Speaker

Shelby L. Garner, PhD, RN, CNE is an Assistant Professor at Baylor University where she has taught in their BSN program for 4 years. Her teaching experience has been primarily focused on medical surgical didactic courses, medical surgical clinical, and undergraduate research. Dr. Garner has a BSN from Texas Christian University, a MSN from University of Phoenix, and a PhD in Health Studies with a focus in Higher Education from Texas Woman’s University. Prior to teaching at Baylor University, Dr. Garner taught in the ADN program at Grayson County College for 10 years.

In addition to committee service at Baylor University, Dr. Garner serves as Health Science Chair for a national organization, the Council on Undergraduate Research (CUR) and was recently appointed to their World Congress to promote undergraduate research globally. Dr. Garner’s current research trajectory focuses on global nurse migration and she has recently conducted and published a number of studies on the topic. Other publications include journal articles on effective teaching strategies for undergraduate nursing students, and RN and LVN case studies for HESI/Elsevier. She is one of the 4 contributing authors for the most recent edition (4th ed.) HESI Comprehensive Review for the NCLEX RN Examination. Dr. Garner has a passion for teaching undergraduate nursing students and is committed to preparing them to pass the NCLEX RN exam and to practice nursing safely and professionally.
The Classroom has Changed!

Then

Now
Objectives

1. Analyze conceptual frameworks related to effective testing.

2. Implement strategies to assess content validity of a curriculum, both internally and externally.

3. Apply guidelines for developing test items that require critical thinking for student success.

4. Analyze the reliability and validity of a test and test items.

5. Critique evidence-based program testing policies.

6. Evaluate and edit test items to improve their critical thinking property.
Critical Thinking

**DEFINITION:**
1. The process of analyzing and understanding how
2. and why we reached a certain conclusion.

Discuss with students early and often.
What behaviors illustrate critical thinking?
In order to think critically...

One must be able to:

• Recognize problems, to find workable means for meeting those problems.
• Understand the importance of prioritization and order of precedence in problem solving.
• Gather and marshal pertinent (relevant) information.
• Recognize unstated assumptions and values.
• Comprehend and use language with accuracy, clarity, and discernment.
• Interpret data to appraise evidence and evaluate arguments.
Additional Abilities

- Recognize the existence (or non-existence) of logical relationships between propositions.
- Draw warranted conclusions and generalizations.
- Put to the test conclusions and generalizations at which one arrives.
- Reconstruct one's patterns of beliefs on the basis of wider experience.
- Render accurate judgments about specific things and qualities in everyday life.
Conceptual Framework
Richard Paul

The art of thinking about your thinking while you are thinking in order to make your thinking better:

• More Clear
• More Accurate
• More Defensible
Terminology changes "The graphic is a representation of the NEW verbiage associated with the long familiar Bloom's Taxonomy. Note the change from Nouns to Verbs [e.g., Application to Applying] to describe the different levels of the taxonomy. Note that the top two levels are essentially exchanged from the Old to the New version." (Schultz, 2005) Source: [http://www.odu.edu/educ/llschult/blooms_taxonomy.htm](http://www.odu.edu/educ/llschult/blooms_taxonomy.htm)
Bloom’s Taxonomy Revised Terms

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

(Anderson & Krathwohl, 2001, pp. 67-68)
Bloom’s Taxonomy (continued)

• **Remembering:** *Can the student recall or remember the information?* define, duplicate, list, memorize, recall, repeat, reproduce, state

• **Understanding:** *Can the student explain ideas or concepts?* classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, paraphrase

• **Applying:** *Can the student use the information in a new way?* choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write.

• **Analyzing:** *Can the student distinguish between the different parts?* appraise, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, test.

• **Evaluating:** *Can the student justify a stand or decision?* appraise, argue, defend, judge, select, support, value, evaluate

• **Creating:** *Can the student create new product or point of view?* assemble, construct, create, design, develop, formulate, write
Built on the principle that measurement of educational attributes is useful in predicting performance.
Conceptual Model for Developing Test Items That Stimulate Critical Thinking (Nibert, 2004)

Classical Test Theory
Measurement of educational attributes is useful in predicting performance

Cognitive Taxonomy (Bloom 1956)

Critical Thinking Theory (Paul 1993)

Relationship between Curriculum and Good Test Items behaviors illustrate critical thinking?
Sound Instruction

Instruction

Objectives

Educator’s Golden Triangle

Evaluation

Outcomes
Breaking the Triangle Down

- Philosophy
- Outcomes
- Objectives

- Instructional Methods

- Evaluation Tools
Curriculum Evaluation
Internal Curriculum Evaluation
Internal Evaluation

- Faculty Testing Committee
- Test Blueprint
- Data Programs
- Storage of Item discrimination data
Testing Committee

- Faculty committee to design and revise the school’s testing policies
- Exam Development and Administration
- Determine acceptable statistical parameters for Test Items and Exams
Writing Style Protocol

Establishing clear guidelines for faculty leaves little room for ambiguity; helps insure uniformity in the presentation of exams throughout the curriculum:

• Will present or past tense be used for test items?
• Will options end in periods, whether or not there are complete sentences?
• Will all options begin with a capital letter?
• When stressing a word in the stem, will it be highlighted, boldfaced, italicized, underlined?
• Will the term patient or client be used?
Determination of Acceptable Statistical Parameters

- What is the acceptable number of mastery items to include?

- What is the minimum acceptable difficulty level for a test item?

- What is an acceptable discrimination level (PBCC) for a test item?

