PHCC TEST ANXIETY QUESTIONNAIRE

Nist and Diehl (1990) developed a short questionnaire for determining if a student experiences a mild or severe case of test anxiety. To complete the evaluation, read through each statement and reflect upon past testing experiences. You may wish to consider all testing experiences or focus on a particular subject (history, science, math, etc.) one at a time. Indicate how often each statement describes you by choosing a number from one to five as outlined below [note that the numbers are in reverse order compared to the previous questionnaire on stress vulnerability].

<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

- ___ I have visible signs of nervousness such as sweaty palms, shaky hands, and so on right before a test.
- ___ I have "butterflies" in my stomach before a test.
- ___ I feel nauseated before a test.
- ___ I read through the test and feel that I do not know any of the answers.
- ___ I panic before and during a test.
- ___ My mind goes blank during a test.
- ___ I remember the information that I blanked on once I get out of the testing situation.
- ___ I have trouble sleeping the night before a test.
- ___ I make mistakes on easy questions or put answers in the wrong places.
- ___ I have difficulty choosing answers.

Now add up your score on all the statements. Scores will range from 10 to 50. A low score (10-19 points) indicates that you do not suffer from test anxiety. In fact, if your score was extremely low (close to 10), a little more anxiety may be healthy to keep you focused and to get your blood flowing during exams. Scores between 20 and 35 indicate that, although you exhibit some of the characteristics of test anxiety, the level of stress and tension is probably healthy. Scores over 35 suggest that you are experiencing an unhealthy level of test anxiety. You should evaluate the reason(s) for the distress and identify strategies for compensating.
Reducing Test Anxiety and Stress

PURPOSES OF TEST ANXIETY STRATEGIES
Test anxiety strategies are intended to reduce the effects of stress due to apprehension of examinations. The goal is not to completely eliminate anxiety, since a reasonable amount of stress can be beneficial in motivating most students. Rather, the goal is to reduce anxiety to a manageable level and to empower students so they have control in testing situations.

Students should become familiar with a variety of the test anxiety strategies described later in this page. Different combinations of strategies may be used to develop stress management plans for different testing situations. It is important to have several options for dealing with test anxiety since exams in various courses and subjects may affect the student differently.

ADVANTAGES OF TEST ANXIETY STRATEGIES
When test anxiety is recognized and dealt with using the strategies described in this page, the student develops a sense of control over his/her academic life. This sense of control often translates into improved self-esteem and a more positive outlook on a course in particular and school or life in general. Test scores often improve as the student gains control.

Test anxiety strategies may be extended into other facets of student life. Many of the approaches are or can be generalized to deal with non-testing situations that cause stress, such as moving far from home, living with roommates, living on one’s own, peer pressure and social acceptance, dealing with parents, and finding a job.

SPECIFIC TEST ANXIETY STRATEGIES
Because testing situations, and therefore the nature and causes of anxiety, vary, students should become familiar with a number of strategies for reducing stress. Incorporate several strategies into an effective anxiety management plan. Expand the plan to deal with other stressors in one’s life.

The following strategies are arranged according to the list of causes of test anxiety, which is outlined in the Background Information on Test Anxiety section.
Health, Exercise, Diet, Rest, Self-Image, Motivation, and Attitudes

HEALTH, EXERCISE, DIET, AND REST
Exercise or do something fun to burn off extra energy. Non-studying activities help to take one's mind off worries and concerns about the test. They also serve as outlets for anger and other negative emotions that feed anxiety.

Eat a balanced meal before the test, especially if you are accustomed to eating that meal. For example, One reason for test anxiety is poor mental or physical health. These, in turn, often result from poor eating, sleeping and exercising habits. The following guidelines help to reduce test anxiety resulting from poor health.

Get a good night's sleep, or one's normal amount of sleep, each day for several days before the test. All-nighters often don't catch up with a person until two days later, so lack of sleep even several days before the test can affect performance.

Exercise or do something fun to burn off extra energy. Non-studying activities help to take one's mind off worries and concerns about the test. They also serve as outlets for anger and other negative emotions that feed anxiety.

Eat a balanced meal before the test, especially if you are accustomed to eating that meal. For example, don't skip breakfast if you normally eat it just because you have butterflies about the test. A high carbohydrate dinner the night before helps to raise energy levels. Get a drink of water before the test, or take a lidded cup in with you if permitted.

Avoid excessive amounts of caffeine as it may cause jitters. Use only small amounts of caffeine occasionally to maintain attention. Use only coffee, tea or soda pop as sources of caffeine. Do not use over-the-counter or prescription stimulants.

If you experience strong physical reactions to anxiety, like butterflies or headache, visualize where they are in your body and describe them to yourself. This may help to alleviate them without medication.

Visit the testing room ahead of time to note the temperature of the room. Dress accordingly. Or better yet, dress in layers so that you may adjust to changes in temperature.

SELF-IMAGE, MOTIVATION, AND ATTITUDES
Several causes of test anxiety are related to internal aspects of the student, including self-image, motivation, and attitudes. Specifically, students may experience test anxiety if they have negative self-images and lack confidence in their abilities, if they dislike the subject, course, and/or instructor, or if they have histories of poor performance on exams in general or in the course.
Students' mental states can greatly affect their performance on exams and their vulnerability to test anxiety. And as Kesselman-Turkel and Peterson (1981) note, for standardized tests like ACT and SAT, mental preparation is sometimes the only preparation one can do for a test. The following paragraphs outline strategies for heading off or dealing with test anxiety that results from internal sources.

**Self-Image**
Students often develop negative self-images when they experience failures on exams, especially if they feel they didn't receive the grade they deserved. This may translate into heightened anxiety on future exams. While self-image is covered in detail in the Attention and Listening section, some general tips are given here.

First, try to focus on past testing successes. Learn from past failures, but don't dwell on them. Consider what you did differently to prepare for tests on which you were successful versus tests that went poorly. Can you see the cause and effect relationships? Repeat those actions that made you successful and alter those that resulted in failure.

Second, engage in positive self-talk. Generate a list of your positive qualities and remind yourself of them by posting them in your room or repeating them to yourself periodically. Then make a more specific list of the positive aspects of your exam preparation. Repeat them to yourself when you feel anxious. Ignore negative comments from classmates, especially while waiting for the exam to be distributed. Realize that these students are negative because they, unlike you, are unprepared.

**Motivation**
The Motivation page of the general-purpose Learning Strategies main stack contains general strategies on creating interest in a subject or course. To get motivated to prepare for and take a test, try the following tips.

Get motivated to begin test preparation early by reflecting on past exam failures that resulted from procrastination. Learn from past mistakes. Remind yourself that every half-hour or hour spent studying well before the test is one or two more correct answers. And remind yourself that the more preparation completed ahead of time, the less to worry about the night before the test and the less to do to prepare for comprehensive finals. Reflect on your short-term and long-term goals that may be fulfilled by passing the test and the course.

Before leaving for the test or while walking to the room, listen to your favorite song on the stereo or Walkman in order to get your blood flowing. It's not a bad idea to listen in the classroom before tests are distributed as well. Your favorite song will get you motivated and will prevent you from hearing negative comments from poorly prepared classmates.
Confidence
Students should do everything they can to bolster confidence in their exam preparation and test-taking abilities. Confidence can greatly reduce feelings of anxiety because if one believes he/she will do well, he/she probably will.

Overpreparation for the exam is a good way to improve confidence. Know the information "backwards and forwards" and be sure of your understanding. Take self-tests or have another student quiz you to prove to yourself that you've mastered the material.

Test Taking and Test Preparation strategies for improving testing skills. Knowing the "tricks of the trade" often helps students to gain confidence because they know how to respond to different, and possibly unexpected, exam requirements.

Another thing to try is studying in the room where the exam will be given. It helps one to feel more comfortable in his/her surroundings. In addition, try not to think about what the best student in the course is doing to prepare for the exam; concentrate on yourself.

Attention and Listening
BACKGROUND INFORMATION ON ATTENTION AND LISTENING
Attention is the ability to concentrate mentally and observe carefully. Listening refers to applying oneself to hearing something. One must pay attention in order to listen effectively, but attending is also important when doing other tasks like reading, writing, taking tests, and reviewing information.

The quality and quantity of attention is vital to the learning process. The process of attending influences the ability of the student to move new information from sensory memory to short-term memory. One must maintain attention through rehearsal in order for information to be moved into short-term memory. Attention and listening are intricately linked to Encoding and Retrieval and Memory.

ADVANTAGES OF ATTENTION AND LISTENING STRATEGIES
Attention strategies are helpful in a number of respects. Academically, improved attending skills can positively impact a student's performance in notetaking, class participation, reading, following directions, completion of assignments, group learning, exam preparation, and exam taking. Students with selective attention or ADD have an impaired learning process. Therefore, strategies designed to aid in attending are vital to their academic success.

Socially, improved attending skills can positively affect a student's self-image and self-esteem as he/she begins to appreciate his/her strengths and weaknesses. This, in turn, may impact a student's willingness to participate in group activities, performance in group activities, sense of organization and control, and ability to behave appropriately in unstructured situations.
SPECIFIC ATTENTION AND LISTENING STRATEGIES

The following strategies for improving attention and listening are described below.

Basic Health Needs, Self-Image & Monitoring of Learning Behaviors and Outcomes

BASIC HEALTH NEEDS

Since the inability to pay attention may be caused or amplified by poor health, it is important that students attend to basic health needs. This strategy is a good "first-step" to addressing attention and listening difficulties because it is fairly straight-forward, it is probably one of the easiest strategies to implement, and it may address one of the fundamental causes of attention deficits.

Health is an ongoing, continuous process. One cannot be concerned with good health one week but not the next. Therefore, it is important that good health habits become a part of each student’s routine.

The following facets of basic health needs should be discussed and evaluated with students.

Sleep

Is the student getting adequate rest and sleep?
Does the student have a sleep routine or is sleeping erratic?

Diet

Is the student eating two or three balanced meals a day?
Is the student overindulging in junk food, cigarettes, or drugs and alcohol?

Physical Conditions

Has the student's hearing and vision been checked?
Has the student been evaluated for attention deficit disorder?
Has the student been screened for affective, neurologic, or chromosomal disorders?
Does the student seek immediate medical attention for even minor illnesses?

Fitness

Does the student exercise regularly?

Mental Health

Does the student meet adversities calmly and rationally or stressfully and irrationally?
Does the student confront or avoid reality?

Does the student worry excessively?

How does the student handle stress?

For more information on health and the learning process, refer to Memory Condition Manipulations on the Memory page.

**SELF-IMAGE**

A student who has difficulty paying attention and listening often performs poorly in school and social settings; this, in turn, may negatively impact his/her self-image. A student's image of him/herself can greatly affect the learning process. Find more information about self-image in the Eliminating Internal Distractions section.

The following tips may be used by instructors, advisors, counselors, tutors, and parents to help a student improve his/her self-image. Numbers 7 through 14 are from Coleman (1993, p. 90-96).

- Help the student identify his/her assets.
- Encourage the student to constantly remind him/herself about those assets.
- Heighten the student's awareness of his/her ambitions and goals, both long-term and short-term.
- Help the student to develop a realistic plan of action for reaching his/her goals.
- Encourage the student to constantly assess his/her progress toward goals, including why or why not the goals have been reached.
- Congratulate and reward the student for completing tasks or reaching goals, and encourage the student to do so for him/herself as well.
- Take notice of and praise good behavior, including learning behavior and social behavior; positive reinforcement is important for young learners as well as college students.
- Use "descriptive" praise instead of judgmental comments; for example, one might comment that a student's research paper "makes good use of examples and statistical data" rather than "this is a great paper."
- Avoid belittling or humiliating comments, and avoid comparing the student and his/her progress to other students.
- Provide the student with clear and simple instructions about a task; use as many senses as possible. Practice social skills with the student.
- Provide the student with social or academic situations in which he/she will be successful. Limit the number of decisions the student has to make.
- Discuss the student's problems in private.

**MONITORING OF LEARNING BEHAVIORS AND OUTCOMES**

The Monitoring page contains more information and strategies about study skills assessment, causal attribution, exam debriefing, time management skills assessment, and stress vulnerability assessment.
• **Self-Monitoring of Learning Behavior:**
  • Direct the student in evaluating his/her learning behaviors, offering feedback on the "correctness" of his/her evaluation.
  • The student will either become confident in his/her ability to evaluate himself/herself, or the student will become aware of his/her incorrect assumptions.

• **Self-Monitoring of Learning Outcomes:**
  • Direct the student in maintaining written records of how tasks were completed, grades for tasks, professor comments, grade point averages, etc.
  • Help the student learn to link inputs and outcomes for each task.
  • Efficient learners are always aware of their academic standing.

### General-Purpose Learning Strategies for Monitoring

**BACKGROUND INFORMATION ON MONITORING**
Monitoring refers to thoughtful assessment and self-regulation of one's behavior. Monitoring encompasses a wide range of activities, including assessment of one's approach to learning, one's actions and habits, and one's beliefs and goals.

Monitoring is related to metacognition. Defined as "the deliberate conscious control of one's own cognitive actions" (Devine, 1987, p. 239), metacognition is being aware of one's processes of perceiving, organizing, and using information. Metacognition appears to positively influence one's thinking ability, but it cannot occur without self-monitoring of some sort.

**PURPOSES OF MONITORING STRATEGIES**
Monitoring strategies are intended to provide students with an assessment of various aspects of the learning process: learning style, study habits, exam preparation, and exam performance. They also help students evaluate their own personal character, including their strengths and weaknesses. Monitoring strategies can improve metacognition, which is turn may positively impact academic and job performance.

**ADVANTAGES OF MONITORING STRATEGIES**
Monitoring strategies are simple to use and flexible, being easily modified to specific student needs or course organization. They may be completed by students on their own or with the help and input of a facilitator. Other advantages of monitoring strategies are listed below.

- Monitoring increases student awareness of personal learning style and study habits.
- Monitoring encourages students to take responsibility for their own learning.
- Monitoring provides guidelines for developing courses of action for improved academic performance.
- Monitoring strategies are applicable to real-life situations, like job interviewing.
SPECIFIC MONITORING STRATEGIES
Several monitoring strategies are described and illustrated in this page. The modality strength (preferred learning channel) strategy allows students to assess their learning styles. The exam debriefing and self-monitoring exam check list strategies provide evaluations of exam preparation and exam performance. The study habits assessment targets study habits in general. Causal attribution helps students to evaluate cause and effect relationships. The self-description strategy aids in preparation for job interviews. The health assessment addresses mental and physical health issues.

Several assessments and questionnaires may be repeated periodically by the student in order to monitor changes and improvements in those behaviors. For example, the study habits, health, time management, stress, test anxiety, and memory assessments may be taken after each term to track the effectiveness of strategies used to improve in these areas.

BACKGROUND INFORMATION ON TEST TAKING
Testing is probably the primary means of evaluating student performance in school. It also pervades other aspects of our lives: getting a driver's license, applying for a job, or gaining certification for a skill.

Testing is also one of the primary causes of stress among students. One reason for this is inaccurate conceptions of what to expect on a test and how to prepare for an exam. In addition, many tests are less than perfect and don't always give an accurate assessment of student ability. Despite this, exams will probably continue to be the main method of student evaluation because they are relatively efficient and objective measures of student performance (Chickering and Schlossberg, 1995).

"Tests can be significant opportunities for learning. They provide deadlines and contexts for assimilating and integrating prior learning. Thoughtful scrutiny of results yields information about gaps and confusions which can guide further learning. So our fundamental point about tests is to use them for learning opportunities, for consolidating prior preparation, for diagnosing purposes when the results are available" (Chickering and Schlossberg, 1995, p. 183).

Tests may be scored in one of two ways (Chickering and Schlossberg, 1995, p. 183-184). Most students are familiar with scores based on how well one meets the requirements of explicit criteria. In this case, one's score has nothing to do with how well other students did on the test. Instead, one's score is based on his/her fulfillment of minimum requirements set forth by the grader. The grader will look for certain pieces of information, and perhaps how the information is organized, in the test answers; the test score is based on how many of these pieces of information the student put in his/her answer. An example of this type of scoring is driver's license tests. The second approach is based on norms, in which one’s score depends on how other students did on the exam. Standardized tests are usually scored on this basis. Exam scores graded "on a curve" also fall into this category.
Test Preparation

BACKGROUND INFORMATION ON TEST PREPARATION
Performance on exams is determined to a great extent by the nature of one's preparation. In this respect, the quality of test preparation is more important than the quantity of preparation. Contrary to most students' beliefs, the way one prepares for an exam is much more significant than the length of time one prepares. The strategies discussed in this page espouse this view.

PURPOSES OF TEST PREPARATION STRATEGIES
Test preparation strategies are intended to help students use study time as effectively and efficiently as possible.

ADVANTAGES OF TEST PREPARATION STRATEGIES
One advantage of test preparation strategies is that they help to improve student performance on exams. In addition, the strategies work to reduce test anxiety, which also improves exam scores. When students are prepared for exams, they tend to be more confident and perform better. Students will find that when they are prepared, tests can almost be fun!

SPECIFIC TEST PREPARATION STRATEGIES
General test preparation strategies may be used to prepare for any type of exam. Much of the information under this heading is summarized from other pages in the General-Purpose Learning Strategies main stack. The test-specific strategies are geared toward certain types of tests.

(General) Test Preparation Strategies
Notes and Time Management
General time management strategies are covered in detail in the Time Management page. Specific tips as they relate to exam preparation are presented here.

Time management is the key to avoiding the pitfalls of cramming. But remember that the amount of time spent studying for an exam is not as important as what one does during that time. Make effective use of time budgeted for exam preparation by following these guidelines.

Develop a plan of action.
- Develop a plan for exam preparation well in advance of the test. Any combination of these activities may be included in the study plan: complete reading assignments, complete lab assignments, complete homework problems, meet with the instructor or tutors, meet with study group members, reorganize or recopy lecture notes, review information in the notes and the readings, and prepare study aids (flash cards, practice questions, visual aids, etc.). The activities selected will depend on the type of test and personal learning styles.

Budget your time.
- Estimate how long it will take to complete each of the activities in the preparation plan. Organize your hours to include ample time for completing
the activities, relaxing, and sleeping. Daily and weekly grids are effective methods for budgeting time; examples are given in the Time Management page. Make up a schedule and stick to it.

Space test reviews.
- Break exam preparation into manageable amounts of time to avoid boredom and loss of concentration. Sessions lasting twenty to thirty minutes are best. Mix up activities (outlining, reviewing, organizing, etc.) so that the information is processed in a number of ways. Studying for six half-hour sessions is much more effective than studying for three straight hours.

Reduce and organize information.
- Few students are able to remember everything in their notes and books. Therefore, time spent reducing the information to major ideas, key words, and key phrases is time well spent. Reduction should be followed by organizing, or providing a logical structure to the information. Not only will reducing and organizing cut down on the amount of information to be remembered, it will provide memory triggers during the exam.

