



## **Board of Certification, Inc. (BOC) Exam Development Style Guide**

*Last Edited on March 2017*

This document is developed to assist BOC item writers and other stakeholders. It provides guidelines/rules to help standardize the development of the BOC exam.

\*This is an evolving document and will be reviewed on a regular basis for edits and alterations.

### **1. General Guidelines**

- A. In general, test items should be critical, important and frequent and do the following:
- Be easily understood
  - Minimize guessing
  - Avoid testing trivial information
  - Avoid candidate scrolling
  - Assess entry level knowledge, skills and abilities (KSAs)
- B. All items should account for characteristics that could affect comprehension including:
- Age
  - Education level
  - Experiences
  - Language
  - Physical/mental limitations
  - Geographic location
- C. Items should be written for the entry level athletic trainer and pertinent to assessing minimum competence required for an athletic trainer within 2 to 3 years of entry to the profession.
- Focus on content that have permeated entry level practice and can be double referenced
  - Items should not be based on opinions. They should be based on established guidelines (i.e., double referenced).
- D. Every item on a high-stakes exam must be linked to the blueprint to be legally defensible.
- E. All items should be written clearly and concisely (minimize expressive/descriptive verbiage).
- Do not use obscure concepts by making sure items are tied to the blueprint and pertinent to the entry level professional.
  - If including practice setting, age, gender, sport, etc., it should have a direct bearing on the content of the item.
- F. Individual items will only test 1 concept at a time.
- If a stem gives information as to a set of signs and symptoms and asks the candidate to identify the potential condition and what to do next, the item should be rewritten into 2 items since it is trying to test 2 concepts (i.e., identification and treatment).
  - Example: “What is the normal pulse rate of an adult and how would each be measured?” This question would need to be split into 2 separate items. Knowledge of normative values is 1 concept and how to assess each is a separate concept.

- G. All items should be written in the form of a question and end in a question mark (?). No fill in the blank or incomplete sentence items.
- H. Refer to the person first within the item as opposed to the injury/illness.
  - Example: “A patient with a sprained ankle...”
- I. All items will be written in third-person.
  - Example: “An athletic trainer would...” as opposed to “you would...”
- J. Items should be written in “active voice.”
  - Example: “The student played basketball at school today.” vs. “Basketball was played at school today.”
- K. All items should be stated positively and avoid the use of statements such as:
  - “All of the following EXCEPT”
  - “Which of the following is NOT true?”
  - Not acceptable example: “All of the following conditions can be safely treated with thermal ultrasound EXCEPT...”
  - Acceptable example: “Which of the following conditions are contraindications for use of thermal ultrasound?”
- L. All distractors should be clearly incorrect but plausible and consistent in content.
  - “Clearly incorrect but plausible” could include common misconceptions, common errors, familiar but incorrect phrases with some embedded truth or close but incorrect information.
  - “Consistent in content” refers to all distractors being in the same “family.” If the stem is asking about “muscles” all of the distractors need to be “muscles.”
- M. The item stem should include all information that is relevant and necessary to answer the question. If necessary, bullet points may be added to present the information in a clear and concise manner (i.e. signs and symptoms). Bulleted information should be short and concise (no full sentences).
- N. Construction of items should avoid content where there may be inconsistencies or variations in, accepted / published terminology, local/regional/national/institutional laws, regulations and/or policies and procedures.
- O. Vocabulary should be consistent with the level of entry level professional.
- P. Avoid absurd responses. These are so highly implausible, that no test taker will choose them. The use of absurd responses makes guessing easier by reducing the number of plausible distractors in a test item. This can also be said about “all of the above” responses, “none of the above” responses, “I don’t know” responses and “a and b above” responses.
- Q. Avoid verbatim phrasing from a textbook. This type of questioning leads to rote memory for students and most of the test questions are at the lower cognitive level of recall.
- R. Avoid using trickery, humor or teaching within items. Test-takers must be able to interact with the items without barriers.
- S. Avoid trick questions that lead to incorrect responses.
  - Trivial content - Items are considered tricky if the content of the item is unimportant and the trivial point is the focus of the correct response.
  - Stem includes unnecessary window dressing - Items are considered tricky if the item writer provided irrelevant information for determining the correct response.
  - Correct response discrimination - Items are considered tricky if the item is discussed at one level of precision such as the approximate area and then it is tested at a much finer level of discrimination such as decimal areas.
  - Opposite principle - Items are considered tricky if they measure knowledge of content in the opposite from which it was learned.
  - Highly ambiguous - Items are considered tricky if the best candidates had no idea of the correct response and they had to guess.

