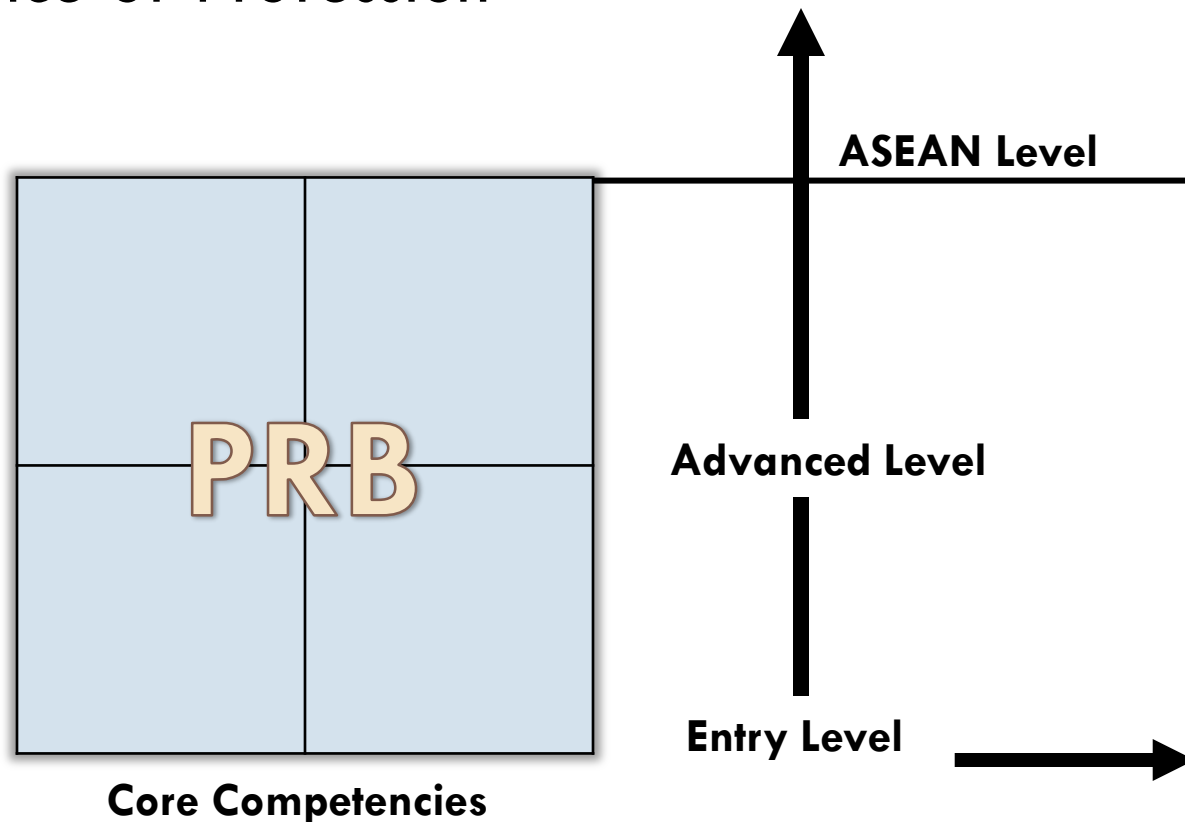


DAY 2: TEST CONSTRUCTION

Leticia M. Asuzano, PhD.

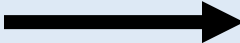
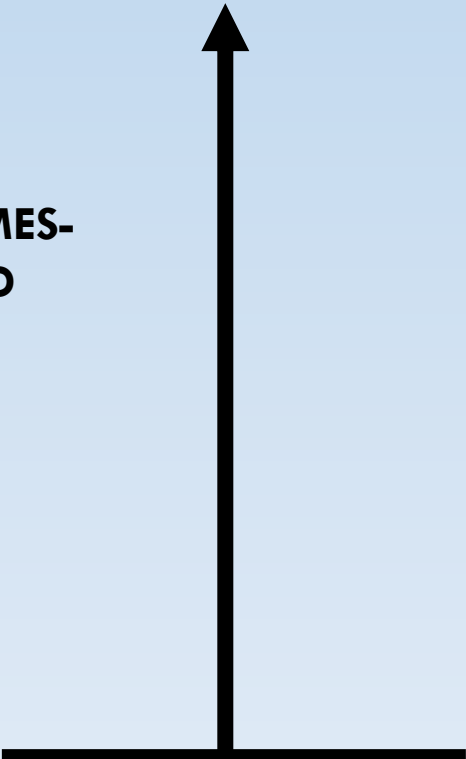
I. ROLE OF PRB'S – Regulation of Profession

- A. Entry to Profession – Tests given by PRC
- B. Practice of Profession



CORE COMPETENCIES

OUTCOMES-
BASED



PRB Tests

PASS

FAIL

Continuing
Development
Programs

Entry Level

Retake Exam

CHED
requirements

TEST is...

