} be the value of v_x at $t = 0$ and let v_x be its value at the arbitrary time t . With this notation we find a_x from

$$a_x = \frac{\Delta v}{\Delta t} = \frac{v_x - v_{x0}}{t - 0}$$

or

$$v_x = v_{x0} + a_x t \quad (9.1)$$

The equation states that the velocity (v_x) at time (t) is the sum of its value v_{x0} at time $t = 0$ plus the change in velocity during time t which is $a_x t$.

When the velocity v_x changes uniformly with time, its average value over any time interval equals one-half the sum of the values of v_x at the beginning at at the end of the interval. That is, the average velocity ($\overline{v_x}$) between $t = 0$ and $t = t$ is

$$\overline{v_x} = \frac{1}{2}(v_{x0} + v_x) \quad (9.2)$$

This relation would not be true if the acceleration were not constant, for then the curve of v_x versus t would not be a straight line.

If the position of the particle at $t = 0$ is x_0 , the position x at $t = t$ can be found from

$$x = x_0 + \overline{v_x} t$$

which can be combined with equation 9.2 to yield

$$x = x_0 + \frac{1}{2}(v_{x0} + v_x)t \quad (9.3)$$

The displacement due to the motion in time t is $x - x_0$. Often the origin is chosen so that $x_0 = 0$.

Notice that aside from initial conditions of the motion, that is, the values of x and v_x at $t = 0$ (taken here as $x = x_0$ and $v_x = v_{x0}$), there are four parameters

of the motion. These are x , the displacement; v_x , the velocity; a_x , the acceleration; and t , the elapsed time. If we know only that the acceleration is constant, but not necessarily its value, from any two of these parameters we can obtain the other two. For example, if a_x and t are known, Equation 9.1 gives v_x , and having obtained v_x , we find x from Equation 9.3.

In most problems in uniformly accelerated motion, two parameters are known and a third is sought. It is convenient, therefore, to obtain relations between any three of the four parameters. Equation 9.2 contains v_x , a_x , and t , but NOT x ; Equation 9.3 contains x , v_x and t but NOT a_x . To complete our system of equations we need two more relations, one containing x , a_x , and t but NOT v_x and another containing x , v_x and a_x but NOT t . These are easily obtained by combining Equations 9.1 and 9.3.

Thus, if we substitute into Equation 9.3 the value of v_x from Equation 9.2, we thereby eliminate v_x and obtain

$$x = x_0 + v_{x0}t + \frac{1}{2}a_x t^2 \quad (9.4)$$

When Equation 9.1 is solved for t and this value for t is substituted into Equation 9.3, we obtain

$$v_x^2 = v_{x0}^2 + 2a_x(x - x_0) \quad (9.5)$$

Equations 9.1, 9.3, 9.4 and 9.5 are the complete set of equations for motion along a straight line with constant acceleration.

EXERCISE _____

DIRECTIONS: Write answers to the questions in the space provided, or carry out the activity specified.

1. What is the problem type? (Objective 1)

2. What is a relevant variable? (Objective 2)

3. What is an empirical relationship? (Objective 3)

4. What do problem types tell you about relevant variables for that type of a problem?

5. What do problem types tell you about empirical relationships? (Objective 4)

6. Why are problem types important in problem-solving? (Objective 5)

7. Why are relevant variables important in problem-solving? (Objective 5)

8. Why are empirical relationships important in problem-solving? (Objective 5)

9. What are the six steps in problem-solving?
(Objective 6)

Step 1 _____

Step 2 _____

Step 3 _____

Step 4 _____

Step 5 _____

Step 6 _____

10. How do you determine the empirical relationships
for a problem type from a textbook passage?
(Objective 7)

11. How do you determine the relevant variables for a
problem type from a textbook passage? (Objective 7)

12. What are the empirical relationships in the text-
book passage in the text? (Objective 7)

13. What are the relevant variables in the textbook
passage in the text? (Objective 7)

10

MASTERY TEST SCORING PROCEDURES

OBJECTIVES

When you have completed this unit, you will be to:

1. Describe in your own words appropriate and inappropriate ways of responding to correct, ambiguous, and incorrect answers of Mastery Tests.
2. Classify, as appropriate or inappropriate, written examples of tutor responses during Mastery Test scoring.
3. Provide appropriate responses to written examples of Mastery Test answers.
4. Critique examples of Peer Aide-student dialogue during Mastery Test scoring.

SUGGESTED PROCEDURE

Read the questions below. Read the text, keeping these questions in mind. Find answers to these questions and write the answers in the spaces provided after the text material. Writing down the answers to these questions will help you master the reading assignment.

1. Before responding to MT answers, the Peer Aide must know whether answers are correct or incorrect. Peer Aides can provide recognition for correct student answers in several different ways. What are the three ways? (Objective 1)
2. Why is it important for a Peer Aide to respond to correct answers on a student's MT? (Objective 1)
3. When is an answer on a student's MT ambiguous? (Objective 1)
4. From a student's written answer, a Peer Aide is unable to tell whether a student has grasped the skill tested by the item. What two rules should the Peer Aide follow in seeking clarification? (Objective 1)
5. Why is it important for a Peer Aid to avoid prompting or giving hints when a student is trying to clarify an ambiguous answer? (Objective 1)

6. If the student demonstrates during discussion that he mastered the material, what should a Peer Aide do? Why? (Objective 1)
7. What is the appropriate Peer Aide response to an incorrect MT answer? (Objective 1)
8. What two things should a Peer Aide avoid doing when a MT answer is incorrect? (Objective 1)
9. Why is it important to always maintain high academic standards? (Objective 1)
10. Identify the Peer Aide behaviour and state whether the behaviour is appropriate or inappropriate for the kind of student answer indicated.
11. What are the appropriate responses to students who indicate answers in MT that are correct? Incorrect? Ambiguous?
12. Roll play a MT scoring session.