- T. Referencing exam items:
- All items should have a minimum of 2 references.
  - Except for seminal references, references will be no more than 5 years old.
    - i. A “Seminal Reference” is typically older than 5 years but has withstood “the test of time” and continues to be used in most ATPs as per the Program Director Reference Survey.
      1. Example: Netters Anatomy
  - References will be generally found to be utilized within a considerable portion of the athletic training field.
  - References should be publically available, not confidential or of limited release. Publically available may require some cost (e.g., a text book, library subscription).
  - In regard to professional statements, Position Statements will be accepted and used (no “official” or “consensus” statements may be used).
  - All references will be cited from their “primary source.”
    - i. Example: NATA Position Statement should be referenced from the Journal of Athletic Training and **not** the NATA website.
  - Peer reviewed journal articles can be used as long as they are either position statements or meta-analyses.
  - Unacceptable References include material from any other professional organization/institutions such as NCAA; ACSM, AMA etc.

<b>2. Classification</b>
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- A. All items must reflect the current classification system that is derived from the most current BOC Role Delineation Study/Practice Analysis.
- B. Why do we classify?
- According to CASTLE Worldwide Inc., each question must be classified according to an appropriate number. The classification number represents the content area that a specific question is testing.
  - Each classification number contains 6 digits. The first 2 digits represent the domain being tested, the second 2 digits represent the task statement being tested, and the last 2 digits represent the knowledge or skill statement being tested.
    - i. For example, classification number 010203 would represent domain 1, task 2 and knowledge and skill statement 3.
  - Every item must reflect a single specific knowledge or skill, as required in the test specifications. The counts of the United States (and most western countries) require that all items be explicitly linked to a facet of professional performance. We make this link between item and performance using the classification system. An examination containing 1 item that is not classified is not legally defensible.
  - Avoid overly general content. Each item should have a specific purpose on a specific content area.
- C. Numbering system:
- 6-digit #
- 010203 = 1<sup>st</sup> two #s designate the domain
- 010203 = 2<sup>nd</sup> two #s designate the task
- 010203 = 3<sup>rd</sup> two #s designate the KSA
- D. Examples:
- PA-7
- 030312 = Domain 3: Immediate and Emergency Response  
Integrating best practices in immediate and emergency care for optimal outcomes
- 030312 = Task 3: Implement appropriate emergency and immediate care procedures to reduce the risk of morbidity and mortality.
- 030312 = Measuring, interpreting, and monitoring vital signs and patient status

<b>2. Terminology</b>
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- A. Patient vs. Athlete vs. Client:
- An individual receiving athletic training service should be referred to as “patient;” the descriptor “athlete” should only be used when a problem is based on participation in a sport.
  - The term “client” should be used for situations where individuals receive athletic training services, usually preventive in nature, on a fee-for-service basis.
- B. If age of the “athlete” or “patient” is a relevant factor in the item, specify the age.
- C. Terminology

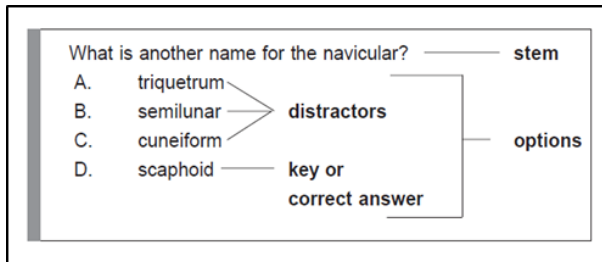
<u>Correct Usage</u>	<u>Incorrect Usage</u>
Athletic Trainer	Certified Athletic Trainer
Physician	Doctor
Athletic training “services”	Athletic training “coverage”
BOC	NATABOC or NATA-BOC
Athletic training facility	Athletic training room
Health Care Provider	Allied Health Care Provider
Orthopedic	Orthopaedic