Word from general to specific.
- Review the main ideas in general terms first. Be sure to understand how the major topics are related. Then focus on the details for each major idea.

Begin to prepare early.
- Ideally, exam preparation should begin the first week of class or immediately after the last test. By starting early, information is stored in long-term memory and test anxiety is reduced.

Use spare time wisely.
- Short periods of "down time" between classes or before meals may be used effectively for exam preparation. Use such opportunities for small tasks, like flipping through flash cards or working a few math problems.

Set two alarms.
- For early morning tests, or for students who have trouble getting up, set two alarms or have a friend call to make sure you are awake. Students who commute should plan to arrive one hour before the test, in case there is car trouble or heavy traffic. They should also have a back-up plan for getting to class.

The night before the test.
- If one has prepared wisely for a test, spacing reviews and beginning preparation early, then the night before the test may be reserved for a final, relaxed review of the material. Your rewards will be a good night's sleep, a positive attitude about the test, and reduced anxiety!

RECOPYING AND REORGANIZING NOTES
Recopying and reorganizing notes aids in exam preparation in three ways (D. Applegate, CAL). First, it helps students identify main points and supporting details discussed in class. Second, it helps students structure the information in such a way that it is more easily recalled and organized during the test; this is especially important for essay exams. Third, it provides the student with opportunities for
reviewing the test material; the more times one goes over the information, the more likely one is to remember it.

Using notes to prepare for an exam should be as active a process as possible. Don't just read over the notes. Involve more senses by reciting the information aloud or by listening to tape recorded versions of the material. Use colored pencils, highlighters, pictures, etc. to enhance the notes.

Select an effective strategy for organizing lecture material. Several options, including the Cornell and outlining methods, are discussed in detail in the Notetaking page. The organizational method chosen will depend on the nature of the information and the type(s) of questions that will be on the test.

### Study Groups and Study Guides

**STUDY GROUPS**

Study groups, a form of cooperative learning, are an effective approach to exam preparation (D. Applegate, CAL). Preparing for a test with two to four other students has several benefits. Because several people share the work, more can be accomplished in a shorter period of time. Study groups allow students to share ideas and explanations of key points. Study groups also provide a form of pre-test evaluation, with students quizzing each other on the exam material. When well run, study groups can also reduce exam anxiety and improve motivation. Study groups are particularly useful for comprehensive test preparation.

Study groups may be used to prepare for tests in a number of ways, such as:
- reading and taking notes from the textbook
- skimming assigned readings
- reviewing, reorganizing, or recopying lecture notes
- making up and answering practice questions
- reorganizing information using outlines, tables, lists, and visual aids
- sharing memory strategies

For detailed information on how to form effective study groups and other applications of study groups, refer to the Study Groups section of the Group and Cooperative Learning page.

**STUDY GUIDES**

Study guides are used to summarize the main ideas and concepts, without the supporting details, to be covered on an exam (D. Applegate, CAL). By reducing the information to be learned to a minimum, to the most inclusive topics, study guides identify the major focal areas of the test that should be examined thoroughly and allow one to effectively budget study time on the various topics. Indeed, they *guide* the way one *studies*.

There are additional advantages of study guides for test preparation. Creating study guides requires that one review the lecture notes and readings. It also requires that one think carefully about the material in order to decide what is important and how information is related. So one benefit of study guides is the
active repetition of working with the information, enhancing memory registration and recall. Second, the information on study guides is easily converted into sample tests simply by turning the main points into practice questions. Third, study guides reduce the amount of information to be reviewed. Finally, associations among different pieces of information are reinforced with study guides arranged topically.

The organization of the information on the study guide will vary according to the type of information, the subject, the type of test, and personal learning styles. Two organizational approaches, topical and categorical, are described here. The former is better for subjective essay exams and the latter for objective tests.

Topical Study Guides

Topical study guides arrange the important information by major topic. Guidelines for developing topical study guides are as follows.

- Identify the major topics.
  - Break the lecture and/or reading material into major topics of related information. One way to select these fundamental subdivisions is to use the chapter titles (or headings in each chapter) in the textbook, the main topics of lectures as indicated in the course syllabus, or the main ideas of lab assignments. Depending on test specifics, one may have two to ten major topics.

- Identify the main ideas.
  - Identify the main ideas covered in each of the major topic areas. Again, the number of main ideas under each topic may vary from one to a dozen. Write the main ideas under the appropriate major topic in short phrases or incomplete sentences. Or, form the main ideas into questions and record them under the appropriate major topic.

- Organize the information.
  - Organize the information into some structured format, such as an outline or the Cornell method; examples of organizational formats are given in the Notetaking page. All related ideas should be subsumed under the corresponding major topic heading. Ideas may be numbered or set off with different symbols.

- Avoid excessive detail.
  - Study guides should only contain main ideas, without supporting details, definitions, or explanations.

An example of a study guide arranged by topic is presented below.

<table>
<thead>
<tr>
<th>Biology Test 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CELLS</strong></td>
</tr>
<tr>
<td>- parts of the cell</td>
</tr>
<tr>
<td>- processes of cell division: mitosis and meiosis</td>
</tr>
<tr>
<td>- how are they similar and different?</td>
</tr>
<tr>
<td>- what is the purpose of each?</td>
</tr>
<tr>
<td>- two kinds of cells: prokaryotic and eukaryotic</td>
</tr>
<tr>
<td>- how are they similar and different?</td>
</tr>
<tr>
<td>- examples of each</td>
</tr>
</tbody>
</table>
DNA
- chemical composition: adenine, guanine, thymine, cytosine
- structure of DNA
- draw a DNA molecule and label the parts
- process of DNA replication
  - what is the purpose?
  - what happens during each stage?

Categorical Study Guides
Categorical study guides arrange information according to the type or category of information: terms, people's names, symbols, formulas, concepts, dates, etc. Guidelines for developing categorical study guides are as follows.
- Identify categories of information.
  - Determine what categories of information will be covered on the test: vocabulary terms, people, dates, concepts, formulas, etc. If unsure, look on the syllabus, consult old exams, check in the book, or ask the instructor.
- Identify important information.
  - Predict what specific pieces of information in each category may be on the test. Again, use old tests, examine lecture notes and chapter reviews, or consult with other students and the instructor to make educated guesses about what should be learned and remembered.
- Arrange the information.
  - Arrange the categories and the specific pieces of information on the study guide.
- Avoid excessive detail.
  - Record only the categories and key terms or phrases on the study guide. Don’t include definitions or explanations.

An example of a completed categorical study guide is shown below.

Archaeology 201
Test 2

TERMS
- food production
- agriculture
- stock breeding
- domestication
- cultigen
- teosinte
- monocropping

PEOPLE
- V. Gordon Childe
- Michael Cohen
- Lewis Binford
- Karl Sauer

CONCEPTS
• advantages of food production over hunting-gathering
• disadvantages of food production compared to hunting-gathering
• how to distinguish wild plants and domesticated plants
• how to distinguish wild animals and domesticated animals
• explanations for the origins of food production
• consequences of shift to food production

Information Organization, Interest & Attention, Memorization.

INFORMATION ORGANIZATION
During the process of test preparation, important information from the notes, labs, and readings should be reduced to the bare essentials and organized into different formats. Organizing information makes it easier to register in and recall from memory the material. It also provides a structure for answering test questions, especially for essay exams. So prior to the test, put the material to be learned and remembered into a format that one can relate to and remember (D. Applegate, CAL).

Organizational Formats
Students have a wide range of organizational strategies from which to choose. These are described in detail in the Information Organization section of the Organization page. Examples of organizational formats are:

• Visual Aids or Graphic Organizers
  • time lines
  • flow charts
  • word maps
  • herringbone maps
  • spider maps
• Matrices or Tables
• Outlines
• Concept Cards and Running Concept Lists
• Study Guides

The formats used will depend on individual learning styles, the nature of the information (e.g. Is it science, history, arts? Is it concepts, numbers, people?), and the type of test questions (e.g. essay, multiple choice, etc.).

Color Coding
Color coding is another helpful organizational tool for test preparation. One of the most common applications of color coding is using highlighters to prioritize information. This involves marking the most important ideas to be remembered from the notes and readings. The key to making highlighting effective is to be very selective in what is marked. Avoid ending up with pages of solid yellow or pink highlighting. Focus on the main ideas and the key words of definitions and explanations.
Another use of color coding is to categorize information. Ideas related to one topic may be coded with one color, and ideas related to another topic in a second color. This helps one to discern relationships among separate pieces of information.

Or, all terms may be marked in one color, all names of significant people in another color, all dates in another color, and so on.

**Three-Ring Binders**

Use three-ring notebooks to organize notes, handouts, study guides, practice tests, copies of old exams, and other study materials. Keeping the study materials in one place makes it easier to find things when needed during exam preparation.

**MEMORIZATION STRATEGIES**

Every test involves, in fact necessitates, memorization to some extent. Tests in introductory courses are often designed to evaluate the students' ability to remember details and concepts. Tests in advanced courses, on the other hand, may require more interpretation and application than memorization.

Memory strategies are discussed at length in the Memory page of the General-Purpose Learning Strategies main stack. Only some of the main points related to test preparation are outlined here (D. Applegate, CAL).

- **Paraphrase the information.**
  - Paraphrasing involves restating the information from the notes or reading in one's own words. It is easier to remember one's own words than someone else's. Just be sure that the paraphrased information is accurate and contains the key words necessary for understanding the information.

- **Focus on key words.**
  - When learning definitions of vocabulary terms or explanations of concepts, identify and memorize the key words only. The key words are those words that are necessary for understanding the term or concept. Underline or highlight these words and focus on them when studying. This reduces the amount of information to be remembered.
  - For example, the key words in this definition are italicized: balkinization is the *break-up of a region into smaller, often hostile* political *units* (De Blij and Muller, 1994, p. G-2).

- **Use a variety of memory techniques.**
  - Select memory techniques appropriate for the information, the type of test, and personal learning preferences. Some "tried and true" memory techniques are outlined below. See the Memory page for complete descriptions.
    - **Association:** Associate the new information with prior knowledge and experiences
    - **Rehearsal:** Go over the information repeatedly, reciting aloud or taking notes
    - **Relevance:** Consider how the information is related to personal beliefs and experiences or to other aspects of the course
• Mnemonics: Use abbreviated words or phrases to remember lists of information
• Clustering: Group ideas according to common characteristics
• Test and retest oneself, working alone or with other students

INTEREST AND ATTENTION
Sometimes one of the most difficult things about test preparation is maintaining interest and motivation for studying. It's not always easy to maintain attention on and motivation for the various tasks involved in test preparation. The following tips may help in such situations. For more details on these topics, refer to the Attention and Concentration page and the Motivation page.

Attitude
Attitude is everything. Unfortunately, a positive attitude is often the most difficult thing to maintain when one dislikes the subject, resents the instructor, or has a history of poor test performance. Try to maintain a sound outlook on the test by engaging in positive self-talk. Work with another student and try to encourage each other. Avoid study partners who consistently express negative views since such attitudes are often contagious. Realize that tests are necessary evils.

Attention and Concentration
Select appropriate places to study. To maintain attention, study in a room that is free from distractions like noise, windows, and wall hangings. To aid concentration, choose a harmonious environment with appropriate temperatures, adequate ventilation and light, and comfortable seats. Try studying in the test room if possible. Attend to health by eating right and getting enough rest. Maintain an optimal level of activity; both too much and too little activity lessons one's capacity to pay attention and remember material.

Interest
To generate and maintain interest in the subject matter, relate the information to personal experiences and beliefs. Ask other students what they know about the topic. Get information from a variety of sources outside the textbook or lecture; try movies, magazines, and newspapers for example. Apply the new knowledge to other classes. Actively use the new knowledge.

Motivation
Get motivated to prepare effectively for the test by considering personal short-term goals (e.g. pass the test without throwing up) and long-term goals (e.g. receive a B in the course, graduate from school) that will be met by preparing effectively for the test. Divide the task into smaller parts, and prioritize the activities to avoid feeling overwhelmed. Reward oneself when tasks are completed. Allow time in one's schedule for recreation and relaxation. Develop an intentionality to the preparation tasks; a deliberate manner will facilitate studying and remembering.
Practice Tests & Workbooks, Test Content and Procedures

PRACTICE TESTS AND WORKBOOKS

The most proven, yet least used, way to study for exams is practice tests (D. Applegate, CAL). Sample questions allow one to assess one's retrieval success before the exam; areas of weakness are identified and addressed prior to taking the actual test. Students may make up their own questions, or they may answer questions on old tests or in the textbook or student workbook accompanying the text.

Practice tests have many benefits. This strategy may be used to prepare for nearly any type of test. They help one to anticipate what the test may look like, reducing anxiety and stress. Practice tests are a valuable way to assess one's understanding of the information, distinguishing what is known and what needs to be learned. Writing one's own questions requires that one thoroughly understand and evaluate the information. When used effectively, practice tests improve one's mental preparation for an exam, bolstering confidence and positive attitudes. Finally, writing and/or answering practice questions forces one to repeatedly review the material, which enhances memory registration and recall.

Some students may complain that making up and/or answering practice questions is too time consuming. However, the advantages of the strategy greatly outnumber the disadvantages. If time is a concern, students may form study groups for sharing the responsibility. Each member writes some questions, and the group meets to exchange and answer the questions.

The following are guidelines for the practice test questions strategy.

- Consider the types of questions.
  - Find out what types of questions will be asked on the test: essay, multiple choice, true-false, etc.
  - Look on the syllabus, ask the instructor, examine old tests, or talk with former students in the class.
- Write practice questions.
  - There are several approaches to writing practice questions. Turn the section headings in the book into questions. Take sets of related pieces of information and write questions focusing on that relationship. Look for the main ideas presented in each lecture and form them into questions. Change the numbers given in math problems and rework them. Ask the instructor for a few sample questions to get an idea of the how he/she writes questions.
  - Until you become accustomed to the strategy, you may want to use prewritten questions instead of making up questions. There are several sources of practice questions: old exams, review questions at the end of each chapter in the textbook, and student workbooks accompanying the text.
• Because writing one's own questions requires thorough examination of the test material, students should attempt to move in this direction as they become more proficient.

• Record the questions.
  • Depending on personal learning strengths and preferences, students may choose to record the practice questions as a list on paper, individually on flash cards, or as a list on audio cassettes.

• Answer the questions.
  • There are three options at this stage. Students may answer the questions as they write them. Or, students may answer the questions later, using the notes and readings as references. In either case, students may want to record the page numbers on which the answers are found in the notes or book.
  • The third option is to use the questions to as a practice test after reviewing for the exam. This is done without the use of notes or other study materials.

• Record the answers.
  • Again, students may record the answers on paper, flash cards, or audio tapes.

• Review the answers periodically.
  • To be really effective, practice questions should be reviewed periodically to test recall and to improve understanding.
  • Look at the flash cards during "down" time between classes or while standing in line. Listen to the tapes while commuting to school or to work.

• Change the order.
  • Shuffle the questions so the information is not learned in a particular order.
  • This insures that one is actually learning the information itself, rather than order of questions and answers.
  • This also helps one to prepare for tests in which the questions are arranged oddly; instructors don't always arrange questions topically or in the order in which the information was covered in class.

• Practice.
  • It takes time to gain proficiency in this strategy.
  • Both writing the questions and predicting what might be asked on the test require practice.
  • These skills should improve as students are exposed to a variety of tests and as they learn more about their instructors' test-writing habits.
  • Don't lose heart when your questions don't appear on the test. If you've used the strategy effectively, chances are you know the material well enough to answer different questions.
TEST CONTENT AND PROCEDURES
The following information must be known in order to form an effective test preparation plan (D. Applegate, CAL). Different strategies must be used for different testing situations. The most common concerns include:

- When and where will the test be administered?
- Which topics, chapters, and readings will be covered on the test?
- What proportion of the questions is from lecture? From readings? From lab?
- What are the most important ideas?
- What kinds of questions - essay, identification, multiple choice, etc. - will be asked?
- Is the exam open-book or closed-book?
- Do students have to memorize formulas, or is a "cheat sheet" allowed?
- What ancillary materials - blue book, calculator, ruler, etc. - are required or permitted?
- What level of detail does the instructor expect in the answers?
- Does the instructor look for accurate regurgitation of memorized facts or for interpretation of information?
- Who will administer the exam - the instructor or a teaching assistant?
- Who grades the exams - the instructor or a teaching assistant?
- How will the questions be graded - full or partial credit, by hand or by machine?
- Does the instructor deduct points for spelling or grammar mistakes?

There are a number of ways to answer these questions. The following tips are based, in part, on Lunenfeld and Lunenfeld (1992) and Kesselman-Turkel and Peterson (1981).

- Examine the syllabus.
  - Many of the aforementioned questions can be answered simply by checking the syllabus. Most instructors describe testing procedures, including the types of questions and the ancillary materials permitted, in the syllabus. Look at the course schedule; topics listed here will probably appear on the test. Check the syllabus before meeting with the instructor; he/she may be put off if you ask questions whose answers are clearly indicated in the syllabus.

- Ask the instructor.
  - One of the best ways to clarify expectations is to consult with the instructor well in advance of the test. It is better to get information "from the horse's mouth" than from a secondary source. Ask for clarification during or after class, or better yet, make an appointment to visit the instructor during his/her office hours. Have a list of questions ready to ask when you meet with the instructor.
  - In some cases, the instructor will reward you with information just for coming to see him/her. But if the instructor seems hesitant to answer questions related to the topics or ideas on which the exam focuses, don't press him/her. Similarly, if he/she says "you should know everything" and when pressed doesn't offer more clarification, check
the syllabus, old exams, the book, or talk with other students for insights. Instructors are sometimes unwilling to divulge too much.

- Analyze the instructor's behavior.
  - If the instructor offers few hints and you've never had a test from him/her before, try analyzing his/her behavior for clues. Consider the types of information emphasized in lecture, the nature of assignments, and the manner of lecture presentation. Ask yourself: Does the instructor focus on details? Does he/she emphasize facts or ideas? Would he/she ask "trick" questions? What's his/her goal in teaching and attitude toward testing? Has he/she encouraged students to evaluate and interpret concepts?

- Look at old tests.
  - Old exams are a valuable source of information concerning the topics or ideas emphasized, the types of questions asked, the way questions are worded, the level of detail the instructor expects in answers, and grading procedures. If copies of old tests are not available, say on reserve at the library, ask the instructor if this accommodation is possible. Some instructors will do this, but only if asked.

- Consult with other students.
  - Talk with students who have taken the class before. Not only may they have old tests, but they may provide insights into instructor expectations, main ideas, and grading procedures. Current classmates may have ideas about the major topics to study.

