Guidelines for EMS Educators

Item writing and exam construction

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"The greatest fool may ask more than the wisest man can answer" (Colton).

I. Why this information is important

A. Without a mechanism to evaluate a student, you will never know if they have achieved the objectives and the goals of instruction.

B. EMS educators must have familiarity with the concepts of evaluation and how to construct and validate questions for a fair and appropriate measurement tool.

II. Written examinations

A. **Definition of a test:** A written or situational occurrence that provides one or more instances for the learner to demonstrate learning.

B. **Purposes of testing**

1. A test is intended to separate qualified individuals who can demonstrate adequate knowledge of the content areas important to safe and effective practice from those who do not meet this standard at the time they took the examination (CTS, 2012).
2. An exam compares student performance to pre-established criteria.
3. Examinees should be asked to define terms; give factual information; calculate; explain; predict; recommend action; interpret; identify common principles; relate ideas; apply theory; solve problems; and evaluate outcomes.
4. Exam results provide feedback to the instructor and the student and they help to clarify and redirect future learning needs.
5. Laxity in applying psychometric standards to testing increases the risk that an unqualified candidate will be awarded a credential or allowed to practice.

C. **Advantages of written examinations**

1. Can be used with a large number of students
2. Measures cognitive objectives
3. Provides for consistent scoring (if done correctly)
4. Grading and compiling results may be faster than for other types of examinations (not always true with essay and short-answer items)

D. **Disadvantages of written examinations**

1. Time consuming to develop good instruments.
2. Difficult to create items that measure higher levels of the domains of learning.
3. Complex validation procedures.
4. Could discriminate against students with learning disabilities (dyslexia).
5. Poorly written items may evaluate a student's reading ability more than they evaluate knowledge of material.
6. They cannot measure skill performance. Items may measure theoretical knowledge of procedure, but actual ability to perform the skill cannot be evaluated using this type of test.

E. **Elements of a good exam**

1. Items are generated from a blueprint that is mapped to objectives that are mapped to education standards. They allow essential (high frequency/high criticality) knowledge to be demonstrated.
2. The examinee’s task is specifically defined
3. Items are well constructed following psychometric principles
4. The exam includes items that range from easy to difficult

5. The instructor has framed the "ideal" answers in the key and items reflect expert consensus on best or correct answers

F. **Types of items**

1. Multiple choice
2. True/false
3. Matching
4. Completion (short answer)
5. Essay
6. Terminal/certifying

III. **General guidelines for written test item construction**

A. **To draft content-valid items, create a blueprint**

1. An examination must measure achievement of specific knowledge objectives and test what it is intended to test. To do this, it must be developed from a blueprint that is based on the judgment of experienced professionals in the field (CTS, 2012).

2. A **blueprint** is a well-designed plan to measure learning

a. First determine the total number of questions to include. This may be driven by the amount of content that has been covered, time limitations, the nature of the quiz/exam, or policy.

b. If time is limited, allow an appropriate interval to answer questions or perform a skill. **Suggested timing strategies:**

(1) Allow an average of one minute per item for a standard multiple choice exam

(2) Allow 2-3 minutes to read a lengthy scenario then one minute for each multiple choice question that may relate to that scenario

(3) Allow more time to compose an essay answer

(4) Allow longer times to answer higher-level questions in any domain than a lower level one.

c. Traditionally, many summative exams have had 150 to 200 questions. Beyond that, students become fatigued and make unnecessary errors.

d. Identify cognitive objectives that the test should measure based on education standards, a needs assessment, QI data, a practice analysis of high frequency, highly critical concepts, or the educator's expert opinion.

e. **Organize the exam in a logical manner:** Design a plan that orders the collective behaviors and content areas to be included in the test.

(1) Group like items (similar content area) together.
(2) Have sections follow a logical sequence.

(3) For a final exam, list the major modules or subsections of the curriculum and place them as subtitles on the left side of the blueprint.

f. Determine the relative importance (value) of each behavior or content area. For example, airway questions may outnumber communications questions on the first paramedic class modular exam.

g. Allocate a corresponding amount of emphasis to measuring learning in these content areas by determining how many questions to include for each topic/objective as a proportion of the total number of questions. For example: a major exam given at one paramedic program had 31 questions out of a total of 150 items devoted to airway access/maintenance to adequately measure achievement of critical objectives. Think about the

important concepts to test in a particular content area and list the critical points (stemming from objectives) on each line under the topic heading. For an example, see below.

Airway adjuncts	**# items: 31**
Nasopharyngeal/Oropharyngeal airways: indications/contraindications, insertion steps	2
Suctioning: oral, tracheal	1
Preparation of equipment and patient positioning for OTI	2
Clues that suggest a difficult intubation	1
Use of premedications for DAI: benzocaine spray, lidocaine	2
Midazolam use in DAI:, classification, action, indication, dose, route, or side effects	2
Etomidate: classification, action, indication, dose, route, or side effects	2
Technique of blade use: curved vs. straight	1
Anatomical landmarks to note when intubating	1
Use of external laryngeal manipulation, lip retraction	1
Passing the tube; time limitations	1
Confirmation of tracheal ETT placement	2
Steps to take if tube is not correctly placed	1
Securing the tube in place	1
Choosing airway access maneuver of choice based on patient scenarios	2
In-line intubation	1
Nasotracheal intubation	1
Digital intubation	1
Anterior/inverse intubation	1
Use of the King LTS-D airway	2
Needle cricothyrotomy	1
Surgical cricothyrotomy	2

h. Take care on exams with a limited number of questions per topic to include only highly critical points.

B. **Table of specifications**

1. Once you have the blueprint completed, construct a table of specifications that reflects the proportionate emphasis to be given to measuring the various professional behaviors that are expected to occur in each of the content areas contained in the blueprint.

2. A table of specifications, is a two dimensional synopsis of the objectives to test distributed across the types of behaviors the exam should test. It should reflect the scope of EMS knowledge and practice. For example:

   a. A & P; physiology; pathophysiology; facts
   b. Assessment elements or techniques
   c. Interpretation of data to reach an appropriate impression/conclusion
   d. Interventions
   e. Anticipation/evaluation of patient responses

3. **Predetermine the percentages of each type of question to ask**. For example, a possible distribution scheme may include ~20% of the questions on assessment, 20% interpretation of data; 40% on interventions; 15% testing low level knowledge of facts; and 5% on patient responses to interventions and/or on-going assessments. This ensures that the exam really tests the major elements of practice. This is critical to ensure that the exam is balanced and does not include too many easy (factual only) questions.

4. **Assessment questions**

   a. Evaluate an examinee's ability to collect data regarding a patient's actual and potential health needs.

   b. Items may focus on the following behaviors:

      (1) Inspection
      (2) Obtaining a history (SAMPLE, OPQRST)
      (3) Techniques and elements of the physical examination (palpation, percussion, auscultation), VS
      (4) Diagnostic studies within the scope of practice of the group to be tested (ECG, SpO_2, capnography, glucose monitoring)

   c. They evaluate a student's ability to ask the right questions, gather the right information, and perform a physical exam appropriately.

   d. **Example**

      What should be an EMT's first action when arriving at a call?