- D. Use “Emergency Cardiac Care (ECC)” as a collective noun. Use “CPR” and “AED” when using an AED or applying CPR.
- E. Use “ligamentous testing,” “manual muscle testing” and/or “special testing.”
- F. Use “differential diagnosis” and/or “impression.”
- G. All items must have a clear choice when using “best” or “most.” “Best” and/or “Most” implies that the correct choice is optimal for the situation when compared to other choices.
- H. Refer to medications by their action.
- Example: “Antibiotic” instead of “Azithromycin” (Z-Pack)
  - Example: “Non-Steroidal Anti-Inflammatory” (NSAID) instead of “Celebrex”
- I. Practice settings will be referred to as the following:
- Clinic/Hospital
  - Health/Fitness Industry
  - Industrial/Corporate
  - Corporate
  - Military/Government/Law Enforcement
  - Professional Sports/Performing Arts
  - Sales/Marketing
  - Secondary School
  - University/College/Community College
  - Youth Sports
- J. Cranial nerves will be expressed as both the roman numeral and the formal name:
- “Cranial Nerve V (Trigeminal)”
  - “Cranial Nerve II (Optic)”
- K. When a term has 2 commonly accepted forms, both will be used and displayed as the following:
- i.e., “Peroneal (fibularis) tendons”
  - i.e., “External (lateral) rotation”
  - i.e., “Internal (medial) rotation”
  - i.e., “3.0/3.3 MHz”

- L. Deep Tendon Reflexes will be expressed as:
- 0 = Absent
  - 1+ = Hypoactive
  - 2+ = Normal
  - 3+ = Brisk
  - 4+ = Hyperactive with Clonus
- M. When expressing the pain scale, it will be listed as the following:
- “8 on a 10 point scale”
- N. Standard instructions for items:
- Multiple-Choice: *Choose only one*
  - Multi-Select: *Choose all that apply*
- O. Ultrasound parameters will be expressed as the following:
- Frequency = MHz
  - Power = w/cm<sup>2</sup>
- P. Electrical Modalities
- The use of “Hz” is appropriate when designating the frequency of alternating current (AC) modalities
  - The use of “pps” is appropriate when designating the pulse rate.
  - Duty cycle will be expressed as “10 seconds on/50 seconds off”
- Q. Trademarked, Registered and Copyrighted Names
- Names that hold the marks <sup>TM</sup>, ®, © are not to be used in exam items. The generic version to describe the protected term must be used

### 3. Item Types

- A. Multiple choice - These items should have a total of 5 options that includes 1 correct answer and 4 incorrect answers (distractors).



- B. Multi-select - These items should have a minimum of 5 options and a maximum of 8 options. There should be a minimum of 2 correct answers with the total number of distractors not exceeding double the number of correct answers.

Possible Combinations of Correct Choices and Distractors for Multi-Select Items		
Number of Total Choices	Number of Correct Choices	Number of Distractors
5	2	3
6	2	4
6	3	3
7	3	4
8	3	5
8	4	4

- C. Drag and drop - These items have a tool bar of options along 1 side and black boxes (i.e., buckets) along the other side for the placement of correct answers. The tool bar should have between 4 and 8 options. In addition, there should be 3 to 6 buckets. The number of options in the tool bar can exceed the number of buckets (i.e., not all options being used).
- D. Hot spot - These items use a dot to identify a location on a drawing/photograph. Although these items can be constructed with a traditional question stem, they are appropriate for the identification of anatomical structures.
- E. Focused testlet - These items present a practical scenario and then ask the candidate to answer 5 items based on the most critical/key concepts of the scenario. All of the different item types can be used to construct a focused testlet. The goal with this item type is to be able to assess clinical decision-making skills in regards to entry level skills to protect the public.
- F. Examples - <http://www.bocac.org/candidates/exam-preparation-tools/sample-exam-questions>