- Use the textbook.
  - Most texts provide review questions at the end of each chapter or unit. These should give you ideas of what may be asked on the test. Or try turning the chapter headings into questions. Check the index listing of people and concepts; the more page references, the more important the idea.

- Use text workbooks.
  - Student workbooks that accompany the text are an excellent source of review questions for the reading material. They can give you an idea of what topics might be covered on the exam and what the questions may look like.

The following chart, called a test procedures organizer, should be completed for each class. Place a copy in the front of the three-ring notebook for each course for easy reference. The chart is modeled after Mengel's (1992) homework organizer.

| COURSE: ____________________ |
| INSTRUCTOR: ________________ |

<table>
<thead>
<tr>
<th>Test Procedures</th>
</tr>
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<tbody>
<tr>
<td>• Types of Questions</td>
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<tr>
<td>______________________</td>
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</table>
PREPARATION OF MATERIALS AND SUPPLIES
All materials and supplies needed for the exam should be assembled well in advance. Preparation gives the student one less thing to worry about and one less potential source of panic and anxiety (D. Applegate, CAL).

Test Materials
Depending on the course and instructor, study materials may be used during an exam. It is common, for example, on chemistry tests to use the periodic chart during a test. Math and statistics teachers often permit students to use formula sheets on a test. Some exams are open-book or open-notes.

If study materials are allowed, prepare them well in advance of the test. The information should be well organized and easily accessible. If the book or notes may be used, mark important pages with paper clips or sticky notes. Formula sheets should be neatly written and include a complete explanation of symbols and the order of operations.

Keep in mind that test materials may be a hindrance to completing the exam in a timely manner if they are not well prepared and well organized. Don't waste time during the test flipping through the book or trying to figure out what you wrote on the study aid. Take care of that before the test.

Test Supplies
Test supplies should be gathered and organized the night before the test at the latest. Find out what supplies are permitted or required for the test. The following supplies may be needed for an exam:

- working pens
- sharpened pencils
• colored pencils
• erasers
• working calculator
• calculator batteries
• ruler
• protractor
• blue books
• lined paper
• scrap paper
• note cards
• watch

If you are borrowing a calculator, be sure you are familiar with the locations of important keys and be sure you know how to use it.

PHYSICAL AND MENTAL PREPARATION

Test preparation doesn't involve learning the information only. One must also prepare mentally and physically for the exam. One's physical and mental states may drastically affect the effectiveness of preparation activities. For instance, one can't prepare if one can't stay awake. Physical and mental states may also profoundly impact exam performance, regardless of how well one prepared. All the preparation in the world will do little good if one is coughing uncontrollably or experiences an anxiety attack during the test.

General guidelines for physically and mentally preparing for tests are provided below. More information on these topics is located in the Attention and Concentration page and the Test Anxiety page.

Physical Preparation

• Good physical health requires that one regularly eat balanced meals. Avoid excessive amounts of junk food, caffeine, cigarettes, and alcohol.
• Adequate sleep is also necessary for good health. Normal nights of sleep are important while preparing for a test as well as the night before the exam.
• Exercise helps to maintain good health and to release tension.
• Attend to all illnesses as soon as they arise.
• Take care of sensory problems such as poor vision.

Mental Preparation

• Studying in the test room often helps student to feel more comfortable about the test.
• When worries arise, try the relaxation techniques described in the Test Anxiety page.
• Visualize every aspect of studying and taking the test. Visualize oneself taking the exam and turning in one's best work.
• Don't worry about what other students are doing, and don't listen to negative comments made by other students.
• Engage in positive self-talk.
• Don't dwell on past testing failures; learn from them and leave them behind. Focus on past successes instead.
• Have confidence in one's preparation plan.
• Gather and organize the necessary supplies ahead of time.
• Arrange to arrive at the test in plenty of time.

TEST ANXIETY

Worries and concerns about an upcoming test can lead to feelings of helplessness. The best way to avoid "self-fulfilling prophecies" about impending doom on an upcoming test is to keep active. Action reduces test anxiety.

Be sure you know the specific procedures for the exam. Develop a plan of action with a variety of strategies, and make a time-table for completing each activity. Start studying well in advance, spacing reviews and keeping study sessions short. Thorough preparation is one of the strongest defenses against anxiety.

Use relaxation exercises when worries arise. Exercise and maintain good health. Unless they can be resolved quickly and easily, avoid stressful situations if possible. Participate in recreational activities to relieve stress. Talk about worries and concerns with impartial parties.

Keep stress at a manageable level. Some stress will keep one alert, but too much will detract from one's performance.

Test anxiety is discussed at length in the Test Anxiety page.

CRAMMING

Cramming is defined as intensive, last-minute preparation for an exam in a short period of time (D. Applegate, CAL). Cramming is not learning. The word "cramming" has negative connotations, and rightfully so. It is not an efficient means of preparing for exams. It may work for the best students, but just in the short-term. For other students, cramming usually just results in anxiety and poor test scores.

Some disadvantages of cramming are:

• One is virtually guaranteed to forget the information soon after the test, within a day or two perhaps. Is it worth the thousands of dollars spent on an education to forget what one learned the next day? What if you will need to know the information later, for another class or your job?
• If the final exam in a class is comprehensive, covering the entire semester or quarter, the student who crammed for mid-term tests has to relearn the information from the beginning of the class because most has been forgotten. This is hardly time-effective.
• Information covered during cram sessions is stored in short-term memory only. It is easily lost from short-term memory during stressful situations. This is the "blanking out" experience some students have while taking a test.
• Cramming is very stressful. It is at this time that students realize how much they need to learn and how little time they have to do it. Cramming contributes significantly to test anxiety.
• Cramming usually involves pouring over material for hours on end. Unfortunately, one’s attention and concentration drop off drastically after only 20-30 minutes! Information covered after that time is probably not going to be remembered.
Despite the drawbacks of cramming, most students are forced to do it at one time or another. If presented with a situation that requires cramming, use the strategies outlined below to get through the crisis (REFERENCE). Then make plans to avoid a repeat performance.
• Assess the situation.
  • Take a few minutes to consider what tasks need to be completed during test preparation. Are notes in order? How much reading must be completed? Is it realistic that all tasks can be completed in time? If not, prioritize the tasks. For example, if there will be few questions from the reading on the last test, wouldn’t skimming the chapters be sufficient?
• Consider the type of test.
  • Find out what type of test questions will be asked. Select one or two time-efficient strategies for preparing for that type of test. For example, making up practice questions for a multiple choice test is not efficient when one only has a few days or hours to prepare. But skimming the chapters, focusing on key terms and concepts, would be effective and efficient.
• Identify main ideas.
  • Identify the main ideas covered in lectures and readings. To do so, look at the course objectives and the topics listed on the syllabus and course schedule. Look at the main points made in each class, or examine the section headings in the textbook. Try to state the main topic of the class and the instructor's purpose for teaching it. For example, "American Business History - to show the relationship between history of U.S. business sector and general U.S. history" (Kesselman-Turkel and Peterson, 1981, p. 6).
• Reduce information.
  • Reduce the lecture notes and readings to the bare essentials, using the main ideas identified in the last step as a guideline. Boiling the information down to one or two pages of material helps to focus one's energy.
• Work on memory devices.
  • Develop methods of remembering the information. Try visual associations or mnemonics. If the test will involve essays, focus on remembering how information is related. If the test is more objective, focus on remembering facts and specific details. Practice the memory schemes often. Try to use other senses in addition to vision.
• Attend to health.
• Avoid the temptation to stay up late studying and to use stimulants like caffeine or No-Doz. Get a normal night's sleep the night or two before the test. If you can't stay awake during the test, your cramming will do no good.
• Accept the situation.
• If you leave exam preparation to a few days before the test, accept the situation. Don't fight it. And though it may be difficult, don't give in to anxiety. There's nothing you can do about it now, so buckle down and do as much preparation as feasible. Try to focus on the task at hand. Stay as relaxed as possible since tension blocks memory recall mechanisms.

TIME MANAGEMENT AND SPACING REVIEWS
The type of questions on the exam is perhaps the strongest factor influencing on one's test preparation plan.

Test-Specific Strategies
Subjective, Objective, and Standardized Tests

SUBJECTIVE TESTS
Subjective tests include essay, short-answer, vocabulary, and take-home tests. Some students become very anxious of these exams because they feel their writing skills are not up to par. The strategies described below may reduce some of that anxiety by better preparing students for subjective questions.

Predict Questions
Students who attempt to predict essay questions before the test tend to do better because they have already prepared the material and organized it in an effective manner. They are less likely to be caught off-guard during the exam. Each practice question should stress the main ideas related to one topic, and should provide the opportunity to include supporting facts and details. Make questions broad enough to encompass many alternatives.

The following sources may be used to make up practice questions: lecture notes, old tests, section headings in the textbook, goals and objectives listed on the syllabus, study group members, review questions in the textbook, and review questions in student workbooks accompanying the text.

If you don't see your predicted questions on the test, don't despair. Chances are the material you did prepare can be reworked and reorganized to answer the test questions. Remember that predicting questions is a skill that comes with practice; you will get better as you learn more about the instructor and about testing in general.

Organize Ideas
Simply answering your predicted questions is not enough. The ideas must be organized into a coherent structure. Doing this during test preparation helps
register the information in memory and aids in recalling the information during the test. It also saves that time spent organizing ideas during the exam.

The organizational method chosen depends on the nature of the information and one's personal learning preferences. Try outlines or visual aids, for example. The answers need not, and perhaps should not, be written out in complete sentences. Instead, use key words and key phrases to reduce the amount of information to be remembered.

Each part of the organizational structure should cover one main idea; these will make up the individual paragraphs in your answer on the exam. Arrange ideas numerically, topically, or sequentially. Think of transitions among major ideas. Be sure to include all major ideas stressed in lectures and readings.

Study guides for subjective tests are most effective when written in topical form.

Periodic Reviews of Answers
Periodically review the answers recorded for the practice questions. Speaking aloud while reading over answers helps keep your attention and store the information in memory. Record answers on audio cassettes and listen to them periodically.

Memory Techniques
Memory strategies stressing the relationships among major ideas are preferred for subjective test preparation. Try rehearsal, association, and retention strategies.

Study Groups
Study groups may be used to predict and answer questions, to organize information, to complete readings, to share notes, to evaluate understanding of the information, and to share memory strategies.

Spelling
If you anticipate problems with spelling, ask the instructor if a spelling aid may be used during the test. Such arrangements should be made prior to exam day. If a spelling aid is not permitted, list the major terms and practice spelling them.

Writing Skills
If you are deficit in writing skills, the instructor may permit the use of a scribe for the test or may permit you to compose his/her answers on a computer or word processor. Again, make such arrangements prior to exam day. Otherwise, practice organizing and writing answers to practice questions.

Prepare Physically and Mentally
Subjective questions require clear thinking more so than objective tests. Part of your preparation, therefore, should include adequate sleep, good nutrition, and exercise. Avoid excessive amounts of caffeine, all-nighters, and stressful situations. Exercise to release anxieties or use relaxation techniques.

OBJECTIVE TESTS
Objective tests include multiple choice, true-false, matching, and fill-in questions. They tend to focus more on specific facts than on general ideas and concepts.
Predict Questions
Students who attempt to predict objective questions before the test tend to do better because they have already prepared the material and organized it in an effective manner. They are less likely to be caught off-guard during the exam. Subjective practice questions should emphasize specific details and relationships among them.

The following sources may be used to make up practice questions: lecture notes, old tests, visual aid captions in the book, study group members, review questions in the textbook, and review questions in student workbooks accompanying the text.

If you don't see your predicted questions on the test, don't lose control. Chances are the material you did prepare will provide clues for eliminating implausible answers and selecting the correct answers. Remember that predicting questions is a skill that comes with practice; you will get better as you learn more about the instructor and about testing in general.

Organize Information
Organizing information when preparing for objective tests helps register the information in memory, aids in recalling the information during the test, and helps students distinguish correct and incorrect choices in objective questions.

The organizational method chosen depends on the nature of the information and one's personal learning preferences. Matrices, flash cards, and visual aids are good choices for objective tests. Study guides are most effective when written in categorical form. Focus on people, dates, events, lists, and key words of definitions.

Periodic Review of Answers
Periodically review the practice questions and answers. Speaking aloud while reviewing helps to keep your attention and store the information in memory. Record questions and answers on audio cassettes and listen to them periodically.

Memory Techniques
Memory strategies stressing lists, definitions, and details are preferred for subjective test preparation. Try visual association, visual elaboration, peg words, grouping, rhymes, and mnemonics.

Study Groups
Study groups may be used to predict and answer questions, to organize information, to complete readings, to share notes, to evaluate understanding of the information, and to share memory strategies.

Prepare Mentally and Physically
Objective tests require that one keep straight various pieces of specific information like facts and figures. Part of your preparation, therefore, should include adequate sleep, good nutrition, and exercise. Avoid excessive amounts of caffeine, all-nighters, and stressful situations. Exercise to release anxieties or use relaxation techniques.
STANDARDIZED TESTS
There are two main strategies for standardized test preparation.

Use Study Guides
Professionally written study guides may be purchased to prepare for most standardized tests, including ACT, SAT, GRE, GMAT, and LMAT. Typically, these study guides include general strategies for taking standardized tests as well as content-specific strategies for math, reading, and other sections of the tests. They help one to know what to expect on the tests. They also provide sample questions in most cases.

Practice
Some practicing may be done by the student. Reading comprehension questions, for example, can be made up without having to buy study guides. This procedure is explained and exemplified in the Reading Comprehension page.

Strategies for Open-Book Tests and Number Problems

NUMBER PROBLEMS
Number problems most often appear on tests in science, math, statistics, and some business courses. They require that the student know special symbols, formulas for solving problems, and the correct sequence of steps for solving problems.

Practice Questions
One of the best ways to prepare for number problems is to practice solving sample questions. Find out what types of problems will appear on the exam. Then look at old tests and student workbooks for those types of questions. Examine sample problems in the text book, and work through extra problems not covered in homework assignments. Change the numbers given in homework problems and rework them. Problems in the textbook and/or workbook are particularly useful because the answers are often provided, so one knows if the problem was solved correctly. If answers to problems are not available, ask a tutor or the instructor to check your work. Practice making and interpreting graphs and other visual aids as well.

Review Procedural Steps
Review the steps required to solve different problems, and be sure to understand how each step works. Sometimes it helps to list the steps for solving each type of problem, record the steps on paper or audio cassettes, review the steps, and then practice sample problems. Use mnemonics and try to identify a key word in each step that may act as a memory trigger. Use flow charts and other visual aids to remember the correct order of steps.
Review Symbols, Formulas, and Equations
Students should understand clearly the symbols used in all formulas and equations. Record symbols and formulas on flash cards or in lists for easy review.

Memory Strategies
The three things that must be remembered for most number problems are the steps for solving the problem, the formula(s) to be used, and the symbols in the formulas. Sequential steps are best remembered using strategies like mnemonics, peg words, and chaining. Formulas may be registered and recalled using rhymes or grouping strategies. Association strategies are useful in remembering symbols and their meanings.

Formula Sheets
If formula sheets are permitted on the exam, prepare them ahead of time. Make sure the information is organized, legible, and easy to find. Include what the symbols in the formulas mean as well as the formulas themselves.

Study Groups
Study groups are useful in practicing problems, reviewing procedures and formulas, and sharing memory strategies.

Know the Calculator
If calculators are permitted on the test, become familiar with the keys available and where they are, the order of operations for inputting data, scientific notation displays, and special function keys. This is especially true of borrowed calculators. Have an extra battery, and know how to change it if necessary.

Attend to Mental and Physical Health
Try to avoid negative feelings toward number problems and try to block out bad experiences from the past. Successful practicing should bolster confidence and mental attitudes. Get plenty of rest and eat well before the test.

OPEN-BOOK TESTS
Even though books and/or notes may be used to answer questions, open-book tests require preparation. In fact, preparation may be the factor separating students who finish on time and those who don't, or students who do well and those who do poorly. The nature of preparation, however, will differ from that of objective and subjective in-class tests.

Organize Information
The best way to prepare for open-book tests is to organize information so that it is easily located. For the textbook, mark important pages with paper clips or labeled post-it notes. Learn how to use the index to find information. For the notes, logically organize them by topic or temporal sequence and then number the pages. Make up a personalized index, complete with page numbers for different topics, for the notes. Arrange the information in a three-ring notebook for easy access, incorporating class handouts and other materials as well as notes. Mark important pages with paper clips or labeled post-it notes.
Make Summary Sheets
Reduce the exam information to main ideas and supporting details, organize it logically, and record it on summary sheets. Paste the summary sheets in the book or notebook. This is especially helpful for tests with formulas, dates, and people.

Develop an Appropriate Attitude
Resist the temptation to "blow off" preparing for open-book tests. Some students think that, because they may use books or notes to answer questions, open-book tests are easier than closed-book exams. Not necessarily. Instructors often expect to see more details and more interpretation of concepts on this type of exam. There may be more questions to answer as well. Take open-book tests seriously.

Encoding and Retrieval
BACKGROUND INFORMATION ON ENCODING AND RETRIEVAL

Encoding and retrieval are intricately linked to memory. They refer to the processes of moving information to and from short-term memory (STM) and long-term memory (LTM), respectively. The relationship between memory and the processes of encoding and retrieving is illustrated by the information processing model shown below.

Encoding involves linking new information to existing knowledge in order to make the new information more meaningful. The quality of this process is related to the degree with which new information can be integrated or assimilated with existing knowledge. Much encoding involves labeling thoughts with words, but pictorial or other forms may be used as well. Students should be directed during the encoding process to insure that accurate information is moved to LTM.

A different view of encoding is espoused by some researchers. According to Herrmann, Raybeck and Gutman (1993, p. 13), "registration in an incidental memory task is called encoding." In other words, encoding involves the unintentional storage of information in long-term memory. They label intentional registration "learning".

Retrieval involves drawing on existing knowledge. It forms the basis for all new knowledge. Retrieval of prior knowledge during learning directly affects the
amount of new information that can be processed. At-risk students often have low funds of previous knowledge, hampering retrieval and, therefore, the learning process.

A distinction between retrieval and realizing, again based on the issue of intentionality, is made by some authors. "In an intentional memory task, remembering is deliberately influenced by directing attention to certain contents in the working memory. This type of remembering is called retrieval. Retrieval may be conceived as realizing plus emergence produced by intentional manipulations" (Herrmann, Raybeck and Gutman, 1993, p.13-14). Unintentional remembering is referred to as realizing. "Retrieval is more likely to result in [remembering] useful information than realizing since retrieval deliberately goes after certain memories whereas realizing occurs without a purpose" (Herrmann, Raybeck and Gutman, 1993, p. 14).