- What is an acceptable reliability coefficient for the exam?
Resources for Developing Critical Thinking Test Items and Alternate Format Questions for Nursing National Council of State Boards of Nursing

- [www.ncsbn.org](http://www.ncsbn.org)
  - NCLEX® Test Plans
    - RN
    - PN
  - Candidate info
- Alternate format items
- Innovative Items
- Test Taking
- FAQ
National Board of Respiratory Care NEW  7/3/13

Therapist Multiple-Choice Exam Detailed Content

I. Patient Data and Evaluation and Recommendations

II. Troubleshooting and Quality Control of Equipment and Infection Control

III. Initiation and Modification of Interventions

Test Blueprints

Method for conducting analysis of content validity

- Faculty Generated
- Electronically Generated

Categories to consider

- NCSBN, AACN, NLN, QSEN, Concepts (Nursing)
- Other Disciplines
# Faculty Made Test Blue Print

<table>
<thead>
<tr>
<th></th>
<th>Objective A</th>
<th>Objective B</th>
<th>Objective C</th>
<th>Objective D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remember</td>
<td>1</td>
<td></td>
<td>1</td>
<td>1</td>
<td>3 (7.5%)</td>
</tr>
<tr>
<td>Understand</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>7 (17.5%)</td>
</tr>
<tr>
<td>Apply</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>15 (37.5%)</td>
</tr>
<tr>
<td>Analyze</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>10 (25%)</td>
</tr>
<tr>
<td>Evaluate</td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
<td>2 (5%)</td>
</tr>
<tr>
<td>Create</td>
<td></td>
<td></td>
<td>2</td>
<td>1</td>
<td>3 (7.5%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>10</td>
<td>8</td>
<td>11</td>
<td>11</td>
<td>40 (100%)</td>
</tr>
</tbody>
</table>
# Exam Blueprint

<table>
<thead>
<tr>
<th>Category</th>
<th>Percent Exam</th>
<th>In Cat</th>
<th>In Calc</th>
<th>Mean Diff</th>
<th>Mean PBCC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Default</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall Exam</td>
<td>100.00%</td>
<td>55</td>
<td>50</td>
<td>0.795</td>
<td>0.362</td>
</tr>
<tr>
<td><strong>Nursing Process</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment</td>
<td>9.09%</td>
<td>5</td>
<td>5</td>
<td>0.859</td>
<td>0.345</td>
</tr>
<tr>
<td>Analysis</td>
<td>10.91%</td>
<td>6</td>
<td>6</td>
<td>0.803</td>
<td>0.343</td>
</tr>
<tr>
<td>Planning</td>
<td>23.64%</td>
<td>13</td>
<td>12</td>
<td>0.895</td>
<td>0.342</td>
</tr>
<tr>
<td>Implementation</td>
<td>50.91%</td>
<td>28</td>
<td>24</td>
<td>0.732</td>
<td>0.371</td>
</tr>
<tr>
<td>Evaluation</td>
<td>7.27%</td>
<td>4</td>
<td>4</td>
<td>0.707</td>
<td>0.408</td>
</tr>
<tr>
<td><strong>Client Needs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safe/Effective Environment</td>
<td>20.00%</td>
<td>11</td>
<td>11</td>
<td>0.856</td>
<td>0.330</td>
</tr>
<tr>
<td>Management of Care</td>
<td>9.09%</td>
<td>5</td>
<td>5</td>
<td>0.862</td>
<td>0.360</td>
</tr>
<tr>
<td>Safety &amp; Infection Control</td>
<td>9.09%</td>
<td>5</td>
<td>5</td>
<td>0.845</td>
<td>0.344</td>
</tr>
<tr>
<td>Health Promotion &amp; Maintenance</td>
<td>3.64%</td>
<td>2</td>
<td>1</td>
<td>0.673</td>
<td>0.367</td>
</tr>
<tr>
<td>Psychosocial Integrity</td>
<td>5.45%</td>
<td>3</td>
<td>3</td>
<td>0.856</td>
<td>0.354</td>
</tr>
<tr>
<td>Physiological Integrity</td>
<td>70.91%</td>
<td>39</td>
<td>35</td>
<td>0.779</td>
<td>0.372</td>
</tr>
<tr>
<td>Basic Care/Comfort</td>
<td>18.18%</td>
<td>10</td>
<td>8</td>
<td>0.802</td>
<td>0.282</td>
</tr>
</tbody>
</table>
External Evaluation

- Benchmarking
  - Standardized Exams
  - Licensing Exams

Valid

Reliable
How to Write Test Items that Stimulate Critical Thinking
**Background Information**

- Students live and breathe from test to test: Begin early to change the culture from “what is on the test?” to “how will this help patients?”
- Use critical thinking test items in class – start early.
- Know your overall curriculum test plan and schedule.
- Continuous improvement of tests and items – faculty team goal (can’t work in silos).
- Focus on clinical application of content.
- If a test is not reliable and valid, then the student scores are not reliable and valid and not indicative of the students understanding of the topic.
NLN Fair Testing Imperative in Nursing Education

• Faculty are ethically obligated to insure that tests and decisions based on tests are valid, evidence based and fair to all test takers.

• Strategies used to assess learning are limited and imperfect.

Critical Thinking Test Items

Morrison, Nibert, & Flick (2006)

- Contain Rationale
- Written at the Application Level or Above
- Require Multilogical Thinking to Answer
- Ask for High Level of Discrimination
Why Write Rationales?

Test Review

- Learning experience
- Faculty friendly
- Legally defensible
- Consider various strategies for test review
The platelet count of a client receiving chemotherapy is 30,000/mm³. Which intervention is most important to include in this patient’s care?

