

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

Last Edited in October 2023

This document is developed to assist BOC item writers, reviewers and other stakeholders. It provides guidelines/rules to help standardize the development of the BOC exam. It also plays an important role in carrying out conventions to help ensure fairness and neutralize bias.

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

1. General Guidelines

- A. In general, items should test content that is critical, important and frequently seen in practice, and achieve the following:
- Be easily understood
 - Minimize guessing
 - Avoid testing trivial information
 - Avoid content cueing from item to item
 - Assess entry-level knowledge, skills and abilities (KSAs)
- B. All items should be fair to candidates regardless of their personal characteristics so they can demonstrate proficiency in athletic training on equal terms.
- Age
 - Disabilities
 - Education level
 - Experiences
 - Gender
 - Geographic location or region
 - Language (e.g., accessible vocabulary, common medical terminology, concise sentence structure)
 - Race/ethnicity
 - Sex
 - Socioeconomic background
- C. Items should be written for the entry-level athletic trainer and pertinent to the assessment of minimum competence required for an athletic trainer within the first 2 to 3 years of practice.
- Focus on content that has been documented as appropriate for 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 practice analysis to be legally defensible.
- E. All items should be written clearly and concisely (minimize expressive/descriptive verbiage).
- Do not write items on obscure concepts or trivial matters.
 - If including practice setting, age, sex, gender, sport, etc., it should have a direct bearing on the content of the item. Information typically reported for medical purposes may be included.
- F. Individual items will only test one 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 two items since it is trying to test two 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 two separate items. Knowledge of normative values is one 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 the 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 the distractors need to be “muscles.”
- M. As a rule, 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). Information typically reported for medical purposes may be included.
- 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 have no idea of the correct response and they have to guess.

T. Referencing exam items:

- All items should have a minimum of two references.
- Except for seminal references, references will be no more than five years old.
 - i. A “Seminal Reference” is typically older than five years but has withstood “the test of time” and continues to be used in most ATPs as per the Program Director Reference Survey.
 - I. Example: Netters Anatomy
- References will be generally found to be utilized within a considerable portion of the athletic training field.
- References should be publicly available, not confidential or of limited release. Publicly available may require some cost (e.g., a textbook, 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.

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| <p>2. Cultural Sensitivity</p> |
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- A. Items must be written to be fair and sensitive to differences in sex, gender, race/ethnicity, socioeconomic background and religious beliefs of candidates. The BOC will strive to balance these cultural differences by the inclusion of all 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 race/ethnicity, sex, gender, socioeconomic backgrounds, 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.
- C. When writing items, incorporate these recommendations:
- Use World Health Organization disablement terminology (i.e., person-first terminology). Avoid “suffering from” and use “presenting with” or “a person with”, etc., instead.
 - Refer to racial or ethnic groups, age and gender only if pertinent to the problem (e.g., a condition associated with a particular group or a cultural competence item). An exception may be made to increase realism, provided that no stereotyping or bias occurs in the question.
 - Do not use redness or other terms that describe skin color that is not applicable to all skin tones; where possible, use terms like erythema, pallor, pale or ashen instead of redness, and use ecchymosis instead of white or black and blue, etc.
 - Use “they”, “them”, or “their” unless the question requires a specific sex; avoid gender-specific pronouns.

- When the context of an item is specific to an individual, either “parent” or “guardian” should be used to avoid the assumption of a two-parent family with mother and father; when the context is general, such as a health history form, use “parent(s)/guardian(s).”
- Regarding conveying information to clients/patients and their families, avoid the use of “share with” and instead use collaborative terms such as “discuss with,” “provide to,” etc.
- Be mindful of sport-related stereotypes (e.g., the predominance of African-American athletes in basketball, track, and football).
- Avoid including details about sports that are less accessible to certain groups of society (e.g., golf, squash, equestrian).
- Be mindful of underrepresented or marginalized groups and other dimensions of diversity in the item writing and review processes.