For more information about the relationship between encoding, retrieval and memory, see the Memory page in the General-Purpose Learning Strategies main stack.

PURPOSES OF ENCODING AND RETRIEVAL STRATEGIES
The purpose of encoding strategies is to improve one's ability to transfer information from short-term memory (STM) to long-term memory (LTM). These strategies involve the development of schemes or networks in order to move information into LTM.

The purpose of retrieval strategies is to improve one's ability to transfer information from long-term memory back to short-term memory.

ADVANTAGES OF ENCODING AND RETRIEVAL STRATEGIES
Academically, encoding and retrieval strategies influence one's ability to perform well when evaluated by instructors. Though testing is the most common form of evaluation, and encoding and retrieval strategies have the greatest impact on a student's performance on examinations, evaluation may take the form of class participation and group activities as well.

In addition, encoding and retrieval strategies may improve one's ability to remember information from reading assignments. Effective comprehension and retention of reading materials is vital for class participation, taking exams, and other tasks.

Individuals sometimes have relatively low funds of previous knowledge stored in their memories with which new information may be linked. Therefore, encoding and retrieval strategies may help to compensate for this deficiency.
SPECIFIC ENCODING AND RETRIEVAL STRATEGIES
The following encoding and retrieval strategies are described in this page.

Spacing Reviews / Repetition, Visual Aids, Color Coding, and the FLASH Strategy

SPACING REVIEWS AND REPETITION
Learning occurs in spurts. The best way to use study time is to work for short periods of time on different subjects or tasks. Spacing reviews and activities is important because it helps to maintain interest and concentration. It also enhances comprehension and retention of the information covered. Encoding information into memory is maximized by studying for short periods of time and going over the same material repeatedly.

The attention span of most people is 20 to 30 minutes. Therefore, study time should be divided into sessions of similar length for working on different activities or subjects. Switching from one subject to another avoids boredom and daydreaming. Mixing up activities helps one process information in a variety of ways.

Consider the following example. A student has set aside three hours to study for an exam one night. Because studying for six half-hour sessions, with a break in between, is much more effective than studying for three straight hours, the student plans this study schedule. Notice that different activities are mixed up in the plan.

- 6:00-6:30 Review Chapter 1
- 6:30-7:00 Go through flash cards for vocabulary terms
- 7:00-7:30 Review Chapter 2
- 7:30-8:00 Reward: Watch favorite tv show
- 8:00-8:30 Review summary sheets from lecture notes
- 8:30-9:00 Make graphic organizers for main concepts
- 9:00-9:30 Review Chapter 3

The following tips can help students space reviews effectively, so as to enhance encoding of information into memory.

- Develop a plan of action.
  - Develop a plan for studying, considering what must be done and how much time one has to do it.
  - Any combination of these activities may be included in the study plan: complete reading assignments, complete lab assignments, complete homework problems, meet with the instructor or tutors, meet with study group members, reorganize or recopy lecture notes, review information in the notes and the readings, and prepare study aids (flash cards, practice questions, visual aids, etc.).
The activities selected will depend on the task(s) to be accomplished (e.g. exam preparation, preparation for class), the nature of the information, and personal learning styles.

- Budget the time.
  - Estimate how long it will take to complete each of the activities in the study plan.
  - Organize your hours to include ample time for completing the activities, relaxing, and sleeping.
  - Daily and weekly grids are effective means of budgeting time. Examples are given in the Time Management page of the General-Purpose Learning Strategies main stack.
  - Make up a schedule and stick to it. Allowing for rewards or considering how your goals will be fulfilled by sticking to the schedule are good ways to get motivated.

- Space reviews.
  - Break the study time into manageable amounts of time to avoid boredom and loss of concentration, and, in turn, to improve encoding. Sessions lasting twenty to thirty minutes are best.
  - Mix up activities (outlining, reviewing, organizing, etc.) so that the information is processed in a number of ways.
  - Studying for six half-hour sessions is much more effective than studying for three straight hours.

- Repetition.
  - Encoding is enhanced when one reviews the material several times.
  - The key to making repetition effective is to space the reviews so different material is covered in consecutive review sessions.
  - Or, mix up the activities so one is processing the information in a variety of ways in each study session.

- Use spare time wisely.
  - Short periods of "down time" between classes or before meals may be used effectively as review sessions.
  - Use such opportunities for simple tasks, like flipping through flash cards or working a few math problems.

Additional information about spacing reviews is located in the Memory page of the General-Purpose Learning Strategies main stack.

**VISUAL AIDS**

Visual aids are pictorial or graphical representations of information. They help one to organize information in a way that enhances encoding and retrieval. Visual aids are especially useful for students with visual learning channel or modality preferences.

Visual aids may take a variety of forms, including comparison-contrast organizers, hierarchical organizers, flow charts, outlines, continuum (scale) charts, matrices, herringbone map, spider map, sample word map, Frayer model, opinion chart, concept or flash cards, and running concept lists. Each of these strategies is fully
described and illustrated in the Organization page of the General-Purpose Learning Strategies main stack.

COLOR CODING
Encoding and retrieval are enhanced with the use of color coding. Color coding functions to: (1) identify important information, (2) indicate relationships among different pieces of information, (3) organize information, and (4) provide a schema for encoding and retrieving information to and from memory. Be creative! Develop your own color coding strategies particular to your needs and skills.

Color coding may be used in a variety of ways during exam preparation to aid encoding and retrieval of information.

- Try writing flash cards about different topics in different colors of inks or on different colors of index cards.
- Use different colors of ink to arrange information in outline form. To distinguish main points from supporting details, write the former in one color and the latter in another. To distinguish information related to different topics, write the main points and supporting details for each topic in a unique color of ink.
- Identify important information in the notes or textbook by using colored highlighters.

Here are some more specific examples of how color coding might be used to aid encoding and retrieval of information.

- For a modern language class, use colored index cards to encode and retrieve word translations. Use blue cards to record all masculine terms and their translations. Use pink for feminine terms and green or yellow for neutral terms.
- For math class, use colored index cards to encode and retrieve geometry formulas. Write all perimeter and circumference formulas on cards of one color, such as pink (pink = perimeter). Similarly, area formulas and volume formulas are written on cards of other colors like red (red = area) and violet (violet = volume).

FLASH STRATEGY
The FLASH strategy (REFERENCE) is designed to activate prior knowledge, aiding the encoding process. By making students more aware of their knowledge base and more conscious of the encoding process, the strategy makes remembering a more active process. Specific examples of prior knowledge with which new information may be linked are given in the Personalization section of this stack.

The steps in the FLASH strategy are outlined below.

- Focus on the topic.
- Look for familiar information.
- Activate knowledge and ask questions.
- See what's connected.
- Hypothesize.
MNEMONICS
Mnemonics (nih-Mon-icks) comes from the Greek word for "memory" and refers to using an aid to improve the efficiency of the memory. The strategy is used to encode and retrieve lists of information. The items in the list may or may not have to be remembered in a certain order.

Cue words or sentences are used in the mnemonics strategy. Directions for and examples of these mnemonics are given below.

The word or phrase used as a mnemonic should not require as much effort to remember as the items themselves. This would obviously defeat the purpose of the strategy. So, try to keep the cue words or phrases as simple as possible.

The most common mnemonic, the FIRST strategy, involves using the first letter of each word in a list to spell out one cue word. This method is easiest to use when the items in the list can be scrambled around in order to form simple cue words or sentences. Associating cue words with a visual image also aids in encoding and retrieval. This strategy was developed by Nagel, Schumaker, and Deshler (year).

- Form a cue word.
  - Use the beginning letters of words in the list to make a word that is easy to remember.
  - Use capital letters for all letters of the cue word that are found in the list.
- Insert a letter.
  - Insert a new letter if the existing letters alone don't make a word.
  - Use a lower case letter for the insertion so it will be clear that it doesn't mean anything.
- Rearrange the letters.
  - If the order of the list items doesn't matter, move the letters around to form the easiest and most memorable cue word.
- Shape a cue sentence or phrase.
  - If no cue word can be made, use the beginning letters of the words to make a sentence or phrase.
- Try combinations.
  - Combine the above to find the most memorable sentence or word.

The following two examples illustrate the formation of mnemonic cue words to encode and retrieve information. The first example is for a list of items that must remain in a certain order, and the second example is for a list of items that can be shuffled around.

- The colors of the visible light spectrum:
  - LIST: Red, Orange, Yellow, Green, Blue, Indigo, Violet
  - CUE WORD: ROY G. BIV
  - ADDITIONAL ENCODING and RETRIEVAL AID: Picture a man walking on a colorful rainbow
The names of the Great Lakes:
- ORIGINAL LIST: Erie, Superior, Michigan, Huron, Ontario
- REORGANIZED LIST: Huron, Ontario, Michigan, Erie, Superior
- CUE WORD: HOMES
- ADDITIONAL ENCODING and RETRIEVAL AID: Picture a cluster of homes nestled around the clear blue water of a great big lake

The following two examples illustrate the formation of mnemonic cue phrases or sentences to encode and retrieve information. The first example is for a list of items that must remain in a certain order, and the second example is for a list of items that can be shuffled around.

- The order of math operations:
  - LIST: Parentheses, Exponents, Multiplication, Division, Addition, Subtraction
  - CUE PHRASE: Please Excuse My Dear Aunt Sally
  - ADDITIONAL ENCODING and RETRIEVAL AID: Picture a dear old lady with gray hair making a math mistake at the blackboard - or picture your aunt's face
The names of American authors:

- ORIGINAL LIST: Mark Twain, Washington Irving, Edgar Allen Poe, Carl Sandburg, Walt Whitman
- REORGANIZED LIST: Irving, Poe, Whitman, Twain, Sandburg
- CUE PHRASE: I Paid Way Too Soon
- ADDITIONAL ENCODING and RETRIEVAL AID: Picture yourself paying a bill before it is due - or picture a huge dollar bill

Summary Writing, Reciting, and Encoding Technical Vocabulary

SUMMARY WRITING

One strategy for encoding new information from required readings is to write summaries. Summaries function to reduce the amount of information to be remembered and to organize the information in a way that aids encoding. The following rules and steps for summary writing are quoted from REFERENCE. Strategies for reading comprehension are given in the Reading Comprehension page of the General-Purpose Learning Strategies main stack. Summarizing is also covered in the Writing and Proofing page.

Four rules of summary writing (REFERENCE):

Collapse lists.

- If you see a list of things, try to think of a word or phrase as a name for the whole list.
- For example, if you saw a list like eyes, ears, neck, arms and legs, you could substitute 'body parts.' Or if you saw a list like ice skating, skiing and sledding, you could use 'winter sports.'
- In short, substitute a superordinate for a list of items or actions.

Use topic sentences.
• Often authors write a sentence that summarizes a whole paragraph. It is called a topic sentence or a main idea.
• If the author gives you one, you can use it in your summary.
• Some paragraphs do not have explicit topic sentences or main ideas. You may have to invent one for your summary.

Get rid of unnecessary detail.
  • Some text information can be repeated in a passage. The same thing can be said in a number of different ways, all in the same passage.
  • Other text information can be unimportant or trivial.
  • Since summaries are meant to be short, you should delete trivia and redundancies.

•Collapse paragraphs.
  • Paragraphs are often related to one another.
  • Some paragraphs explain one or more other paragraphs. Other paragraphs just expand on information presented in previous paragraphs. Some are more necessary or important than others.
  • Decide which paragraphs should be kept, which can be deleted and which can be joined with others.

Five steps of summary writing (REFERENCE):
1. Make sure you understand the text.
   • Ask yourself, 'What was this text about?' and 'What did the author say?'
   • Try to say the general theme to yourself before you begin to summarize the text.
2. Look back.
   • Reread the text to make sure you got the general theme right.
   • Also reread to make certain that you really understand what the important parts of the text are.
   • Star or mark the important parts of the text.
   • Now use the four specific rules for writing a summary.
3. Rethink.
   • Reread a paragraph of the text.
   • Try to say the theme of that paragraph to yourself.
   • Is the theme a topic sentence? (Main idea?) Have you marked it?
   • Or is the topic sentence missing? If it is missing, have you written one, in the margin, for example?
4. Check and double check.
   • Did you leave in any lists? Make sure you don't list things out in your summary.
   • Did you repeat yourself? Make sure you didn't.
   • Did you skip anything?
   • Is all the important information in the summary?
5. Polish the summary.
When a lot of information is reduced from an original passage, the resulting concentrated information often sounds very unnatural. Fix this problem and create a more natural-sounding summary.

Adjustments may include but are not limited to: paraphrasing, insertion of connecting words like 'and' or 'because,' and the insertion of introductory or closing statements.

Paraphrasing is especially useful here, for two reasons: It improves your ability to remember the material and it avoids using the author's words, otherwise known as plagiarism [Paraphrasing and plagiarism are discussed in detail in the Writing and Proofing page of the General-Purpose Learning Strategies main stack].

**RECITING**

Reciting is an encoding strategy that involves verbalizing the information to be remembered. The student reads the information aloud while studying, engaging both visual and auditory paths of processing. Or, the student may verbalize and record the information on audio tapes and play them while reviewing the material.

When combined with repetition and spacing reviews, reciting is a simple and effective approach to encoding. Reciting is useful because it enhances concentration and it forces the student to use more than one sense in processing information.

**ENCODING TECHNICAL VOCABULARY**

Most courses in college require that students learn the meanings of a variety of technical, content-specific vocabulary terms. Encoding of such vocabulary may be accomplished using the following tips.

- **Rephrase.**
  - After reading or listening to the definition several times, try to rephrase the definition into your own words.
  - Encoding is more effective if the information is familiar, so paraphrase definitions.

- **Reduce.**
  - Eliminate all unessential words in the definition.
  - Focus only on the key words that must be present in order to understand the definition.
  - The less there is to encode, the more likely one is to remember the information.

- **Associate.**
  - Try to link the term and key words to something you already know.
  - Associate the information with past experiences, personal feelings or beliefs, pictures in the text book, songs heard on the radio, or images seen in movies.
  - See the section on Personalization below for more ideas.

- **Visualize.**
  - Try to mentally picture the term and key words.
• Visualize actual objects or people referred to in the definition.
• Visualize objects that represent the words or ideas in the definition.
• Visualize what would happen if someone ate it, wore it, found it, believed it, or practiced it.

General-Specific / Specific-General, Personalization, and Relaxation

MOVING FROM GENERAL TO SPECIFIC AND FROM SPECIFIC TO GENERAL
Students wishing to improve their encoding skills should practice moving back and forth between general themes and specific details.
• Identify some information to be encoded.
• Break the information into a general theme and the specific details supporting that main idea.
• Review the general theme for a few minutes. Writing the main idea or verbally reciting it while reading it are effective means of repetition.
• Review the specific details for a few minutes, again using some repetition technique(s).
• Repeat the short reviews, moving from general to specific and from specific to general.

PERSONALIZATION
Personalization refers to relating new information to a personal experience or making up a story that relates to the new information. Because new information is linked to existing knowledge or beliefs, the personalization strategy improves one's chances of successfully encoding and retrieving information. Personalizing requires that one thoughtfully reflect on one's experiences and beliefs in order to establish links between existing and new knowledge. See the FLASH strategy in this page for more information on the process of activating prior knowledge.

The following are tips for personalizing information.
• Experiences.
  • Past experiences related to the new information serve as an effective link between prior and new knowledge.
  • For example, in an anthropology class you must remember famous archaeological sites. If you have visited any of these places, seen them in a movie or on TV, or read about them in a magazine or novel, link the new information about the site with what you already know about it.
  • For a history class you must learn the dates of certain events. Try to link that numeric information with numbers you already know like phone numbers or relatives' birthdays.
  • For a business class, relate new theories and concepts to past job or intern experiences.
• For a history class, relate new information about the Depression to what one knows from reading novels like *The Grapes of Wrath*.

• Beliefs.
  • One's beliefs about certain topics may be related to new information about those issues.
  • One may compare or contrast the new information with personal beliefs.
  • In a sociology course, for example, new information about drug abuse, family composition, teen pregnancy, sexual orientation, and crime may be related to your personal beliefs on those topics.
  • For a biology course, relate new information about evolution with your own beliefs about the development of new life forms.

• Personal Preferences.
  • One's personal preferences serve as effective links between existing and new knowledge.
  • For example, you may remember important statistics (e.g. percentage of oxygen in the atmosphere, thickness of the earth's crust, number of gods in the Greek pantheon) by linking them to the uniform numbers of your favorite athletes.

**RELAXATION TECHNIQUES**

No matter how well information is encoded, retrieval of information from long-term memory is often blocked by anxiety and tension. Relaxation techniques are one way to reduce stress and aid retrieval. Students may visit the campus counseling center for ideas on relaxation or meet with a private consultant versed in yoga, DASA, or another meditation approach. Or, students may try some of the exercises described below.

• **Exercise 1**: This nine-step procedure is quoted from Twining (1991, p. x). It can be used while seated or lying down in a quiet room. Use this exercise in one's room the night before a stressful event or just before leaving one's room. Play soothing music if that helps you relax. For each step, remember to inhale as muscles are tightened and to exhale as muscles are relaxed.
  • **Step 1**: Tighten your right fist; feel the tension build. Now release the fist. Let your hand go limp; feel the relaxation. Next tighten your left fist; feel the tension. Now release; feel the relaxation.
  • **Step 2**: Bend your right arm, tightening your fist and your biceps. Hold it tight and feel the tension in your arm. Now release the tension and let your arm hang loose; feel the relaxation. Next bend your left arm, tightening your fist and your biceps. Hold it tight and feel the tension in your arm. Now release the tension and let your arm hang loose; feel the relaxation.
  • **Step 3**: Straighten out your right arm until it feels stiff as the triceps tightens. Now release the tension and let the arm hang loose. Next straighten out your left arm until it feels stiff. Then release the tension and let the arm hang loose.
• **Step 4:** Close your eyes tight; feel the pressure mount. Now open your eyes and relax the tension. Next clench your teeth; feel the pressure in your jaws. Now release your jaws and feel the relaxation.

• **Step 5:** Inhale deeply and hold the breath tight in your lungs. Now release and feel the flow of relaxation. Again, inhale; hold it. Exhale. Relax.

• **Step 6:** Now tighten your stomach muscles; hold the tension. Now release the stomach muscles and relax. Again, tighten the stomach muscles; now relax.

• **Step 7:** Straighten your legs and tighten your thighs, let the tension build. Now release the tension, let your legs lie loose, and feel the relaxation. And again, straighten your legs and tighten your thighs. Now release the tension.

• **Step 8:** Straighten your feet and tighten your calves. Now let your muscles go loose. And again, tighten your calves; then release your muscles and feel the relaxation.

• **Step 9:** Now relax your body completely, allowing it to lie limp. Feel the total relaxation that comes from a lack of tension.