      A. Conduct a scene size-up
      B. Obtain a SAMPLE history
      C. Take a full set of vital signs
      D. Perform a secondary assessment

5. **Analysis/interpretation/evaluation of data questions**

   a. These measure a student's ability to form an appropriate conclusion by organizing, analyzing, synthesizing, evaluating, and/or summarizing the data collected.

   b. They test the student's ability to interpret assessment data including clinical findings, vital sign values, and/or diagnostic studies. The examinee must analyze subjective and/or objective findings to reach a conclusion.

   c. **Recommended item structure**

      (1) Place the assessment findings in the stem and test conclusions or rationale in the options.

      (2) The stem usually ends with, "What should an EMT or Paramedic conclude or suspect?"

   d. **Example**

      A conscious adult with blunt trauma to the left anterior chest presents with chest pain, unequal chest expansion, extreme dyspnea, agitation and restlessness. Breath sounds are absent on the left, diminished on the right and jugular veins are distended. The carotid pulse is weak and rapid and the radial pulse is absent. Heart tones are clear and there is no paradoxical movement of the chest wall. Which of these should a paramedic suspect?

      A. Flail chest
      B. Cardiac tamponade
      C. Open pneumothorax
      D. Tension pneumothorax

6. **Intervention questions**

   a. Test the student's ability to treat the person appropriately or select an appropriate course of action.

   b. Interventions should be patient-focused and goal directed based on physiologic principles in the curriculum.

   c. On written exams, these items test the cognitive aspects of interventions to be performed or anticipated, e.g., airway management, suction, CPR, etc., within the student's scope of practice.

d. **Example**

Which of these requires a traction splint?

A. Closed deformity of the middle thigh with decreased pedal pulse
B. Shortened and externally rotated leg with severe hip pain
C. Open fracture with bone protruding from the anterior tibia
D. Deformity of the knee with displacement of the patella

7. **Evaluation questions**

a. Assess a patient's responses to interventions, which could include side effects of medications, responses to fluid boluses, effectiveness of pain management, or airway status after adjuncts are inserted, etc.

b. These items determine the extent to which a patient has been stabilized or needs further monitoring/interventions.

c. **Example**

If breath sounds are present on the right and absent on the left after tracheal intubation, which of these is indicated?

A. Aspirate the tube with an EDD to check for resistance
B. Withdraw the tube slightly and reauscultate breath sounds
C. Needle decompress the left lung to relieve excess air tension
D. Deflate the cuff, remove the tube and begin the process again

C. **Selecting testable material**

1. Concepts to be tested must be

a. related to objective achievement from the education standards (map to standards);

b. **clinically relevant:** Items should be reflective of important concerns for practice based on **frequency of use or criticality** to the individual's scope of practice. Consider the consequences of not knowing. An item measures high criticality if lack of knowledge covered in the item could result in job performance errors that could result in harm to a patient. For example, avoid constructing questions that ask the learners to cite percentages or statistical data from a particular research study. These are usually considered "so what?" items.

c. reflective of principles and ideas not generally known by those who have not been in an EMT or paramedic program; and

d. based on facts for which there is documented consensus among experts.

2. Every item must be directly related to the specific content listed in the blueprint and table of specifications.

3. You must ensure that students have been given the objectives to be measured and directed to the sources used to validate the information via reading assignments, handouts, or some other form of independent study.

D. **Exam items must be appropriate for the level of knowledge to be measured and balanced based on the overall desired level of exam difficulty (cognitive complexity)**

1. Consider how far into the learning domain (high or low level) you want to measure

2. Whenever possible, test questions should evaluate a student's ability to apply relevant knowledge to real problems that arise in the practice of the profession rather than just recall individual facts (CTS, 2012).

3. **Suggested approaches**

a. **Low level cognitive**: Multiple choice items written to comprehension or application, matching, true/false, simple completion, short answer essay or

oral exam seeking understanding at the comprehension or application level.

b. **High level cognitive**: Multiple choice items written to analysis, synthesis or evaluation; longer essays with multiple points to make requiring complex or higher order reasoning or problem solving, oral exam or projects analyzing or evaluating case studies

c. **Low level psychomotor:** Rote demonstration of skill

d. **High level psychomotor:** Situational scenarios, projects (designing scenarios) and observational reports

e. **Low level affective:** Oral, short-answer essay, projects (opinion papers) and observational reports

f. **High level affective**: Oral and situational scenarios, projects (group-designed presentations) and observational reports

E. **Levels of mastery/Item difficulty**

1. Item difficulty should range from simple (easy) to complex (difficult) with the overall exam reflecting a median of easy to difficult questions. A difficult question should require sophisticated reasoning or understanding of a complex subject (CTS, 2012). For example, a strategy often used has exams blueprinted to have about 50% of the questions at a medium difficulty level; 25% at an easy level and 25% at a higher difficulty level.

2. The National Association of EMS Educators Instructor Guidelines have grouped the levels of learning into three categories:

a. **Knowledge/Comprehension: Recall/knowledge (lowest level)**

(1) Students demonstrate that they can recall and recognize, recall, and comprehend (interpret and understand the meaning behind the information) facts, dates, events, terms, definitions, theories, methods, procedures, or professional attributes (Clay 2001).

(2) These questions measure simple skills or thought processes

(3) They ask the candidate to recognize, recall, list, identify, define terms, name. In the psychomotor domain, students would be expected to imitate and manipulate equipment or skills. In the affective domain, they would receive and respond to behavioral principles.

Examples

Which of these is an opiate narcotic used for pain management?

A. Toradol
B. Fentanyl
C. Midazolam
D. Nitrous oxide

What is the name of the long bone in the upper arm?

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

b. **Application/interpretation (analysis)**

(1) These items build upon the foundation established at the comprehension level and measure how or why something is done.

(2) Application involves the transfer of concepts from theory into practice; asking students to apply general rules, methods or

principles to a new situation (Clay 2001), integrate and execute principles, procedures and values within specific situations. It tests interpretation or application of classroom concepts to real-life situations or experiences. It may involve asking the examinee to use a formula to solve a problem.

(3) In the cognitive domain, these questions ask the examinee to classify, explain, differentiate, analyze, apply, detect, compare or contrast. In the psychomotor domain, they include precision in skill execution. In the affective domain, they measure how a student demonstrates that they value professional feelings and beliefs and organize to demonstrate their commitment to those values.

Example

An unconscious adult with blunt abdominal trauma responds to a pain stimulus by moaning. The skin is cool, pale, and moist; the abdomen is flat; bowel sounds are diminished; and the examiner notes diffuse involuntary abdominal guarding and rigidity. VS: BP 90/76; P 110; R 32; SpO_2 94%. Lung sounds are clear bilaterally. What should a paramedic suspect?

A. Ascites
B. Shock & peritonitis
C. Retroperitoneal bleeding
D. Gastric distention with air

c. **Synthesis/Evaluation: Problem solving**

(1) Builds upon application and measures the student's ability to use higher order thinking to reason critically.

(2) These questions involve the analysis of information, procedures, and feelings in order to modify and adapt specific tasks depending upon situations. The student is expected to separate the whole into parts in order to analyze their meaning and understand their importance. They require multiple steps in the thought process or require reorganization of the information to formulate, evaluate, estimate, or plan.

(3) **Synthesis**: Students are able to create new connections, generalizations, patterns or perspectives; combine pieces of information into a new or different whole (Clay. 2001).