TEXT

As a Peer Aide you will have the most contact with students while checking MTs. During scoring sessions, your goals are to: (1) score MTs accurately, (2) let students know how much they have accomplished, and (3) help them to know which steps to take next. The way you handle these goals will depend on how students answer MT questions. In this Chapter you will learn which Peer Aide behaviours contribute to or hinder student progress toward mastery of the JMB Preparation Programme material.

When you evaluate MTs, your goals are to score MTs accurately, to let students know what they have accomplished, and to remind them of steps they can take to accomplish more. If you keep these general goals in mind, you should have little difficulty evaluating MTs.

Accuracy in scoring is of the utmost importance. Peer Aides are sometimes tempted to pass students on answers that are "almost right." If you accept less than the best, some students will begin to study for less than mastery. Passing students on tests with less than mastery is not a favor to them. They will not thank you when a question is asked on the JMB that should have been mastered but was not because you accepted less. Students will adhere to and study for the standards you set in the beginning.

It is equally important to communicate your evaluation clearly. When you finish scoring a MT, the student should know exactly which answers are correct and which answers need

more work. This Chapter contains suggestions for effective MT scoring. What you do while scoring a test will depend on whether student answers are correct, ambiguous, or incorrect. In the sections that follow we suggest specific ways of handling each type of answer.

Students deserve recognition for their successful efforts. In their haste to provide help where it is needed, however, Peer Aids sometimes miss the opportunity to comment on well-written answers or those showing original thought. When you provide recognition for correct answers, you give students an opportunity to talk about the material with which they feel comfortable. This will help students consolidate their knowledge, and gain an increased sense of confidence in their ability to handle course material.

As a Peer Aide, you can indicate your interest in a student's correct answers in three ways:

- 1) By restating these answers in your own words.
- 2) By asking follow-up questions
- 3) By praising student answers.

Each of these approaches to student answers may be used alone, or the approaches can be combined.

Rephrase Student Answers. Simple paraphrasing of a student's answer lets the student know that you are doing more than mechanical checking. You are actively attending to the student's ideas. You may rephrase the whole answer to a MT question, or put into your own words a part of the answer:

Peer Aide: I see that you've correctly identified the two major reactions to frustration: fight and flight.

or

Peer Aide: You've used the method of least squares to get the right answer here.

Rephrasing student answers is a relatively straightforward procedure, but keep two points in mind. First, do not insert new opinions or ideas into your restatements. Be sure to paraphrase simply on the basis of what the student has written or said. Second, keep restatements brief; one sentence should be adequate in most cases.

Ask Questions. Peer Aides can also use questions to show that they are paying attention. Asking a follow-up question about a correct answer will encourage the student to talk about the material. When an answer is correct, the Peer Aide can ask the student to share personal reactions and opinions:

Peer Aide: I see you selected the correct answer on item 4, the possibility of erosion. Did any of the other alternatives look

attractive to you?

or

Peer Aide: You've presented Stephenson's principles very clearly. Do you find her ideas practical?

Use care in formulating your follow-up questions. While questions can convey Peer Aide acceptance and trust, they can also be used to convey suspicion and mistrust. Your job is not to cross-examine or interrogate the student. In almost all cases, the student's written responses will establish whether he has achieved mastery.

Give Praise and Encouragement. Praise for real achievement is appropriate. If you are impressed by an answer, let the student know.

Peer Aide: I really think you did a good job on this answer.

or

Peer Aide: You've gotten the key distinction here. Very good.

or

Peer Aide: I like the way you've stated this.

Praise will lose its effectiveness if overused. Make your praise correspond to the perceived difficulty of the problem. Students will feel good if they know they have done well on a challenging job. They will not take praise seriously if they feel it is given in a mechanistic or insincere way. Some students will even resent praise if they feel you are using it to manipulate them or show superiority.

The JMB Preparation Program Mastery Tests often call for short essay or open-ended answers. Responses to open-ended questions can often be evaluated easily as correct or incorrect, but sometimes responses are ambiguous. It may be hard to determine from a written answer whether the student has grasped the essential point or mastered a necessary skill. If a student's written answer leaves room for doubt, your instructor may want you to elicit further information from the student. There are two important procedures to follow: (1) probe, and (2) have the student record clarification in writing.

Don't Prompt. When a student gives an ambiguous answer, some Peer Aides provide far too many hints until the student produces the desired response. Peer Aides should not give more information than is contained in the MT item when scoring MTs. Examples of inappropriate prompting are: "This is similar to the answer you gave to question 2," or "I'm looking for two words to describe the process."

Prompting on unclear student answers defeats the purpose of the MT. If the student knows the answer, the Peer Aide who prompts cheats the student of the opportunity to demonstrate mastery on his own. A student who does not know an answer may guess correctly when prompted by a Peer Aide. Also, if the student gives a correct response, but not under MT conditions, the Peer Aide could assume mastery and the student may stop studying without realizing that the real objective of the Study Guide has not been reached. Prompting misleads students and Peer Aides into a sense of complacency about what is known.