• **Exercise 2:** This guided relaxation exercise is adapted from Davis, Eshelman, and McKay (1988) and is quoted from REFERENCE (year, page). The exercise involves physical relaxation as well as positive self-talk. Use the strategy in one's room before a stressful event or in the classroom during those nervous minutes waiting to do a stressful activity. While the instructions refer specifically to test-taking situations, the exercise may be used before any activity that produces anxiety, like public speaking, interviews, or class presentations.

  • Position yourself comfortably in the chair. Close your eyes and breathe deeply from the stomach. Notice that your muscles are beginning to feel smooth, a little heavy and comfortable.

  • Focus on your breathing, exhaling slowly. As you exhale, let go of all tension and negative thought.

  • Notice how relaxed you feel. You can feel this relaxed even in a stressful situation.

  • Your muscles are relaxed and your are breathing deeply. Imagine yourself in the classroom taking an exam. See yourself sitting there breathing as you are right now, feeling comfortable and thinking positive thoughts. Your are very much in control. Each time you exhale, you feel more serene, calm and confident.

  • You have all the knowledge you need to pass this exam. You have studied using the best study techniques you know, and you are fully prepared. You will have no problem passing this exam.

  • See yourself reading each question, one at a time, slowly and carefully, moving through each item on the exam. You have the ability to do well on this exam.
• Take a moment now to experience how calm and regular your breathing is and how confident you feel. After you have counted five breaths, open your eyes and feel relaxed and alert.

• **Exercise 3**: This last-minute relaxation technique helps students focus and relax in the classroom before a stressful event. It even may be used during a stressful activity if anxiety levels increase and the student feels he/she is losing control. The exercise is simple and easy to remember.
  - Close your eyes. Tense every muscle in your body, starting with the neck and moving down to the shoulders, arms, stomach, legs, and feet. Keep all muscles tensed as you move down the body. Inhale as each muscle is contracted, and hold your breath for a few seconds; then slowly exhale.
  - After all the muscles in your body are tense, hold them for a few seconds.
  - Starting with the toes, slowly relax every muscle in your body. Exhale as each muscle is relaxed.
  - Repeat the process as necessary.

• **Exercise 4**: This relaxation technique, quoted from Lunenfeld and Lunenfeld (1992, p. 27), is based on muscle control and visualization. Use this exercise before or during a stressful activity when anxiety levels begin to rise.
  - Find a comfortable chair or sit on the carpet or a cushion. It helps to take off your shoes and close your eyes.... Tense up your muscles, starting with your jaw. Make a fist. Tighten your calf muscles. Next let them relax.
  - Now visualize a staircase. Imagine grasping the balustrade and walking up the plush steps. When you reach the top visualize walking into a very pleasant place, such as a forest, a beach, or any area in which you liked to play as a child.
  - Try to use all of your senses to aid you to bring this scene to life. For example, if you're at the beach feel yourself walking in warm water up to your knees. Feel the water on the lower part of your legs and the sun on the upper part of your body. Taste the salt in the air. Try to hear the sound of the waves as they hit the shore. (To help this visualization you can purchase a tape of wave sounds and play it in the background as you go through this routine.) You can see the blue of the water, the white clouds in the sky, and so on. If you put it all together you might actually think yourself back there, even when real snow is falling outside your room.
  - At this point start listening to your breathing. It should be deep and even.
  - Now tense up your muscles again, starting with your jaw and working down to your toes. With your muscles tense, go through the visualization exercise of walking up the stairs to your favorite location. While in the happy scene slowly relax your muscles, one by one, until you are completely calm, as judged by regular deep breathing.
If you are willing to take this exercise one last step, think hard about an upcoming exam or other tense situation you fear. You will notice your muscles at once tighten involuntarily and your breathing again becomes shallow and irregular. By plunging back into your visualizations, while at the same time relaxing your muscles and keeping your breathing regular, you will go a long way towards being able to control panic in any difficult situation. When the actual situation arrives, just go through all the steps you practiced. You will not only feel yourself relaxing, but you will notice your mind clearing.

**Visual Imagery, Information Dumping, Environment Matching, Practice Test Questions, and Test Taking Retrieval Strategies**

**VISUAL IMAGERY**

Imagery is the ability to produce mental pictures of things that have previously been seen or can be imagined visually. Visual associations are used to facilitate retrieval when old, familiar images are associated with images of information to be remembered.

Students often use this method unconsciously as a means of remembering information. They can become more efficient by recognizing the process and working to make images more vivid.

Material from a wide variety of subjects may be symbolized and remembered using visual associations. Abstract concepts and events as well as things may be entered into and retrieved from memory using the strategy.

Visual association is similar to visual elaboration, except that visual association relies on linking to images that already exist in memory while visual elaboration does not. In addition, visual association is usually done by the student him/herself and is not usually written down. Visual elaboration is covered in the Memory page of the General-Purpose Learning Strategies main stack.

The following are guidelines for visual imagery.

- Identify the new information to be remembered.
- Identify an image from existing knowledge that reminds you of the new information.
  - Make the image large, exaggerating features and enlargening it to unusual or unnatural proportions.
  - Make the image as bizarre or unusual as possible.
  - Produce associations that are different from what might be expected.
  - Images may be still or, better yet, animated. When motion is added to a mental picture, it helps the mind to retain and recall it.
- Add sounds or smells to the image if you can.

The following are examples of the visual imagery strategy.
To remember that the Boston Tea Party occurred in 1773, imagine a sailing ship with costumed people throwing boxes of tea over the side. Above this ship imagine the numbers "1773" flashing on a neon sign in the sky. Smell the salt water and listen to the sound of crashing waves.

To remember the parts of a computer's central processing unit (arithmetic-logic unit, control unit, clock, registers, and bus), image a large, loud yellow bus dropping people off at an office, where a controlling boss barks out orders, an employee works feverishly on math problems and enters the answers on oversized blue registers, and a huge neon digital clock hangs over everyone's heads.

**INFORMATION DUMPING**
A specific test-taking strategy that aids in retrieval is dumping. Information dumping refers to quickly writing down all information that one feels he/she may forget or confuse otherwise. It is done before looking at the test questions. If you fear you will forget or confuse names, dates, formulas, or statistics, dump that information on the back of the test as soon as it is distributed. You should also dump visual aids, organizational aids, and other "tricks" that were used to encode the information (see the Visual Aids section of this page). Then refer to the dumped information for answering questions.

**ENVIRONMENT MATCHING**
Environment matching refers to matching the internal and external environments of task preparation with the internal and external environments of the task situation. It is often used for exam preparation but is appropriate for other tasks, such as public speaking.

The internal environment reflects what the student thinks about the material and him/herself, while the external environment refers to the setting in which the student undertakes an activity. Retrieval is enhanced when task-preparation and task-completion environments match to some degree.

**Retrieval Structure Manipulations**
Retrieval structures are best suited to information that must be remembered perfectly. It is often the case that retrieval structure manipulations register information more effectively than do attention, rehearsal, attribute, and association manipulations, each of which is described in the Memory page of the General-Purpose Learning Strategies main stack.
There are four types of retrieval structures, each of which varies in applicability and ease of application: elaboration manipulations, reduction manipulations, transformation manipulations, and technical manipulations. Manipulations may involve a combination of methods from these categories. Much of this information comes from Herrmann, Raybeck and Gutman (1993).

Elaboration Manipulations
Elaboration manipulations are among the easiest to use. These structures build on the information to be remembered by combining it with additional information. The additional information provides a code that enhances remembering. Because of this, the elaboration structure itself must be remembered completely in order for the manipulation to be effective. In addition to the elaboration manipulations described below, several elaboration manipulations are described in the Memory page of the General-Purpose Learning Strategies main stack: rhymes, songs and poems, name associations, visual imagery (visual association), and mnemonics. The latter two are also discussed elsewhere in this page.

Acrostic Manipulations
- This type of manipulation is similar to the FIRST mnemonic strategy described elsewhere in this page.
- A short poem or verse is made by using each letter in the new item to form a word that describes the item.
- For example, to remember Bill's name, elaborate by saying that Bill is a Big Interesting Likeable Lug.

Ad Hoc Manipulations
- The ad hoc manipulation makes use of limericks or poems.
- There are published compilations of common ad hoc manipulations used to remember certain information (e.g. Pugh, 1970).
- For example, "Columbus sailed the ocean blue, In fourteen-hundred and ninety-two."

Verbal Mediation Manipulations
- Link the item with a word that has an established association with the item.
- For example, to remember that Bill pitches a good curve ball, associate a baseball with round with curve.

Image Elaborations
- Image elaborations may take four forms.
  - Color manipulations involve picturing the item to be remembered in one color against a background of a different color. For example, to remember a neuron, picture it in a neutral color against a red background.
  - Color with affect manipulations involve picturing the item in a color that symbolizes your feelings or emotions about the item. For example, to remember an item you dislike, picture it in red.
  - Graphic manipulations involves mentally picturing the letters of the word to be remembered. For example, to remember a person's name, picture the letters in your mind.
• Visual integration manipulations involves elaborating an item into a visual image. For example, to remember the name "Deng Xiao-ping," picture a bullet hitting a bell ("ding"), a bullet bursting a balloon ("pow"), and a bullet hitting a wall ("ping").

• Number Elaborations
  • Use common numerical configurations (phone numbers, currency, years, zip codes, etc.) to remember numbers.
  • For example, to remember the percentages of nitrogen and oxygen in the atmosphere, 78% and 22%, write them as currency $78.22.

• Principle Stating
  • Look for and describe a pattern or regularity in the new material.
  • For example, after attending a play, state whether it was a comedy or a tragedy.

• Ridicule
  • Make the item to be remembered as humorous or ridiculous as possible.
  • Try turning the item into a funny name or a pun. For example, "Fred-schmed" or "Smithie-withie."

• Sentence Generation
  • Use the new information as part of a factual or a false sentence.
  • A true sentence is useful for associating related items.
  • A false sentence should be made blatantly false in order to avoid confusion with facts.
  • For example, to remember a new acquaintance, elaborate a sentence like "I just met John Gates, an electrician from Cleveland."

• Story Generation
  • Make up a story that contains the new information.
  • Again, it may be true or false.
  • For example, "Alan Turing developed the first digital computer, the Colossus, to break Nazi codes during World War II."

Reduction Manipulations
Reduction retrieval structures are based on only a portion of the original information. Reduction manipulations are shorter and usually easier to remember than elaboration manipulations. However, they may be more ambiguous than elaboration methods.

• Abbreviations
  • Using a few letters from the word, form a smaller word.
  • For example, remember "photo" instead of the longer "photosynthesis."

• Bleaching
  • Imagine the new item in black in white.
  • For example, to remember the seven wonders of the ancient world, picture them without color.

• First Letter Coding
  • Arrange the first letters of each item in a list into an acronym.
  • This strategy is covered in the mnemonics section of this page.
• Sentence Reduction
  • Form new words from the first letters of each item in a list.
  • Put the new words into a sentence.
  • This strategy is covered in the mnemonics section of this page.

• Summary Stating
  • Select key words from a story or a block of text that capture the overall theme or point of the material.
  • For example, text about the two types of cells might be summed up by two key words, "eukaryote" and "prokaryote."

Transformation Manipulations
Transformation manipulations are more difficult to use because they alter the form of the original information, although the transformed information is related to the original material. However, they may be less ambiguous than reduction methods and less lengthy than elaboration structures. Transformations are perhaps the best retrieval structures for understanding and comprehension, and therefore may be preferred in situations when information is to be understood, not simply registered.

• Synonym Generation
  • Replace the item to be remembered with the most appropriate, and easiest to remember, synonym.
  • For example, to remember that a country is a democracy, rehearse it as a "free state" also.

• Contrast Generation
  • Replace the item to be remembered with an appropriate anonym.
  • For example, to remember that a country is totalitarian, rehearse it as "not a free state" as well.

• Class-Member Generation
  • Associate the item with words that are in the same class or category as the item.
  • For example, to remember that a country is a democracy, rehearse its name with other democracies like Canada and United States.

• Homophonic Generation
  • Associate the item with words that sound like it.
  • For example, to remember that a country is a dictatorship, rehearse the country's name along with "dictate or ship."

• Comprehensive Generation
  • This strategy uses combinations of the four other transformations to reflect all the possible relationships and sounds of the information to be learned.

Technical Manipulations
Technical manipulations, which are based on structures memorized ahead of time, are among the most difficult to use. They are called "technical" because the require prior preparation and instruction. Unlike the other forms of retrieval structures, the special encoding and retrieval schemes used in technical manipulations are not related to the new material to be learned. Despite the
special effort needed to use technical manipulations, they have been shown to be highly effective in improving memory performance.

- **Links**
  - Establish links between pairs of items in an ordered or unordered list.
  - Refer to the Chaining (Link System) section of the Memory page for a more complete description.

- **Pegs or Peg Words**
  - Pegs can be alphabetical, verbal or pictorial.
  - The pegs stand for numbers in a list (e.g. 1 = sun, 2 = shoe, etc.).
  - Pegs are used to trigger associations with the actual items in the list.
  - See the Pegwords section of the Memory page for a more complete description.

- **Loci or House of Memory**
  - To remember a list of items, imagine a familiar building and place one item from the list in each of the rooms.
  - Your "house of memory" can be a home, church, office building, a town, or a landscape, as long as the locus is easy to remember and visualize.
  - While mental images of the memory loci are sufficient, the student may wish to sketch the loci and associated items.
  - An example of a house of memory for encoding and retrieving the Hindu pantheon is given below.

**Acrostic Manipulations**
- This type of manipulation is similar to the FIRST mnemonic strategy described elsewhere in this page.
- A short poem or verse is made by using each letter in the new item to form a word that describes the item.
- For example, to remember Bill's name, elaborate by saying that Bill is a Big Interesting Likeable Lug.

- **Ad Hoc Manipulations**
  - The ad hoc manipulation makes use of limericks or poems.
  - There are published compilations of common ad hoc manipulations used to remember certain information (e.g. Pugh, 1970).
  - For example, "Columbus sailed the ocean blue, In fourteen-hundred and ninety-two."

- **Verbal Mediation Manipulations**
  - Link the item with a word that has an established association with the item.
  - For example, to remember that Bill pitches a good curve ball, associate a baseball with round with curve.

- **Image Elaborations**
  - Image elaborations may take four forms.
  - Color manipulations involve picturing the item to be remembered in one color against a background of a different color. For example, to
remember a neuron, picture it in a neutral color against a red background.

- Color with affect manipulations involve picturing the item in a color that symbolizes your feelings or emotions about the item. For example, to remember an item you dislike, picture it in red.
- Graphic manipulations involve mentally picturing the letters of the word to be remembered. For example, to remember a person's name, picture the letters in your mind.
- Visual integration manipulations involves elaborating an item into a visual image. For example, to remember the name "Deng Xiao-ping," picture a bullet hitting a bell ("ding"), a bullet bursting a balloon ("pow"), and a bullet hitting a wall ("ping").

- Number Elaborations
  - Use common numerical configurations (phone numbers, currency, years, zip codes, etc.) to remember numbers.
  - For example, to remember the percentages of nitrogen and oxygen in the atmosphere, 78% and 22%, write them as currency $78.22.

- Principle Stating
  - Look for and describe a pattern or regularity in the new material.
  - For example, after attending a play, state whether it was a comedy or a tragedy.

- Ridicule
  - Make the item to be remembered as humorous or ridiculous as possible.
  - Try turning the item into a funny name or a pun. For example, "Fred-schmed" or "Smithie-withie."

- Sentence Generation
  - Use the new information as part of a factual or a false sentence.
  - A true sentence is useful for associating related items.
  - A false sentence should be made blatantly false in order to avoid confusion with facts.
  - For example, to remember a new acquaintance, elaborate a sentence like "I just met John Gates, an electrician from Cleveland."

- Story Generation
  - Make up a story that contains the new information.
  - Again, it may be true or false.
  - For example, "Alan Turing developed the first digital computer, the Colossus, to break Nazi codes during World War II."

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  - An example of a house of memory for encoding and retrieving the Hindu pantheon is given below.

![Diagram of a house of memory with Hindu gods]

**Number-Letter Conversion**
- Numbers and letters are converted using a predetermined scheme:
• 1 = t, d or th
• 2 = n
• 3 = m
• 4 = r
• 5 = l
• 6 = g
• 7 = c, k, hard g or q
• 8 = f, ph or v
• 9 = p or b
• 0 = z, s or soft c

• Vowels are not used.
• To remember a numerical item, use the coded letters to form a cue word. Add vowels to form the cue word, if necessary. For example, to remember a numeric item like the year Columbus landed in the New World, 1492, use the code letters t, r, b, and n to form the cue word "turban."
• To remember a word, use the coded numbers to form a cue number. For example, to remember the name of computer software mogul Bill Gates, form the code number 955-610.

PRACTICE TEST QUESTIONS
The most proven, yet least used, way to study for exams is practice tests. Sample questions allow one to assess one's retrieval success before the exam; areas of weakness are identified and addressed prior to taking the actual test. Students may make up their own questions, or they may answer questions on old tests or in the textbook or student workbook accompanying the text. Practice tests have many benefits. This strategy may be used to prepare for nearly any type of test. They help one to anticipate what the test may look like, reducing anxiety and stress. Practice tests are a valuable way to assess one's understanding of the information, distinguishing what is known and what needs to be learned. Writing one's own questions requires that one thoroughly understand and evaluate the information. When used effectively, practice tests improve one's mental preparation for an exam, bolstering confidence and positive attitudes. Finally, writing and/or answering practice questions forces one to repeatedly review the material, which enhances memory registration and recall. Some students may complain that making up and/or answering practice questions is too time consuming. However, the advantages of the strategy greatly outnumber the disadvantages. If time is a concern, students may form study groups for sharing the responsibility. Each member writes some questions, and the group meets to exchange and answer the questions. The following are guidelines for the practice test questions strategy.
• Consider the types of questions.
  • Find out what types of questions will be asked on the test: essay, multiple choice, true-false, etc.
  • Look on the syllabus, ask the instructor, examine old tests, or talk with former students in the class.
• Write practice questions.
There are several approaches to writing practice questions. Turn the section headings in the book into questions. Take sets of related pieces of information and write questions focusing on that relationship. Look for the main ideas presented in each lecture and form them into questions. Change the numbers given in math problems and rework them. Ask the instructor for a few sample questions to get an idea of the how he/she writes questions.

Until you become accustomed to the strategy, you may want to use prewritten questions instead of making up questions. There are several sources of practice questions: old exams, review questions at the end of each chapter in the textbook, and student workbooks accompanying the text.

Because writing one's own questions requires thorough examination of the test material, students should attempt to move in this direction as they become more proficient.

Record the questions.

Depending on personal learning strengths and preferences, students may choose to record the practice questions as a list on paper, individually on flash cards, or as a list on audio cassettes.