A. Place the patient in protective isolation

B. Frequently assess the patient’s blood pressure

C. Observe the patient for signs of dehydration.

D. Assess the patient for abnormal bleeding
A patient with a platelet count of 30,000/mm³ is at risk for bleeding because the blood is unable to clot normally (D).

The normal platelet count is 100,000-400,000/mm³.

(A) is indicated for a patient with neutropenia (decreased WBCs).

(B) is indicated for a patient with a decreased Hgb or Hct.

(C) might be indicated for a patient with continuous vomiting (often a side effect of chemotherapy).

However, with a low platelet count, (D) has a greater priority than (C).
Written at the Application Level & Above

- Prepare students for licensing exams
- Promote thinking about clinical problems
- Cause teaching methods to become creative
At what age should we expect the anterior fontanel to close?

A. 12 months
B. 15 months
C. 18 months
D. 21 months
At what age should we expect the anterior fontanel to close?

A. 12 months

B. 15 months

C. 18 months

D. 21 months

Correct Answer = C
When comparing the closing of the anterior and posterior fontanels, the clinician knows that the anterior fontanel closes:

A. before the posterior fontanel
B. after the posterior fontanel
C. at the same time as the posterior fontanel
D. 6 months after birth and the posterior at birth
When comparing the closing of the anterior and posterior fontanels, the clinician knows that the anterior fontanel closes:

A. before the posterior fontanel
B. after the posterior fontanel
C. at the same time as the posterior fontanel
D. 6 months after birth and the posterior at birth

Correct Answer = B
When performing a physical assessment of a 28-month-old boy, the clinician notes that he has an open anterior fontanel. What action is best for the clinician to implement?

A. Instruct the family to bring the child to the clinic for weekly assessments

B. Report the findings to the attending physician immediately

C. Document the physical findings in the client’s record

D. Teach the parents how to palpate and assess the child’s fontanels
When performing a physical assessment of a 28-month-old boy, the clinician notes that he has an open anterior fontanel. What action is best for the clinician to implement?

A. Instruct the family to bring the child to the clinic for weekly assessments

B. Report the findings to the attending physician immediately

C. Document the physical findings in the client’s record

D. Teach the parents how to palpate and assess the child’s fontanels

Correct Answer = B
Rationale

The anterior fontanel normally closes by 18 months and the posterior by 2 months.

Therefore, this finding is abnormal and may be indicative of hydrocephalus; it should be reported to the physician immediately (B).

Weekly assessments (A) would only watch the anomaly continue, although after the physician has evaluated the situation, he may want follow-up done weekly.

Although the findings should be documented, (C) this intervention does not have the priority of (B).

(D) might be appropriate, but does not have the priority of (B).
DEFINITION:

Thinking that requires knowledge of more than one fact to logically and systematically apply concepts to a clinical problem.
Which breakfast selection indicates that the client understands the dietician’s instructions about the dietary management of osteoporosis?

A. Egg-beaters, toast, and coffee
B. Bran muffin, mixed fruit, and orange juice
C. Granola bar and grapefruit juice
D. Bagel with cream cheese and skim milk
Which breakfast selection indicates that the client understands the dietician’s instructions about the dietary management of osteoporosis?

A. Egg-beaters, toast, and coffee

B. Bran muffin, mixed fruit, and orange juice

C. Granola bar and grapefruit juice

D. Bagel with cream cheese and skim milk

Correct Answer = D
Rationale

The primary dietary implication of osteoporosis is the need for increased calcium, and a reduction in foods that decrease calcium absorption, such as caffeine and excessive fiber.

(D) includes dairy products that contain calcium and does not include any foods that inhibit calcium absorption.

(A, B, and C) do NOT include any source of calcium, and (A and B) DO contain foods that may reduce calcium absorption.
Highly Discriminating

Questions should provide viable alternatives so that they require a high degree of discrimination to answer.
Critical Thinking Questions

- Which intervention is most important?
- Which intervention, plan, assessment data is/are most critical to developing a plan of care?
- Which intervention should be done first?
- What action should the nurse take first?
- Which intervention, plan, nursing action has the highest priority?
- What response is best?
A young adult male is admitted to the ER following a motor vehicle crash in which he sustained a head injury. Which assessment finding provides the earliest indication that the client is experiencing increased intracranial pressure?

A. Lethargy

B. Decorticate positioning

C. Fixed dilated pupil

D. Clear drainage from the ear
A young adult male is admitted to the ER following a motor vehicle crash in which he sustained a head injury. Which assessment finding provides the earliest indication that the client is experiencing increased intracranial pressure?

A. Lethargy

B. Decorticate positioning

C. Fixed dilated pupil

D. Clear drainage from the ear

Correct Answer = A
Reliability - Consistency of Score
Reliability

- is the consistency of the measurement

- A test (or test item) is reliable, when high-scoring test-takers consistently answer the question(s) correctly and low scoring test takers consistently answer the questions incorrectly.
Actual Situation

- Reliability is determined by the same students taking the same exam today that they took yesterday. If they make the same score on the second day that they made on the first day, the test is reliable **Right?**

- **WRONG**—they would have previous experience with the exam and such experience would influence their scores on the second examination experience.

- Statistical measures that describe the internal consistency (reliability) of exam scores using the result of only one test
Validity

Does the test measure what it claims to measure?