Instead of prompting on unclear answers, the Peer Aide should use one or both of the following techniques:

Ask the student to restate the answer. The student may know the material but did not express the answer in writing.

Ask the student another form of the question. The student may know the material but misread or didn't understand the question. Sometimes questions are ambiguous or poorly stated. If this is the case, you should make a note of it and discuss the question with the Resource Aide.

Require Clarifications in Writing. On the JMP Preparation Programme, students should not be allowed to pass a MT verbally. If a student demonstrates mastery during discussion, ask the student to write the answer. The correctly written answer will let the instructor know at a glance the quality of answers that are accepted as correct. Also, remember that during the actual JMB, verbal answers won't count!

Sometimes during the discussion of an ambiguous or unclear answer, you will find that the student is unsure of the material and needs more work. If this is the case, you should handle it the same as an incorrect answer.

When an answer on a MT is incorrect, it is your job to help the student develop a procedure for overcoming deficiencies. The most effective Peer Aide will help by giving suggestions for further study without lecturing or criticizing.

Clarify Study Procedures. The student who has missed an item on a MT should know what study procedures will help in overcoming the deficiency on the item. The Peer Aide can help the student develop an appropriate study procedure.

Peer Aide: You have a problem here on #2.
Do you know what your error is?

Student: I blew it! I used the test for correlated means. It has to be the other one that's right.

Peer Aide: Can you show me which of the types of items is represented by #2?

Student: It's this one.

Peer Aide: In the practise items for this type of problem there are several examples of situations where you use one or the other of the two tests. I suggest you check over your answers to those problems. If you have any questions about any of them, I'd be glad to try to help.

When advising students about next steps to take, use suggestions. Don't tell students what they should or ought to do. It is important for the students to be given guidelines and the freedom to adapt them to their own study strategy.

Don't Lecture. When a student misses an item on a MT, it is very tempting to tell the student the answer to remove any misunderstanding.

Peer Aide: You've predicted that volume increases here. Actually, volume would have to go down because.....

The Peer Aide may develop little lectures on items that students often miss, and launch into these explanations at the slip of a student pen.

What happens when the Peer Aide gives the student an answer? The student may not and perhaps repeat the answer. At best, the Peer Aide has only verified that the student can copy and echo. The students who echo or copy the Peer Aide's answer may think they know more than they do! With a false sense of assurance, the student will work no more on the problem.

Giving away answers also robs the student of the chance of demonstrating mastery and independence. If Peer Aides provide quick and easy answers to questions, students may lose their motivation to think for themselves. Finally, when Peer Aides give away explanations and answers, they restrict their own opportunities to learn from students. A Peer Aide who immediately tells every student the keyed answer to a MT question may never learn, for instance, that a MT Item does not give enough information for the student to reach the answer independently.

Avoid Criticism. In a MT scoring situation, students are vulnerable to criticism. A critical remark by a Peer Aide can frustrate a student's efforts. The criticism does not have to be severe to have this effect. Few Peer Aides would dream of saying:

"If you'd stop being lazy, you'd be able to get this."

or

"You've made the same mistake again. How do you expect me to help you when you don't listen to what I tell you?"

Less direct criticisms can be just as painful to new learners:

"You've made the same mistake again. You won't be able to pass a MT unless you can get this type of question right."

These are negative statements, and not very helpful. They do not give even a vague clue about what the student should know. Instead of giving students positive steps to take to achieve success, criticisms like these often provoke stereotyped reactions. They bring to the surface any defences the student can muster, or they provoke counter-criticism. In the face of criticism, some students get discouraged and may drop even further behind.

REMEMBER: WHEN SCORING MASTERY TESTS

ALWAYS MAKE A CLEAR STATEMENT OF CORRECTNESS

GIVE RECOGNITION FOR CORRECT MT ANSWERS BY

Rephrasing the answers

Asking follow-up questions

Giving praise and encouragement

IF THE STUDENT'S ANSWER IS AMBIGUOUS

Don't hint or give away answers

Require clarification in writing

IF THE STUDENT'S ANSWER IS INCORRECT

Clarify study procedures

Don't lecture

Avoid criticism

ALWAYS KEEP YOUR STANDARDS HIGH

EXERCISE _____

DIRECTIONS.

As you read the text, write answers to the questions or carry out the activity in the spaces provided.

1. Before responding to MT answers, the student must know whether answers are correct or incorrect. Peer Aides can provide recognition for correct student answers in several ways. What are three ways? (Objective 1)

(1) _____

(2) _____

(3) _____

2. Why is it important for a Peer Aide to respond to correct answers on a student's quiz? (Objective 1)

3. When is an answer on a MT ambiguous? (Objective 1)

4. From a student's written answer, a Peer Aide is unable to tell whether a student has grasped the skill tested by the item. What two rules should the Peer Aide follow in seeking clarification? (Objective 1)

5. Why is it important for a Peer Aide to avoid prompting or giving hints when a student is trying to clarify an ambiguous answer? (Objective 1)

6. If the student demonstrates during discussion that he has mastered the material, what should a Peer Aide do? Why? (Objective 1)

7. What is the appropriate Peer Aide response to an incorrect MT answer? (Objective 1)

8. What two things should a Peer Aide avoid doing when a MT answer is incorrect? (Objective 1)

9. Why is it important to always maintain high academic standards? (Objective 1)

EXERCISE _____

DIRECTIONS: Identify the Peer Aide behavior in the following dialogue. State whether the behaviour is appropriate or inappropriate for the kind of student answer indicated. When a behaviour is inappropriate, indicate an appropriate response? (Objective 2)

When the MT Answer is Ambiguous

Peer Aide: I'm not sure what you mean by this answer, can you explain it to me?