- A measuring tool to capture one's cognitive traits through pen and paper
- A tool in which measuring unit depends on its length and the level of difficulty of items as indicated by their assigned points.
- Able to allow students to answer at the same time using the same format
- Object scoring of tests
- Easy ranking of students
- Easy conversion to decision making

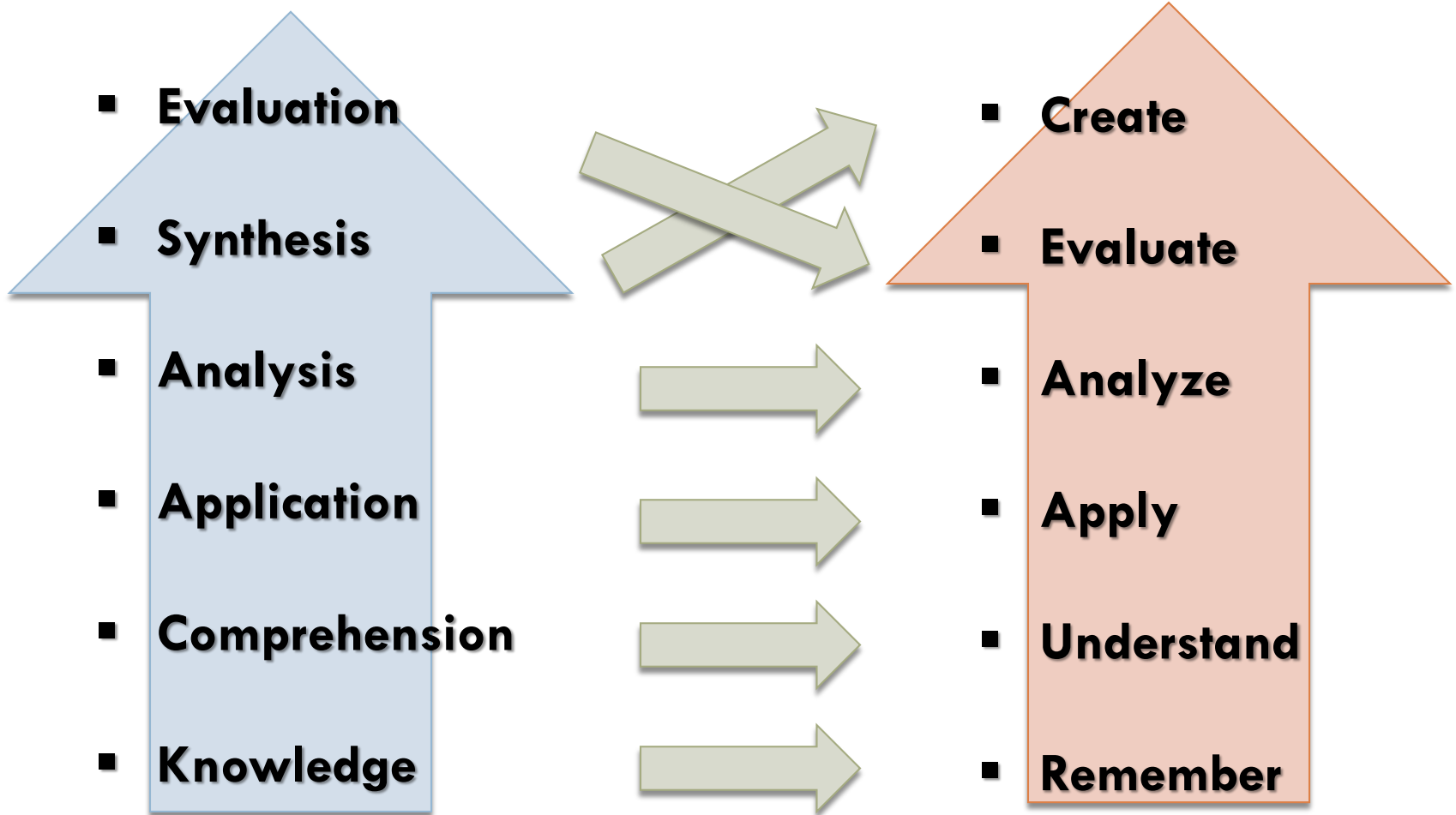
Why test?