<b>4. Distractors</b>
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- A. Options - The options are the possible choices or responses to a multiple-choice item.
  - One of the responses is called the “one best or correct answer” or “keyed response.” The keyed response is the option of a multiple-choice item that is considered the correct response.
  - The incorrect responses are called the distractors.
  - The Plausible Distractors are the incorrect responses that are common errors that do not answer the question.
  - The distractor statements should include true statements that do not satisfy the requirements of the item posted, or similar content and include incorrect statements with common sense plausibility, therefore appealing to the unknowledgable candidate.
  - Suggestions for writing detractors
    - i. All distractors must be plausible. In writing distractors, item writers may use common errors, important sounding words (significant, accurate, etc.), textbook-type language and the words with verbal associations in the stem (politician ...political). Item writers may think of common misunderstandings and careless errors.
- B. Best answer – The best answer(s) is correct:
  - Multiple responses can have some truth to them
  - Can increase the confusion among test-takers
  - Subject Matter Experts (SMEs) judge the correct response(s) in conjunction with double referencing
  - The stem must confine the choice to the available options (i.e., “best”, “most”)
  - Verify that all 4 responses are grammatically related to the stem.
  - Ensure that the correct response is similar in length to the distractors.
- C. Technical accuracy - For technical accuracy edits ask the following questions:
  - “Is there only 1 best answer to a question?”
  - “Is the answer technically correct?”
- D. Broad option types - The following are broad option types that we utilize:
  - Absolutely correct
  - Best answer(s) correct
- E. Writing an Item - When writing an item, you should think about which one will make the item the clearest to the test-taker. Absolutely correct items:
  - Typically recall in nature
  - Can be less ambiguous

- F. Distractors must be drawn from the same pool, which means that they are all members of the same group as the correct response.
- Distractors must be similar in length, complexity, vocabulary, grammatical construction, etc. An item with distractors are not drawn from the same pool as the correct response.
  - Do not use “All of the above” and “None of the above” as distractors. If a candidate can eliminate one of the other 3 distractors, then “All of the above” is also eliminated.
  - Similarly, for “None of the above.” In such an event, the chances of the candidate guessing the correct response are substantially improved.
  - Avoid using terms like “always” and “never.” Very few things in professional settings are always true or never true. Candidates can use these terms in eliminating distractors.
- G. In review, the options, both key and distractors, will be effective if they are:
- Parallel
  - Plausible
  - Comparable in length
  - Mutually exclusive (not overlapping)
  - Without clueing
  - Without dual actions or explanations

## 5. Level of Decision Making

- A. Recall/Understanding - Items are generally testing factual knowledge.
- Assessing recall/understanding - Item writers can develop a variety of questions at the knowledge level. Professional knowledge is a body of terms, facts and principles that characterize the profession. It is information that is stored in books, other media and memory.
  - One type of recall/understanding question involves terminology because the knowledge base for a profession may be identified by its jargon. Even though candidates might not have large general vocabularies, their competent performance of job duties often requires that they possess the specific vocabulary of the field. An example of a multiple-choice question assessing recall or understanding of terminology is:

Which of the following words has the same meaning as egress?  
a. Depress  
b. Enter  
c. Exit  
d. Regress
  - Professions are also distinguished by the body of factual knowledge that practitioners use in supplying competent service to their clients. The knowledge base is built through ongoing research and candidates should demonstrate their mastery of factual knowledge.
  - An example of a multiple-choice question assessing factual knowledge is:

Which of the following missiles launched the first U.S. astronaut into orbital flight around earth?  
a. Atlas  
b. Mars  
c. Midas  
d. Polaris
  - Normally, however, the recall of facts is insufficient for competent professionals. They must also possess understanding of important principles. Principles explain phenomena: how things work, how things move, why things are true, etc.