(4) **Evaluation**: Students must use evidence to make judgments and decisions about and with the information presented; resolve controversies or differences of opinion (Clay, 2001).

(5) When an individual is at the farthest point of this level they are capable of metacognition (thinking about thinking). This is usually not possible in the entry level courses but may be something to strive for in CE post-tests.

Simple example

An agitated and combative adult presents with the strong odor of alcohol on the breath and is unable to state their address or phone number. Their speech is slurred and they stagger when they walk. The patient is refusing transport and wants to drive home. Which EMS action is appropriate?

A. Assess for hypoglycemia and hypoxia
B. Administer a sedative to increase their cooperation
C. Send them home with a friend to watch them until sober
D. Give full disclosure of risk and have the person sign a release

F. **Content concerns**

1. Items should be crafted by subject matter experts (SMEs) who have experience and insight into the content that should be tested.
2. Each question must be crafted to measure a specific content area in the test blueprint and be validated using course materials and references that should be familiar to qualified candidates (CTS, 2012).
3. Avoid trick questions or items that depend on obscure information or concepts that would not be expected of a professional with the scope of practice, expertise, or experience level of those being tested. They are unnecessary and unfair. Keep vocabulary appropriate for the group of students being tested (12^{th} grade reading level).
4. Avoid opinion-based items. Each question must be supported by a source document or reference that should be familiar to the students. There must be a written citation for every item for which the student has access.
5. However, do not quote directly from a book or reference source. Paraphrase the language to avoid testing for simple recall or recognition. The goal is to test how a concept is related or applied to problems, not remembering how they appeared on a line in a book.
6. Keep the content of each item independent from other items on the test. A correct answer on one item should not key the answer for another question.
7. Do not use acronyms or abbreviations unless universally understood and/or included in the exam data dictionary. The complete name should be spelled out the first time it is used. EMS lives in a world of abbreviations and acronyms – don't write like you might talk!
8. Make sure the item can be answered without looking at the options OR that each option is 100% correct or incorrect.

G. **Style concerns**

1. Be consistent in the page set up design used for margins, question formatting, and graphics (fonts) on a written examination. Fonts that are clean and crisp duplicate best and are easiest to read (e.g., Arial font 10, 11 or 12).
2. Use correct grammar, punctuation, capitalization and spelling. Use capital and lower case letters and superscripts/subscripts consistently and correctly throughout the test in the numbering strategy. For example, when formatting multiple choice items, using capital letters (A, B, C, D) has proven to be more readable than a, b, c, d for labeling distracters. Be consistent in typing vital signs in scenario-based questions. Example, BP vs. B/P; O2 vs. O_2; pulse ox vs. SpO_2. Pick a naming regimen and use it consistently in all quizzes and exams: Example: VS: BP; P; R; SpO_2 98%; O_2 15 L/NRM or BVM.
3. Use a consistent strategy to draw attention to material in the test. While not allowed in any of the state exam questions because it helps KEY a question, be consistent with the use of <u>underline</u>, **bold**, CAPITALIZATION, or *italics*.
4. Position options appropriately.
    a. If the choices are "A", "B". "C". and "D", place them in that order.
    b. Place answers with numbers in them in ascending or descending order from smallest to greatest or greatest to smallest integers.
    c. The distracters should range from the shortest to longest answers in descending order of A. B, C, and D or could be altered to read from longest to shortest.

5. Format items vertically rather than horizontally with the A, B, C, D options under each other rather than using the following format:

   A. C.
   B. D.

6. Always include all the content for an item on one page. Do not split a stem and discriminators or scenario and questions on two pages.

H. **Provide clear, complete directions about the test on the cover**

1. Indicate if a student can or cannot write on the test booklet or answer sheet.
2. Indicate if any electronic equipment or tool (calipers) is allowed in the testing environment.
3. State if they must use a pencil to fill in an answer sheet.
4. Indicate whether or not breaks are allowed during the test.
5. Specify consequences if an exam is compromised or removed from the testing environment.
6. Example: See attachment

I. **Peer review:** CRITICAL POINT: Have another instructor review your exam items for clarity and completeness, content and construction.

J. **Attention to detail:** Be sure that the items are free of typographical, grammatical, punctuation, spelling and content errors.

K. **Confidentiality and Security of test materials**

All examination questions, drafts, and copies in paper or electronic media must be kept in a locked and secure place. No information about the content of any test question or examination should be disclosed or used in any way or in any capacity other than for its intended purpose.

IV. Multiple choice item writing guidelines

A. Before a test question is ready for use in an examination, it must go through several stages of detailed content validity, editorial sensitivity, and psychometric review. A fair test question may be refined several times as it moves from the initial idea of the item writer until it is included in an exam (CTS, 2012).

B. **Terminology definitions**

1. **Stem:** Introductory statement that formulates a problem or asks a question. It may be written as a question or an incomplete statement. It is often called the "question".
2. **Key:** The correct or best response.
3. **Distracters:** Plausible but incorrect or less desirable answers to the stem.
4. **Options:** Collective word for the distracters and the key.
5. **Item:** Common instructional design term for all of the components of a written examination question including the stem, distracters and key.

C. **Stem construction**

1. Stems that are written as a question are easier for candidates to understand than those that are written as an incomplete sentence that is completed by the distracters (CTS, 2012).
2. **A well-written stem should incorporate four components:**

   a. A clear, concise formulation of a single problem that has a single correct or best response

b. All information needed to answer the question and to eliminate ambiguity about the intent of the question

c. All evidence against the incorrect options

d. Any words or phrases that would have to be repeated in each option

3. **Include only one concept per question**. Focus on one central idea in each question with a concept or problem clearly presented in the stem to which all of the options relate in the same way (CTS, 2012).

   a. Situational sets (where you ask more than one question based on a given scenario) should not extend for more than two questions. If a student answers incorrectly on the first item, they are likely to answer incorrectly for the rest of them. If writing for a test bank, all items must stand alone and not be referenced to any other item.

   b. The examinee should be able to answer the question in their mind by reading the stem with one hand over the options.

4. Make sure enough information to select the correct or best response and to rule out the distracters is provided in the stem. Too much information in the stem may increase the likelihood that more than one answer is correct.

5. Avoid "*window dressing*" (excessive verbiage). Brevity is a virtue related to clarity. The premise should be easy to read. Sentence structure should be simple and direct. Avoid loading the stem with complex sentence structure, nonessential information, and elaborate jargon. These elements convert the item into a measure of reading comprehension. Two or more short, simple sentences are better than one long complex sentence. Minimize the amount of reading in each item.

6. Information contained in the stem should be pertinent and directly related to formulating an accurate response. Ambiguity or lack of focus leaves the learner at a loss in deciding how to respond. If a competent practitioner can anticipate the correct response before considering the options, it is a clearly posed question.

   Ambiguous:

   How many intraosseous attempts may be made on each patient?

   A. 1
   B. 2
   C. 3
   D. 4

   Better construction

   What is the maximum number of intraosseous attempts that may be made on each bone?

   A. 1
   B. 2
   C. 3
   D. 4

7. **Don't teach in the stem - Example**

   Insulin is necessary for the body to appropriately use sugars or carbohydrates. Which disease is characterized by a total lack of insulin secretion?