According to the Standards for Educational and Psychological Testing (1999):

“Validity … refers to the appropriateness, meaningfulness, and usefulness of the inferences made from test scores.” Therefore, it is not a test, but rather the inferences drawn from a test that are ultimately evaluated for validity.
Item Analysis

- The presence of even a few poor items on an exam reduces reliability, sometimes to a great extent.

- The more items you have, the greater the chance of poor test items.

- Length of exam
  - 50 items
  - 70-100 for comprehensive exam
Post-Analysis RELIABILITY

Helps to determine the quality of the test
Reliability Tools for Exams

- Cronbach alpha - EXAM (a variety of test items)

- Kuder-Richardson Formula 20 (KR20)(dichotomous data-right or wrong) — EXAM

- Range from -1 to +1
Ways to Improve an Exam’s Reliability

Increase the Length of the Test *or* Improve each Test Item
Item Analysis – 3 Steps

1. Review Difficulty Level – percent correct

2. Review Discrimination Data
   - Item Discrimination Ratio (IDR)
   - Point Biserial Correlation Coefficient (PBCC)

3. Review Effectiveness of Alternatives
   - Response Frequencies
   - Non-distracters
Parameters for Test Item Difficulty

- Difficulty level = % of correct responses to a test item
- Depends on number of distracters, there is a different % of correct responses
  - 3 options - 67%
  - 4 options - 63% (Standard for NCLEX)
  - 5 options - 60%

75%-85% is the usual standard
Mastery Test Items

- Items that cover essential nursing content
- Should identify essential content before item is developed
- Purpose of inclusion: to reinforce the content
- Should include no more than 10% of an exam, since they have little or no discrimination value and detract from reliability
Item Discrimination Ratio (IDR)

- IDR is the difference between the lower-scoring 27% and the upper-scoring 27% of test takers who answered the test correctly.

- An acceptable IDR is 25% or above. Items with scores below this are poor discriminators.

- Items with an IDR of 40% or above are excellent discriminators.

- Items with zero discrimination or a negative discrimination should probably not be used again.
Powerful Measure of Discrimination

- Point Biserial Correlation Coefficient (PBCC)

- Range from -1 to +1
  - 0.30 & above - Excellent item
  - 0.20-0.29 - Good
  - 0.15-0.19 - Acceptable
  - 0.10-.14 - Poor and revise
Interpretation of Test Items Discrimination Data

- Is information outdated?

- Is content being taught differently?

- Is the test item being shared by students?

- Is the size of the group small?

- Is student absence influencing the item discrimination data? (*Might want to use cumulative data if you have it.*)
Actions for poor test items

1. Give credit for more than one answer.
   - Total # of items remains the same; many students’ exam scores are likely to increase.

2. Nullify test item by giving credit for all choices.
   - Total # of items remain the same; scores of students who answered it incorrectly will increase and students who answered it correctly will stay the same.

3. Delete the item from the exam.
   - Total number of items decreases, scores of student that answered it incorrectly will increase; scores of students who answered it correctly will decrease.
Standards of Acceptance

- **Item difficulty** 30% - 90%
- **Item Discrimination Ratio** 25% and Above
- **PBCC** 0.20 and Above
- **KR20** 0.70 and Above
Standards of Acceptance
Nursing and Health Professions

- **PBCC** 0.15 and Above

- **KR20** 0.60 - 0.65 and Above
### Summary of Test Analysis Findings

#### Item Difficulty

<table>
<thead>
<tr>
<th>Item Code</th>
<th>Item Description</th>
<th>30% or below of Total Group</th>
<th>Above 30% but below 90% of Total Group</th>
<th>90% Or Above of Total Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>395572</td>
<td>IM equip</td>
<td>0.075</td>
<td></td>
<td></td>
</tr>
<tr>
<td>395593</td>
<td>Nocturnal emis</td>
<td>0.125</td>
<td></td>
<td></td>
</tr>
<tr>
<td>395495</td>
<td>Heparin fill-in</td>
<td>0.200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>395540</td>
<td>PO calcium calc</td>
<td></td>
<td>0.325</td>
<td></td>
</tr>
<tr>
<td>395563</td>
<td>IV pump fill-in</td>
<td></td>
<td>0.500</td>
<td></td>
</tr>
<tr>
<td>395500</td>
<td>Pedi fill in blank</td>
<td></td>
<td>0.600</td>
<td></td>
</tr>
<tr>
<td>395520</td>
<td>IV cal fill-in</td>
<td></td>
<td>0.600</td>
<td></td>
</tr>
<tr>
<td>395335</td>
<td>Urine catheter</td>
<td></td>
<td>0.625</td>
<td></td>
</tr>
<tr>
<td>395494</td>
<td>Narcan-fill in blank</td>
<td></td>
<td>0.650</td>
<td></td>
</tr>
<tr>
<td>395221</td>
<td>Kayexalate enema</td>
<td></td>
<td>0.725</td>
<td></td>
</tr>
<tr>
<td>395288</td>
<td>Transdermal instr</td>
<td></td>
<td>0.750</td>
<td></td>
</tr>
<tr>
<td>395380</td>
<td>Spiritual distress</td>
<td></td>
<td></td>
<td>1.000</td>
</tr>
<tr>
<td>395417</td>
<td>Iodized salt</td>
<td></td>
<td></td>
<td>1.000</td>
</tr>
<tr>
<td>395459</td>
<td>Charting omission</td>
<td></td>
<td></td>
<td>1.000</td>
</tr>
<tr>
<td>395556</td>
<td>Fl vol excess/IV</td>
<td></td>
<td></td>
<td>1.000</td>
</tr>
<tr>
<td>395561</td>
<td>Hi protein meal</td>
<td></td>
<td></td>
<td>1.000</td>
</tr>
</tbody>
</table>

| % of Exam | 5.45% | 47.27% | 47.27% |
### 7/1/2005 Results

- **Class:** Summer I
- **Mean Score:** 83.15
- **Standard Deviation:** 9.05
- **Number of Students:** 40
- **Date:** 10/21/2005
- **Reliability (Kr20):** 0.78