Appropriate or Inappropriate? _____

Why? _____

Peer Aide: Could you explain number 7 to me? It's much more complex than this.

Appropriate or Inappropriate? _____

Why? _____

Peer Aide: This question asks what major group or groups of mollusks show little change from their primitive ancestors. You have listed one, do you know the other?

Appropriate or Inappropriate? _____

Why? _____

When the Mt Answer is Correct

Peer Aide: I like the way you answered the second question.

Appropriate or Inappropriate? _____

Why? _____

Peer Aide: I see you have used the short method of calculating the standard deviation for this data.

Appropriate or Inappropriate? _____

Why? _____

Peer Aide: Number 1 is excellent... Number 2
is excellent... Number 3 is excellent
... Number 4 is excellent... Number...

Appropriate or Inappropriate? _____

Why? _____

When the MT Answer is Incorrect.

Peer Aide: You did a good job on the first part
of the unit. If you read through
pages 34-37, it will help you with
the last two objectives.

Appropriate or Inappropriate? _____

Why? _____

Peer Aide: You used the wrong formula for this
problem. Let me show you how to
handle this.....

Appropriate or Inappropriate? _____

Why? _____

Peer Aide: I had trouble with this Concept when I
took the course. The table in Appendix
C helped me.

Appropriate or Inappropriate? _____

Why? _____

Peer Aide: I'm not sure why you're having trouble
with this Objective...it seems perfectly
clear to me...

Appropriate or Inappropriate? _____

Why? _____

EXERCISE _____

DIRECTIONS: What are the appropriate responses to the following examples? (Objective 3)

1. John's answer to a certain question is complete. He has provided a good example to demonstrate the Concept.

2. From Mary's answer you are not sure whether she understands the Concept or not. She gives an example but it is the same one that is in the readings.

3. Tim's answer is wrong. He defines a Concept incorrectly and does not provide an example.

EXERCISE _____

DIRECTIONS: Critique the following example of a Peer Aide-student dialogue during a MT score situation. In your critique: (1) consider appropriate and inappropriate behaviour described in this chapter; (2) consider the four social behaviours from Chapter 7; and (3) responses to feelings in Chapter 7. (Objective 4)

Peer Aide: Hi, Claude. I see that you've already finished Study Guide M-06. That's good.

Student: Yes, I hope to finish the JMP Preparation Programme early. Can you correct my MT on Study Guide M-07?

Peer Aide: Sure, let's take a look at it. (Looking over the MT.) On Item 4 you say that the mean is the best measure of central tendency for these data. It's a skewed distribution. What measure should you have used?

Student: Oh, I didn't realize that it was skewed. I should have said the median.

Peer Aide: Good. (Pause while looking.) Number 6 is wrong.

Student: I thought so. I really have a problem with that. It's very frustrating.

Peer Aide: It sounds like you're getting discouraged. This is a tough unit, but all you have to do is work a little harder.

Student: Yeah, I guess so.

Peer Aide: Well, read over pages 36-42. I think they will help you.

Student: O.K.

Peer Aide: Anything else I can help you with?

Student: No, I think I'm O.K.

Peer Aide: Good luck.

EVALUATION

AND

11

THE ROLE OF THE RESOURCE AIDE

OBJECTIVES

When you have completed this unit you will be able to:

1. State the specific duties of a Resource Aide.
2. Describe how to use the record keeping system for the JMB Preparation Programme.
3. Use a Mastery Test Scoring Observation Form to gather systematic information on the Peer Aides' ability to mark Mastery Test properly.
4. Use the information gathered from the Mastery Test Scoring Observation Form to make concrete suggestions to Peer Aides for improving their Mastery Test grading.
5. Use a Peer Aide Interaction Observation Form to gather systematic information on Peer Aide behaviour.
6. Use the information gathered from a Peer Aide Interaction Observation form to make concrete suggestions to Peer Aides for improvement of their ability to help students.

SUGGESTED PROCEDURE

Read the questions below. Read the text, keeping these questions in mind. Find the answers to the questions and write the answers down in the space provided at the end of the text material or complete the activity indicated.

