

# MULTIPLE CHOICE TESTING

Advanced Assessment for HOSA Advisors



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## About this Module

Health Science Technology Education instructors who are taking this e-Learning course will learn many ways to improve classroom instruction through the use of HOSA competitive events. The focus of this particular module will be on testing, and the use of multiple choice tests.

This module is all about HOSA Category I events, and Category I events are all about testing.

As a result of the information and activities in this module, we hope to help you become more comfortable in writing multiple choice test items. While you may never be asked to write area, state or national tests for HOSA, your understanding of the elements of multiple choice tests will help improve your classroom assessment skills. At the same time, this deeper understanding may help you help your students.

There are thousands of articles written on the subject of **TEST ANXIETY**. Most of those articles are written about students who have test anxiety.

We believe that maybe teachers have a little test anxiety of their own. We also believe that when teachers learn about multiple choice testing, the anxiety is replaced by confidence. Confident teachers are in a better position to help their students. In other words, if you view the test as the enemy, so will your students. If you view the test as a tool to be mastered, so will your students.

**The goal of this unit is to help you become a better test writer, which in turn we hope will make your students better test takers, both in HOSA events and in the classroom.**

Good luck!

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## Why do We Test in HOSA?

Testing is a method of measuring what students know. In HOSA, we use multiple choice tests in two ways:

1. As a competitive event. The competitor with the highest score wins.  
Examples include:
  - a. Medical Terminology
  - b. Medical Math
  - c. Dental Terminology
  - d. Knowledge Tests
  - e. Kaiser Permanente Healthcare Issues Exam
  
2. As Round One to qualify competitors for Round Two. Examples include:
  - a. Medical Spelling
  - b. Dental Spelling
  - c. Dental Assisting
  - d. CPR/First Aid
  - e. EMT
  - f. Administrative Medical Assisting
  - g. Medical Assisting Clinical
  - h. Medical Laboratory Assisting
  - i. Nursing Assisting
  - j. Practical Nursing
  - k. Physical Therapy
  - l. Sports Medicine
  - m. Veterinary Assisting
  - n. HOSA Bowl
  - o. Medical Reading
  - p. Creative Problem Solving
  - q. Parliamentary Procedure

In all, HOSA creates and administers 26 multiple choice tests at the annual HOSA National Leadership Conference, and provides tests for states to use in Regional and State competition, for a total of nearly 5000 multiple choice test items every year. That's a lot of test items!

And that also gives you 5000 reasons why you should become a knowledgeable and proficient test item writer!

## Why do We Test in the Classroom?

Classroom tests, when used properly, provide the teacher with essential information.

- Feedback                      So we know if our students got it.  
    So our students know if they got it.  
    So the school, parents and stakeholders know if our students got it.
- Benchmarking                How are we doing compared to others?
- Achievement                Helping students learn how to meet pre-defined standards in order to reach a goal. (Licensure, certification, etc.)

In some classrooms, testing is just “a score.” It becomes more of a “gotcha” mechanism than a feedback tool. If you test and move on without understanding the test results, then you may want to re-think your use of classroom testing.

Testing sometimes earns a negative response from teachers because of the quantity of outside tests, as well as high stakes testing. Teachers often feel that “end-of-course” tests are not a true reflection of what the student knows, and that SAT or ACT tests are not a true reflection of what a student is capable of doing.

Our hope with this Module is for the HSTE teacher to:

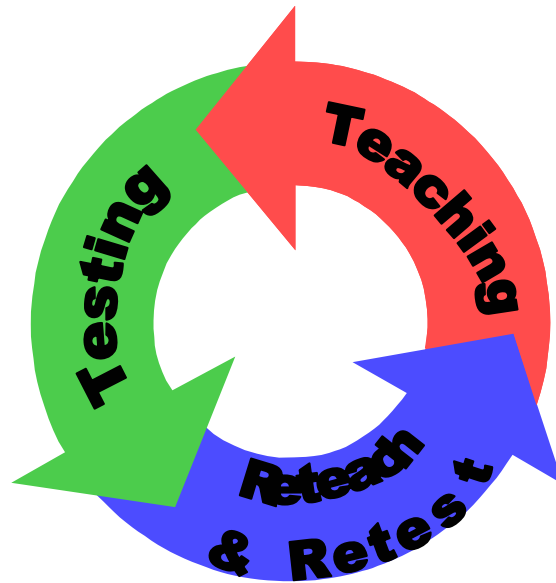
- Explain the use of testing in HOSA.
- Become a better item writer.
- Help students improve their test taking skills.