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| 3. Terminology |
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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 the age of the “athlete” or “patient” is a relevant factor in the item, specify the age.

C. Terminology

| Correct Usage | Incorrect Usage |
|------------------------------|------------------------------|
| 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 | • Sales/Marketing |
| • Health/Fitness Industry | • Secondary School |
| • Industrial/Corporate | • University/College/Junior College |
| • Military/Government/Law Enforcement | • Youth Sports |
| • Professional Sports/Performing Arts | |
- 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 two 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 reflex
 - 1+ = Diminished reflex
 - 2+ = Normal reflex
 - 3+ = Exaggerated reflex
 - 4+ = 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/cm²
- 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 TM, ®, © are not to be used in exam items. The generic version to describe the protected term must be used
- R. Diabetes will be expressed as the following:
- Diabetes Type I or Diabetes Type II
 - Glucose readings should use mg/dL after the glucose amount
 - Example: 80 mg/dL

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| 4. Numbers |
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- 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
- E. Ranges of numbers should not overlap and should be of equal intervals
- Example: 5-10, 11-16, 17-22

5. 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)

| Length | | |
|-------------------|-------------------------------|---------------------------|
| U.S. Measurements | Metric System | Conversions |
| Inch = in | Millimeter = mm | 1 in = 2.54 cm |
| Foot = ft | Millimeters of mercury = mmHg | 1 ft = 30.48 cm = 0.305 m |
| Foot = ft | Centimeter = cm | 1 yd = 0.914 m |
| Yard = yd | Meter = m | 1 mi = 1.609 km |
| | Kilometer = km | |

| Weight | | |
|-------------------|----------------|-------------------|
| U.S. Measurements | Metric System | Conversions |
| Ounce = oz | Milligram = mg | 1 oz = 28349.5 mg |
| Pound = lb | Centigram = cg | 1 oz = 28.350 g |
| | Gram = g | 1 lb = 0.453 kg |
| | Kilogram = kg | |

| Volume | | |
|-------------------|-----------------|-----------------|
| U.S. Measurements | Metric System | Conversions |
| Teaspoon = tsp | Milliliter = ml | 1 tsp = 5 ml |
| Tablespoon = tbsp | Centiliter = cl | 1 c = 236 ml |
| Cup = c | Liter = l | 1 qt = 0.946 l |
| Pint = pt | Kilo = kl | 1 gal = 3.785 l |
| Quart = qt | | |
| Gallon = gal | | |

| Temperature | | |
|--------------------|---------------|-------------------------|
| U.S. Measurements | Metric System | Conversions |
| Fahrenheit = F | Celsius = C | 1 degree C = (F-32)/1.8 |

6. 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)

7. Hyphenation

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

8. Range of Motion (values)

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

9. 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.

10. Muscle Testing

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

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| 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

11. 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.)

12. 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 must submit a current ECC card to the BOC in order to become certified upon passing the exam.

13. 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. |

14. 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.

| | |
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| 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 – 4 th 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 |

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| LCL | Lateral Collateral Ligament <ul style="list-style-type: none"> • need to specify which body part (knee, elbow, etc.) |
| MCL | Medial Collateral Ligament <ul style="list-style-type: none"> • 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 |
| PICO | Patient/Problem, Intervention, Comparison, Outcome |
| PIP | Proximal Interphalangeal |
| PNF | Proprioceptive Neuromuscular Facilitation |
| PPE | Preparticipation 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 |
| RRROM | Resistive Range of Motion |
| SLAP | Superior Labral Tear from Anterior to Posterior |
| SOAP | Subjective, Objective, Assessment, Plan |
| SP0 ₂ | Blood Oxygen Saturation Level |
| STD | Sexually Transmitted Disease <ul style="list-style-type: none"> • when referring to STD, need to mention STI in parentheses |
| STI | Sexually Transmitted Infection <ul style="list-style-type: none"> • when referring to STI, need to mention STD in parentheses |
| 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 |