   A. Prediabetes
   B. Type 1 diabetes
   C. Type 2 diabetes
   D. Metabolic syndrome

Better construction

Which of these is characterized by a total lack of insulin secretion?

A. Prediabetes
B. Type 1 diabetes
C. Type 2 diabetes
D. Metabolic syndrome

8. Avoid extraneous cues to the best answer (i.e., common grammatical, terms, and stylistic formats in the stem and the correct answer).

9. Do not end a stem with a preposition. Example: What would you check for?

10. Do not write questions of the form, “Which of the following statements is correct?” or “is true?” or “Each of the following statements is correct **EXCEPT**”. These questions have the tendency to be unfocused and have heterogeneous options.

Poorly written

Which of the following is true regarding insertion of an intraosseous line?

A. It should be reserved for persons 6 years of age and older.
B. Direct the needle slightly superiorly in order to avoid the epiphyseal plate.
C. A bone marrow needle is inserted 1-3 cm below the tibial tuberosity into the anterior medial surface of the tibia.
D. It is necessary to aspirate bone marrow to confirm placement prior to infusing normal saline.

11. Do not use personal pronouns such as “you” in the stem. Instead of “What should you expect?”, the sentence should be restated as, “What should an EMT-B or paramedic expect?” This recommendation comes from the medical literature in which some candidates may have special knowledge of new/contemporary methodologies not taught in class. Thus, phrasing the stem with terms such as “an EMT” rather than “you” emphasizes that the question is asking what an EMT in general should do or expect and not necessarily what any one individual should do or expect.

12. Avoid using redundant or unnecessary words in the stem and in the discriminators.

Poorly written

Which *of the following drugs* may cause bronchoconstriction?

A. Albuterol
B. Ipratropium
C. Propranolol
D. Epinephrine

Better construction

Which of these may cause bronchoconstriction?

A. Albuterol
B. Ipratropium
C. Propranolol
D. Epinephrine

13. **Questions should be phrased using a positive frame of reference.**

a. A negative premise is one which tests whether the person knows an incorrect solution to a problem.

b. Negative response formats include options that are an exception, error, exclusion, anomaly, or other aberration. They are often easier to write, but are generally not acceptable (e.g., all of the following **EXCEPT**, which is **NOT** associated with...).

c. Negative items are often inconsequential and examinees find them confusing. They can often be rewritten with some minor rephrasing of the sentence. For example, “A patient is NOT able…” can be changed to “A patient is unable. ”

d. The one, general exception to the rule against using negative items are cases in which the person must know what has to be avoided, such as a dangerous situation or a contraindication to a drug or procedure.

e. If negative words are used, such as **NOT**, **NEVER**, or **EXCEPT**, capitalize and boldface the word to draw the examinee’s attention to it.

D. **Writing OPTIONS (keys and discriminators)**

1. Options are as important as the stem and typically will determine the difficulty level of a question.

2. All items must have only ONE correct answer (correct response format). Keys must be absolutely correct and distracters must be plausible, but incorrect. Avoid distracters that unqualified candidates could recognize as obviously incorrect. If there is any possible justification for considering one of the distracters as an acceptable response, edit the question.

3. Common types of incorrect responses

   a. Answers are related to the situation and sound plausible to the unqualified candidate, but are incorrect

   b. Answers depend on a common misconception or misunderstanding of the topic. Use typical errors or wrong answers of students. They provide excellent distracters!

   c. Statements may be true but are unrelated or not relevant to the problem stated in the stem (CTS, 2012)

4. Do not assume any qualifications that are not specifically stated in the premise. Never introduce any information in an option that is necessary to answer the question. All essential information should be included in the stem.

5. Options should be homogenous in content, focus, terminology, phrasing, parts of speech, units of measure, frame of reference and general length. All options must be logical and grammatically consistent with the stem.

   a. If the stem is a statement to be completed, it should be possible to read the stem and each distracter choice as a complete sentence. If the premise is a complete question, each choice should make sense as a stand-alone answer to that question.

   b. Maintain grammatical consistency between the key and distracters (i.e., all technical or all layman’s terminology). Pay particular attention to tense, use of a/an, and singular vs. pleural references.

   c. Avoid "red herring" options (parallelism) with 3 to 1 splits in the use of terminology or structure of the choices. One answer should not stand out on its own as being different from the other three. This leads the examinee to focus on the one different choice.

      Poorly written

      Which of these is a lower airway structure?

      A. Uvula
      B. Larynx
      C. Trachea
      D. Stomach

6. **Avoid cluing the right answer**

a. Avoid giving clues that may help an unqualified candidate find the right answer to a question without understanding the concept to be tested (CTS, 2012).

b. Do not write the key so it stands out as different from the distracters. Avoid a conspicuously correct or incorrect option. Do not make the key clear and concise and the distracters vague and ambiguous (CTS, 2012).

c. The more homogenous the options, the better they will discriminate between the knowing and the unknowing (Wild ass guess or WAG) learner.

d. Keep the length of options about equal if possible. Don't write the key so it is much longer, shorter, or more technical than the distracters. Often, the keyed answer is the longest and most specific. If necessary, use two longer and two shorter answers or two that are more technical and two that are less technical (CTS, 2012).

e. Don't use the same words or descriptive phrases in the stem and key if they do not appear in the distracters.

f. Never use distracters that are simply the opposite of the correct answer.

Poorly written

Which clinical finding suggests compensated hypovolemic shock?

A. Tachycardia
B. Bradycardia
C. Hypotension
D. Slow, shallow ventilations

Better construction

Which of these suggests compensated hypovolemic shock?

A. Hypotension
B. Warm, flushed skin
C. Sustained tachycardia
D. Slow, shallow ventilations

g. Avoid using two options that mean the same thing as incorrect alternatives. If two alternatives mean the same thing, and there is only once correct answer, the examinee can automatically eliminate both similar options.

Poorly written

Which of these results from stimulation of the sympathetic nervous system?

A. Hypotension
B. Slow, shallow ventilations
C. Tachycardia
D. Low blood pressure

Better construction

Which of these results from stimulation of the sympathetic nervous system?

A. Tachycardia
B. Hypotension
C. Warm, flushed skin
D. Slow, shallow ventilations

7. Avoid frequency terms in the options (e.g., rarely, usually, often, and sometimes). These terms are not consistently defined by test-takers.

8. Avoid determiners like always, never, completely, and absolutely. The test-wise student will eliminate the other options because they are less likely to be true than something stated less absolutely.

9. Limit the use of three right answers and one incorrect answer (All of the following EXCEPT). This form of question is more difficult than a positively worded one in the same content area (CTS, 2012).

10. *All of the above*, *none of the above* distracters or keys are generally not acceptable.

    a. Recognition of one incorrect distracter immediately eliminates "all of the above" as a possibility.

    b. Recognition of a couple of distracters as correct (or possibly correct) leads the student to guess that "all of the above" is the correct answer.

    c. "None of the above" can be an alternative if the question is a mathematical (computational) one.

11. Multiple response formats, known as K questions, should be avoided (e.g., A, B, and D; B, C, and D; A & D, etc.). Technically, when using multiple response formats, all of the possible combinations should be used to make up the distracters. Questions with four options result in over 15 answer combinations, making them impractical items.

12. **Formatting:** If the options complete a sentence, the first word of each answer should be typed with a small case letter and end with a period.