- An example of multiple-choice question assessing knowledge of principles is:

The principle of capillary action helps to explain how fluids:

- a. Enter solutions of low concentration.
- b. Escape through small openings.
- c. Pass through semipermeable membranes.
- d. Rise in fine tubes.

B. Application - Items ask the test-taker to recognize the correct application of principles and/or facts.

- Assessing Application - Multiple-choice questions that assess application pose a problem or circumstance that professionals might reasonably experience in performing their responsibilities. The problem or circumstance presented in the question illustrates relevant facts or principles and the relationship between the factor or principle and some phenomenon. If the problem involves a method or procedure, application-level questions might ask the candidate to identify the correct justification for the method or procedure.
- Many application-level questions require the candidate to recognize the correct application of facts and principles. These questions present a phenomenon, and then require the candidate to identify the fact or principle it represents. Other questions present the fact or principle, and then require the candidate to choose from among several phenomena presented.
- An example of multiple-choice question assessing the candidate's identification of correct application is:

Which of the following explains why adequate lighting is necessary in a balanced aquarium?

- a. Fish need light to see their food.
- b. Fish take in oxygen in the dark.
- c. Plants expel carbon dioxide in the dark.
- d. Plants grow too rapidly in the dark.

C. Analysis - Items ask the test-taker to identify and analyze the relationship between principles and/or facts. They can also ask the test-taker to decipher between inference and fact as well as irrelevant and relevant.

- Assessing analysis - Analysis refers to the ability to break information into its component parts so that its organizational structure can be understood. This can include the identification of the parts, analysis of the relationship between the parts, and recognition of the organizational principles involved. Candidates must demonstrate their understanding of both the content (terminology, facts, principles and methods) and procedures. In analysis, the candidate must recognize unstated assumptions and logical fallacies.
- When questions require candidates to review information and distinguish fact from inference, they must analyze the information and categorize it in order to identify the correct response. In many professions, analysis of signs (facts) may lead to a diagnosis (inference). Multiple-choice items that incorporate interpretive exercises (scenarios, drawings, tables, graphs, etc.) are useful in writing or developing analysis-level questions. For example, a multiple-choice question that requires analysis of the distinction between facts and inferences.

Which of the following is an inference explaining why North Carolina selected the cardinal as the state bird?

- a. The cardinal is indigenous to the state.
- b. The state's cardinal population is high.
- c. The cardinal lives in all parts of the state.
- d. The cardinal would look pretty on the state flag



- Competent professionals must be capable of distinguishing between relevant and irrelevant information when solving problems. Correct solutions require the candidate to determine what pertains to the problem and ignore information that is irrelevant or inconsequential. A multiple-choice question that requires analysis of the relevance of certain information using an interpretive exercise is:

Use the following information about plumbing parts and prices to answer Questions X through Y:

Component	Quantity	Unit	Material	Labor
8.2 gallon water cooler including piping, wall mounted	1	each	\$352	\$108
Type DWC copper tubing	5	linear ft.	\$8	\$40
Wrought copper tee, 2" diameter	1	each	\$5	\$34
Copper P trap, 1" pipe	1	each	\$7	\$14
Galvanized steel pipe, 2" diameter	4	linear ft.	\$17	\$27
Type L copper tubing, 3/8" diameter	10	linear ft.	\$6	\$46
Standard coupling for C.I. soil type, 4" diameter	5	each	\$15	\$99
Wrought copper, 90 degree elbow	3	each	\$2	\$33
Wrought copper, Tee for solder joint	1	each	\$1	\$17
Copper stop and waster, 3/8" diameter	1	each	\$3	\$10

What is the total cost estimate for installation of an electric, self-contained, wall-hung water cooler with the relevant components, including overhead and profit at 14%?