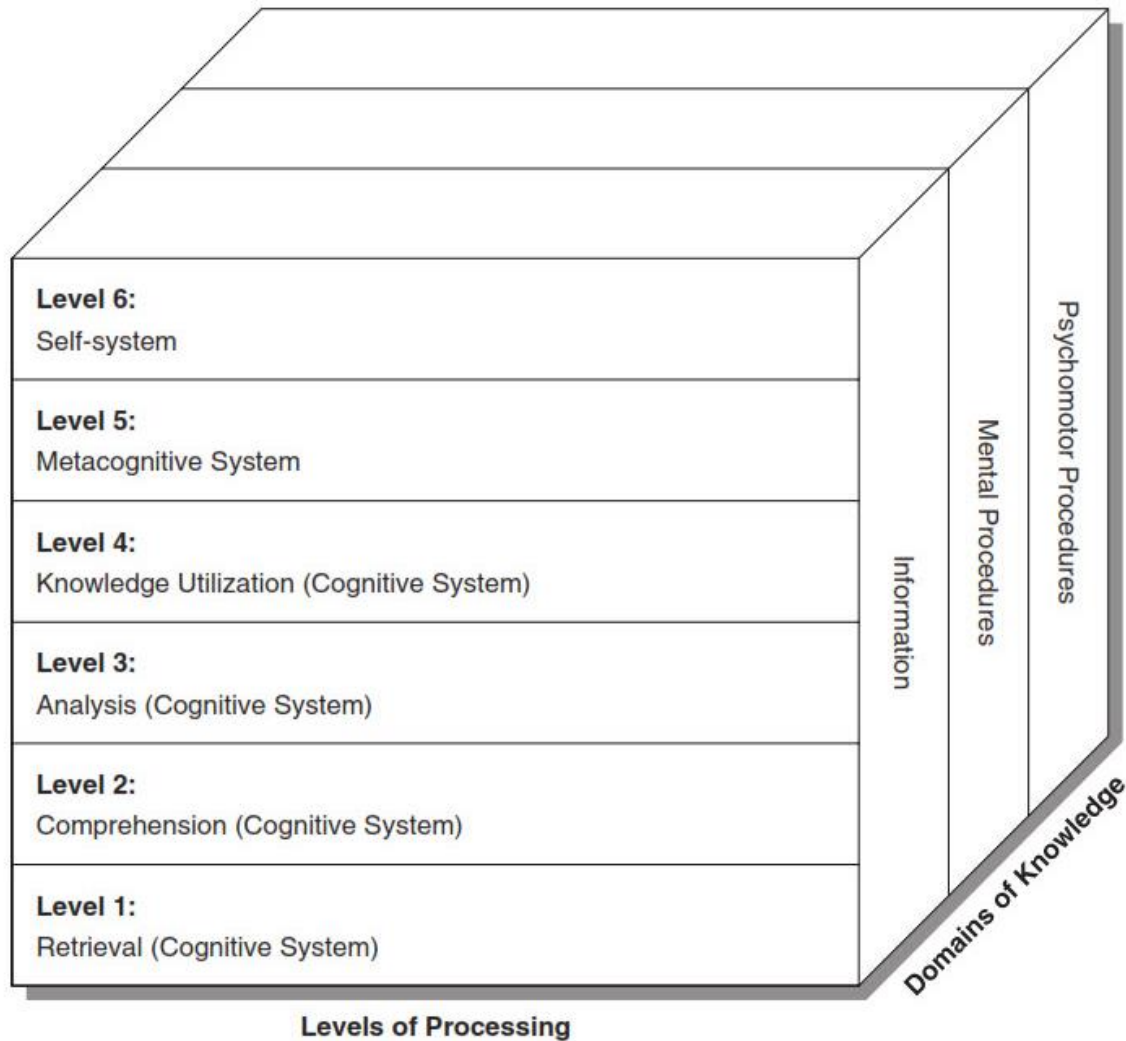
- What cognitive learning objectives should be targeted by the test?