    Incorrect construction and formatting:

    Blunt abdominal trauma in a patient that is 32 weeks pregnant is associated with

    a. Liver or spleen injuries
    b. Bowel perforation
    c. Retroperitoneal hematoma
    d. Abruptio placenta

    Correct construction and formatting

    Persistent tetanic uterine contractions following blunt abdominal trauma in a patient that is 32 weeks pregnant is most likely caused by

    A. bowel perforation.
    B. abruptio placenta.
    C. liver or spleen injury.
    D. retroperitoneal hematoma.

13. If a stem ends with a question mark, the first letter of each option should start with a capital letter.

    Which of these would cause persistent tetanic uterine contractions following blunt abdominal trauma in a patient that is 32 weeks pregnant?

    A. Bowel perforation
    B. Abruptio placenta
    C. Liver or spleen injuries
    C. Retroperitoneal hematoma

14. If some inherent sequence is present among the options (order of magnitude, numerical, alphabetical, or chronological order), they should be listed in a logical sequence.

Poorly written

Which AV block is characterized by a total dissociation between atrial and ventricular impulse conduction?

A. 2nd degree Mobitz II
B. 3rd degree
C. 2nd degree Mobitz I
D. 1st degree

Better construction

Which atrioventricular (AV) block is characterized by a total dissociation between atrial and ventricular impulse conduction?

A. 1st degree
B. 2nd degree Mobitz I
C. 2nd degree Mobitz II
D. 3rd degree

15. Options that deal with numerical ranges should be exclusive of each other so the correct choice does not overlap two or more potential choices.

Poorly written

How fast should you ventilate a patient?

A. 8-10
B. 10-14
C. 14-16
D. 10-12

Better construction

At what rate per minute should a paramedic ventilate a non-breathing adult with no history of asthma found in respiratory arrest prior to placing an advanced airway?

A. 6 to 8
B. 10 to 12
C. 14 to 16
D. 18 to 20

16. Make sure all numeric data are stated consistently (i.e., all a single integer or all as ranges). If a question asks for a range and one answer offers a single number, it can be immediately eliminated.

17. **Do not start an option with the word, it**

Poorly written item

Which is true about the incidence of trauma?

A. It is more common in children and young adults.
B. It is more often associated with death in those 44-90 years.
C. It is more frequent in females.
D. It is more often caused by penetrating mechanisms than blunt.

Better construction but still a poor question

Trauma is most frequently associated with

A. children and young adults.
B. females rather than males.
C. death in those 44-90 years of age.
D. penetrating mechanisms rather than blunt.

18. **Avoid repetition of the same words or measures in each option**

Example of a poorly written item:

The average systolic blood pressure for a 5-year-old child is calculated to be

A. 90 mmHg.
B. 80 mmHg.
C. 70 mmHg.
D. 60 mmHg.

Better construction

What is the average systolic blood pressure in mmHg for a 5-year-old child?

A. 90
B. 80
C. 70
D. 60

Accept or reject? This questions was actually submitted for a test bank.

Which statement is TRUE regarding compliance?

A. **The greater the compliance, the easier the expansion.**
B. The greater the compliance, the harder the expansion.
C. The greater the compliance, the greater the resistance.
D. The greater the compliance, the lesser the elasticity.

19. **General recommendations on the use of a period (.)**

a. A period should not be used after each option if the blank (_____) is not at the end of a stem.

b. If a stem ends as an incomplete sentence, each option that finishes the statement should end with a period.

c. If the stem poses a problem as a complete statement/sentence or ends with a question mark and each option is a complete statement/sentence, then each option should end with a period. The first letter of each option should be capitalized.

d. If the stem poses a problem as a complete statement/sentence or ends with a question mark and each option is NOT a complete statement/sentence, then each option should NOT end with a period. The first letter of each option should be capitalized.

20. **General recommendations on the use of blanks (_____)**

a. All lines should be of equal length when constructing fill in the blank items. Do not use two lines to key a two-word answer, use one line.

b. Blanks should be placed at the end of a sentence if possible. Rewording stems to remove or relocate blanks is usually straightforward.

Example:

A 30-pound child in shock should receive _____ mL of IV fluid.

A. 150
B. **270**
C. 420
D. 600

Better construction:

How many mL of NS IV fluid should be given as an initial bolus to a 30-pound child in hypovolemic shock?

A. 150
B. **270**
C. 420
D. 600

21. **Don't be cute or funny in the stem or the answers.** Do not make up words or answers in the stem or options.

Example of a poorly written question

You have been toned to a 911 response. Your partner informs you that he will be there as soon as he finishes a phone call to his "bookie". This behavior constitutes

A. slander.
B. abandonment.
C. breech of duty.
D. fiscal responsibility.

22. **Big words do not mean better questions**

Example of a poorly written question

What is the primary action of low dose dopamine?

A. Stimulation of beta-1 receptors
B. Parasympathetic receptor blockade
C. Sympatholytic action on beta-2 receptors
D. Stimulation of alpha adrenergic receptors

Better construction

What is the primary action of dopamine in 5 mcg/kg/min doses?

A. Decreased heart rate
B. Dilation of coronary arteries
C. Enhanced cardiac contractility
D. Vasoconstriction of peripheral vessels

23. **Drug names**

a. Generic names should start with a lower case letter. Trade names should be capitalized and placed in parentheses if inserted after the generic name, e.g. midazolam (Versed).

b. Options should be parallel regarding generic and trade names. Generic is often preferable to using trade names.

24. **References:** All questions must be mapped to an objective and correct and incorrect answers must be validated to at least one source or reference document available to every student (CTS, 2012). They may not be referenced to a particular speaker's presentation. In a master document, note the reference and location for each source cited. This information does not need to be included on the test instrument given to the students.

E. **Icing on the cake** - **last steps**

1. Look at all the options. Organize them from shortest to longest or longest to shortest for the best look on the page. See the question examples in this handout.

2. Then key the exam on an answer sheet so you can look at trends and patterns of the correct answers.

3. **Check the sequencing of the key**

   a. The total number of A, B, C, and D answers should balance so students don't think they can guess B or C and be correct most of the time.

   b. Avoid having long strings of the same correct answer. No more than 3 of the same answer (C, C, C) in a row.

   c. Avoid having predictable patterns in the answers, e.g., A, B, C, D, C, B, A.

4. The options may need to be rearranged to allow for better randomization of the key.

5. **Item development pitfalls**

   a. **"***They will know what I mean"* syndrome. They won't...be clear and precise.

   b. *"It's not a big deal" syndrome.* Little mistakes not caught before the test DO matter.

   c. Students will scrutinize each item for specific wording and unintended meanings. They naturally "read into" questions that are not clear.

F. **Sensitivity and fairness criteria based on ETS Fairness Review Guidelines (2003)**

1. **Guideline 1: Treat people with respect in testing materials**

   a. Language and images: Show respect for people in different groups.

   b. Societal role: Demonstrate that people in different groups are found in a wide range of societal roles. Do not over represent members of any group in examples of inappropriate, foolish, unethical, or illegal behavior. Example: hyperventilating patients are often depicted as hysterical females.

   c. Problems and beliefs: Do not treat problems or beliefs of a group as humorous or inconsequential.

   d. Ethnocentrism: Avoid indicating a particular group is superior to another or the standard by which others should be compared (e.g., avoid culturally deprived, our country, etc.)