Find your balance by understanding the nature and use of multiple choice tests.

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## Classroom Assessment



### Why do teachers assess students?

- ☞ To determine whether what has been taught has also been learned, how well, and by how many
- ☞ To monitor the progress of individual students as well as of groups
- ☞ To evaluate instructional methods and procedures
- ☞ To amass and retain accurate records of student attainment
- ☞ To aid learning

If you want to know if they know:

*Completion*  
*Matching*  
*Multiple Choice*  
*Essay*

If you want to know if they can do it:

*Performance*

If you want them to do it:

*Product*  
*Project*

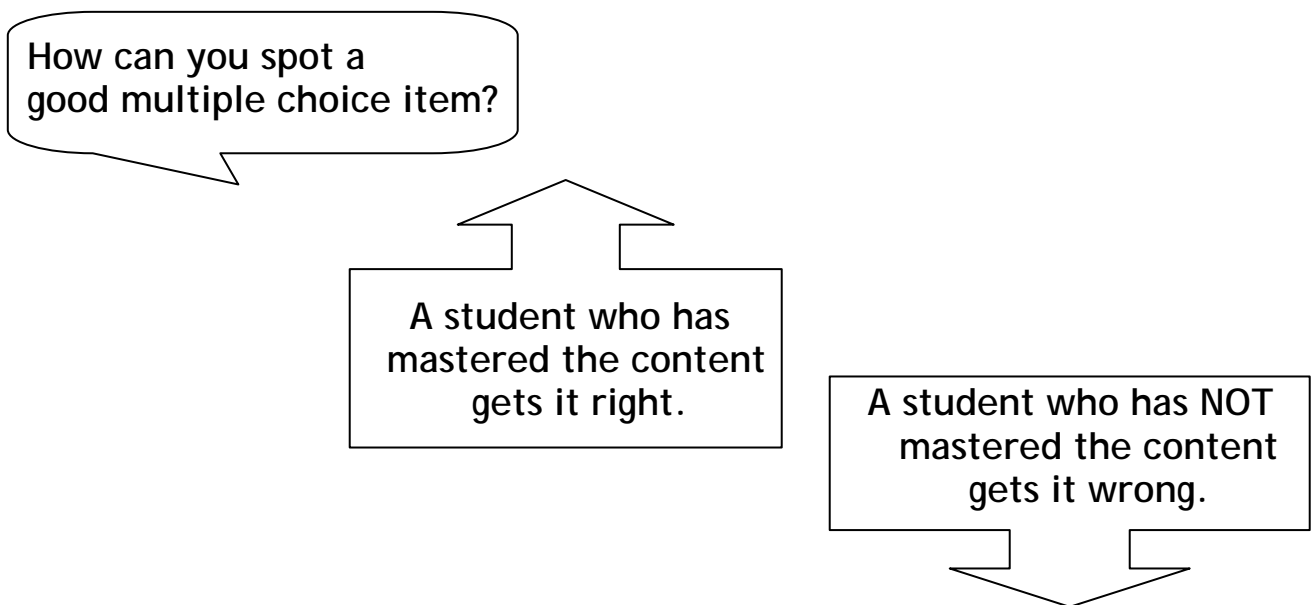
HOSA competitive events use multiple choice, performance, product and project assessment. Classroom teachers use a variety of assessments to measure student learning.

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## Why Multiple Choice?