1. What are the specific duties of a Resource Aide? (Objective 1)
2. What is the purpose of the Student Background Information Card? (Objective 2)
3. What is the purpose of the Study Guide Evaluation Card? (Objective 2)
4. Use the Mastery Test Scoring Observation Form to record information from a Mastery Test scoring session. (Objective 3)
5. Use the sample Mastery Test Scoring Observation Form to make specific recommendations for a Peer Aide. (Objective 4)

6. Use the Peer Aide Interaction Observation Form to summarize information from transcripts of a tutoring session (Objective 5)
7. Use the Peer Aide Interaction Observation Forms completed above to make recommendations for a Peer Aide. (Objective 6)

TEXT

Duties of Resource Aides

The actual duties performed by Resource Aides may vary from programme to programme, but Resource Aides will perform at least five functions in every programme. The five duties that all Resource Aides perform are:

1. Coordinate Peer Aides. Resource Aides serve as supervisors of Peer Aides. The Resource Aide makes sure that enough Peer Aides are available at the times they are needed by the students. The Resource Aide also helps the Peer Aides to understand the procedures used in the specific programme and answers the Peer Aides' questions about the curriculum materials.
2. Observer of Peer Aides. Part of the role of coordinator of Peer Aides is giving feedback to Peer Aides about their teaching and Mastery Test scoring. Providing feedback to Peer Aides on both teaching and Mastery Test scoring behaviour is essential for their improvement in these areas. This is so important that parts of this Chapter deal specifically with observation of Peer Aides to provide feedback for improvement of teaching and Mastery Test scoring. We recommend that every Resource Aide observe each Peer Aide regularly, using the observation forms provided in this Chapter. The Resource Aide should then discuss the results of the observation with the Peer Aide, making positive suggestions for improvement.
3. Be an Information Resource. Occasionally students will ask questions that Peer Aides are unable to answer. Some of these questions may even go beyond the material in the JMB Preparation Programme. In this case, the Peer Aide may ask the Resource Aide for help. If the Resource Aide knows the answer immediately he may help the student directly. In other cases, the Resource Aide may direct the Peer Aide to a textbook where the question is discussed.

4. Resolve Disputes between Peer Aides and Students.

Sometimes a Peer Aide may not be able to convince the student that a Mastery Test answer is incorrect. The student may insist that their answer is correct or that the Mastery Test answer key is wrong. In this case the Resource Aide has the ultimate authority to resolve disputes. The word of the Resource Aide is final.

5. Coordinate Record-Keeping. Record-keeping is essential to document the need, and improve, the programme. Documentation of programme usage is crucial for future funding for expansion of the programme. Therefore brief records must be kept of the numbers of students who use the programme at each site. The records needed include some brief background information (to be completed once) and information on how student use the Study Guides (to be completed after each Mastery Test.) No student names are necessary. The Resource Aide is responsible for making sure that these records are collected, and for providing the record cards to the Programme Evaluation Liason each month.

Record-Keeping System

Student Background Information Card. The record-keeping system is essential to demonstrate that people are using the materials. Data on the numbers of people using the programme can also be crucial in obtaining future funding for similar programmes. The record-keeping system is designed to be easy to use while providing all of the data necessary to establish that the programme is well-attended. The data is recorded on the Student Background Information Cards that are kept in a card file at the programme site. The Student Background Information Card asks for some educational and other background information on the student. It is filled out once by a student when the student takes the first Mastery Test.

STUDENT BACKGROUND INFORMATION CARD	
Name _____	Age ____ ____ (10-11)
(9)	
 (1 - 8)	
<u>Directions:</u> Circle one answer	
1. Are you employed?	(a) Full-time (b) Part-time (c) Not employed
2. What is your racial category?	(a) Black (b) Coloured (c) Indian (d) White
3. What is the highest standard in school that you have completed?	(a) Standard 6 or below (b) Standard 7 (c) Standard 8 (d) Standard 9 (e) Standard 10 (f) Post Matric
4. Are you enrolled in school now?	(a) Yes (b) No
5. What is your sex?	(a) Female (b) Male

Study Guide Evaluation Card. A second record-keeping card is the Study Guide Evaluation Card which asks students about how they used the program and materials. Each time a student takes a Mastery Test, he or she fills out a Study Guide Evaluation Card.

STUDY GUIDE EVALUATION CARD

THIS FORM MUST BE COMPLETED BEFORE YOUR MASTERY TEST IS EVALUATED

1st Name Initial	Surname Initial	Birthdate		
		Day	Month	Year

(1-8)

Name _____
(9)

Title of Study Guide _____
(10)

Study Guide Number

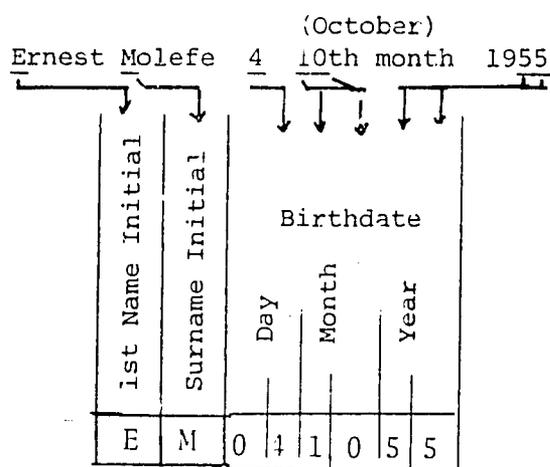
--	--	--

(11-14)

1. Approximately how many hours did it take you to complete this Study Guide? _____
(a) Less than 5 (b) 6-10 (c) 11-15 (d) 16-19 (e) 20 or over
2. How many times did you get help from a Peer Aide to finish this Study Guide? _____ (15)
(a) not at all (b) 1-2 times (c) 2-5 times (d) 6-10 times (e) over 10 times.
3. How many times per week did you come to the Study/Testing Center? _____ (16)
(a) Once (b) Twice (c) 3 or more times
4. What materials did you use to study the Mastery Test? _____ (17)
(a) Study Guide only
(b) Study Guide plus text reference
(c) Study Guide plus other material
(d) Study Guide plus test reference plus other material
5. How helpful was this Study Guide? _____ (18)
(a) Not very helpful (b) Somewhat helpful (c) Very helpful
6. How would you rate this Study Guide? _____ (19)
(a) Very easy (b) Easy (c) Just right (d) Difficult (e) Very difficult
7. How can these materials or this program be improved? _____ (20)