Answer the questions.

There are three options at this stage. Students may answer the questions as they write them. Or, students may answer the questions later, using the notes and readings as references. In either case, students may want to record the page numbers on which the answers are found in the notes or book.

The third option is to use the questions to as a practice test after reviewing for the exam. This is done without the use of notes or other study materials.

Record the answers.

Again, students may record the answers on paper, flash cards, or audio tapes.

Review the answers periodically.

To be really effective, practice questions should be reviewed periodically to test recall and to improve understanding.

Look at the flash cards during "down" time between classes or while standing in line. Listen to the tapes while commuting to school or to work.

Change the order.

Shuffle the questions so the information is not learned in a particular order.

This insures that one is actually learning the information itself, rather than order of questions and answers.

This also helps one to prepare for tests in which the questions are arranged oddly; instructors don't always arrange questions topically or in the order in which the information was covered in class.

Practice.
• It takes time to gain proficiency in this strategy.
• Both writing the questions and predicting what might be asked on the test require practice.
• These skills should improve as students are exposed to a variety of tests and as they learn more about their instructors' test-writing habits.
• Don't lose heart when your questions don't appear on the test. If you've used the strategy effectively, chances are you know the material well enough to answer different questions.

Examples of practice questions are given in most of the pages in the Content-Specific Learning Strategies main stack.

TEST-TAKING RETRIEVAL STRATEGIES
A common academic task that requires efficient retrieval skills is test taking. Test-taking retrieval strategies vary according to the type of material to be covered, the types of test questions, and a student's preferred learning channel.

The Test Taking page in the General-Purpose Learning Strategies main stack extensively describes and illustrates test-taking strategies in general as well as strategies for specific types of tests. While most test-taking strategies are used during an exam, some are used before or after the test. Examples of strategies covered in the Test Taking page that relate to retrieval are studying in the test room (or environment matching, also covered earlier in this page), information dumping (also covered earlier in this page), starting with the questions one knows best, looking for clues in other parts of the test, and writing outlines.

PURPOSES OF TEST-TAKING STRATEGIES
The primary purpose of test-taking strategies is to improve student performance on exams. A second, but related, purpose is to reduce exam anxiety. If both of these goals are achieved, higher test scores should result.

"When you take a test - any test - you're really being tested on two things: how much you know about the subject and how much you know about taking a test" (Kessleman-Turkel and Peterson, 1981, p. v). Test-taking strategies address the latter.

ADVANTAGES OF TEST-TAKING STRATEGIES
Test-taking strategies have the following advantages:
• Improve test scores
• Bolster student confidence about exams
• Reduce exam anxiety

SPECIFIC TEST-TAKING STRATEGIES
Pre-test strategies that improve test performance are discussed under the Before the Test and the In the Test Room sections. The section on General Strategies describes test-taking strategies that may be applied to any type of exam. The remaining strategies address the specific requirements of certain types of exams. The After the Test section covers post-test evaluation of performance. Much of the

BEFORE THE TEST
Because a student's actions and attitudes before the test can greatly affect his/her performance, a few words about pre-test strategies is appropriate. Some of these ideas are presented in the Test Anxiety and Test Preparation pages; refer to them for more details. The tips are important enough to be summarized again.

Preparation
Thorough preparation is one key to successful test taking. Develop a time table for exam preparation and stick to it. Schedule time for reading assignments, recopying or reorganizing notes, reviewing notes, reviewing texts, preparing organization aids and other study materials, meeting with other students or the instructor, looking at old exams, and practicing homework problems.

Another important facet of preparation is knowing what to expect on the exam. Find out from the syllabus or the instructor the following things: when and where is the test, what chapters or topics will be covered, what types of questions will be asked, what the instructor looks for in answers, is it open- or closed-book, what supplies are needed, who will administer the test, who will grade the test, and how the test will be graded.

Study in the Testing Room
Work in the test room in order to become comfortable with those surroundings, especially if the testing room is not the usual lecture or lab room. Visit the test room often to review for the exam or complete homework assignments.

Find a desk in the room where you want to sit during the test. Pick a seat away from sources of distraction like wall charts or maps, aisles, doors, and windows. The seat should be in a well-lit and well-ventilated section of the room. Arrive early enough at the test to get that desk.

To insure your comfort during the test, take note of the room temperature and dress accordingly. Check if there is a clock in the room; if not, plan to wear a watch to the test.

Prepare Mentally
Bolster your confidence by reflecting on past exam successes and your pre-test preparation. Avoid worrying about what other students are doing.

Picture yourself in the testing situation. Imagine you are calm, cool and collected. Picture yourself scanning the test, knowing all the answers, and turning in a passing test.

Use relaxation techniques to quell feelings of anxiety. Avoid depressing or infuriating situations before the test. Get psyched up by listening to your favorite music.

Assemble the Necessary Supplies
Gather and organize all the supplies you will need the night before the test. This includes pens, sharpened pencils, eraser, paper or blue books, calculator, ruler, student id card, and watch. Organize notes or formula lists if these study materials may be used during the test.

IN THE TEST ROOM
Some students become anxious in the test room, waiting for the exams to be distributed. This is the time when good students will brag about their preparation and poor students will moan about the impending failure. Timing and mental preparation are vital at this stage. Again, refer to the Test Anxiety and Test Preparation pages for more information.

Arrive on Time
Arrive at the testing room in enough time to get the seat you want and to get relaxed. But don't arrive so early that you have time to become anxious.

If you have an early exam or have trouble waking up, make arrangements to insure that you arrive at the test on time. Set two clocks, with the second set to go off soon after the first. Use one battery-operated or wind-up clock in case there is a power outage. Ask friends or family members to call you to ensure you are awake.

If you are commuting, plan to arrive at the testing room one hour ahead of time. Then if you have car trouble, you have time to enact an alternate plan (bus, taxi, bike, friend's car) to get to the test.

Prepare Mentally
Don't resist the test, even if you believe tests are useless and unnecessary. Instead, bolster your confidence by reminding yourself about your effective test preparation and your past successes. Use relaxation techniques to calm any anxieties. Concentrate, and block out all distractions. Ignore others as they vent their worries or boast about their knowledge. Listen to a headset if necessary.

Scan your study guide one last time. Review your plan for completing the exam: read directions, read all questions, answer the ones you know, work on the ones you are less sure of, proof read. Plan to use the entire class time. Picture yourself walking out of the room at the end of the exam having turned in your very best work.

GENERAL STRATEGIES
The seven strategies discussed in this section may be used for most types of tests in nearly every subject. They are arranged in the order in which they should be used when taking a test. The strategies should become part of every student's test-taking plan.

Dump Information
Information dumping refers to quickly writing down all information that one feels he/she may forget or confuse as the test is completed. If you fear you will forget or confuse names, dates, formulas, statistics, etc., dump that information on the back of the test as soon as you receive it. It is also helpful to dump mnemonics,
organizational aids, and other memory devices as soon as possible. Refer to the "dumped" information when answering questions.

Read the Directions
Very carefully read the directions for all sections of the test. Pay special attention to words like "and," "or," "have to," "may" and "best." For example, are you to "answer questions A and B" or "answer question A or B?" Are you to "circle the best answer" or "circle the correct answer?" Take note of what questions are to be answered, if answers may be used more than once, or if there is more than one answer for each question.

Break up complicated directions and run-on sentences into smaller parts. Flag tricky directions by circling or underlining them so you don't forget to follow them carefully. For example, are answers to be written on blanks or circled? Are multiple choice answers to be written in upper or lower case letters? Some instructors are sticklers and will deduct points if answers are not in the designated place or form.

Take note of how questions will be scored. Most often only those questions answered correctly will be used to calculate the score. But some tests, like standardized tests, penalize the student for incorrect answers and scores are calculated by subtracting the number wrong from the number right. Another thing to note is if partial credit is given.

Use all supporting material indicated in the directions: notes, scrap paper, calculator, etc. Don't be arrogant and try to do even simple math in your head; that's the way "stupid mistakes" are made.

Scan the Test
After reading the directions, quickly scan the entire test. Take note of the types of questions: essay, true-false, matching, etc. Pay particular attention to the number of questions and the amount of information required to answer each. Look at the point values for each section or question. Quickly categorize sections as easy or difficult, and jot down a note in the margin next to each section.

Decide if the exam is a "speed test" or an "accuracy test." Speed tests are tests that only the best students will be able to finish in time. Most standardized tests (e.g. ACT, SAT, GRE) are speed tests. Accuracy tests are tests that average students should have time to finish. Most exams encountered in school are accuracy tests, on which students are graded for content and organization.

Develop a Plan
The next step involves quickly developing a plan for completing the exam. Budget your time for completing each section or question, and stick to your schedule. For speed tests, allow equal time for each section or question. For accuracy tests, spend more time on the questions worth the most points. Leave the time-wasting, lower-point questions for last.

Start with the easy questions, with the material you know the best, or the type of question (essay, true-false, multiple choice, etc.) on which you do the best. However, if you start with the questions you know the most about, be careful not to go overboard and spend too much time on them.
Plan to give more information in the answers to the higher-point questions than in the answers to the lower-point questions. Budget time for checking your answers or filling in blanks. Check your watch or the clock constantly, after every section or each page for example, to make sure you stay on schedule. Plan to use the entire time period allowed for the exam; there is no sense in rushing through the test.

**Read the Questions Carefully**

Don't skip sample questions and answers, because they may give you clues as to what the instructor expects or how answers should be marked or organized. Break down complicated questions into more manageable parts and then work on each part individually. Number each part to make sure all of them are answered. Ask the instructor to interpret or reword a question if you don't understand it. Don't over interpret the questions or look for hidden meanings.

**Make Educated Guesses**

If you don't know the answer to a question right away, circle the question and go back to it later after you have worked through the entire test once. If you labor over something you don't know, you're wasting precious time. However, avoid rereading questions over and over again as that wastes time too.

When the answer is not clear, look for clues in the questions and the answer choices (for multiple choice or matching). Clues include grammar (only the correct answer is grammatically correct), verb tense (past, present or future tenses should match between question and answer), word type (noun versus verb), and singular versus plural (should match between question and answer). Substitute simple words for difficult or unknown words in the questions or answers. Use context clues or your knowledge of word elements to decipher words. Look for content clues in other test questions.

If two answers look correct, and the directions indicate that there is only one correct answer for each question, pick the most obvious answer. If no answer seems to be quite right, pick the closest one. If all else fails, make a guess at the answer. Guessing pays off if you are not penalized for incorrect answers or if partial credit is given.

**Watch Out for Careless Errors**

Reread the directions to make sure you have completed each section of the test correctly. Then reread the questions to make sure you read them accurately and understand what they are asking.

Double-check your answers after you have completed the test and the pressure is reduced. Reread answers to make sure that you wrote what you intended to write and that you answered all parts of the question.

Be sure that all numbers (especially "2" and "5," "4" and "9") and letters (especially "a" and "d," "t" and "f") are clearly legible. Double check any math calculations, using a different method if possible. Always use a calculator if permitted.

Make sure all answers are in the right places. Be sure all questions have an answer, even if it is just a guess (unless you are penalized for wrong answers).
ESSAY TESTS
Essay tests are common in college-level courses, especially in the humanities and sciences. They allow instructors to test students' abilities in remembering, organizing, and evaluating information. Essays are considered relatively subjective questions, because there is no one specific answer that is correct. Though the instructor usually looks for certain points to be made in the answer, there are varying degrees of correctness. Sometimes instructors will accept as correct some answers that diverge from common interpretations, as long as the answers are logically and substantively supported.

The following strategies for taking essay tests are presented in the chronological order they should be used before and during the exam.

Pre-Test Preparation
Before the test, practice writing answers to sample essay questions. Make up your own questions, or consult the textbook or workbook for sample questions. Work with another student to write questions for each other. When answering sample essay questions, give yourself the same amount of time you will have during the actual test. Don't refer to your study materials when answering sample essays.

It is also important to find out before the test who will be grading the answers. If the instructor is grading the test, find out what types of answers he/she prefers. Does he/she look for facts, for ideas, or for supported interpretations? If someone other than the instructor, a teaching assistant for example, is grading the test, avoid reinterpreting concepts and presenting unpopular viewpoints. Give lots of facts and examples instead.

Read the Directions Carefully
Many points on essay tests are lost because students fail to read the directions carefully. Pay attention to the following points when reading directions:

- Are you to answer every question or do you have choices?
- Where are you to write your answers: on the test, on lined paper, in a blue book?
- How are you to write your answers: skip a line, one side of page only, etc.?
- Is there a certain number of ideas you need to include?
- Are you supposed to write a certain amount of information: a few sentences, a paragraph, etc.?
- Are you supposed to include dates?
- Are you supposed to include examples?
- Are you supposed to include the names of important people?

Key words to look for in the directions are listed below (Kesselman-Turkel and Peterson, 1981, p. 102). Be sure to know what these words mean.

- synonym
- antonym
- none of
- similar to
- the same as
- all of
- the opposite of
• assume that
• if
• all but one
• only one correct choice

Budget Your Time
Decide how to divide all available time among the questions. Plan to spend more
time on questions that count for more points; spend equal time on questions with
the same point value. Allow time to check answers after completing all questions.
For each question, allow half of the time for writing an outline and half for writing
the answer.

Read All Questions before Answering Them
Reading all the questions before answering them allows one's brain to begin
processing information. Reading before answering is especially important when
one has a choice of questions to answer.

Determine what information is given, what information is requested for the
answer, and how you are to answer the question (e.g. compare, contrast, prove,
summarize, etc.). Break down complex questions into smaller parts, numbering
each to make sure all parts are answered. Jot down a few notes as you read each
question. If you don't understand a question, ask the instructor for clarification.

Closely Examine Instructions for Directional Words
Essay questions often contain verbs asking students to do certain things with the
information. Students must know what these words mean in order to provide the
information that the instructor wants. The most commonly used directional words
and their definitions are provided below. Be aware of variations on these words
that are specific to certain instructors; not all instructors use the words in the
same way. If unsure, ask the instructor for clarification.

• Analyze: Break the subject into its component parts and discuss each part
  (Lunenfeld and Lunenfeld, 1992).
• "Compare: Show how they are the same and how they differ.
• Contrast: Show how they differ.
• Criticize: Examine the pros and cons and give your judgment.
• Defend: Give details that prove it or show its value.
• Define: Just give the meaning.
• Describe: Give the details and examples that show what it is.
• Discuss and review: Examine from all angles. (These words are catchalls.
  Depending on the teacher, they might mean trace, outline, describe,
  compare, list, explain, evaluate, defend, criticize, enumerate, summarize, or
tell all you know about it.)
• Distinguish: Tell how this is different from others similar to it.
• Evaluate: Give your opinion as to the advantages and disadvantages.
• Explain and show: Show, in logical sequence, how or why something
  happened (or both).
• Illustrate: Give examples.
• Justify: Give the facts and then prove it's true.
• Name, list, tell, and enumerate: Give just the information that is specifically asked for.
• Prove: Show that it is true and that its opposite is false.
• Summarize and outline: Give the main points.
• Trace: Show how something developed step by step (usually chronologically)” (Kesselman-Turkel and Peterson, 1981, p. 101-102).

Pick a Title
Select a title for each essay answer. Titles help to keep one on track while writing the answers. In other words, titles help one avoid straying from the topic of the question and including irrelevant information. Each title should contain the following information: topic, point of view or approach, and boundaries (temporal, spatial) of the topic. For example, if the question asks "Compare and contrast British colonial policies in different parts of the world," the title to the answer might be "Similarities and Differences Between British Policies in Asian and African Colonies in the Late Nineteenth and Early Twentieth Centuries."

Organize (Outline) the Answer
Good essay writers spend half of their time formulating an outline before answering a question. This may seem like a large investment of time, but outlining insures that each response is organized and answers the question asked. If one has prepared for the exam by reorganizing information or by making up and answering practice essay questions, the organizing process is completed ahead of time and precious testing time is saved.

Divide the outline into general points and specific details. The general points usually are taken from the information in the question, or one may restate the different parts of the question. The student supplies the specific details under the appropriate general points. If the essay questions had been anticipated, try to remember the outline you prepared before the exam.

Organize the main points of the outline. The structure chosen depends on the question and the discipline. Complete details on essay organization are given in the Writing and Proofreading page, but brief descriptions of five common methods of organization are given below (Kesselman-Turkel and Peterson, 1981, p. 103).

• Chronological Order - order of historical events, cause to effect, step-by-step sequence
• From General to Specific - general topic to subtopics, theoretical to practical, generalizations to specific examples
• From Least to Most - easiest to most difficult, smallest to largest, worst to best, weakest to strongest, least important to most important, least complicated to most complicated, least effective to most effective, least controversial to most controversial
• From Most to Least - most known to least known, most factual to least factual (fact to opinion)
• Giving Both Sides (Grouped or Interspersed) - pros and cons, assets and liabilities, similarities and differences, hard and easy, bad and good, effective
and ineffective, weak and strong, complicated and uncomplicated, controversial and uncontroversial.

Remember that outlining is not the only way to organize information. One may choose to organize the main ideas and specific details for the essay in an alternate format, such as a herringbone map, a matrix or table, a hierarchy or array, a flow chart, or a spider map.

Get Active
Get actively involved in your essay, showing enthusiasm in your answer. Recall personal experiences related to the topic or exciting lectures, books and movies that interested you in the subject. While these won't be part of your answer, they help to get you in the right state of mind.

Write Methodically
Write your answer as if you were writing a mini term paper. Your answer should have a title, an introduction or topic statement, a body, and an ending or conclusion.

- Tips for selecting an appropriate title were discussed previously.
- Your topic statement can be a reworking of the title.
- The body should include at least one paragraph for each general point in your outline. Each paragraph in the body should begin with a general summary sentence, usually a complete sentence containing the information in the outline. Skip a line between paragraphs.
- Your ending can be a summary of the answer, a restatement of the topic sentence, or your interpretations or opinions. Do not introduce new information in the ending.

Use ample details and examples in the answer. Use clear labeling words, such as examples, comparisons, similarities, contrasts, differences, supports, arguments, reasons, most, probably, main point, exceptions, etc. Underline key words.

Think in three's: three paragraphs, three sentences per paragraph, three examples per main point, etc. Avoid one sentence paragraphs. Be direct and to the point.

Don't Waste Space
Although it's a good idea to skip lines between paragraphs, don't skip lines between sentences or use only one side of the paper unless told to do so. Avoid ornate or illegible handwriting that takes up a lot of room on the paper. Don't try to fill up extra test booklets by wasting space. Some graders interpret wasted space as a cover up for not knowing the material.

Check Your Work
You should have allotted time for checking your answers. For content, did you answer the question, and did you stick to your point of view? For organization, did you answer all parts of the question, and are paragraphs and sentences logically ordered? For writing, is your answer clear, is you writing legible, is your grammar correct, and is your punctuation correct?