This learning module will focus entirely on multiple choice testing. Multiple choice tests have a few advantages over other types of testing, including:

- Very high reliability and validity
- Relatively inexpensive to develop and implement
- Measures factual information
- Measures understanding
- Samples broadly
- Eliminates guessing
- Eliminates writing skill
- Easy to score
- Scoring is objective
- Pinpoints learning errors
- Provides instant feedback (in the classroom)



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## Test Plan

The first thing you need is a PLAN.

In order to create a test, the test developer must know how many items to draw from each competency. In HOSA competitive events the test plan is included in the event guidelines.

### Medical Terminology Test Plan

Content	%	TI
Roots, prefixes, suffixes and combining forms	45%	45
Overview of body	5%	5
Skeletal	5%	5
Muscular	5%	5
Respiratory	5%	5
Digestive	5%	5
Cardiovascular and Lymphatic	5%	5
Nervous/Special Senses	5%	5
Endocrine	5%	5
Reproductive	5%	5
Integumentary	5%	5
Urinary	5%	5
	100%	100

% - Percent in event guidelines test plan

TI = Number of test items in a 100 item test

Should classroom tests have a plan? Yes!!!!

**VERY IMPORTANT**

Teachers should write the test BEFORE teaching a unit, and should share the test plan with the students before the test.

Here's why. When teachers write the test before teaching the unit, they tend to write questions about the most important concepts, and then stress those concepts during instruction.

When the teacher writes the test the night before it is given, he or she tends to measure the things that are easy to measure, which may not be aligned with instruction.

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## Item Standards

Item standards are rules about multiple choice test items that are recommended by psychometricians - experts in writing test items. The standards are based on research results and help improve the quality of test items.

- First and foremost, the item must measure the competency.
- Each item should deal with an important aspect of the content area, and not with trivia.
- Writers should avoid trick items which are misleading or deceive students into answering incorrectly.
- Item content should be accurate and up to date.

### Anatomy of a Test Item

For the purpose of this module, we will use the following terminology:

This is the  
STEM.

The Occupational Outlook Handbook provides information on a variety of:

- A. Employers with job vacancies.
- B. E-mail addresses for businesses.
- C. College majors.
- D. Careers.

These are **RESPONSE CHOICES**.  
There is one correct answer and  
three **DISTRACTOR**S.

### The Stem

- Clear and concise
- Readable
- Asks a question or prompts for missing information
- Student should know what to look for after reading the stem
- Keep it positive (do not use "except" or "not" questions)
- Critical terms in ALL CAPS

### The Distractors

- All plausible
- One clearly correct answer
- Length is not a clue to the correct answer
- Grammatically correct
- Logical order if possible
- Avoid "All of the Above" and "None of the Above"

Now that you know the rules it is time to start writing test items.

## Item Writing Steps

1. **COMPETENCY:** Start with the competency or objective if you are writing classroom items. Before, during and after writing an item, BE SURE the item measures the competency.

When writing items for HOSA practice tests, refer to the test plan.

2. **MEASURING THE CONTENT:** To write an item, decide what concept you wish to measure. For example, if we wish to measure the student's knowledge of urinary system terminology, we might ask the following question:

In what organ would you find a nephron?

- A. Liver
- B. Pancreas
- C. Kidney
- D. Muscle

If we wanted to write 5 items for this objective, we would try to balance the questions to measure terminology related to the urinary system.

3. **READING LEVEL:** The level of reading difficulty and the vocabulary level (with the exception of technical terms) should be appropriate for the average student in the lowest grade level at which the course is offered.
4. **GET TO THE POINT:** Be sure the item doesn't contain more information than is absolutely needed. Take, for example, the following item:

Marie went on a ski weekend with friends. As she was skiing down the mountain she ran into a tree. She sustained multiple injuries and was air-lifted from the mountain to a local hospital. She had surgery to repair a fracture of the largest bone in her body. What bone did she fracture?