Assigning Identification Codes

The Students do not identify themselves on either of the record keeping cards. Instead of using a name, the students identify themselves with a code composed of the last two digits of their year of birth and the first letters of their first and last names. For example, suppose a student's name is Ernest Molefe who was born on 4, Oct. 1955. Ernest's code is then:



Note: All code boxes must be filled. 1 April 1956 would code as 010456. 13 November 1961 would be coded as 131116. 3 March 1958 would be coded 030358. No boxes can be blank and single digit dates should be preceded by zero. As above, the fourth day of the month is coded 04 NOT 40.

The Resource Aide must make sure that the Peer Aides ask each student to fill out a student background information form when they take their first Mastery Test. The Resource Aide must also be sure that students fill out a Study Guide evaluation card when they take a Mastery Test. The Resource Aide then files the student Background Information Card and the Study Guide Evaluation Cards. This file of cards is given to the Programme Evaluation Liaison each month for tabulation. Note that the anonymity of the students is preserved even when the cards leave the programme site.

Observing Mastery Test Scoring Sessions

The Resource Aide will assist Peer Aides to become more effective Mastery Test scorers. Effective scoring requires two kinds of skills. One type of skill helps the Peer Aide to establish positive atmosphere to avoid communication barriers. These skills were discussed in Chapter 7. It may be a good idea to review Chapter 7 if you are not sure that you remember the material.

The second type of skill needed for effective Mastery Test scoring includes the mechanics of scoring that were presented in Chapter 10. One of the best ways to help Peer Aides

is to observe them when they are scoring Mastery Tests. Since several skills are needed in a scoring session, we have provided a Mastery Test Scoring Observation Form to help you record instances of correct hahaviour when observing a MT scoring session.

A copy of the form is given on page . The Form provides space to record information on the mechanics of Mastery Test scoring.

The seven columns are used to record information and answers to each test question. For example, if the answer given by the student to MT Item 2 is correct, the observer checks the "Item is correct" row under column two. If the Peer Aide recognises the correct answer by rephrasing the student's answer, the observer checks the "Rephrasing student answers" row under column two. When the observation is completed, the observer has a complete record of the test scoring behaviour of the Peer Aide for the 1st seven items of the Mastery Test. The Resource Aide can therefore determine if the Peer Aide is using the procedure explained in Chapter 10.

MASTERY TEST SCORING OBSERVATION FORM

This form is to help the Resource Aide provide useful feedback to the Peer Aide

DIRECTIONS: The seven columns below correspond to the first 7 items on the Mastery Test. As the Peer Aide scores the Mastery Test with the student, indicate by checking the appropriate column each time the behaviour occurs.

- | | | |
|---|-----|-----|
| | Yes | No |
| A. Did Peer Aide require student: to complete Study Guide Evaluation Card <u>before</u> scoring test? | ___ | ___ |
| B. Did Resource Aide file the Study Guide Evaluation Card? | ___ | ___ |

	Item	1	3	4	5	6	7
1. Does the Peer Aide indicate clearly if the item is correct or incorrect? (If yes, indicate ✓)							
<u>ITEM IS CORRECT</u>							
1. Did Peer Aide rephrase student's answer?							
2. Did Peer Aide ask questions?							
3. Did Peer Aide give praise or encouragement?							
<u>ITEM IS AMBIGUOUS OR PARTIALLY CORRECT</u>							
1. Did Peer Aide probe?							
2. Did Peer Aide require student to rewrite answer?.....							
<u>ITEM IS INCORRECT</u>							
1. Did Peer Aide recommend further study?							
2. Did Peer Aide provide direct instruction?							
3. Did Peer Aide encourage student to try working the item again?							

Observing Peer Aide Sessions

The Resource Aide will also assist Peer Aides to become more effective with students. Effective teaching involves creating a positive atmosphere, identifying the problem, and solving the difficulty. The skills for identifying problems and solving difficulty were discussed in Chapter 4. Creating a positive atmosphere was discussed in Chapter 7. A Peer Aide Evaluation Observation Form is provided to help the Resource Aide identify some of the desirable behaviours. One of the best ways to help Peer Aides be more effective is for the Resource Aide to observe the Peer Aide and record information on the Peer Aide Interaction Observation Form. The completed form provides the basis for recommending changes in Peer Aide behaviour to help them teach better. Copies of the Peer Aide Interaction Observation Form are printed on pages and . Use the Peer Aide Observation Form on page to record information from the Peer Aide Session transcript below. Pay attention to the comments at the side indicating what is happening in the session.

Peer Aide Session Transcript 1

(Comments)

PA: Hi, Sue. I see that you're on Study Guide 3 already. That's really great. How's it going?

Warm greeting establishes rapport, praises student on overall progress.

S: I'm having a hard time telling the difference between igneous and sedimentary rocks.

PA: We,, Objectives 2, 3 and 4 are concerned with the different kinds of rocks. Let's look at them on the Study Guide. Objective 2 states that you must be able to distinguish between rocks in terms of origin. Can you do that?