If You Prepared for the Different Questions
Sometimes students anticipate that certain questions will be asked, but the test questions turn out to be different. When this happens, make sure you have
completely answered the questions you do know. Then look for ambiguity in the questions you don't know, since lack of clarity may allow some leeway in your answer. Stretch what you do know about the topic by giving many examples and comparisons. Add less relevant information by linking it with general statements.

If You Run Out of Time
If you are running out of time and haven't yet answered all questions, write down the outlines and indicate that you ran out of time for that/those question(s). Some instructors will give partial credit for outlines.

MULTIPLE CHOICE TESTS
The multiple choice format is commonly used in testing because the exams are relatively easy to grade and the questions effectively evaluate students' knowledge of facts and understanding of concepts. This is an objective form of testing since, if the questions are well written, there is only one correct answer to each question, leaving little room for interpretation.

Work Quickly
By working quickly through multiple choice tests, one insures that the test is completed in time and that questions are not over-interpreted, with hidden meanings read into them. Read each question only once, underlining key words as one reads. Break complicated questions into smaller segments, so that the answer choices may be checked against each part. Cross out unimportant or irrelevant parts of the question. If you are unable to answer the question after your first reading, mark it for later consideration as time allows.

Consider the Instructor
If the directions indicate that one should choose the "best" answer to each question, pick the one that the instructor (not you) would think is most correct. Be wary of "all of the above" and "none of the above" responses, since some instructors use these choices when they can't think of another content-related answer to use.

Guess Before Choosing
Decide what the answer to each question should be before looking at the answer choices. Then examine the choices and pick the answer that most closely matches your answer. If none of the choices is similar to your guess, carefully study the answers looking for key words and other clues. Choose simple answers even if they seem obvious. And remember, never pick an answer without first reading all of the choices, no matter how sure you are of the answer.

Eliminate Unlikely Answers
Cross off answers that are only partly correct or only partially answer the question. Eliminate answers that are correct but do not answer the question. If you know for sure that one response is not true, eliminate "all of the above" as a possible answer.

Look for Clue Words and Numbers
The following clues apply to many multiple choice questions.
• If two answers are opposites, one of them is probably correct.
• Answers with the following words are usually incorrect: always, never, all, none.
• Answers with the following words are usually correct: seldom, generally, most, tend to, probably, usually.
• Look for grammatical clues between the question and the choices. For example, the question and correct answer often have verbs of the same tense and have nouns and verbs that agree.
• Underline familiar words or phrases from the lecture or textbook.
• Be aware of degrees of correctness. With numbers and dates, one choice is usually too small or too early, and one too large or too late; these choices may be eliminated.
• If two choices are very similar, differing only in degree, the one expressed in more general terms is probably correct.
• Use the content of other questions as additional clues.

**Be Wary of Multiple Answers**
Carefully evaluate "all of the above" and "none of the above" choices before selecting them. For the former, all of the responses should be correct. But if you are absolutely sure that at least two of the choices are correct, then you are probably safe in choosing "all of the above." Select the latter if you are sure at least two of the choices are incorrect.

**When in Doubt, Guess**
As long as you are not penalized for wrong answers, guessing is a good strategy to use. Even if you are randomly guessing, you should get about 25% of the questions correct. With educated guessing, the percentage may rise to 75%. Educated guessing involves eliminating all implausible answers first and looking for clues in the question and answers.

When randomly guessing, try some of these tips.
• The longest response is often the correct answer.
• Answer "c" is a good choice if it hasn't been used for several previous questions.
• Some instructions use patterns in their answers, such as spelling out short words like "cab" or "bad," to make it easier to grade the tests by hand. Looking for such patterns may help when guessing (but ignore patterns if you know the material or if the test is machine-graded).
• The answer that is longest in length may be the correct answer.

**Do Change Answers**
Only consider changing answers after completing the entire test. And reread the directions before checking and changing answers. First check the questions that were flagged the first time through the test. Then check the other questions if time permits. If you can't decide between two choices, write an explanation of your choice in the margin of the test. Erase all changes carefully and completely, especially if the test will be graded by machine. Make sure all answers are legible and in the right place (circled, on blanks, on an answer sheet, etc.).
Don't Give Up
Resist the temptation to become frustrated, bored, or anxious. Move quickly through the test. Look for material that you do know. Apply that information to questions you don't know. Use relaxation techniques to fend off anxiety. Use the entire class period to complete the test and check answers.

TRUE-FALSE TESTS
True-false questions are suited for evaluating students' knowledge of specific facts and concepts. Like multiple choice questions, true-false questions are objective in that there is only one correct answer.

Read the Questions Carefully
Read each word in the statement, circling or underlining key words and phrases. Break complex sentences into parts, and consider the validity of each part separately. Cross off irrelevant information in the statement. Circle key words listed in the next paragraph.

Look for Clue Words
Statements with the following words are usually false: all, only, never, always, because. Statements with the following words are often true: seldom, generally, most, tend to, probably, usually, often, none [note that "none" in multiple choice questions usually indicates the choice is incorrect, but the opposite is the case for true-false]. Look for familiar phrases from lecture or the textbook. The content of other questions may provide additional clues.

Don't Quibble
With true-false questions, it is especially important to resist reading too much into the statements. Don't look for hidden meanings and avoid over-analyzing the questions. Statements that are approximately true often are correct. Don't indicate that a question is false just because it is grammatically incorrect. When in doubt about the meaning of a statement, ask the instructor.

Guess
Guess at true-false questions only if no penalties are assessed for incorrect answers. Remember, if part of the statement is incorrect, the entire question is false. As a general rule, there tend to be more true than false questions on exams; so, when in doubt, guess "true." Like multiple choice tests, there may be patterns in the answers of true-false questions. But detecting the pattern requires that many of the questions are answered correctly.

Don't Change Answers
Unlike multiple choice tests, true-false answers should not be changed unless one is absolutely sure of the answer. If one is not sure, it is best to stick with the original impulse and write an explanation in the margin of the test.

MATCHING TESTS
Matching questions are particularly effective for testing students' knowledge of terms and definitions, people and their contributions, dates and important events, and other numerical information. Matching questions are classified as objective.
Read the Directions Carefully
The directions for matching questions usually contain vital information including whether questions only have one answer or more than one answer, if responses may be used only once or more than once, and how answers are to be written (on an answer sheet, on blanks on test, draw lines to match items, etc.).

Read the Column with the Longest Phrases First
To save time, read through the column with the longest phrases first. Then read and reread the shorter column to match the two.

Do the Easy Questions First
Match the items that you know for sure first, marking off the choices as you use them. If answers can only be used once, this reduces the number of choices to select from for the unknown questions.

Do the Difficult Questions Next
Try the process of elimination, crossing off known items first. Try to visualize information in the notes or textbook, or try to associate the questions with things you do know. Look for clues in grammar or tense. If answers may be used more than once, look at the items that have been used already to answer the easy questions; an instructor probably wouldn't indicate that answers could be used more than once unless some of them are. Then concentrate on the answers that have not yet been used.

Write Explanations
If you are unsure of any of your answers, write a brief explanation of your answer in the margin of the test. Clearly indicate the question number to which you are referring.

FILL-IN AND SHORT ANSWER TESTS
Fill-in the blank questions are most often used to evaluate students' recall of details like dates, terms, and people. If well written, fill-ins should be objective questions, having only one correct answer. Short answer questions, on the other hand, help to evaluate students' understanding of concepts and are more subjective. Despite these differences, similar strategies may be used when answering fill-in and short answer tests.

Read the Questions Carefully
Be sure to understand what the question is asking; refer to the list of instructional terms and definitions in the Essay Tests section of this page. Underline key words and phrases. Break complex questions into smaller parts and evaluate each part separately.

Look for Clues
Look at the grammar and tense of the questions for clues to the answer. Is the answer a noun, a verb, a qualifier? [Tip: It is a noun if you put the word "the" in front and it makes sense, and it is a verb if it makes sense with "to" in front.] Is it singular or plural? Other questions on the test may provide contextual clues.

Don't Overanalyze the Questions
Don't read too much into the wording of the questions, but take note of the clues listed above.

**Watch the Blanks**
The number of blanks, and sometimes their length, may be a clue to the answer in terms of the number or words, and perhaps the length of the words.

**Think of the Type of Information Requested**
Is the instructor looking for a technical term, a person, a number? When two items are compared, is the instructor looking for a qualifier such as increasing, decreasing, less, more, etc.? Does the instructor want you to define, describe, illustrate, or summarize?

**Make Educated Guesses**
Examine the key words and phrases in the question; picture them in your notes or try to remember hearing the instructor talk about them. Try to remember what other ideas were discussed in relation to these key words. Again, consider the context and grammar of the question.

**Overanswer**
If you think two answers may be correct, write down each with a *brief* explanation in the margin. If you have time, write more than the directions indicate, unless told otherwise.

**VOCABULARY TESTS**
Vocabulary tests evaluate students' abilities to define key terms and, less often, major concepts. One advantage for students is that vocabulary tests are fairly easy to prepare for with practice. Use the vocabulary lists at the end of the textbook chapters, or make up your own vocabulary list using the bold words in the text and key words from lecture.

**If You Know the Word, Watch for Word Traps**
Be wary of words with similar meanings (e.g. hypothesis and theory) and words that look similar (e.g. physiology and psychology, sulfide and sulfate). Pay attention to grammar; for example, if the question makes reference to a noun, the answer should be a noun.

**If the Word Look Familiar, But You're Not Sure**
Try to use the word in a sentence. Picture the word in your notes or book, or remember when it was discussed in lecture. Then try to remember what information was discussed in relation to the word.

**If You Don't Know the Word, Make an Educated Guess**
Examine the word elements (suffix, prefix and root word) for clues. Look for grammatical clues. Try to associate the unknown word with words you know. Make use of any foreign languages you know, looking for cognates.
NUMBER PROBLEMS
Tests in some courses such as math or statistics may be comprised completely of number problems. In other courses like accounting, chemistry, geology, and physics, a significant number of test questions may take this form.

Work Systematically
If the directions indicate that you are not penalized for arithmetic mistakes, spend less time on accuracy and checking answers and spend more time on setting the problem up correctly. If arithmetic errors are counted off your score, do the following. Write all numbers carefully, especially 2 and 5, 4 and 9, and 1 and 7. Write numbers in columns with the decimal points in line. Recopy answers from scrap paper very carefully. Watch units of measurement. If permitted, use a calculator for all arithmetic, even the simplest operations. Leave enough time to check answers, following the guidelines listed in a subsequent paragraph.

Organize Your Work
Make a list of all the numbers and variables given to you in the problem. Determine what you are supposed to find or calculate. Identify the formula(s) needed to solve the problem. Use pictures and graphs as needed to interpret the question, and label the visual aids with the data provided in the problem. Estimate what the answer should be before you solve the problem. What will be the relative size of the number? Will it be positive or negative?

Use All Information Given in the Problem
In most cases, all of the data provided in the question will be needed to solve the problem.

Study Visual Aids Carefully
If graphs and figures are given in the problem, study them carefully. Is the graph origin at (0,0)? What are the intervals for the axes? Are any numbers skipped on the axes? What are the units of measurement?

Don't Quit
When you run into trouble setting up the answer or solving the formulas, don’t give up. Substitute real numbers for the variables to see if the question makes more sense. Think of real-life situations when the formulas or concepts were used. If fractions are a problem, substitute rounded numbers or decimals for them.

For Multiple Choice Tests
Some number problems ask that students solve the problem and choose an answer from a multiple choice list. In this case, cover the answers until you have worked the problem. This helps to reduce biases in the way you set up the problem [unless, of course, you don’t know how to set up the problem]. Estimate what the answer should be. As a general rule, eliminate answers that are very high or very low, especially if you have to guess at the answer.

Check Your Answers
Always budget time to go over your answers. Reread the directions and each question. Make sure you have answered all parts of the question and have used the correct units of measurement. Does your answer make sense, given the
information in the problem? Compare the estimated and calculated answers. If
time permits, rework the problem using another method. If time permits, reenter
numbers into the calculator to check for accuracy. Check all decimal places and
signs. For inequalities, try substituting other numbers besides the answer to see if
they make sense.

**TAKE-HOME TESTS**
Take-home tests are a special variety of essay exams, the difference being take-
homes are completed outside of class. They share the other characteristics of
essay tests: subjective, evaluate students' understanding of concepts, evaluate
students' abilities to interpret and apply information, and evaluate students' abilities to organize information. Therefore, refer to the essay test strategies in
this page for more ideas related to take-home tests.

*Synthesize*
Instructors usually grade take-home tests, in part, on the students' abilities to
synthesize information from a variety of sources, especially the lecture notes and
the text book. It is therefore necessary to include information from all relevant
sources, including outside readings, movies, and guest speakers, in your answers.
Your answers should demonstrate that you have consulted all these sources of
information.

*Avoid Plagiarism*
Plagiarism, or using someone else's ideas without giving them credit, is against
the student codes of all schools. In many cases, plagiarism is grounds for
dismissal from school. Do not take direct quotes from a printed source without
using citations on take-home tests. Avoid excessive use of the words and ideas of
others.

Plagiarism is covered in more detail in the Writing and Proofreading page.

*Proofread*
Never turn in a take-home test without proofreading it or having someone else
look it over. More will be expected in the way of organization, logical transitions
between ideas, grammar, punctuation, and spelling on take-home tests compared
to in-class exams. Do not lose points for these types of errors. Run the spell
checker and grammar checker on your computer or word processor. Ask a
qualified person, like a tutor or an English major, to look over the answers for
grammar (not content).

*Do Your Own Work*
Instructors can easily spot take-home tests completed by students who worked
together. In some cases, students will be penalized for having similar answers that
suggest cooperative work, especially if students were instructed to work on their
own. Be on the safe side; write your own answers. Make your test unique. Make it
stand out from the others.

*Keep Copies*
Make a copy of your test answers before you turn in the test. This way you will
have proof that the test was completed in case the instructor misplaces your
exam. Make a back-up copy of the disk on which the test was saved. Once the test is returned, keep it until the final grade has been received in case there are problems with your grade.

*Don't Wait Until the Last Minute*
Take-home tests are not necessarily easier than in-class essay tests just because you may consult notes and readings. In fact, they are usually more difficult because you have to write more, include more details, and make critical evaluations.

Take-home tests require a significant time commitment. Begin the test early enough so you have plenty of time to do a first draft, have it proofed, do a final draft, and have it printed.

Don't wait until the last minute to print. Inevitably, that is when the printers will be occupied or broken. If the printers are down and you have reached the test deadline, ask the instructor if you can turn in a copy of your disk and bring in the printed version as soon after as possible. Or, the instructor may accept an e-mailed copy until the printers are fixed.

**OPEN-BOOK TESTS**

Like take-home tests, open-book tests may be more difficult than closed-book tests because the instructor usually has higher expectations of the quality and quantity of information to be written by students. Therefore, don't take open-book tests lightly. Prepare for them as seriously as one would for closed-book tests.

*Preparation*
Poor performance on open-book tests may be due to running out of time, as students’ waste time looking for things in the book. To avoid this, prepare thoroughly before the test. Make sure you know where everything is in the book. Mark important pages with paper clips. Or better yet, use tabs or "post-it" notes to briefly describe and label important sections of the text. Become familiar with using the index for looking up specific topics. Prepare summaries of major concepts, listing key points and relevant page numbers. Tape the summaries into the book.

*Work Through the Test Quickly*
If you can't find the answer after a few minutes of searching in the book, flag the question and move on. Return to that question as time permits, after you have completed the other questions. Remind yourself to work quickly, avoiding excessive search time in the book.

*Avoid Plagiarism*
Plagiarism, or using someone else's ideas without giving them credit, is against the student codes of all schools. In many cases, plagiarism is grounds for dismissal from school. Do not take direct quotes from a printed source without using citations on open-book tests. Paraphrase the information and cite the page number from which the material was taken.

Plagiarism is covered in more detail in the Writing and Proofreading page.
STANDARDIZED TESTS

Standardized tests include ACT, SAT, GRE, PPST, GMAT, and LMAT. They are used to assess students' knowledge in the areas of reading, math, and science as well as in specific content areas. Good performance on standardized tests is important because they are a condition for acceptance into most undergraduate and graduate programs or they may be required to obtain certification. Standardized tests are timed, meaning students are given a certain amount of time to complete each section of the test.

Prepare

Study materials can be purchased for some tests such as GRE and GMAT. The study guides provide sample questions as well as strategies for improving one's performance. Send for these materials early as the requests may take weeks to process. For reading comprehension, one may practice on one's own, using the strategies discussed in Reading Comprehension Tests section of this page.

Read the Directions Carefully

Some standardized tests are graded with "rights only" while others deduct points for incorrect answers. Read the directions carefully to determine how the test is scored, how much time is given per section, how answers are to be recorded, etc.

Study Sample Questions

Most standardized tests provide sample questions and answers for each section of the test. Study these carefully to get an idea of what the questions are looking for and how to mark your answers.

Work Quickly

Most standardized tests are speed tests, meaning only the best students will be able to complete the entire test during the allotted time. Spend the same amount of time on each question. For example, if there are 30 questions in a section and you are given 60 minutes to complete the section, spend no more than 2 minutes on each question. If you don't know the answer after reading the question once, mark it and move on; go back to all flagged questions as time permits after you have looked over the entire section.

Additional Sources of Strategies Information


VERBAL ANALOGY TESTS

Verbal analogies usually are found only on standardized tests. They are objective word problems that evaluate students' vocabulary and students' abilities to discern relationships among words. Verbal analogies have one pair of words related in a certain way; students must pick another pair of words related in the same manner.
The following example of a verbal analogy is quoted from Kesselman-Turkel and Peterson (1981, p. 50):

- "bigotry : hatred
  - (a) sweetness : bitterness
  - (b) segregation : integration
  - (c) equality : government
  - (d) fanaticism : intolerance"
- The answer is d.

**Practice**

Old tests and study workbooks often contain sample verbal analogies that students may answer for practice. The key is to begin preparation weeks or months before the test. Work for 30 minutes to an hour at a time. It takes considerable time to master the kind of thinking required for verbal analogy questions.

**Turn the Analogies into Sentences**

Try putting the analogy words into sentences, such as "Bigotry relates to hatred in the same way that sweetness relates to bitterness? segregation relates to integration? equality relates to government? fanaticism relates to intolerance?" (Kessellman-Turkel and Peterson, 1981, p. 50-51). Or, "Bigotry is to hatred as sweetness is to bitterness, as segregation is to integration, ... ."

**Look for Clues to the Relationship**

Try to determine what the relationship is between the two words given in the question. Are they opposites? Are they related by cause and effect? The following list, quoted from Kessellman-Turkel and Peterson (1981, p. 51-52), summarizes types of relationships found in verbal analogies.

