PEDIATRIC NURSING CERTIFICATION BOARD

ITEM WRITING MANUAL

Revised July 2016

Introduction

Welcome to your endeavor to learn and develop the skills to become an item writer for the Pediatric Nursing Certification Board (PNCB). Our mission is to provide the highest quality certification services for nursing professionals who care for pediatric populations, which is directly supported by a rigorous and relevant item writing process. Your charge as an item writer is to develop items that ensure our exams appropriately measure the skills, knowledge, and abilities of test-takers to determine their qualification for certification and continuing competency.

Writing good test questions is both an art and a science. As you begin to develop your skills as an item writer, you will appreciate its challenge. Up to 60% of submitted items never make it to a scored, usable status in the item bank because they do not perform well statistically. This is often due to flaws such as unclear stems or distractors that are implausible. Working to improve and refine your item writing skills increases the impact of your contributions, as well as the chance that your questions will be included in PNCB's exams!

The purpose of test questions is to differentiate between test-takers who have the knowledge and those who do not. Items should be written in a fair manner (no trick questions) so that test-takers with the knowledge get the question correct, and those without the knowledge get the question wrong.

This manual provides the rules and rationale for best practices in item writing, supported by the science of measurement and assessment known as psychometrics. You are asked to read about these practices and apply them to your item writing.

This manual is divided into the following sections:

Section 1: The Basics of Item Writing

Section 2: Item Writing Guidance through Examples

Section 3: Developing Questions and Refining Skills

Section 4: Reviewing your Items before Submission

Section 5: The Documented Item and Resource Links

While the term examination or exam is most appropriate for assessments used to establish professional credentials, the terms "test" and "exam" or "examination" are used synonymously throughout this manual, such as when referring to test questions, test items, and test-takers.

SECTION 1: The Basics of Item Writing

What is a test item?

"Test item" and "test question" are equivalent terms and describe what is used to assess some aspect of knowledge. The items on the PNCB's exams are formatted as multiple-choice questions with four **options** (A, B, C or D) from which the test-taker selects a **single** correct response. This type of multiple-choice question format is also referred to as the "one-best-answer".

A test question represents a task posed to the test-taker, which is introduced in the **stem**. There are two styles of stems: a **closed stem** asks a complete question, punctuated with a question mark at the end; an **open stem** is formatted with an incomplete or lead-in statement where each of the options completes the sentence started in the stem. Because each option completes the sentence, each option ends with a period.

EXAMPLES of OPEN versus CLOSED STEMS	
Closed Stem	A 2 month old presents with bilious vomiting for 24 hours. Physical exam is unremarkable and there is no weight loss. Which of the following is the anticipated care of this infant?
Open Stem	A 2 month old presents with bilious vomiting for 24 hours. Physical exam is unremarkable and there is no weight loss. The anticipated care of this infant includes

Other components of a question are the:

Key correct option/response

Distractors incorrect options/responses

SAMPLE QUESTION	
STEM>>	The MOST important reason to frequently review a child's use of a peak expiratory flow device is because
DISTRACTOR>>	a. noncompliance is prevalent.
DISTRACTOR>>	b. values and technique vary by brand.
KEY>>	c. technique and effort affect measurements.
DISTRACTOR>>	d. personal best measurement must be validated.

OPTIONS

The following styles of items are **NOT** used in PNCB exams and will **NOT** be accepted:

- True or False questions
- Fill in the blank questions
- Multiple response questions (e.g., when 4 responses are included in the stem, and the options for example, are: A & B, A & C, B & D, C &D.)
- Questions which are negatively worded (e.g., "which of the following is not…")
- Questions with options that include "all of the above" or "none of the above."

Exam Content

For each certification exam, PNCB conducts initial and on-going role delineation/job analysis studies to determine the knowledge, skills, and abilities necessary for each nursing role. The final products of this research include the **test specifications**. The test specifications include the **content outline** for the exam. To promote the validity and defensibility of exams, questions included in any exam must relate to specific areas on the content outline.

The **content outline** is a key document used by the test developers who build the exams, PNCB staff, item writers, and exam candidates. It identifies the major domains of knowledge or content that may be covered in the exam. Within the content outline, content areas are weighted to show how many items are included from each content area. Your item writing assignment will often be based on needs within specific content areas.

As an item writer, you must ensure that your items are fair. One aspect of an item's **fairness** is that it must be congruent with the required knowledge reflected in the content outline. The item writer is also responsible for ensuring that questions ask about important knowledge for entry-level practice in the role, as opposed to being written to an advanced level of experience. Questions should also represent what is most **prevalent and realistic in practice**, rather than asking about what is obscure or rarely encountered. However, when considering ideas for items, it is important to delve into different related aspects of the topic and *not* ask the most obvious question that has likely been asked.

Additionally, avoid writing items about information that in practice is not routinely committed to memory; this may be information that changes periodically, or it is information that is readily accessible in work references. Examples include immunization schedules or certain formulas that are used for calculations. For this reason, it is NOT appropriate to write questions about knowledge that is routinely accessed through available references in the work setting.

Test questions vary in their complexity and reflect the level of consideration and cognitive processing expected of the test-taker to answer the item. This complexity is linked to the objective of the question. Questions in PNCB exams are written to one of three cognitive levels: **recall, application, or analysis:**

	**ANALYSIS**	Questions that require test-takers to identify the significance and implications of several pieces of information (if X and Y, then Z) to determine priorities, next steps, diagnoses, or actions. Analysis questions often include a patient scenario.
	APPLICATION	Questions that have the test-taker use information or knowledge in another familiar situation, such as to select an appropriate action or response. Application questions may include conditions such that the question poses if X then Y. Application questions often involve a patient scenario, but the amount of data and problem-solving is less than an analysis-based question.
	RECALL	Questions that require recall of terms, facts or other information.