Peer Aide uses Study Guide to locate precise difficulty.

S: Well, most sedimentary rocks are formed from weathered sediments laid down on the earth's surface. Igneous rocks are formed from magma, generally inside the earth.

PA: That's perfect. No trouble there. Now Objective 3 states that you must be able to list the defining characteristics of each type of rock. Can you do that?

S: Oh, I know all those--I just can't use those characteristics to identify rocks.

PA: The Study Guide recommends careful study of the section starting on page 34. Maybe we should go over that. It helped me a lot when I was taking this course.

Peer Aide attempts to use Study Guide to solve difficulty.

S: That did help a little, but I have trouble going from the book to the specimens.

PA: Yes, I agree that is a little tricky. Let's go over to the lab table and look at the specimens. See--rocks in this pile are all igneous rocks, while these other rocks are sedimentary. Can you see anything that the igneous rocks have in common that the sedimentary rocks do not have?

By presenting identified examples side-by-side, the Peer Aide provides instruction. Note how through the period of instruction the Peer Aide continuously requires the student to respond and talk about the material and then indicates whether the response is correct or incorrect.

S: Well, the sedimentary rocks seem to be more homogeneous in color.

PA: As a group maybe, but that isn't always true. This conglomerate is sedimentary and it has many colors. Can you tell me the defining characteristics of an igneous rock?

S: Don't most igneous rocks have interlocking crystal grains? But I'm not sure what that means.

PA: You're right! Here, look at this rock, see how each crystal adheres to other crystals. Sort of like an irregular patchwork quilt. Now look at this sedimentary rock--how is it different?

The Peer Aide helps the student construct a way of understanding the difference between the two types of rocks.

S: Oh, I see! The grains in this sedimentary rock are not really touching but are sort of cemented together.

PA: Good! Can you see any other feature that the igneous rocks did not have?

S: Not really.

PA: See how all the sedimentary rocks are generally layered? The differences in how the rocks were originally formed account for this distinction. Here are three more rocks. Use the characteristics we discussed and tell me which ones are igneous rocks and which ones are sedimentary.

Peer Aide requires a response to a new example.

S: This one is igneous and the other two are sedimentary.

PA: That's right! Can you tell me why?

S: The igneous rock has interlocking crystals.

PA: Good, and the other two show layering. Now see if you can do the study questions.

S: Thanks.

PA: Is there anything else I can help you with?

S: No, I'm O.K. now.

PA: Good. See you, Sue.

The Peer Aide gives feedback referring to the defining characteristics.

Peer Aide asks course-related question.

Peer Aide gives a friendly "good-bye."

INTERACTION
PEER AIDE OBSERVATION FORM

DIRECTIONS: This form is to help the Resource Aide provide useful feedback to the Peer Aides. Observe the teaching/learning interaction between the Peer Aide and the Student and place a check (✓) opposite the behaviour if it occurs during this session.

<u>Behaviour</u>	<u>Check (✓) if behaviour is observed</u>	<u>Comments</u>
CREATING A FRIENDLY ATMOSPHERE		
Peer Aide greets student	_____	_____
Peer Aide praises student progress.	_____	_____
Peer Aide asks course-related question.	_____	_____
Peer Aide gives friendly good-bye.	_____	_____
ATTENDING TO FEELINGS		
Peer Aide restates feeling, shares own feelings, or helps student deal with feelings.	_____	_____
DEFINING GENERAL OR VAGUE PROBLEM		
Peer Aide uses Study Guide.	_____	_____
Peer Aide uses follow-up questions. (Probes)	_____	_____
SOLVING DIFFICULTY WITH MATERIAL		
Peer Aide refers to relevant material.	_____	_____
Peer Aide uses prompts, hints.	_____	_____
SOLVING DIFFICULTY WITH DIRECT INSTRUCTION		
Peer Aide provides instruction.	_____	_____
Peer Aide requires a response.	_____	_____
Peer Aide gives feedback.	_____	_____

EXERCISE _____

DIRECTIONS: As you read the text, write the answers to the questions below, or fill out the forms as indicated.

1. What are the specific duties of the Resource Aide?
(Objective 1)

2. What is the purpose of the Student Background Information Card? (Objective 2)

3. What is the purpose of the Study Guide Evaluation Card?
(Objective 2)

EXERCISE _____

DIRECTIONS: Use a Mastery Test Scoring Observation Form to record information from the following transcript of a Mastery Test scoring session.

Transcript of a MT-scoring session.

Peer Aide: Hi, Pam! How's it going?

Student: Not so good. I thought I knew this stuff until I started taking this quiz.

Peer Aide: Sounds like you had a rough time of it--let me check your MT and see where you're having trouble. Number 1 is correct. Did you have any trouble learning the difference between a statistic and a parameter?

Student: No. The exercise for Objective 1 really helped me.

Peer Aide: Good. (Pause) You have demonstrated in number 2 that you understand the mathematical symbols.

Student: I was worried about that one! It took me awhile to figure out what I was supposed to do!

Peer Aide: Well, you did figure it out right. You might want to review the exercises for Objective 2 on your Study Guide before going on to the next unit if you feel unsure.

Student: Thanks, I will.

Peer Aide: You have good examples of the different types of scales for number 3. (Pause) In number 4 I'm not sure if you understand the difference between continuous or discontinuous scales. Could you restate your answer and give me examples of both?