- \$686
  - \$782
  - \$844
  - \$962
- Providing competent service requires the professional to examine a situation and understand the relationship among its components. An example of a multiple-choice question that requires analysis of the structure of the material presented and relationships among its components is:

Which of the response options is the indirect object of the following sentence?

As president, Clinton gave Congress a clear mandate to address reform of the health care system.

- Mandate
  - Congress
  - Reform
  - System
- 4 Verbs to watch for:
    - Recall - who, what, when, where, which
    - Application - apply, solve, show, make use of, modify, demonstrate and compute
    - Analysis - differentiate, compare and contrast, distinguish x from y. Answer how does x relate to y? Why does x work?

## 6. Abbreviations

Abbreviations on the list below may be used without spelling out the entire term. All other abbreviations **NOT** on the list below need to be spelled out: i.e., American Red Cross (ARC). This does not apply when an item is specifically testing the knowledge of commonly accepted abbreviations.

AAROM	Active Assistive Range of Motion
ACL	Anterior Cruciate Ligament
ADL	Activities of Daily Living
AED	Automated External Defibrillator
AIDS	Acquired Immune Deficiency Syndrome
AMA	American Medical Association

AROM	Active Range of Motion
BESS	Balance Error Scoring System
BID	Twice a Day
BMI	Body Mass Index
BOC	Board of Certification, Inc.
BP	Blood Pressure
bpm	Beats Per Minute
CAATE	Commission on Accreditation of Athletic Training Education
CDC	Centers for Disease Control and Prevention
COPD	Chronic Obstructive Pulmonary Disease
CPM	Continuous Passive Motion
CPR	Cardiopulmonary Resuscitation
CT Scan	Computed Tomography Scan
DIP	Distal Interphalangeal
DSM IV	Diagnostic and Statistical Manual of Mental Disorders - 4th Ed.
EAP	Emergency Action Plan
ECC	Emergency Cardiac Care
ECG/EKG	Electrocardiogram
EMG	Electromyogram
EMS	Emergency Medical Services
EPA	United States Environmental Protection Agency
FERPA	Family Educational Rights and Privacy Act
FDA	U.S. Federal Drug Administration
HIPAA	Health Insurance Portability and Accountability Act
HIV	Human Immunodeficiency Virus
HMO	Health Maintenance Organization
HOPS	History, Observation, Palpation, Special Tests
HR	Heart Rate
LCL	Lateral Collateral Ligament • need to specify which body part (knee, elbow, etc.)
MCL	Medial Collateral Ligament • need to specify which body part (knee, elbow, etc.)
MCP	Metacarpophalangeal
MMT	Manual Muscle Test
MRI	Magnetic Resonance Imaging
MRSA	Methicillin Resistant Staph Aureus
MTP	Metatarsophalangeal
NATA	National Athletic Trainers' Association
NCAA	National Collegiate Athletic Association
NOCSAE	National Operating Committee on Standards for Athletic Equipment
NSAID	Non-Steroidal Anti-Inflammatory Drugs
OSHA	Occupational Safety and Health Administration
OTC	Over-the-Counter
PCL	Posterior Collateral Ligament
PIP	Proximal Interphalangeal
PNF	Proprioceptive Neuromuscular Facilitation
PPE	Pre Participation Examination
PPO	Preferred Provider Organization
pps	Pulse Per Second
PRN	As Needed
PROM	Passive Range of Motion
QD	Per Day
QID	Four Times a Day
ROM	Range of Motion
RROM	Resistive Range of Motion
SLAP	Superior Labral Tear from Anterior to Posterior
SOAP	Subjective, Objective, Assessment, Plan

STD	Sexually Transmitted Disease <ul style="list-style-type: none"> <li>when referring to STD, need to mention STI in parentheses</li> </ul>
STI	Sexually Transmitted Infection <ul style="list-style-type: none"> <li>when referring to STI, need to mention STD in parentheses</li> </ul>
TBI	Traumatic Brain Injury
TENS	Transcutaneous Electrical Nerve Stimulation
TID	Three Times a Day
WGBT	Wet-Bulb Globe Temperature
WNL	Within Normal Limits
X Ray	Radiographs

<b>7. Grammar</b>
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- A. Capital letters - For the most part, only the first word in a sentence is capitalized. Athletic trainer used in a sentence (The athletic trainer assisted the patient...) is not capitalized. Proper names will be capitalized - Board of Certification. But, proper nouns do not need capitalization within a phrase or sentence (athletic training facility, emergency action plan). The first word of an answer choice should also be capitalized.