The **revised taxonomy of cognitive behavior** could serve as the framework of the test.

Original Terms
(Bloom & Associates, 50s)

Original Terms
(Anderson & Krath, 50s)

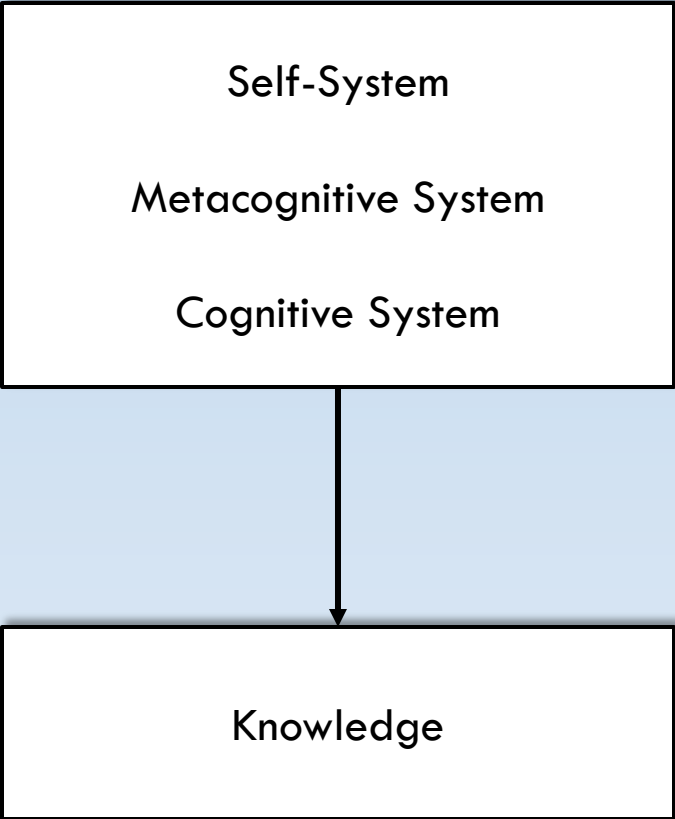




THE NEW TAXONOMY



Bloom's Taxonomy



New Taxonomy

<i>New Taxonomy Level</i>	<i>Operation</i>	<i>General Form of Objectives</i>
Level 1: Retrieval	Recognizing	The student will be able to validate correct statements about features of information, but not necessarily understand the structure of the knowledge or differentiate critical and noncritical components.
	Recalling	The student will be able to produce features of information, but not necessarily understand the structure of the knowledge or differentiate critical and noncritical components.
	Executing	The student will be able to perform a procedure without significant error, but not necessarily understand how and why the procedure works.

<i>New Taxonomy Level</i>	<i>Operation</i>	<i>General Form of Objectives</i>
Level 2: Comprehension	Integrating	The student will be able to identify the basic structure of the information, mental procedure, or psychomotor procedure and the critical as opposed to noncritical characteristics.
	Symbolizing	The student will be able to construct an accurate symbolic representation of the information, mental procedure, or psychomotor procedure differentiating critical to noncritical characteristics.

<i>New Taxonomy Level</i>	<i>Operation</i>	<i>General Form of Objectives</i>
Level 3: Analysis	Matching	The student will be able to identify important similarities and differences relative to the information, mental procedure, or psychomotor procedure.
	Classifying	The student will be able to identify superordinate and subordinate relative to the information, mental procedure, or psychomotor procedure.
	Analyzing Errors	The student will be able to identify errors in the presentation or use of the information, mental procedure, or psychomotor procedure
	Generalizing	The student will be able to construct new generalizations or principles based on the information, mental procedure, or psychomotor procedure
	Specifying	The student will be able identify logical consequences of the information, mental procedure, or psychomotor procedure

<i>New Taxonomy Level</i>	<i>Operation</i>	<i>General Form of Objectives</i>
Level 4: Knowledge Utilization	Decision Making	The student will be able to use the information, mental procedure, or psychomotor procedure to make decisions in general or make decision about the use of information, mental procedure, or psychomotor procedure.
	Problem Solving	The student will be able to use the information, mental procedure, or psychomotor procedure to solve problems in general or solve problems about the information, mental procedure, or psychomotor procedure.
	Experimenting	The student will be able to use the information, mental procedure, or psychomotor procedure to generate and test hypotheses in general or generate and test hypotheses about the information, mental procedure, or psychomotor procedure.
	Investigating	The student will be able to use the information, mental procedure, or psychomotor procedure to conduct investigations in general or conduct investigations about the information, mental procedure, or psychomotor procedure.