- A. Radius
- B. Tibia
- C. Humerus
- D. Femur

**What's wrong with this question?** TOO MUCH INFORMATION! By the time the student gets to the end of the question, he/she may be confused as to what the question is really asking.

Try this instead:

What is the largest bone in the body?

- A. Radius
- B. Tibia
- C. Humerus
- D. Femur

5. **ITEM STANDARDS:** Know and follow the item standards as described on Page 8 of this document.

## Higher Order Thinking Skills

Can you use multiple choice assessments to measure understanding and application?  
Yes. Look at the different types of knowledge that can be assessed.

### Basic Knowledge

A test item measures basic knowledge if it asks the student to:

- Recall previously learned material
- Recall specific facts
- Bring to mind the requested information
- Define or describe something
- Answer who, what, when, where or how

For example:

A motion that closes a meeting is the motion to:

- A. Adjourn.
- B. Dismiss.
- C. Recess.
- D. Suspend.

The correct answer is A.

### Higher Order Thinking Skills

Test items written at a higher level relate to the student's ability to apply, analyze, synthesize, or evaluate information.

A test item measures higher order thinking skills if it asks the student to:

- Apply principles to a new situation
- Apply rules, concepts, methods, laws or theories
- Solve mathematical problems
- Construct charts or graphs
- Demonstrate the correct usage or a procedure
- Identify or analyze parts
- Distinguish between facts and inferences
- Analyze the organizational structure of something

- Evaluate the importance of data
- Produce something new by putting parts together
- Write a theme, story, poem, or plan
- Solve a problem
- Judges the value of something
- Answer why
- Classify, outline, or diagram something
- Predict an outcome

For example:

According to *Robert's Rules of Order*, which of the following motions would be allowed if the motion to Limit Debate is pending?

- A. Adjourn
- B. Amend
- C. Postpone indefinitely
- D. Refer to a committee

The correct answer is A.

Notice in the above example that the student must apply the rules of 5 different types of motions to a new situation. In this example, the new situation is that the motion to limit debate is pending. The student must use higher order thinking skills to decide which of the given motions is appropriate.

In HOSA, at least 25% of the questions on a test are written to measure higher order thinking skills. In the classroom, your goal should be greater than 50%!

### Another Example

Remember this question?

What is the largest bone in the body?

- A. Radius
- B. Tibia
- C. Humerus
- D. Femur

This is a recall question. If you wanted to write a "femur" question that is considered a higher order thinking question, you would write something like this:

If you fractured your femur, you would not be able to:

- A. Talk.
- B. Write.
- C. Walk.
- D. Cough.

Do you notice a difference? Think about what is going on in your mind as you answer the question. Are you processing the information differently?

Let's try another one.

Suppose you taught the term "contusion" and shared the following information with students:

- Contusion = bruise
- Caused by blunt trauma to soft tissue
- Causes bleeding under the skin

Can you write a lower level thinking question? Sure you can! It's pretty obvious and easy.

What is the medical term for a bruise?

- A. Contusion
- B. Abrasion
- C. Laceration
- D. Avulsion

Now, try measuring the content with a higher order thinking question. How about this one:

Jake was mugged and suffered multiple contusions. What weapon did Jake's attacker use?

- A. A knife
- B. Pepper spray
- C. A sword
- D. His fists

Writing higher order thinking questions takes practice. The following sections contain suggestions for making it easier.

## When It's Easy

Sometimes it is relatively easy to write higher order thinking questions. The ease or difficulty depends on the nature of the content.

Math problems are easy. The math problems you write may not be easy to solve, but they will be very easy to write. Math items are application questions because they require the learner to compute or solve.

When application questions for terms are easy to create, then writing those items can be very easy. Let's look at an example:

CONTENT - MEDICAL LEGAL TERMS	
Assault	A threat of an attempt to injure another person in an illegal manner.
Battery	Unlawful touching of another person without consent, with or without injury.
Invasion of privacy	Unlawful making known to the public any private or personal information without the consent of the wronged person.
Libel	Communicating something untruthful and harmful about another person in writing.
Malpractice	Bad or harmful practice that injures another person.
Negligence	Failure to perform duties in a reasonable and customary way.
Slander	Verbally communicating something untruthful and harmful about another person.