- "Purpose: A is used for B the same way X is used for Y.
- Cause and Effect: A has an effect on B the same way X has an effect on Y.
- Part to Whole: A is part of B the same way X is part of Y.
- Part to Part: A and B are both parts of something the same way X and Y are both parts of something.
- Action to Object: A is done to B the same way X is done to Y.
- Object to Action: A does something to B the same way X does something to Y.
- Word Meaning: A means about the same as B the same way X means about the same as Y.
- Opposite Word Meaning: A means about the opposite as B the same way X means the opposite as Y.
- Sequence: A comes before (after) B the same way X comes before (after) Y.
- Place: A and B are related places just as X and Y are related places.
- Magnitude: A is greater (less) than B the same way X is greater (less) than Y.
- Grammar: A and B are parts of speech related to each other - noun to noun, adjective to noun, etc. - in the same way that parts of speech X and Y are related to each other.
• Numerical: A is numerically related to B the same way X is numerically related to Y.
• Characteristic: The attributes of A and B are related in the same way as those of X and Y.

Systematically Analyze the Words
If the relationship isn't obvious by looking at the first word and then the second, try switching the order. Or, look at the first word in the analogy and the first word in each of the choices. Then look for relationships between the second words in the analogy and the choices.

When in Doubt, Guess
Eliminate implausible answers before guessing. For example, if the words in the analogy are both verbs, cross off answers that contain a noun and a verb. Make guesses as long as points are not deducted for incorrect answers.

READING COMPREHENSION TESTS
An important component of most standardized tests like ACT and SAT is reading comprehension. This section outlines strategies to help one prepare for the reading comprehension sections of standardized tests. Because respectable standardized test scores are necessary for admission into undergraduate, graduate, and professional programs, it is important to perform well on the reading comprehension portions of these tests.

Reading comprehension tests usually contain excerpts of text a few hundred words in length. Topics of the text vary widely from popular culture to natural science to current politics. Each passage is followed by several questions based on the text. The number of questions is proportional to the length of the passages.

Three strategies for improving performance on reading comprehension tests are knowing typical questions on reading comprehension, reading the passage before the questions, and practicing reading skills (REFERENCE). Other strategies such as underlining and annotating are discussed.

For more strategies, see the Reading Comprehension Tests section of the Test Taking page.

Typical Reading Comprehension Questions
Students should become familiar with the main categories of reading comprehension questions asked on standardized tests. Having these question types in mind will help to focus one's attention while reading the passages.

Reading comprehension questions usually take one of three forms: questions based on the entire passage, questions based on sections of the passage, and questions based on particular words or sentences. Each of these is discussed and exemplified below (REFERENCE).

• Questions Based on the Entire Passage
  Questions based on the entire reading usually target the main point of the text, author intentions, main ideas, and content. Ten types of questions
Based on the entire passage are given below along with sample wordings from SAT questions.

<table>
<thead>
<tr>
<th>QUESTION TYPE</th>
<th>SAMPLE WORDING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Point: What is the passage trying to tell you?</td>
<td>The passage is mainly concerned with ...</td>
</tr>
<tr>
<td>Primary Purpose of Author: What does the author want to tell you?</td>
<td>The author's primary purpose in the passage is to ...</td>
</tr>
<tr>
<td>Mood or Attitude of Author: What is the tone or attitude of the author?</td>
<td>On the basis of the passage, the author's attitude toward ____ can most accurately be termed as one of ...</td>
</tr>
<tr>
<td>Assumptions Made by Author: What assumptions are made by the author but not directly stated in the passage?</td>
<td>Which of the following is an assumption made by the author?</td>
</tr>
<tr>
<td>Implications of Passage or Author: What does the author or the passage imply?</td>
<td>The author implies that ____ is ...</td>
</tr>
<tr>
<td>Applications of Main Ideas: How can you extend the main ideas of the passage?</td>
<td>The author provides information that would answer all of the following questions except ... According to the author, ____ would lead to ...</td>
</tr>
<tr>
<td>Summary of Passage: In a few words, how would you describe the passage? What title would you give the passage?</td>
<td>Which of the following titles best summarizes the content of the passage? Which of the following would be the most appropriate title for the passage?</td>
</tr>
<tr>
<td>Content of the Passage: What is the passage really about?</td>
<td>Which of the following describes the content of the passage?</td>
</tr>
<tr>
<td>Inferences: What can you infer from the passage as a whole?</td>
<td>It can be inferred from the passage that ...</td>
</tr>
<tr>
<td>Statements With Which the Author Would Agree: What could you say that the author would agree with, knowing the way he/she wrote the passage?</td>
<td>With which of the following statements regarding ____ would the author probably agree?</td>
</tr>
</tbody>
</table>
Questions Based on Sections of the Passage
In order to answer questions on specific sections of the passage, one must be able to identify and understand the main points in each paragraph. Look for cue words like advantages, disadvantages, similarities, differences, in contrast with, in comparison to, most importantly, primarily, and on the other hand.

Questions based on portions of the text usually deal with inferences, applications, and implications of the information. Six types of questions based on sections of the passage along with sample wordings from SAT questions are given in the following table.

<table>
<thead>
<tr>
<th>QUESTION TYPE</th>
<th>SAMPLE WORDING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inferences:</td>
<td>It can be inferred that the ancient's atomic theory was primarily based on ...</td>
</tr>
<tr>
<td>Applications:</td>
<td>The author provides information that answers which of the following questions?</td>
</tr>
<tr>
<td>What Precedes or Follows Passage:</td>
<td>It can be inferred that in the paragraphs immediately preceding the passage, the author discussed ...</td>
</tr>
<tr>
<td>Stated Ideas:</td>
<td>According to the passage, blacks were denied entrance into anti-slavery societies because ...</td>
</tr>
<tr>
<td>Implications:</td>
<td>The author implies that many American's devotion to the ideal of justice is ... In describing American attitudes about the land (lines 7-8), the author implies that ...</td>
</tr>
<tr>
<td>Tone or Mood:</td>
<td>At the conclusion of the passage, the author's tone is one of ...</td>
</tr>
</tbody>
</table>

Questions Based on Words, Phrases or Sentences
Specific details and pieces of information may be the subject of test questions. The content itself is not usually the subject of questions. Rather, the reasons for using the information or the meanings of the information are usually the subject of questions.

Two types of questions based on words, phrases, or sentences are listed in the following table along with sample wordings from SAT questions.
<table>
<thead>
<tr>
<th>QUESTION TYPE</th>
<th>SAMPLE WORDING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason for Use:</td>
<td>The author mentions Newton's <em>Principis</em> in order to ...</td>
</tr>
<tr>
<td>Why are certain words,</td>
<td></td>
</tr>
<tr>
<td>phrases, or sentences</td>
<td></td>
</tr>
<tr>
<td>mentioned or used in the</td>
<td></td>
</tr>
<tr>
<td>passage?</td>
<td></td>
</tr>
<tr>
<td>Meanings of a Word or</td>
<td>The enemy referred to in the last sentence is probably ...</td>
</tr>
<tr>
<td>Phrase:</td>
<td></td>
</tr>
<tr>
<td>What is the meaning of a</td>
<td>According to the author, the words in the Declaration of Independence, &quot;all</td>
</tr>
<tr>
<td>certain word, phrase, or</td>
<td>men are created equal,&quot; are meant to represent ...</td>
</tr>
<tr>
<td>sentence in the passage?</td>
<td>By &quot;this skepticism&quot; (line 35), the author means ...</td>
</tr>
</tbody>
</table>

*Read Passages Before Questions*

Some authors (e.g. Lunenfeld and Lunenfeld, 1981) contend that one should look over the questions before reading the passage, arguing that it saves time and focuses one's attention on certain information. But others argue that for standardized tests this practice is probably a waste of time. Because standardized tests are timed, it is important to move through the passages and questions efficiently.

If one is familiar with the common types of questions asked on standardized tests, as described on the previous tables, one will already know what to expect. "Reading the passage first forces you to get involved with the passage and with the intent of its author. By getting involved you will, in fact, anticipate many if not all of the questions that follow the passage" (REFERENCE, p. 40). If one reads the questions first, one will be tempted to move too quickly through the passage looking for the answers. As a result, the intentions and tone of the author will be lost. It is also likely that the general theme of the entire passage will be misunderstood.

*Practice Reading Skills*

One of the best ways to prepare for reading comprehension tests is to practice. It is relatively easy to find reading materials appropriate for standardized test preparation. One might also work with a buddy, finding passages and making up questions for each other.

Locate passages of text about three to six paragraphs in length from the following sources: newspaper stories, newspaper editorials, newspaper political columns, essays and columns in news magazines like *Time* or *Newsweek*, science fact magazines, encyclopedia articles, nonfiction books, and general interest magazines like *Reader's Digest*.

Read a passage, keeping in mind the common types of standardized test questions discussed previously. After completing the reading, make up questions based on the entire passage, on sections of the passage, and on specific words or sentences. Then answer your own questions.
An example of practicing reading comprehension is outlined below. Questions and answers follow the sample passage of text (REFERENCE).

• Sample Passage
"We should also know that 'greed' has little to do with the environmental crisis. The two main causes are population pressures, especially the pressures of large metropolitan populations, and the desire - a highly commendable one - to bring a decent living at the lowest possible cost to the largest possible number of people."

"The environmental crisis is the result of success - success in cutting down the mortality of infants (which has given us the population explosion), success in raising farm output sufficiently to prevent mass famine (which has given us contamination by pesticides and chemical fertilizers), success in getting the people out of the tenements of the 19th-century cities and into the greenery and privacy of the single-family home in the suburbs (which has given us urban sprawl and traffic jams). The environmental crisis, in other words, is largely the result of doing too much of the right sort of thing."

"To overcome the problems that success always creates, one must build on it. But where to start? Cleaning up the environment requires determined, sustained effort with clear targets and deadlines. It requires, above all, concentration of effort. Up to now we have tried to do it in the headlines - when what we ought to do first is draw up a list of priorities."

• Sample Questions
1. This passage assumes the desirability of
   (a) using atomic energy to conserve fuel.
   (b) living in comfortable family lifestyles.
   (c) settling disputes peacefully.
   (d) combating cancer and heart disease with energetic research.
   (e) having greater government involvement in people's daily lives.

2. According to this passage, one early step in any effort to improve the environment would be to
   (a) return to the exclusive use of natural fertilizers.
   (b) put a high tax on profiteering industries.
   (c) ban the use of automobiles in the cities.
   (d) study successful efforts in other countries.
   (e) set up a time table for corrective actions.

3. The passage indicates that the conditions that led to overcrowded roads also brought about
   (a) more attractive living conditions for many people.
   (b) a healthier younger generation.
   (c) greater occupational opportunities.
   (d) the population explosion.
   (e) greater concentration of population pressures.

4. It could be logically assumed that the author of this passage would support legislation to
(a) ban the use of all pesticides.
(b) prevent the use of autos in cities.
(c) build additional power plants.
(d) organize an agency to oversee efforts to deal with environmental problems.
(e) restrict press coverage of protests.

- **Answers to Sample Questions**
  1. Choice (b) is correct because the author discusses people leaving urban tenements to live in more attractive suburban homes. The other choices are not mentioned in the passage.
  2. Choice (e) is correct because the author argues for "clear targets and deadlines." The other choices are not mentioned in the passage.
  3. Choice (a) is correct because life in the suburbs lead to traffic problems. The other choices are not mentioned in relation to overcrowded roads.
  4. Choice (d) is correct because the author argues for directed and concentrated efforts to deal with environmental problems. The first choice is not correct because the author only indicates that pollution from pesticides is an outgrowth of modern agricultural practices. Choices (b) and (c) are not justified by the content of the passage. The author would probably welcome more press coverage as long as this is not the only form of action against environmental problems, so the last choice is not correct.

*Other Strategies for Standardized Reading Test Preparation*
Additional strategies for improving reading comprehension on standardized tests include underlining key words and numbering the main ideas or key points as one reads a passage. One also may choose to write very brief annotations in the margins while reading. The key to these strategies is to keep it brief so valuable time is not wasted.

One should work quickly while completing reading comprehension questions. The easier passages are usually given first, so don't skip them. Don't skip questions after reading a passage since this wastes time.

Don't add one's own interpretations and facts to the passage in order to answer questions. The answers should be based on the information presented in the text only, even if one disagrees with the material.

Check each answer after selecting it. Are all parts of the question answered? Is the answer contained in the text?

**IDENTIFY AND EXPLAIN TESTS**
Identify and explain tests are somewhat subjective questions requiring that students write a few sentences summing up the important aspects of the topic. The identification words may be people, places, things, or concepts.
**Use Descriptive Words**
To convey extra meaning with only a few words, use descriptive words to describe the topic. For example, instead of saying Patton was a general, write that Patton was an infamous general. On the other hand, if one is unsure of the specifics of a topic, use general words to describe it. For example, if one can't remember that Archduke Francis Ferdinand was the heir to the throne in Austria, say that he was a national leader in eastern Europe.

**Give Temporal and Spatial Details**
Whenever possible, indicate the temporal or spatial specifics of the topic. If exact dates or places cannot be remembered, use general terms. For example, if one forgets that Darwin's Origin of Species was published in 1859, write that the book was published in the mid-nineteenth century. If one can't remember the exact country (Cambodia) in which the Khmer empire arose, write that it was in southeast Asia.

**Explain the Significance**
As specifically as possible, give at least one reason why the topic is important. One may use general terms if the exact significance of the topic is uncertain. In this case, add a specific date or statistic to make the answer appear more detailed.

**ORAL TESTS**
There are several varieties of oral exams. In one case the topic of the test is supplied to the students ahead of time, permitting some out-of-class preparation. In another case, only the general scope of the test will be indicated. Oral tests evaluate students' knowledge of the topic, their abilities to organize information, and their speaking skills.

Oral tests are administered in the following manner. The student is assigned the topic to be discussed. He/she is given a certain amount of time to prepare an answer, taking notes or making an outline of the information to be covered. After that time, the answer is presented orally.

**Prepare**
Familiarize yourself with the main ideas that may be covered by the test. What were the main ideas and concepts presented in lecture? In the book? How would you discuss them? Try to predict what the exam questions may be, and develop an outline or summary of the main points and supporting details to answer each question.

**Listen Carefully to the Questions**
If allowed, take notes as you are given the question. Pay particular attention to key words, directional words, and multiple parts of the question. Rephrase the question so it corresponds to what you know about the subject. Ask for clarification if you don't understand the question. Take a few minutes to collect your thoughts.
Focus on a Topic
Instead of saying a little about several things, try to narrow the topic and discuss it in detail with many statistics, dates, or examples. When narrowing the topic, consider the major points from lecture and/or the section headings in the textbook.

Think in Threes
Try to include three main points about the topic, and support each point with three specific details.

Attend to Appearance
One's appearance can greatly influence impressions on the instructor. Wear appropriate clothes, like a skirt or dress pants. When in doubt about what to wear, err on the side of overdressing. Iron your clothes and be well groomed. Use body gestures that indicate confidence: maintain eye contact, stand quietly but not rigidly, and maintain an even tone of voice.

Use Appropriate Language
Find a "happy medium" in the language used in the answer. Using complicated words that are misused or mispronounced will not impress anyone. Avoid talking down to the audience as well. Instead, try to use language that conveys enthusiasm for the subject.

If You Don't Know the Answer
If you don't know the answer to the question, admit it and explain why. Perhaps the question is beyond the material to be covered by the exam. Or maybe you can't answer that specific question but you can discuss a related topic. Try not to panic. Instead, make a statement like, "That is an interesting question. I don't recall that topic being covered in lecture, but it seems to be related to another issue we discussed in class. ..."

Make a Good Exit
After answering the question, wait to be dismissed by the instructor. Don't forget to collect your notes and say "thank you."

Practice
Work individually or with other students to practice answering test questions orally. Make up your own questions, or refer to review questions in the textbook or workbook. Practice in front of a mirror or video camera for feedback on your style of presentation. Record the answers on audio cassettes for feedback on the content and organization of the answer. Give yourself the same amount of time you will be given in class.

AFTER THE TEST
The learning process does not end when you turn in an exam and walk out of class. Nor does it end when the test is graded and returned to you. Effective learning requires monitoring after the test. Evaluate your performance and your test-taking skills by using the following strategies.
Compare How You Prepared with How You Performed
What exam preparation strategies were used? When did you start studying? How many hours did you study and did you use that time efficiently? Did extraneous situation distract you or contribute to exam anxiety? Did you get the grade you expected? Why or why not? The Exam Debriefing section of the Monitoring page provides examples of forms used to evaluate one's preparation and performance.

Talk with the Instructor
Resolve all questions shortly after the test has been returned. If answers are not reviewed in class, ask for the correct answers to the questions you missed during or after class. Seek explanations of grades after class or, better yet, during the instructor’s office hours. Ask about strengths and weaknesses in your performance. Ask the instructor about his/her grading criteria.

Keep All Materials
Keep all tests and study materials until you have received your final grade in the class, in case there are disputes or mistakes.

Evaluate Answers
For objective questions, examine closely the correct response and your answer. Determine why you selected the answer you did, why that answer is wrong, and why you didn’t choose the correct answer. Look for a pattern in your mistakes, then develop a plan to rectify it for future exams (Chickering and Schlossberg, 1995).

Evaluate the Test Score
As indicated in the Background section of this page, tests are scored in one of two ways: norms and explicit criteria. One should evaluate his/her performance with respect to the manner in which it was scored. If one's score is based on the normative approach, one has an idea of how he/she is doing with respect to other students in the class. If one's score is based on explicit criteria, one has a measure of how well one knew the material covered on the test. In this case, be sure to understand the criteria used by the grader to score the questions. If unsure, ask the grader (Chickering and Schlossberg, 1995).

Self-Referenced Evaluation
The most important measure of exam performance is personal knowledge gained by the student. According to Chickering and Schlossberg (1995, p. 184-185), "it is the gains in knowledge or competence you have achieved, relative to where you started, that are most important. If you started out totally ignorant, you may have made great strides and still not perform very well on the exam. ... It is your learning and your standards that are critical for you, not the professor's, not the test maker's. So that should be the basis for your final interpretation."

If You Blow It
What do you do if you blow a test? Try to evaluate your performance as impartially as possible. Were your expectations of the exam met or not? Were your preparation procedures appropriate for the type of test? Was your preparation
adequate? Why or why not? Did you understand the test directions? Did you understand what the questions asked? Why or why not?

Remember to assess preparation in terms of what was done, not how many hours were spent studying. It often helps to talk with someone when one performs poorly on a test. Seek out a friend, roommate, family member, or counselor and discuss your concerns. The instructor may have suggestions for improving your performance on the next test.