<i>New Taxonomy Level</i>	<i>Operation</i>	<i>General Form of Objectives</i>
Level 5: Metacognition	Specifying Goals	The student will be able to establish a goal relative to the information, mental procedure, or psychomotor procedure and a plan for accomplishing that goal.
	Process Monitoring	The student will be able to monitor progress toward the accomplishments of a specific goal relative to the information, mental procedure, or psychomotor procedure.
	Monitoring Clarity	The student will be able to determine the extent to which he or she has clarity about the information, mental procedure, or psychomotor procedure.
	Monitoring Accuracy	The student will be able to determine the extent to which he or she is accurate about the information, mental procedure, or psychomotor procedure.

<i>New Taxonomy Level</i>	<i>Operation</i>	<i>General Form of Objectives</i>
Level 6: Self-System Thinking	Examining Importance	The student will be able to identify how important the information, mental procedure, or psychomotor procedure is to him or her and the reasoning underlying this perception
	Examining Efficacy	The student will be able to identify beliefs about his or her ability to improve competence or understanding relative to the information, mental procedure, or psychomotor procedure and the reasoning underlying this perception
	Examining Emotional Response	The student will be able to identify his or her emotional responses to the information, mental procedure, or psychomotor procedure and the reasons for these responses.
	Examining Motivation	The student will be able to identify his or her overall level of motivation to improve competence or understanding relative to the information, mental procedure, or psychomotor procedure and the reasons for this level of motivation.

THE REVISED BLOOM'S TAXONOMY

COGNITIVE PROCESS DIMENSION

Knowledge Dimension

	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual						
Conceptual						
Procedural						
Metacognitive						

THE REVISED BLOOM'S TAXONOMY

KNOWLEDGE DIMENSION	DESCRIPTION
Factual	Terminologies, specifics details and elements
Conceptual	Knowledge of classifications, principles, generalization, theories, models and structures
Procedural	Knowledge of subject-specific skills and algorithms/procedures
Metacognitive	Self-knowledge, strategic knowledge, contextual and conditional knowledge, knowledge of a cognitive task

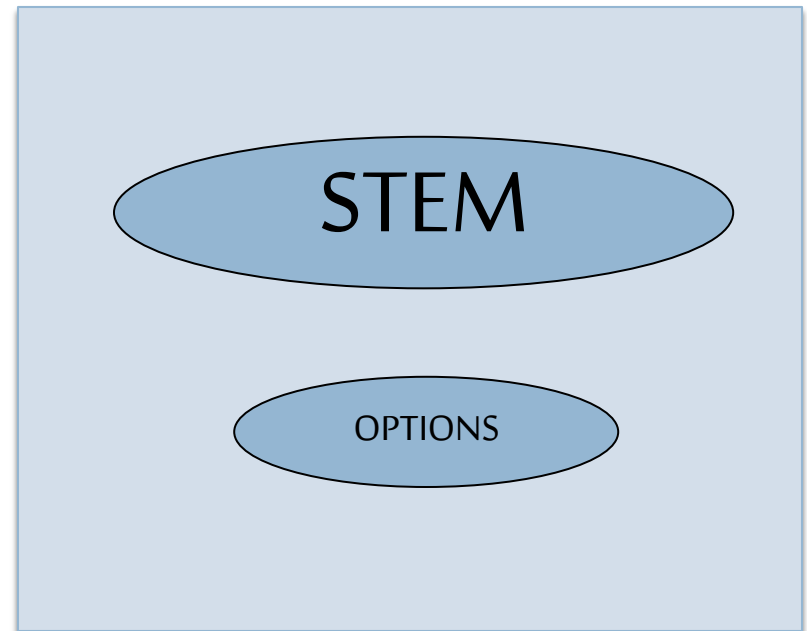
Cognitive Behaviors in the Revised Bloom's Taxonomy

Remember:	Retrieving, recognizing and recalling relevant knowledge from long-term memory.
Understand:	Constructing meaning from oral, written, and graphic messages through interpreting, exemplifying, classifying, summarizing, inferring, comparing and explaining.
Apply:	Carrying out or using a procedure through executing or implementing.
Analyze:	Breaking material into constituent parts, determine how the parts relate to one another and to an overall structure or purpose through differentiating, organizing, and attributing
Evaluate:	Making judgments based on criteria and standards through checking and critiquing.
Create:	Putting elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure through generating, planning, or producing.