Student: Well, a continuous scale has an unlimited number of intermediate values--like someone's weight--it is possible to weigh 150.596 lbs. A discontinuous scale is limited--like how many people are in this room--it's hard to have 25.5 people.

Peer Aide: (Laughs) I can see you really do know that stuff --it's just not very clear on your MT. I think it would clarify your answer if you included those examples. (Student adds examples to answer) Number 5 and number 6 are both correct. Well, it looks like you'r ready to go on to Unit 2.

Student: That's good. I was worried.

Peer Aide: I was worried about my first MT, too, when
I took the class. Well, you did a good job.
Is there anything else I can help you with?

Student: No, I'll make it now, thanks.

Peer Aide: See you next week, Pam.

EXERCISE _____

DIRECTIONS: Use the completed Mastery Test Scoring Observation Form from the previous Exercise to answer the following questions.

1. Did the Peer Aide try to create a friendly atmosphere? How? (Objective 4)

2. Did the student express any feelings? How did the Peer Aide respond? (Objective 4)

3. Was the first answer correct, ambiguous or incorrect? (Objective 4)

4. How did the Peer Aide respond to the second answer? (Objective 4)

5. Why is the third answer scored as both ambiguous and incorrect? (Objective 4)

6. What is wrong with the way the Peer Aide responded to the fifth answer? Describe what should have been done. (Objective 4)

7. Evaluate the Peer Aide's response to number 7. (Objective 4)

EXERCISE _____

DIRECTIONS: Use a Peer Aid Interaction Observation Form to record information from the following transcript of a Peer Aide-Student session.

Peer Aide-Student Session Transcript.

- PA: Hi, Fred. You're on Unit 9 I see, you're really picking up speed. That's terrific. Can I help you with anything?
- S: I'm having trouble with these problems where we're supposed to calculate the appropriate measure of central tendency.
- PA: O.K. Let's look at the Study Guide. There are four Objectives on application of measures of central tendency. The first is to be able to identify the appropriate measure to use in a given situation. Do you know which measure to use in this problem?
- S: I would calculate the mean.
- PA: Why?
- S: Because I want the most stable measure and it isn't a skewed distribution.
- PA: Good. I guess you're O.K. on this Objective. The next Objective is to be able to state the formula for the mean. Do you know the formula?
- S: I think it is the "sum of the score values divided by the total number of scores." It is symbolized like this. (Demonstrates.)
- PA: That's right, now can you use that formula to get the mean for this data?
- S: Well, that's where I think I'm having a problem. Some of my answers aren't checking.
- PA: It looks like the answers that don't check involve frequency distributions. Did you follow the rules for forming frequency distributions?
- S: Yes, I got that procedure down pat in MO-7.
- PA: Let's look at your use of the formula in this problem. Oh, I see. For N, you're using the number of intervals instead of the number of scores. That's what's causing the difficulty.
- S: I'm not sure I know what you mean.

PA: Let's look at the worked example in the book. The number of intervals is 12. Is that also the number of scores? Where would we find the number of scores?

S: Here, I guess. It must be the total frequency.

PA: Yes, that's right. To calculate the mean from a frequency distribution, you divide the sum of scores by the number of scores or total frequency. (Pointing) Here is the sum of scores, and here is the total frequency.

S: I see.

PA: Why don't you correct this problem, and see if you get the right answer.

S: (After working the problem) My answer is 114.6/

PA: That's perfect. Here's another frequency distribution. Can you apply the formula to it?

S: (After working the problem) How's this? I got a mean of 17.8.

PA: Right, that's good. Notice, too, how you can sort of check to see if you have a correct answer by seeing if your mean lies about half-way between your lowest and highest score.

S: I see, thanks for helping me.

PA: Sure. How's the course going generally for you?

S: Good! I'm even beginning to like statistics.

PA: Great. Good luck on the Mastery Test, Fred.

INTERACTION
PEER AIDE OBSERVATION FORM

DIRECTIONS: This form is to help the Resource Aide provide useful feedback to the Peer Aides. Observe the teaching/learning interaction between the Peer Aide and the Student and place a check (✓) opposite the behaviour if it occurs during this session.

<u>Behaviour</u>	Check (✓) if be- <u>haviour</u> is observed	<u>Comments</u>
CREATING A FRIENDLY ATMOSPHERE		
Peer Aide greets student	_____	_____
Peer Aide praises student progress.	_____	_____
Peer Aide asks course-related question.	_____	_____
Peer Aide gives friendly good-bye.	_____	_____
ATTENDING TO FEELINGS		
Peer Aide restates feeling, shares own feelings, or helps student deal with feelings.	_____	_____
DEFINING GENERAL OR VAGUE PROBLEM		
Peer Aide uses Study Guide.	_____	_____
Peer Aide uses follow-up questions. (Probes)	_____	_____
SOLVING DIFFICULTY WITH MATERIAL		
Peer Aide refers to relevant material.	_____	_____
Peer Aide uses prompts, hints.	_____	_____
SOLVING DIFFICULTY WITH DIRECT INSTRUCTION		
Peer Aide provides instruction.	_____	_____
Peer Aide requires a response.	_____	_____
Peer Aide gives feedback.	_____	_____

EXERCISE _____

DIRECTIONS: Use the completed Peer Aide Interaction Observation Form from the previous exercise to answer the following question:

What recommendations would you make to the Peer Aide in tutoring session one? (Objective 6)