Consider the content above. Creating scenario questions for the definitions given above is relatively easy - for example:

A surgeon who accidentally removes the wrong kidney could be guilty of:

- A. Slander.
- B. Libel.
- C. Invasion of privacy.
- D. Malpractice.

## Skill Questions

Writing questions about skills and procedures can also be easy. Asking a question about the order of steps requires the learner to think through the entire procedure and arrange steps in proper order. For example:

When measuring a blood pressure, what should you do next after hearing the diastolic pressure?

- A. Remove the sphygmomanometer
- B. Remove your stethoscope
- C. Let the air out of the cuff
- D. Listen for the systolic pressure

### When it Gets More Challenging

We find it more difficult to write items when the content is primarily behavior. That is because many times the correct behavior is obvious in a multiple choice item.

For example - Look at the following job interview behaviors.

#### Job Interviewing

1. Do plan to arrive on time or a few minutes early. Late arrival for a job interview is never excusable.
2. If presented with an application, do fill it out neatly and completely. Don't rely on your application or resume to do the selling for you. Interviewers will want you to speak for yourself.
3. Do greet the interviewer by last name if you are sure of the pronunciation. If not, ask the employer to repeat it. Give the appearance of energy as you walk. Smile! Shake hands firmly. Be genuinely glad to meet the interviewer.
4. Do wait until you are offered a chair before sitting. Sit upright, look alert and interested at all times. Be a good listener as well as a good communicator.
5. Do look a prospective employer in the eye while speaking.
6. Do follow the interviewer's leads, but try to get the interviewer to describe the position and the duties to you early in the interview so that you can apply your background, skills and accomplishments to the position.
7. Do make sure that your good points come across to the interviewer in a factual, sincere manner. Stress achievements. For example: sales records, processes developed, savings achieved, systems installed, etc.
8. Do always conduct yourself as if you are determined to get the job you are discussing. Never close the door on opportunity.
9. Do show enthusiasm. If you are interested in the opportunity, enthusiastic feedback can enhance your chances of being further considered. If you are not interested, your responsiveness will still demonstrate your professionalism.
10. Don't forget to bring a copy of your resume! Keep several copies in your briefcase if you are afraid you will forget.
11. Don't smoke, even if the interviewer does and offers you a cigarette. Do not chew gum.
12. Don't answer with a simple "yes" or "no." Explain whenever possible. Describe those things about yourself which relate to the situation.
13. Don't lie. Answer questions truthfully, frankly and succinctly.

14. Don't make unnecessary derogatory remarks about your present or former employers. Obviously, there were issues or else you would not have left a prior company or be looking to leave a present employer. However, when explaining your reasons for leaving, limit your comments to those necessary to adequately communicate your rationale.
15. Don't inquire about salary, vacations, bonuses, retirement, etc., on the initial interview unless you are sure the employer is interested in hiring you. If the interviewer asks what salary you want, indicate what you've earned but that you're more interested in opportunity than in a specific salary.

Now, consider the following question. Is this a good higher order thinking question to measure item #13 from the list above?

The interviewer, a big sports fan, asks you "Why did you stop playing basketball your senior year?" The truth is that you were cut your senior year because of your lack of skills and effort. How would you respond?

- A. "I chose not to play basketball my senior year and focus on my studies instead."
- B. "I was cut my senior year."
- C. "The coach and I had differences and we decided I should not play my senior year."
- D. "I prefer not to answer that question."

The correct answer is B.

This is actually a pretty good question. The approach you need to take is "application" or scenario questions.

Another trick for item writing is to look for questions that require the learner to infer or differentiate among answers.

Using the Job Interview points we wrote this question:

What should you do FIRST at a job interview?