Otherwise, use a dictionary or simply follow basic principles of capitalization. For example, 1 common term in BOC items is athletic trainer. This term does not need to be capitalized because it is not a proper name or a formal title when referred to in a general manner within an item.

- B. Punctuation - Follow the usual rules for punctuation. If the option is a full sentence, please use proper punctuation normally a period at the end of the sentence. If the option is a word, group of words or a phrase, please use the Oxford comma (a comma between each word and one before the and) but you do not need a period at the end of the phrase.

All items should feature a stem that ends in a question mark.

- For example: What effect does thermal ultrasound produce?
- Begin each answer choice with a capital letter.
- Decide whether the answer choices are sentences.

If the answer choices are sentences meaning that each has a complete subject and a complete predicate that join together to express a complete thought, they receive end punctuation most likely a period. If the answer choices are not sentences, they do not feature any end punctuation.

- C. Option length - Check the options and see that they are similar in length to one another. You can work in groups - 3 of similar length and 3 of similar length for a six-option MS item.
- D. Do not use “you” in any item. Use “athletic trainer.”
- Use single pronouns if the item talks about the patient, use a gender pronoun that is appropriate like he or she. For a single patient, please do not use the plural “they” or “their.” Just remember to use as many “he/his” as you use “she/her.”
- E. Multi-select item type key - Remember 50 percent or less correct answers.
- F. Option order - Order the options in a logical way, A to Z, Z to A, 1 to 100 or shortest to longest character length. The goal is to make reading easy for the candidate and to ensure that the correct answer is not always A.
- G. Using “the athlete, the patient, or the client” - When in doubt, use “the athlete” as the noun in a sentence or in a phrase rather than writing a sentence without a noun.

## 8. Hyphenation

- A. A hyphen will be used when grammatically indicated.
- Example: X-ray, patient-centered

## 9. Numbers

- A. Numbers less than 10 will be spelled out.
- Example: 7 = seven
- B. Insert a leading zero if the decimal number is less than one.
- Example: 0.4 meters instead of .4 meters
- C. Age will be displayed as the following:
- Example: 17 year(s) old, Nine year(s) old
- D. Refer to spinal segments with no hyphens or spaces.
- Example: **C4** instead of C 4 or C-4

## 10. Measurements

- A. All measurements (results and inanimate objects) will be displayed in English Customary Units with the Metric System equivalent in parentheses to one decimal point.
- Example: 160 lbs (72.5 kg)
- B. All temperatures will be displayed in Fahrenheit with the Celsius equivalent in parentheses.
- Example: 98 degrees F (36.7 degrees C)

Inch = in	Millimeter = mm	1 in = 2.54 cm	1 tsp = 5 ml
Foot = ft	Centimeter = cm	1 ft = 30.48 cm = 0.305 m	1 c = 236 ml
Yard = yd	Meter = m	1 yd = 0.914 m	1 qt = 0.946 l
Mile = mi	Kilometer = km	1 mi = 1.609 km	1 gal = 3.785 l
Ounce = oz	Gram = g		
Pound = lb	Milliliter = ml	1 oz = 28.350 g	
Tablespoon = tbsp	Liter = l	1 lb = 0.453 kg	
Teaspoon = tsp	Celsius = C		
Cup = c	Fahrenheit = F	1 degree C = (F - 32) * 0.5555556	
Quart = qt	Millimeters of mercury = mmHg		