II. CONSTRUCTION OF TESTS

MULTIPLE CHOICE TYPE

-A test which consists of a stem and options where the examinee must choose one correct answer.



Multiple Choice Type

- ❑ Easy to correct
- ❑ Good percentage of guessing
- ❑ Easy to manipulate

PLANNING YOUR TEST

- Step 1. Know and identify your objectives/learning outcomes.**
- Step 2. List the major topics that you are to cover in the particular test you are going to construct.**
- Step 3. Plan out the type of tests you want and map out the number of items you want for each of the topic you are to cover in the time allotted.**
- Step 4. Summarize into a Table of Specifications or grid.**

Steps in Preparing a Table of Specifications (TOS)

1. **Decide on your standards/objectives/learning outcomes.**
2. **Look at the major topics that contain the MOST ESSENTIAL points (i.e. knowledge, concepts, skills, attitudes) of the subject.**
3. **Consider the length of time spent in teaching for each major topic.**
4. **Then decide on the following:**
 - a) length of the test
 - b) type of the test
 - c) percentage distribution of items
 - d) number of items

Framework for a Table of Specifications (TOS)

CONTENT \ SKILLS	KNOWLEDGE	UNDERSTANDING/ COMPREHENSION	APP/EVA/SYN HOTS	TOTAL NO. of ITEMS
I.				25%
II.				30%
III.				30%
IV.				15%
	30%	40%	30%	100%

SUGGESTIONS FOR WRITING BETTER MULTIPLE CHOICE ITEMS

1. BE SURE THE STEM OF THE ITEM CLEARLY FORMULATES A PROBLEM.

Poor Item: Hemoglobin A₁C

- *A. Is measured by affinity chromatography
- B. Reflects diabetic control over several hours
- C. Is a new thalassemia variant
- D. Has decreased affinity for oxygen

Improved: Hemoglobin A₁C can be measured in the clinical laboratory by

- *A. affinity chromatography
- B. titration
- C. ELISA
- D. Nephelometry

2. INCLUDE AS MUCH OF THE ITEM AS POSSIBLE IN THE STEM, AND KEEP OPTIONS AS SHORT AS POSSIBLE

Poor: The term “empty calorie” food designates:

- *A. a food that has few essential nutrients but high caloric value.
- B. a food that has neither essential nutrients nor caloric value.
- C. a food that has both high nutritive value and high caloric value.
- D. a food that has high nutritive value but low caloric value.

Improved: The term “empty calorie” applies to foods that are:

- *A. low in nutrients and high in calories.
- B. low in both nutrients and calories.
- C. high in both nutrients and calories.
- D. high in nutrients and low in calories.

3. INCLUDE IN THE STEM ONLY THE MATERIAL NEEDED TO MAKE THE PROBLEM CLEAR AND SPECIFIC.

Poor: Cells of one kind belong to a particular group performing a specialized duty. We call this group of cells a tissue. All of us have different kinds of tissues in our bodies. Which of the following would be classified as epithelial tissue?

- A. tendons
- B. adenoids and tonsils
- *C. mucous membranes
- D. cartilage

Improved: Which of the following would be classified as epithelial tissue?

- A. tendons
- B. adenoids and tonsils
- *C. mucous membranes
- D. cartilage

4. USE THE NEGATIVE ONLY SPARINGLY IN AN ITEM.

EXAMPLE 1:

Poor: Which of the following structures of the ear is NOT concerned with hearing?

- A. eardrum
- B. oval window
- *C. semicircular canals
- D. cochlea

Improved: Which of the following structures of the ear helps to maintain balance?

- A. eardrum
- B. oval window
- *C. semicircular canals
- D. cochlea

Even Better: Which of the following structures of the ear helps to maintain balance?

- A. cochlea
- B. eardrum
- *C. oval window
- D. semicircular canals

5. USE NOVEL MATERIAL IN FORMULATING PROBLEMS THAT MEASURE UNDERSTANDING OR ABILITY TO APPLY PRINCIPLES.

EXAMPLE 1:

Poor Measures Rote Memory: Which of the following foods will yield the largest number of calories when metabolized in the body?