### Summary of Test Analysis Findings

#### PBCC

<table>
<thead>
<tr>
<th>Item Description</th>
<th>0.09 and &lt; Poor Item</th>
<th>&gt; 0.09 - 0.14 Marginal</th>
<th>&gt;0.14 - 0.19 Acceptable Item</th>
<th>&gt;0.19 - 0.29 Good Item</th>
<th>&gt; 0.29 Excellent Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>QID 1 adm</td>
<td>0.020</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Position-dyspnea</td>
<td>0.055</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IM equip</td>
<td>0.069</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PO calcium calc</td>
<td>0.101</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient bill of rights</td>
<td>0.127</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypoxia S&amp;S</td>
<td>0.131</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaphylaxis-assess</td>
<td>0.131</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FF-prevent UTI</td>
<td></td>
<td></td>
<td></td>
<td>0.162</td>
<td></td>
</tr>
<tr>
<td>Non-humidified oxygen</td>
<td></td>
<td></td>
<td></td>
<td>0.175</td>
<td></td>
</tr>
<tr>
<td>Overflow incont</td>
<td></td>
<td></td>
<td></td>
<td>0.190</td>
<td></td>
</tr>
<tr>
<td>Communication/death</td>
<td></td>
<td></td>
<td></td>
<td>0.204</td>
<td></td>
</tr>
<tr>
<td>DC catheter</td>
<td></td>
<td></td>
<td></td>
<td>0.207</td>
<td></td>
</tr>
<tr>
<td>Vital sign assessment</td>
<td></td>
<td></td>
<td></td>
<td>0.208</td>
<td></td>
</tr>
<tr>
<td>Kayexalate enema</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.586</td>
</tr>
<tr>
<td>IV caI fill-in</td>
<td></td>
<td></td>
<td></td>
<td>0.623</td>
<td></td>
</tr>
<tr>
<td>Ratio calc</td>
<td></td>
<td></td>
<td></td>
<td>0.624</td>
<td></td>
</tr>
</tbody>
</table>

#### % of Exam

- 0.09 and < Poor Item: 30.91%
- > 0.09 - 0.14 Marginal: 7.27%
- >0.14 - 0.19 Acceptable Item: 5.45%
- >0.19 - 0.29 Good Item: 18.18%
- > 0.29 Excellent Item: 38.18%
<table>
<thead>
<tr>
<th>Item No.</th>
<th>Item ID</th>
<th>Item Name</th>
<th>Percent Correct</th>
<th>Lower 27%</th>
<th>Upper 27%</th>
<th>PBCC</th>
<th>Response Frequencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>395236</td>
<td>Hypoxia S&amp;S</td>
<td>95.00</td>
<td>91.67</td>
<td>100.00</td>
<td>0.13</td>
<td>A: 2, B: 38, C: 0, D: 0</td>
</tr>
<tr>
<td>2</td>
<td>395237</td>
<td>Oxygen admin- flow meter</td>
<td>82.50</td>
<td>58.33</td>
<td>100.00</td>
<td>0.32</td>
<td>A: 1, B: 6, C: 33, D: 0</td>
</tr>
<tr>
<td>3</td>
<td>395535</td>
<td>Non-humidified oxygen</td>
<td>82.50</td>
<td>66.67</td>
<td>100.00</td>
<td>0.17</td>
<td>A: 33, B: 2, C: 2, D: 3</td>
</tr>
<tr>
<td>4</td>
<td>395321</td>
<td>Trapeze use</td>
<td>97.50</td>
<td>100.00</td>
<td>100.00</td>
<td>-0.09</td>
<td>A: 39, B: 0, C: 1, D: 0</td>
</tr>
<tr>
<td>5</td>
<td>395704</td>
<td>FF-prevent UTI</td>
<td>97.50</td>
<td>91.67</td>
<td>100.00</td>
<td>0.16</td>
<td>A: 0, B: 0, C: 1, D: 39</td>
</tr>
<tr>
<td>6</td>
<td>395561</td>
<td>Hi protein meal</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>0.00</td>
<td>A: 0, B: 0, C: 40, D: 0</td>
</tr>
<tr>
<td>7</td>
<td>395705</td>
<td>Phys signature</td>
<td>87.50</td>
<td>83.33</td>
<td>100.00</td>
<td>0.32</td>
<td>A: 2, B: 2, C: 35, D: 1</td>
</tr>
<tr>
<td>8</td>
<td>395256</td>
<td>Injection sites</td>
<td>95.00</td>
<td>100.00</td>
<td>81.82</td>
<td>-0.22</td>
<td>A: 0, B: 2, C: 38, D: 0</td>
</tr>
<tr>
<td>9</td>
<td>395288</td>
<td>Transdermal instr</td>
<td>75.00</td>
<td>58.33</td>
<td>90.91</td>
<td>0.38</td>
<td>A: 7, B: 3, C: 30, D: 0</td>
</tr>
<tr>
<td>10</td>
<td>395293</td>
<td>Transdermal adm</td>
<td>87.50</td>
<td>66.67</td>
<td>100.00</td>
<td>0.33</td>
<td>A: 4, B: 1, C: 0, D: 35</td>
</tr>
<tr>
<td>11</td>
<td>395296</td>
<td>Legal prescribe</td>
<td>80.00</td>
<td>66.67</td>
<td>100.00</td>
<td>0.35</td>
<td>A: 0, B: 32, C: 8, D: 0</td>
</tr>
<tr>
<td>12</td>
<td>395169</td>
<td>Ratio calc</td>
<td>77.50</td>
<td>41.67</td>
<td>100.00</td>
<td>0.62</td>
<td>A: 8, B: 0, C: 31, D: 1</td>
</tr>
<tr>
<td>13</td>
<td>395439</td>
<td>Dose/hr receive</td>
<td>82.50</td>
<td>58.33</td>
<td>100.00</td>
<td>0.33</td>
<td>A: 0, B: 1, C: 6, D: 33</td>
</tr>
<tr>
<td>14</td>
<td>395445</td>
<td>IV pump rate</td>
<td>75.00</td>
<td>66.67</td>
<td>51.82</td>
<td>0.21</td>
<td>A: 0, B: 1, C: 9, D: 30</td>
</tr>
</tbody>
</table>
An example of a post test item analysis...