2. **Guideline 2: Avoid controversial, inflammatory, offensive, or upsetting material unless it is construct relevant** (i.e., understanding of the term is required by the occupation). If required, attempt to make the material as objective as possible (do not support or oppose a view, praise or ridicule a position).

3. **Guideline 3: Use appropriate terminology to refer to people**

   a. Do not assign labels to people unless relevant.

   b. Do not use the term “minority” to refer to groups of people.

   c. Persons with disabilities – put the person first, i.e., a person who is blind, not “blind person”.

   d. Avoid negative connotations (afflicted, crippled, confined, victim); replace “confined to a wheelchair” with “uses a wheelchair”; “victim” with “casualty”, “fatality” or “injured party”, etc.

   e. Do not use the term handicap as a disability may or may not be a handicap.

   f. Avoid euphemistic or patronizing terms such as special, physically challenged, and inconvenienced.

   g. Avoid phrases such as inspirational, courageous, in spite of a disability, and overcoming a disability.

h. Avoid implying someone with a disability as sick (invalid, sickly, victim).

i. **Do not use the following terms:**

(1) Deaf and dumb
(2) Mongoloid
(3) Hearing impaired (use deaf or hard of hearing)
(4) Learning disabled (use person with a learning disability)
(5) Mentally ill (use person with a psychological or emotional disability)
(6) Mentally retarded (use person with mental retardation, developmentally disabled, developmentally delayed)

j. **Gender references**

(1) Women and men should be referred to in parallel terms. Gentlemen and Ladies (not men and Ladies or Gentlemen and women).
(2) Describe both by mental, physical, or professional attitudes (not one gender by mental and the other by physical).
(3) Use “women” and “men” if 18 years or older; “girls’ and “boys” if less than 18 years.
(4) Do not use language that implies all members of one profession are one gender.
(5) Do not couple generic role words with gender-specific pronouns or actions unless a specific person is being cited.

k. **Do not use he and man to refer to all people**

(1) Replace mankind or man with humanity, people, or person.
(2) Replace manmade with synthetic.
(3) Replace manpower with workers, work force.
(4) Replace fireman, mailman, foreman, etc. with firefighter, mail carrier, or supervisor.
(5) Replace, “If a student studies, he will” with “If a student studies she or he will…”, “If students study, they will”. Replace “He is transported…” “The person” or “The patient is transported”.

4. **Guideline 4: Avoid stereotypes**

a. Do not imply all members of a group share the same culture.

b. Avoid stereotypes in language and images.

c. No group should be stereotyped with respect to the following:

(1) Contribution to society; dependence on welfare
(2) Dialect or language use
(3) Generosity
(4) Honesty
(5) Impulsiveness
(6) Industriousness
(7) Leadership ability
(8) Morality
(9) Physical appearance
(10) Quality of culture

5. **Guideline 5: Represent diversity in depictions of people**

Gender balance: Do not depart from the gender distribution in an occupation or patient population. There should be equal representation of male and female patients. If possible, do not refer to a patient as he or she. Use “the person” or the “patient” unless gender is important for the diagnosis. For example, pregnant patients are always women.

V. **True/false items**

A. Includes a complete statement and a two choice alternative of true or false.

B. **Limitations**

1. Item must be limited to the two choices of true and false. This tends to test memory, not understanding.
2. Superficial logic usually suggests the wrong answer.
3. The item must not allow for any gray area.
4. Difficult to construct an item in the positive voice.
5. Avoid extreme answers that include absolute or hedging statements. Words associated with incorrect statements are always, never, only, necessarily, merely, must, all, none and impossible. Words associated with correctness that are less absolute and allow for exceptions and variability are often, seldom, perhaps, generally, may, and usually.

VI. **Matching**

A. Typically two columns of information are offered with the intent of selecting items from one column and matching them to items in the other column to form correct or complete statements. Add headings over each column so each is plainly identified. Alphabetize each list or place in an inherent order to decrease reading time.

B. **Limitations**

1. Works best with definitions and terms or with simple concepts and obvious relationships
2. Difficult to design properly
3. Ensure that multiple matches are not possible within the columns.
4. Items used must bear some similarity. Example: unless you are matching terms with definitions, it would be useless to match terms like humerus, vasopressor, and inferior because the answers would be obvious
5. Unclear directions how matching is to occur
    a. Explain if students will use each term one time or multiple times
    b. Explain if single or multiple answers are needed to complete a match

VII. **Completion items**

A. Fill-in-the-blank

B. Constructed of statements with part of their information omitted so the students must complete the statement.

C. **Uses**

1. For recall of facts, definitions, processes and principles subject to limited interpretation.
2. For computational problems with few potentially correct answers.
3. For naming numbered or lettered parts on an illustration, diagram or model.

D. **Limitations**

1. Enough information must be included for the student to glean the intent of the statement without leading the student to the answer.
2. Restricted levels of cognitive assessment (recall, recognition) precipitates "lifting" words/phases verbatim and encourages toe memorization of bits of information.
3. Meaning may be unclear and several answers may emerge as correct. May present a problem in scoring.

4. The answer space may provide a problem: Gives a hint to the student if a blank line is used for each word of the answer. Use one single line even if the answer takes two or three words.

E. **Guidelines for construction**

1. Should be worded to require a single, unique answer to one idea or concept.
2. Should be concise and unambiguous so answer is brief and definite.
3. All blanks should be the same length or to the right margin to decrease the possibility of cluing the answer. Let students know how much of an answer is expected.
4. Avoid textbook wording. This doesn't demonstrate any understanding, only the ability to read.
5. For numerical or symbolic responses, include the unit of measurement appropriate for the response.
6. Avoid grammatical cues by using both forms of indefinite articles such as a/n.

VIII. **Essay**

A. Short answer: Requires a bulleted list of responses or several questions to complete.

B. Long answer: Requires students to provide a lengthy prose style answer.

C. **Uses**

1. To measure complex cognitive behaviors, especially those requiring originality or creativity.
2. To elicit critical, logical and analytical thinking and problem-solving.
3. May be used for measuring affective learning.

D. **Limitations on both types**

1. May not be effective for measuring the lower levels of the domains of learning.
2. Time consuming and sometimes reliability in scoring is usually very limited.
    a. Grading can be very subjective: group grading is an alternative.
    b. Scoring can be slow and difficult as instructors try to assign a point value to the various components of the expected response.
    c. Aspects of the response unrelated to learning (handwriting, grammar, punctuation, spelling, composition) may influence scoring of items. Students often write illegibly because of time pressure or may try to add information at the end making the response difficult to follow.
    d. Some student's thought processes do not follow a linear progression causing an unfair disadvantage in a timed test.
    e. Student may include much more information than desired in an attempt to be thorough.
    f. If students do not understand the question, they may provide a very well thought out, but incorrect answer. You must consider whether you will award partial credit for a well-constructed incorrect answer.

E. **Guidelines for construction**

1. Increase the number of behaviors sampled by writing items that require a brief, focused response.
2. Use restrictive, specific verbs (contrast, outline, list) rather than broad, ambiguous verbs (describe, explain).
3. Verify that all behaviors in the instructional objectives occur in the essay item(s).