- *A. 1 gram of fat
- B. 1 gram of sugar
- C. 1 gram of starch
- D. 1 gram of protein

Improved (Application): Which of the following would result in the greatest reduction of calories if it were eliminated in the daily diet?

- *A. 1 tablespoon of butter
- B. 1 tablespoon of granulated sugar
- C. 1 slice of white and rich bread
- D. 1 boiled egg

6. BE SURE THAT THERE IS ONE AND ONLY CORRECT OR CLEARLY BEST ANSWER WHERE EXPERTS WOULD GENERALLY AGREE.

EXAMPLE 1:

Poor : A color-blind boy inherits the trait from a:

- A. Male parent
- *B. female parent
- C. maternal grandparent
- D. paternal grandparent
- E. remote ancestor.

Improved: A color-blind boy most probably inherited the trait from his:

- A. Father.
- *B. Mother.
- C. paternal grandfather
- D. paternal grandmother

7. BE SURE WRONG ANSWERS ARE PLAUSIBLE.

EXAMPLE 1:

Poor : Which of the following elements is found in proteins but not in carbohydrates or fats?

- A. Carbon dioxide
- B. oxygen
- C. water
- *D. nitrogen

EXAMPLE 2:

Poor: The gas formed in the cells after the oxidation of food, and taken to the lungs and expelled is:

- A. oxygen
- *B. carbon dioxide
- C. helium
- D. chlorine

8. BE SURE NO UNINTENTIONAL CLUES TO THE CORRECT ANSWER ARE GIVEN.

EXAMPLE 1: Clang Association

Poor : The function of the platelets in the food in the blood is to help in:

- A. Carrying oxygen to the cells.
- B. carrying food to the cells.
- *C. clotting of the blood.
- D. fighting disease.

Improved: Which of the following structures in the blood helps in forming blood clots?

- A. Red blood cells
- B. lymphocytes
- *C. platelets
- D. monocytes

EXAMPLE 2: Specific Determiners

Poor : Which of the following is characteristic of anaerobic bacteria?

- A. They never live in soil.
- *B. They can live without molecular oxygen.
- C. They always cause disease.
- D. They can carry on photosynthesis.

Improved: The one characteristic that distinguishes all anaerobic bacteria is their ability to:

- A. Withstand extreme variation in air temperature
- *B. Live without molecular oxygen.
- C. Live as either saprophytes or parasites
- D. Reproduce either in living cells or nonliving culture media.

EXAMPLE 3: Length Clues

Poor : The term *side effect* of a drug refers to:

- A. Additional benefits from the drug.
- B. The chain effect of drug action.
- C. The influence of drugs on crime.
- *D. Any action of the drug in the body other than the one the doctor wanted the drug to have.

Improved: Which of the following, if it occurred, would be a side effect of aspirin for a man who had been taking two aspirin tablets every 3 hours for a heavy cold and slight fever?

- A. Normal body temperature
- B. Reduction in frequency of coughing
- C. Easier breathing
- *D. Ringing in the ears.

EXAMPLE 4: Grammatical Inconsistency

Poor : Penicillin is obtained from a:

- A. bacteria.
- *B. mold.
- C. coal tars.
- D. tropical trees.

Improved: Penicillin is obtained from:

- A. bacteria.
- *B. molds.
- C. coal tars.
- D. tropical trees.

9. USE THE OPTION “NONE OF THESE” OR “NONE OF THE ABOVE” OR “ALL OF THE ABOVE” USE ONLY WHEN THE KEYED ANSWER CAN BE CLASSIFIED UNEQUIVOCALLY AS CORRECT OR INCORRECT.

EXAMPLE 1:

- Poor :** Of the following, the one that is never a function of the stem of plants is:
- A. conduction
 - B. photosynthesis
 - C. support.
 - D. food storage
 - *E. none of the above

EXAMPLE 2:

Poor : How many pints of blood does a normal human adult of average weight have?

- A. 3 pints
- *B. 13 pints
- C. 30 pints
- D. 50 pints
- E. none of the above

Improved : Approximately what percentage of the body weight of a healthy human adult is blood?

- A. 3% to 5%
- *B. 8% to 9%
- C. 12% to 15%
- D. 20% to 25%