114 students took a 50 item multiple choice examination…..
A 20-year-old female is admitted to the hospital with fever and septic shock. Which set of assessment findings would the nurse expect the patient to exhibit?

A. Bradycardia, palpitations, confusion, rash

B. Respiratory distress, jugular venous distention

C. Low blood pressure, tachycardia and generalized edema

D. Reduced cardiac output, increased systemic vascular resistance, moist cough
Responses

114 students answered the question:

✓ 108 of the students choose C, the correct answer
× 1 student chose answer choice A
× 1 student chose answer choice B
× 4 students chose answer choice D
Item Difficulty

• This question has an item difficulty of 0.947 indicating that approximately 95% of the students answered the question correctly.

• Because the item difficulty is close to 1.0, the item is considered too easy.
PBCC

- The PBCC was 0.209.

- The PBCC, item to total correlation, is appropriate as it is greater than 0.20 indicating the item was answered correctly more often by the students with high scores on the test as compared to students with low scores.
• This question is a knowledge level in the cognitive domain because it asks the student to identify symptoms associated with sepsis.

• The question is constructed fairly well; however, the age and sex of the patient could be considered extraneous information as any patient with sepsis will present with similar symptoms.
The question should be reconstructed to read:

“A patient is admitted to the hospital with fever and septic shock. Which set of assessment findings would the nurse expect the patient to exhibit?”
The distractors should read as follows:

A. *Hypothermia, systemic rash, palpitations, and bradycardia*

B. *Respiratory distress, jugular venous distention, orthostatic hypotension, rash*

C. *Hypotension, tachycardia, restlessness, and generalized edema*

D. *Reduced cardiac output, increased systemic vascular resistance, agitation, hypothermia*
Some Improvements….

• However, the plausible answers have unequal length and number of symptoms.

• Each plausible answer should have the same number of symptoms; answer choice A has 4 symptoms, B has 2 symptoms and answer choices C and D have 3 symptoms.

• Also, distractors A and B had only 1 student choose them; therefore, more difficult distractors could be substituted to increase the difficulty level of the question.
If you wanted to increase the level of this question to application or analysis, what changes would you make?
A patient is receiving his third intravenous dose of a penicillin drug. He calls the nurse to report that he is feeling “anxious” and is having trouble breathing. What will the nurse do first?

A. Notify the physician  
B. Take the patients vital signs  
C. Stop the infusion  
D. Check for allergies
Responses

114 students answered the question:

✔️ 94 students choose C the correct answer - C
× 19 students chose answer B
× 1 student chose answer  D
× 0 students chose answer A
Item Difficulty

- The item difficulty for this question was 0.825 or approximately 83% and is within range as normal range is 0.3-0.9; therefore, it is considered an easy question.
PBCC

- The PBCC was 0.098

- The PBCC, item to total correlation, is low, signifying a low degree to which this question contributes to the internal consistency and reliability of the comprehensive exam. The PBCC indicates that there is no correlation between students who answered the question correctly and those who scored highest on the comprehensive exam.
• To decrease the item difficulty score and produce a more difficult question, this question should be rewritten.

• The stem contains some extraneous information and extra wording resulting in word confusion.

• A more appropriate way to ask this question is, “A patient is receiving his third dose of penicillin. He calls the nurse to report that he is feeling anxious and having trouble breathing. What should the nurse do first?”
Some Improvements....

• It is unnecessary to say a “penicillin drug” as any medication in that class will have similar adverse symptoms.

• In addition, the question must be reworded to indicate correct prioritization and “will” must be replaced with “should.”
• Errors are present even with the plausible answers. Answer B has a spelling error and must be correct to state possession: Take the patient’s vital signs.