- A. Sit up straight
- B. Be enthusiastic
- C. Greet the interviewer by last name
- D. Shake hands firmly

The correct answer is C. The person being interviewed would do all four things, but greeting the interviewer immediately precedes the handshake.

## Real Experiences

Experienced professionals often rely on their own work experiences as fuel for writing test items. "What would you do if..." questions are usually very effective because they make good application questions.

A 17 year-old student is working at a hospital pharmacy. The pharmacist asks the student to drive her car to a neighborhood pharmacy a mile away to pick up some medications. The student should:

- A. Explain that she is not permitted to leave her work location.
- B. Walk to the pharmacy since she cannot drive the car.
- C. Call her teacher ask for permission to drive to the pharmacy.
- D. Drive to the pharmacy as directed by the pharmacist.

In the example, one of the rules for clinical assignments is that the student NEVER leaves the assigned area without permission from the instructor. Also, driving a car for work purposes is against child labor laws for anyone under the age of 18. Consequently, the correction answer is A.

A word of caution. If you write questions from your own experiences, you may wish to change the scenario slightly so that the identity of the student is protected.

## When in Doubt, Turn it Over

Sometimes we find that the best way to focus on the content that needs to be tested is to read the content, then turn the page over and think about what is really important, and what is the author trying to say. Doing this keeps us from trying to measure the minutia and rather focus on the big picture.

Can you read the "Attitude" content and write a "big picture" question?

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### ATTITUDE

- A. What is attitude?
  - 1. Attitude is our general outlook on life.
  - 2. Attitude is a feeling or emotion.
  - 3. Attitude is the way we choose to react to people and situations.
  - 4. Our attitude can be positive or negative.
    - a. A positive attitude is seeing the "good" in things, making the best of a bad situation (optimistic).
    - b. A negative attitude is seeing the "bad" side of things (pessimistic).
- B. Why is learning about attitudes important?
  - 1. We can be more successful if we have a positive attitude.
  - 2. People who have a positive attitude are generally happier.
  - 3. More employees lose their job because of poor attitudes than because of poor work skills.
- C. How is our attitude developed?
  - 1. By following other role models

2. Our attitude may be influenced by the messages media sends and the role models media characters portray. Analyze the different attitudes that are portrayed by characters in sitcoms, dramas, etc....
  - a. Television
  - b. Movies
  - c. Books
  - d. Magazines
  - e. Music
3. 80% of people let others control their thinking...80%!
  1. Do we have a choice on whether we have a positive or a negative attitude? YES!
    1. We make choices every day. What are examples of choices you made today, starting from when you woke up?
      - a. Whether to get up when your alarm went off
      - b. What to wear
      - c. Whether to arrive at school on time
      - d. Whether to smile and say hello to people
      - e. Whether to participate in class or not
    2. We **choose** to feel good about life. We **choose** to look on the bright side of things or be miserable and find the worst in everything.
    3. Do our attitudes fluctuate? YES.
  2. How does our past affect our attitude?
    1. Bad or poor choices we made in the past can affect our attitude. Sometimes we stay down on ourselves when we have made a bad or poor choice.
    2. The environment we are raised in can affect our attitude both positively and negatively.
    3. We cannot change our past decisions or actions. And you have a limited influence on your living environment since you are teenagers and most of you have to live at home.
      - a. But, we can learn from our past.
      - b. We can choose to do things differently in the future.
      - c. We can choose to look at the bright side of things, even when much of it is out of our control.

How important is attitude in a work setting?

- A. Attitude is far less important than work performance
- B. Employers only value employees with a good attitude
- C. Employees should hide their negative attitude from the boss
- D. Employee attitudes affect job performance and satisfaction

### Misconception: Higher Order Thinking Questions are Difficult

Actually, it is most often the distracters that makes a question difficult. Consider the following question.

A surgeon who accidentally removes the wrong kidney could be guilty of:

- A. Slander.
- B. Libel.
- C. Invasion of privacy.
- D. Malpractice.

This item has a low level of difficulty. The student should easily recognize D as the correct answer. Clearly, the other 3 choices are legal terms but not at all related to malpractice.