4. Create a **rubric** to describe the criteria that must be included to achieve each grade level.

   Example: For an "A" the student must provide all the correct information and write in complete sentences without committing any spelling errors. For a "B" the student must provide 80% of the required answer and commit one to three spelling errors.

IX. **Terminal/certifying examinations**

A. Final, summative exam with the intent of granting permission to attempt a licensing or certifying examination. Example: state exams.

B. It may require successful completion of one or a combination of two or three examinations to complete the program

1. Written examination
2. Practical examination
3. Oral examination

C. The multiple choice items must be pre-rated by a committee anticipating the number of candidates that are expected to answer the item correctly. Item analyses are reviewed after a critical mass of students have taken the exams to review question performance.

X. **Post written examination quality review by students**

A. Will students be able to keep the test?

1. **Advantages**

   a. Provides a learning aid for later testing (quizzes serve this purpose)
   b. Provides examples of your style of item writing

2. **Disadvantages**: Eliminates that test from reuse

B. **Allow students the opportunity to review their test results**

1. Highlights areas of strengths and ongoing learning needs for further study and remediation.

2. Highlights areas of weakness in the presentation of the material.

3. Can help control bias or discrimination concerns when students see what other students missed.

4. Promotes a climate of fairness when students can challenge questions, answers, or the wording of a question if improperly prepared.

5. Can be used as a learning aid for the students and instructor.

XI. **Post written examination quality review by faculty**

A. Compile the results (**item analysis**), including an accounting of incorrect answers.

B. If the upper one-third of the group missed a specific item determine the following:

1. Is the test item keyed correctly?
2. Is the test item constructed poorly?
3. Is it free from bias, confusion and errors in grammar and spelling, etc.?
4. Was the content covered in class? If not, were the student directed to it through self-study?

C. If the lower one-third of the group missed a specific item:

1. Which distracters were most attractive?
2. Improve distracters that were not attractive.
3. Consider a distracter well written if it is not selected by the upper-third of the class but it is selected by the lower-third.

D. **Calculate measures of central tendency** to look for skewed results

1. **Mean**: Mathematical average of all scores
2. **Median:** Middle score from the range of all scores
3. **Mode:** Score(s) most frequently achieved
4. **Range:** Lowest to highest score
5. Mean, median and mode should be very close to one another is a bell curve distribution of scores.

XII. **Practical examinations**

A. **Two basic types: Situational and rote**

1. **Rote:** Demonstration of the critical steps of performing a skill independent of manipulation of outcomes. Generally follows very specific order of steps.
2. **Situational**: Demonstration of a skill in the context of a scenario allowing for manipulation of the outcome or procedure by the student. Good for evaluating critical thinking skills as well as skill performance.

B. **Rote mechanical skill**

1. Requires simple task analysis.
2. Is the easiest skill examination to administer.
3. Create a written task analysis and a checklist commensurate with the task analysis.
   a. Each step should contain some measurable criteria so all evaluators agree on criteria of successful completion of each step.
   b. Sequence steps clearly to reduce errors in evaluation.
4. May or may not reflect the actual field performance capabilities of the student.
5. Isolated skill performed without "real world" stresses may not adequately evaluate affective and psychomotor domains.

C. **Situational skills**

1. Evaluates judgment and/or decision making
2. Requires more elaborate simulations
3. More difficult to develop and deliver
4. Is a more accurate predictor of actual performance because it asks students to critically think through a scenario that does not always have an obvious answer.

D. **Advantages**

1. Most closely approximates actual job performance
2. Allows observation and evaluation of related behaviors and attitudes
3. Situational stations allow evaluation of psychomotor skills, decision-making and leadership skills

E. **Disadvantages**

1. Difficult to standardize evaluation
2. Time-consuming and labor-intensive to prepare and deliver
3. Limited number of students may be examined at one time
4. Instructor providing feedback needs to be clear about expected outcomes, whether a situational or rote response is required, and should evaluate accordingly.

XIII. **Reliability (very introductory – much more to cover here)**

A. Extent to which an exam is consistent in measuring student performance between different classes at the same site or at different sites.

B. Does it measure a behavior or body of knowledge consistently on different occasions?

C. Does the environment influence consistency?

D. Do different instructors influence results?

E. Does it discriminate against groups or individuals?

F. If an exam is not performing reliably, do a root cause analysis to determine the cause of the variability.

XIV. **Content validity (also very introductory)**

A. Validity is the extent to which an examination is representative of a defined body of knowledge; the ability of an examination process to measure the knowledge and skills it was intended to measure in accordance with curriculum objectives. Building an exam from a blueprint will help insure that it is testing what it is intended to test.

B. Are sub-test sections weighted and distributed properly?

C. Do they place an over importance on a single subject?

D. Is that your intent?

E. Does it cover a reasonable sample of the knowledge and skill objectives?

F. Is it an accurate predictor of performance? High frequency and/or high criticality?

XV. **Common mistakes**

A. Relying on subjective judgments

B. Testing trivia or facts that are not common knowledge. Students should not have to cram for little details.

C. Ambiguous or tricky questions

D. Areas of knowledge too broadly or too narrowly defined

E. Cluing the correct answer

XVI. **Final checklist for each item**

A. Question is clear, complete, and well focused.
B. There is a single answer that experts would agree is correct.
C. The stem is direct, concise and unambiguous.
D. The stem includes all necessary but no extraneous information.
E. The stem and options do not contain confusing double negatives or logical inconsistencies.
F. Options provide rationally appropriate completions of the stem.
G. Options are homogenous in focus, phrasing, terminology, content and length.
H. Options do not overlap.
I. Options do not clue a lesser knowledgeable examinee.

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BOOKLET # _____

Northwest Community
Emergency Medical Services System

Paramedic Training Program
Final Written Exam

June 2012

PURPOSE:

The purpose of this exam is to measure a paramedic student's mastery of didactic principles deemed essential by the EMS Medical Director prior to graduating from the NWC EMSS Paramedic Program and being approved to take the Illinois Department of Public Health or National Registry Paramedic examination.

Instructions:

1. You will be given a maximum of 2½ hours to complete this examination.
2. You may use calipers to assist with rhythm analysis.
3. You may not use any electronic device during the exam. Scratch paper will be provided.
2. Complete the identifying information as specified by the exam preceptor on the answer sheet.
3. Read each question and its lettered answer carefully. **There is only one correct answer.** All questions relating to patient treatment should be answered within the context of the current NWC EMSS SOPs, policy and/or procedure manuals unless otherwise specified.
4. Select the option that **best** answers the question then completely fill in the circle with one dark mark on the answer sheet. Fully erase all changes or stray marks.
5. Do not leave any questions unanswered.
6. Do not make any marks in the test booklet.
7. Each question is worth 0.66 points. A minimum score of 75% is required to pass.
8. When finished, return the test booklet and answer sheet to the exam proctor.

Good Luck!

This examination is a closed book test. No aids, prompts, SOPs, study tools, notes, or information from another examinee may be used to assist in answering the questions.
The exam booklet is the property of the Northwest Community EMSS and may not be duplicated or removed from the testing location by any examinee.
Violation of these policies will result in instant dismissal from the program.