• Because answer choices A and D were only chosen by 1 student, more difficult plausible answers should replace them.
For example, the answer choices should be reconstructed to read:

A. Assess the patient’s skin for signs and symptoms of rash

B. Obtain a full set of vital signs

C. Stop the infusion

D. Obtain a full set of labs to monitor for drug toxicity
Storing Data
What about Cheating?

“It's not cheating, it's crowdsourcing.”
Academic Policies and Practices to Deter Cheating in Nursing Education (2014)

Karen Stonecypher and Pamela Wilson

Nursing Education Perspectives 35 (3) 167-178
Search of the literature

- 6 data bases
- More than 28,000 articles
- 43 articles met criteria

**Disciplines**
- Nursing
- Radiology
- Education
- Pharmacy
- Physical Therapy
- Occupational Therapy
- Dental Hygiene
- Business
- Allied Health
Types of Cheating

• Plagiarism and Dual Submission

• Acquisition of examination or test questions

• Misrepresentation

• Alterations in Documents

• Forgery
Strategies to Respond to Cheating

• Honor Code, with student participation in development

• Clear, understandable policies, to facilitate ongoing discussion

• Consequences clearly defined, agreed upon, and enforced

• Clearly define expectations in student/faculty handbook
• Develop easy-to-understand procedure for reporting misconduct

• Develop culture of honesty-focus on learning

• Develop well-defined institutional processes to ensure student rights

• Socialize students in the role of self-enforcement of honor codes.
Written Assignments

• Define plagiarism/teach paraphrasing and citing methods

• Require submission of working drafts

• Use Internet and online plagiarism services to verify plagiarism

• Craft term paper requirements to limit the students’ ability to find a previously written paper on the exact topic
Testing

- Define classroom management techniques during testing
- Monitor/proctor test closely and stay in the room
- Consistently reinforce re-testing and remediation principles
- Establish rules for electronic devices during examinations with clearly stated penalties for adherence
Write Critical Thinking Test Questions
Tweaking
Which assessment finding is characteristic of a client with Parkinson’s disease?

A. Night blindness.
B. Pain in lower extremities.
C. Shuffling gait.
D. Incontinence.
Which assessment finding is characteristic of a client with Parkinson’s disease?

A. Night blindness.

B. Pain in lower extremities.

C. Shuffling gait.

D. Incontinence.

Correct Answer = C
The physical therapist is making a home visit to a 75-year-old male client who has had Parkinson’s disease for the past five years. Which finding has the greatest implication for this client’s care?

A. The client’s wife tells the Physical Therapist that the grandchildren have not been to visit for over a month.

B. The Physical Therapist notes that there are numerous throw rugs throughout the client’s home.

C. The client has a towel wrapped around his neck that the wife uses to wipe her husband’s face.

D. The client is sitting in an arm chair, and the Physical Therapists notes that he is gripping the arms of the chair.
The physical therapist is making a home visit to a 75-year-old male client who has had Parkinson’s disease for the past five years. Which finding has the greatest implication for this client’s care?

A. The client’s wife tells the Physical Therapist that the grandchildren have not been to visit for over a month.
B. The Physical Therapist notes that there are numerous throw rugs throughout the client’s home.
C. The client has a towel wrapped around his neck that the wife uses to wipe her husband’s face.
D. The client is sitting in an arm chair, and the Physical Therapists notes that he is gripping the arms of the chair.

**Correct Answer = B**
Rationale

• Parkinson’s disease is characterized by a shuffling gait, and throw rugs throughout the home pose a safety hazard for this client (B).

• Visits from the grandchildren (A) may or may not be significant to this client, and the Physical Therapist should gather more information about the client’s feelings regarding such visits.

• Drooling is also characteristic of Parkinson’s disease, and a towel wrapped around the client’s neck (C) may be a good means of keeping the client dry, however, the nurse may need to counsel the family to be sure the client is dry and clean.

• Tremors are characteristic of Parkinson’s disease and grasping the arms of a chair (D) may help to control tremors in the hands and arms.
Which instruction is most important for the nurse to provide a client who has splenomegaly?

A. Do not lift heavy objects.
B. Avoid exposure to excessive ultraviolet light.
C. Schedule frequent rest periods.
D. Take precautions to minimize bleeding.
A young male client has developed splenomegaly secondary to infectious mononucleosis. Which factor in the client’s history is most important in developing his discharge teaching plan?

A. He works weekends as a furniture mover.

B. He regularly eats at fast food restaurants.

C. On weekends he usually drinks 1-2 beers.

D. Lately he requires 10-12 hours of sleep daily.
Rationale

- Rupture of the spleen (which is life-threatening) can occur when a person with an enlarged spleen (splenomegaly) lifts heavy objects.
- Therefore, his occupation (moving/lifting furniture) will have to change during his recovery period (A).
- A good diet is important to recovery from mononucleosis, however, with proper selection, nutritious foods can be obtained from fast food restaurants (B).
- Alcohol (C) should be avoided during recovery from mononucleosis, however this factor does not have the same priority as (A).
- Increased sleeping is a symptom of infectious mononucleosis (D).
Alternative Test Formats
Alternative Format Questions

- Multiple choice-multiple answer
- Fill-in-the-blank test items
- Hot-spots--identify an area on a picture or graphic
- Drag and drop (Ranking)
- Chart exhibit
- Video/Audio – requires headphones to hear audio clip, video may be embedded
- Graphic options – graphics are answer options
Use an Alternate Format, when you want the student to:

- Use a calculated numeric value
- Select a specific location
- Collect data from an audible source
- Choose from multiple options
- Plan a sequence of actions/interventions
- Make decisions based on multiple types of data
Fill in the Blank

• Use a calculated numeric value
• Select a specific location
• Collect data from an audible source
• Choose from multiple options
• Plan a sequence of actions/interventions
• Make decisions based on multiple types of data
Hot Spot: Select a location

- Physical assessment
- Data analysis
- Skill performance

Image from Wold, “Basic Geriatric Nursing, 4th ed.”
Using Graphics in Test Items

- Hot spot format
- Multiple choice format or other alternate formats
- Graphics may be images or photos

Graphic from Paul & Hebra, “The nurse’s guide to cardiac rhythm interpretation”
The nurse needs to administer 1.5 mL of medication. Which syringe should the nurse select?