Now, take a look at the same question when we change the distracters:

A surgeon who accidentally removes the wrong kidney could be guilty of:

- A. Negligence.
- B. Battery.
- C. Breach of contract.
- D. Malpractice.

Does the question have a higher level of difficulty? While answer D is still the best answer, options B and C could be argued. Option A is very similar to option D. Because the distracters are now more reasonable, the question has a higher level of difficulty.

We believe that there are three types of distracter sets:

1. Not even close
2. In the same content area but clearly not correct
3. Similar to the correct answer but not quite as good as the correct answer

Items writers should never write questions with Type 1 distracters. A non-instructed test taker would be able to determine the correct answer by looking at the far-fetched answer choices. When that is done, we are not evaluating anything!

An item writer should consider the testing audience when deciding whether to use Type 2 or Type 3 distracters - or both. Type 3 distracters will usually be more challenging to the test taker.

## Test Taking Strategies

Teachers must help students learn long-term study habits to develop the knowledge, skills and abilities related to the content that is measured by a test.

1. Research shows that students who have a good attitude about testing have higher levels of achievement than students who do not have a good attitude about testing. Students internalize their attitudes about testing from significant adults.
2. Teachers and students must have a basic understanding of what will be measured on a test, and what is expected of the test taker.
3. Students benefit when they have an opportunity to become familiar with the format of the test. Students should have practice with:
  - a. The type of questions that will be asked and how to deal with each type.
  - b. Following directions.
  - c. Performing under specific time constraints - to include using time wisely and pacing themselves appropriately.
  - d. Terms and vocabulary used on the test.
4. Students should be taught how to deal with test anxiety.
5. Students should have an opportunity to practice with any tools they will be expected to use on the test (calculators, computers, etc.).
6. Students should have an understanding of how the test will be scored. They should know if they will be penalized for an incorrect answer or guessing.
7. Students should be taught how to make educated guesses - by eliminating choices, especially on a multiple choice test.
8. Students should get a good night's sleep and eat a breakfast of substance routinely before taking any test.
9. Some students find it helpful to cover the answers, read the stem, and think about what the question is asking - BEFORE looking at the answer choices.
10. Teachers should remember that ASSESSMENT provides FEEDBACK. Classroom tests tell the teacher what the students have learned, and what they have NOT learned. Intervention should occur at the unit level, with teachers developing strategies for reteaching BEFORE the last few days of the course.
11. Teachers must set an example that values the retention of course content. Show students that course knowledge must be retained to be applied in work-based learning experiences. If teachers "test and move on" both literally and philosophically, so will the students.

## Classroom Testing Ethics and Practices

Testing involves ethical considerations for privacy, individual rights, and equality. Public Law 93-380 grants parents of children under the age of 18 the right to access educational records, and the right to challenge their accuracy.

Teacher-made tests need not be abandoned, however, teachers should use care and common sense in the administration, interpretation, and use of tests.

### Testing Best Practices

- Grade tests in class as a way to reinforce learning.
- Set a goal to return graded tests the next day. More than 3 days is TOO LONG!
- Provide an equal playing field for assessment. For example, a teacher requires all tests be returned, saves them, and then gives them back to students to study from for the final exam.
- Allow study time in class, perhaps in pairs.
- Use a green pen. Don't use red. (Red ink is perceived by students as negative and green as positive.)
- Keep a learning focus. If there is a way to re-teach and re-test - do it.
- Take the time to make positive comments on tests. It's a nice way to communicate with students.



## Be Positive About Testing!

Being positive creates energy,  
generates enthusiasm, promotes inner peace,  
lessens fear, and induces joy!

Encourage - DON'T Discourage!



Praise + Enthusiasm = Success

**TEACH STUDENTS NOT TO WORRY!**  
Worrying is a counter-productive activity.  
It tends to drain energy, dampen enthusiasm,  
create tension and stress,  
and is a waste of one's valuable time.