NWC EMSS EMT-P Training Program

Modular Exam III – S12

Blueprint

Topics	# items
HEAT / COLD EMERGENCIES	**7**
Assessment/ Rx of heat cramps, exhaustion, or stroke	4
Assessment/Rx frostbite or hypothermia including ECG changes for hypothermia	3
DROWNING and WATER-RELATED EMERGENCIES	**3**
Diving emergencies of descent, depth, or ascent	2
Drowning resuscitation per SOP	1
ALTITUDE ILLNESS	**3**
Cause of altitude illness	1
S&S mountain sickness, HAPE, HACE	2
ALLERGIES/ANAPHYLAXIS	**8**
Assessment /identification/ treatment of localized, mild, moderate ;severe reaction	4
Treatment of cardiac arrest from anaphylactic shock	2
Drug profile of diphenhydramine	1
Drug profile of epinephrine	1
ENVIRONMENTAL EMERGENCIES – bites & stings	**4**
Assess/identify brown recluse vs. black widow spider bites	2
Vectors that may spread disease	1
Snake bite characteristics/treatment	1
INFECTIOUS DISEASES	**7**
Assessment/Rx of diseases	5
BSI/hand washing	1
Significant exposure policy	1
NEURO A&P/Assessment	**9**
Functions of cerebral lobes	2
Cerebellum; function; assessment	1
Function/assessment of CN: II, III, V, or VII	2
Glasgow scoring	2
Determinants of cerebral perfusion pressure	1
Motor/sensory assessment	1
MEDICAL NEURO DISORDERS	**10**
Stroke: pathophysiology, assessment using Cincinnati stroke screen; treatment	4
Assessment/Rx of seizures	1
Neuro disorders: S&S and/or treatment headaches, meningitis, ALS, multiple sclerosis, GBS, muscular dystrophy, Alzheimer's disease, Parkinson's disease	5
GI EMERGENCIES	**7**
Assessment/Rx of appendicitis, cholecystitis, bowel obstruction, diverticulitis, pancreatitis, or esophageal varices	6
Upper vs. lower GI bleeding	1
GU/RENAL EMERGENCIES	**5**
Differentiation of GU emergencies: Pyelonephritis, kidney stones, testicular torsion/Rx	3

Topics	# items
Cardiac arrest management in the dialysis patient	1
Vascular access in a chronic renal failure patient	1
DIABETES	**11**
Pathophysiology of type 1 vs. type 2 DM	1
Action of insulin and glucagon	2
Assessment/Rx of hypoglycemia adults and elderly	3
Assessment and Rx of hyperglycemic complications (DKA, HHNS)	3
Complications of DM: neurologic and cardiac implications	2
ENDOCRINE	**2**
Hyper or hypothyroid diseases	1
Adrenal disorders: Addison's disease or Cushing's disease	1
OB/GYNE/Newborn emergencies	**24**
Organs of pregnancy	1
Estimating gestational age	1
Prenatal diseases that may impact mother or fetus	1
Identification of spontaneous abortion, ectopic pregnancy, abruptio placenta, placenta previa	4
Identification or Rx of preeclampsia or eclampsia	2
Sign of imminent delivery	1
Timing of contractions	1
Preparing for a normal delivery	1
Identification or Rx of a prolapsed cord	1
Facilitating a delivery with or without a nuchal cord, meconium aspiration, shoulder dystocia	5
Components of APGAR scoring	1
Newborn resuscitation	3
Facilitating a breech delivery	1
Post partum complications	1
PEDIATRICS	**28**
Vital sign normals in children	1
Airway management in children	3
Signs of respiratory distress in children; ventilatory management in children	2
Cardiovascular differences in children; S&S cardiorespiratory compromise; IV fluid calculation in children	3
Cardiac arrest management in children	2
Identification and treatment of croup/epiglottitis	3
Identification and management of seizures in children	2
Cold stress in children	1
Rx of hypoglycemia in children	1
SIDS	1
Identification/Rx of asthma/bronchiolitis (RSV virus) in children	2
GCS adjustments in children	1
Relieving upper airway obstruction in child/infant	1
Trauma considerations in children: thoracic, musculoskeletal	2
Rx of pediatric bradycardia with a pulse	1

Topics	# items
Pain assessment & management in children	2
TOXICOLOGY	**10**
Assessment/Rx of OD: stimulants, hallucinogens, cholinergic agents, narcotics, beta blockers, TCAs, ecstasy, GHB, Rohypnol, alcohols; CO, cyanide	10
12-Lead ECG	**2**
Acquiring the 12 lead	1
Interpreting the 12 lead	1
Geriatric patients	**5**
Physiology of aging: changes to major organ systems; response to illness and disease	3
IMC special considerations in the elderly	2
Violence/abuse	**5**
Child abuse: types of injuries; reporting	2
Protective custody: Who is authorized to take this step?	1
Child neglect	1
Elder abuse: types of injuries; reporting	1
TOTALS	150

Exam 3BP S12

State of Illinois
Paramedic EXAM CONSTRUCTION ASSUMPTIONS

1. Concepts to be tested shall be clinically relevant and highly critical for paramedic practice. The exam shall be constructed to measure safe entry-level knowledge by evaluating the Paramedic's mastery of key cognitive objectives. All items to be tested shall correspond to content in the national EMS Education Standards.
2. **The blueprint shall follow the topical breakdown of core classes and the number of questions per topic shall be weighted based on the criticality of the information to safe prehospital practice based on subject matter experts.**
3. The table of specifications shall include a distribution of questions on A&P or pathophysiology, patient assessment, interpreting data to reach an appropriate paramedic impression of the patient's problem(s), prehospital interventions and patient monitoring. The level of mastery to be evaluated will range from application to synthesis and integration of concepts requiring higher order thinking.
4. All items shall be constructed as multiple choice questions testing only one concept per question. The information to be tested shall be clearly communicated. All technical terms shall be defined, all abbreviations shall be included in the data dictionary or spelled out, and all discriminators will be clearly correct or incorrect based on referenced sources, avoiding "red herring" answers. Questions should be phrased using positive frames of reference. None of the above/all of the above answers, compound multiple, and "all of the following *except*" questions are not acceptable. Actual case scenarios shall be used whenever possible to frame assessment questions. Discriminators that finish a stem shall be grammatically correct and the first word of each answer shall be typed with a small case letter. All discriminators in a given item shall be of similar length and complexity.
5. All ECG strips will be originals and classic examples of the dysrhythmia to be tested.
6. All question answers must be referenced to a current paramedic textbook.
7. All areas of controversial or inconsistent practice or regional bias will be avoided on the exam, i.e., most drug dosages.
8. Consensus must be reached by the Item Writer's Committee regarding the content and use of each question prior to being accepted into the exam bank.

Affirmed: F98; Reaffirmed: F12

Medication list
Adenosine
Albuterol
Amiodarone
Aspirin
Atropine
Benadryl (diphenhydramine)
Dextrose 50%
Dopamine
Epinephrine 1:1000
Epinephrine 1:10,000
Fentanyl
Glucagon
Lidocaine
Magnesium
Morphine
Narcan (naloxone)
Nitroglycerin
Sodium bicarbonate
Valium (diazepam) / Versed (midazolam)
Vasopressin
Verapamil

Normal values (reference norms)

Intrinsic pacing rates:	SA node	60-100
	AV node	40-60
	Ventricles	20-40
PR interval:	0.12-0.20 seconds	
QRS duration:	0.04 - 0.10 seconds	