## 11. Time

- A. When referring to “after” something, it will be referred to as “post.”
- Example: “post-practice” vs. “after practice” and “post-surgery” or “post-surgical” vs. “after surgery”
- B. When referring to “before” something, it will be referred to as “pre.”
- Example: “pre-practice”
- C. Specific time-of-day will be expressed as:
- 9:00 a.m., 12:00 p.m. (noon), 5:00 p.m., 12:00 a.m. (midnight)

## 12. Range of Motion (values)

- A. Must include joint/motions assessed.
- B. Must include a number range.
- Example: 0–60 degrees of elbow flexion

### 13. Severity of Injury (grades)

The following injury severity grading will be utilized for all items:

- A. **Grade I (mild)** = little or no damage to tissue, normally no loss of function.
- B. **Grade II (moderate)** = partial tearing or damage to tissue with some loss of function noted.
- C. **Grade III (severe)** = complete or near complete tear or rupture of tissue with complete loss of function usually noted.

### 14. Muscle Testing

A. The following manual muscle testing grading scale will be utilized for all items:

Normal	5	Complete ROM against gravity with maximal resistance
Good	4	Complete ROM against gravity with moderate resistance
Fair +	3 +	Complete ROM against gravity with minimal resistance
Fair	3	Complete ROM against gravity with no resistance
Fair -	3 -	Some, but not complete, ROM against gravity
Poor +	2 +	Initiates motion against gravity
Poor	2	Complete ROM with some assistance and gravity eliminated
Poor -	2 -	Initiates motion if gravity is eliminated
Trace	1	Evidence of slight muscular contraction; no joint motion
Zero	0	No muscle contraction palpated

- B. Manual muscle testing will be expressed in this manner:
  - The patient tested 3/5 (Fair) upon a manual muscle test of the biceps brachii

### 15. Cultural Sensitivity

- A. Items must be written to be sensitive to differences in gender, ethnicity and religious beliefs of the candidate. We will strive to balance these differences by the inclusion of all gender/ethnic groups within exam items.
- B. When writing a problem for a certification exam, item writers need to be vigilant about producing work that is fair — avoiding bias and stereotyping. Bias and stereotyping in testing are two different concepts.
  - **Bias:** No problem should have characteristics that result in differential performance for individuals of the same ability but from different ethnic, gender, cultural or religious groups. Problems also can have characteristics that may cause bias against individuals with disabilities.
  - **Stereotyping:** Tests should be free of material that may be offensive, demeaning or emotionally charged. While the presence of such material may not make the problem more difficult for the candidate, it may cause her or him to become “turned off” or emotional and result in lowered performance.

### 16. Sports/Activities

- A. When constructing items, all types of activities need to be represented within the exam. Therefore, we will not lean heavily on any given sport/activity when writing items (i.e., basketball, industrial worker, recreational participant, etc.)

### 17. Emergency Cardiac Care (ECC) Items

- A. Only items that refer to when to utilize CPR/AED or that give information about the status of CPR/AED are applicable to the exam. Items pertaining to the specifics of CPR/AED application (i.e., compression ratio, number of respirations, etc.) are not needed. All candidates have to submit a current ECC card to the BOC in order to become certified upon passing the exam.

**18. Images, Audio and Video Files**

- A. All submitted media must be free of copyrights. This includes releases from models used in the images or from artists who created the images.
  - a. If needed, the BOC will handle all copyright issues with files used for exam items.
- B. Specific requirements:

<i>Digital Imagery</i>	<i>Diagrams and Other Non-Photographic Images</i>	<i>Scanned Imagery</i>	<i>Videos</i>	<i>Audio (stand alone)</i>
Original source file should be 1600 x 3200 dpi (largest setting on most digital cameras). If file is too large to submit via I-Dev, please compress and submit via email to the project manager.	Original source file should be 1600 x 3200 dpi. If file is too large to submit via I-Dev, please compress and submit via email to the project manager.	Images should be no less than 256 colors and 1200 dpi.	Files should be in MPEG format with 10,005 Kbit/second streaming video and 44,100 Hz * 320 Kbit/second audio channel.	Files should be non-compressed .wav files.