A. 3 mL syringe

B. 5 mL syringe

C. 20 mL syringe

D. 1 mL syringe
The nurse needs to administer 1.5 mL of medication. Which syringe should the nurse select?

A. 3 mL syringe
B. 5 mL syringe
C. 20 mL syringe
D. 1 mL syringe

Graphics adapted from Macklin, Chernecky and Infortuna, “Math for Practical Practice.”
Drag-Drop (Ranking)

In which sequence should the nurse implement the prescriptions for a client newly admitted with urosepsis?

A. Administer the initial dose of Vancomycin.
B. Obtain a urine specimen for culture.
C. Notify lab personnel that peak and trough levels are needed.
D. Insert an indwelling urinary catheter.

Which action should the nurse complete first when implementing prescriptions for a client newly admitted with urosepsis?

A. Administer the initial dose of Vancomycin.
B. Obtain a urine specimen for culture.
C. Notify lab personnel that peak and trough levels are needed.
D. Insert an indwelling urinary catheter.
In which sequence should the nurse implement the prescriptions for a client newly admitted with urosepsis?

3. A. Administer the initial dose of Vancomycin.

2. B. Obtain a urine specimen for culture.

4. C. Notify lab personnel that peak and trough levels are needed.

1. D. Insert an indwelling urinary catheter.

Correct Answer = D-B-A-C

Which action should the nurse complete first when implementing prescriptions for a client newly admitted with urosepsis?

A. Administer the initial dose of Vancomycin.

B. Obtain a urine specimen for culture.

C. Notify lab personnel that peak and trough levels are needed.

D. Insert an indwelling urinary catheter.

Correct Answer = D
When instilling a client’s eye drops, which technique(s) should the nurse include?

1. Apply gentle pressure over the inner canthus.
2. Apply firm pressure over the outer canthus.
3. Hold the dropper six inches above the eye.
4. Dab the cornea with a sterile cotton swab to absorb excess moisture.
5. Ask the client to look up while placing the drop.
6. Carefully drop the medication on the cornea.

A. 1, 2, 3, and 6
B. 4, and 5
C. 3 and 6 only
D. 1 and 5 only
E. All of the above

How can I make this an Alternative Format question?

When instilling a client’s eye drops, which technique(s) should the nurse include? (Select all that apply.)

A. Apply gentle pressure over the inner canthus.
B. Apply firm pressure over the outer canthus.
C. Hold the dropper six inches above the eye.
D. Dab the cornea with a sterile cotton swab to absorb excess moisture.
E. Ask the client to look up while placing the drop.
F. Carefully drop the medication on the cornea.
<table>
<thead>
<tr>
<th>Admission prescriptions</th>
<th>Admission assessment</th>
<th>Admission lab reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obtain soft regular diet NS w 20 mEq KCl at 75 ml/hr</td>
<td>S: Extreme fatigue Feels hungry &amp; thirsty Recent 8 lb weight loss O: Dry mucous membranes Inelastic skin turgor Breath sounds CTA</td>
<td>Na 145.0 K 3.2 Cl 102.0 Hct 55% Hgb 10.0 WBC 10,000 Albumin 2.2</td>
</tr>
<tr>
<td>Administer Prostigmine PO</td>
<td>Dietary referral for teaching</td>
<td></td>
</tr>
</tbody>
</table>

The ED nurse assumes care of a client with myasthenia gravis. After reviewing the medical record, in which sequence should the nurse complete the admission prescriptions?

A. Obtain soft regular diet  
B. NS w 20 mEq KCL at 75 ml/hr  
C. Administer Prostigmine PO  
D. Dietary referral for teaching

B-C-A-D
Other Methods of Evaluation

• Standardized Testing

• Skills Lab Practice
  • Safety Lab

• Add to Lecture
  • Photos of Safety Lab

• Clinical

• Simulation
Housekeeping Tips
Item Writing Rules

- Get rid of names
- Get rid of ‘multiple’ multiples
- Use non-sexist writing style
- Develop parsimonious writing style
  - Cross out “of the following”
  - Delete scenarios
- Write items independent of each other
and More Rules

- Use a question format when possible
- Make distracters plausible and homogeneous
  - Equal in length
  - No opposites
...and More Rules

- Eliminate “all of the above” and “none of the above”
- Rewrite any “all except” questions
- Ensure that alternatives do not overlap
- Vary correct answer
David is a 5-year-old boy who is hospitalized for burns to the face, and both his eyes are covered with bandages. Which intervention is most important for any clinician to implement when caring for this child?

A. Foster independence by encouraging him to feed himself.

B. Speak to him when entering the room.

C. Reassure him that his parents are allowed to stay as long as they wish.

D. Allow him to sit at the nurse’s station when he seems bored.
When sighted children temporarily lose their vision, every aspect of their environment can become frightening. Unfamiliar sounds are especially frightening.

Therefore, (B) would have the highest priority.

(A and C) are indicated but (B) has a higher priority.

(D) is NOT indicated because there is too much activity at the nurse’s station, which could frighten and confuse him since he does not have sight.
“I think you’ll find my test results are a pretty good indication of your abilities as a teacher.”
Faculty
Teaching-Learning Activity

1. Divide into groups

2. As a group, revise assigned test item(s)

3. Group Reporter, present revised test item(s)
References


Thank you for your time and attention!

**Important:** In order to receive your Continuing Education credits, you will need to complete an online survey.

The eval will be sent to your email within the next week following this event (check your junk/spam mail as well). Please try to complete the online eval no later than a week after receiving the survey link via email.