Application and analysis level questions are more appropriate to certification exams, although a small percentage of recall questions are included. Item writers are encouraged to strive towards writing more application and analysis level questions. **Section 3** of this manual (pg. 19) includes information on developing the patient scenario-based questions that begin with developing a "clinical stem." Scenario-

based questions are often analysis questions, especially if the diagnosis is not stated, but must be deduced from other information in the stem.

Item Writing Rules

Rule #1: Promote fairness in your test questions

Write clearly and succinctly

The fairness of a test question is promoted by ensuring it is written with clarity and succinctness. Why is this rule critical in your test questions? Most people can identify with some anxiety or nervousness about test-taking, especially when the exam is used to establish important professional credentials. It is unfair to add to that anxiety by padding questions with **inconsequential information** that causes the test-taker to waste time reading and considering information that is not pertinent to the subject matter. For example, a common flaw by new item writers is including the setting where the child was seen, which is generally unnecessary information. Keeping items succinct helps promote fairness by minimizing reading load since assessing reading comprehension is not the purpose of PNCB's exams.

A test question sets up a **clear task** for the test-taker, containing all the information necessary to select the correct response. If an item is well-written, the test-taker who has the knowledge should be able to anticipate the correct response before even reading the options. It should never be necessary to read the options to understand what a question is asking.

Poorly developed stems can occur when the question is too broad to define a clear task. This type of flaw is referred to as an **undirected stem**, and requires revision. The undirected stem creates an unfair question as the test-taker tries to determine what exactly is expected when the possibilities may seem limitless. An example of an undirected stem is: "When completing a physical assessment on a child it is important to…" In this example it is easy to imagine the hundred or more possible important aspects of physical assessments that could be an answer.

In striving for succinctness, keep in mind that the purpose of the test or questions is not to teach. When writing stems, avoid introductory statements that teach. For example, the first sentence of this stem is teaching and unnecessary: "~~Assessing changes in pulmonary function affecting the child's functional status is important.~~ Which of the following devices provides an objective method of measuring asthma severity and is most helpful in assessing function?"

Helpful Hint

After you write your item, leave it for a while. Later, with a fresh eye, re-read the question. Consider the objective of the question and ask yourself what information the test-taker really needs to answer the question. Edit your question to remove extraneous words.

Do not use negatively worded stems

A negatively worded question requires that the test-taker recognize a single exception. Looking for an exception takes an active shift in logic for the test-taker. With a negatively worded stem, the test-taker needs to recognize several correct options but select an option that is incorrect. This style of question increases test-takers' risk of misinterpreting the task or answering the question incorrectly because the "negative" word in the stem was simply overlooked.

Examples of negatively worded stems
• All of the following studies are used to establish the diagnosis of malrotation **EXCEPT**: • Which of the following is **NOT** a diagnostic study used to diagnose malrotation? • Which is the **LEAST** likely cause of….

While questions that ask about CONTRAINDICATIONS are considered negative, they are allowed because they ask about knowledge important and relevant to clinical practice.

Limit the use of age and gender

When writing questions, consider if there is real significance to knowing the age of a child for the knowledge being tested. Test-takers should not be distracted considering the potential influence of age unless it is critical to the knowledge being assessed.

If age is important to include, consider if a specific age is necessary or whether referring to an age group is reasonable. The age groups included in PNCB's style are: **newborn, infant, toddler, preschooler, child, school-age child, or adolescent.** The use of terms such as "baby" or "teen" should be avoided unless used within a quotation as stated by a caregiver or parent.

This same principle relates to gender. Introducing a child's gender should be avoided unless it is relevant to the knowledge being tested. It is also inappropriate for a child's gender to be referred to in the options when it was not previously introduced in the stem. Usually this occurs when an item writer confronts a grammatical challenge. Take time to rethink alternate wording, as the use of gender in any options when previously unmentioned in the stem might confuse the test-taker.

Avoid referring to the "nurse" in the question

Questions should NOT be worded to refer to the nurse or to ask what the nurse should do. The nurse is the test-taker, so the nurse is already the implied audience. If your questions refer to the nurse (or nurse practitioner), take time to revise your items and pose the question more directly.

EXAMPLE: When selecting an appropriate gauge needle the nurse should…

REVISED: When selecting an appropriate gauge needle it is important to…

Keep "YOU" out of the question

Questions should NOT be worded to include the word "you." The reason for this is rather humorous. For example, if the question asks, "When giving an IM injection to an adolescent in the deltoid muscle, which needle gauge would you use?" the wording suggests the objective is to identify your personal preference or choice. There is no way to mark a question correct or incorrect that is asking a personal choice. Therefore, NEVER include "you" in the question, and instead make the objective of the question to establish the appropriate action or response.

Other guidelines for promoting fairness, clarity and succinctness:

- Do NOT personalize children, their families, or the nurse by giving them names.
- Do NOT use the term "patient". Instead, refer to "the child" if needed.
- Keep questions focused on a single behavior or objective. Avoid trying to assess as much as possible about the test-taker's abilities from a single clinical situation.
- Avoid writing questions that expect the test-taker to recognize specific theorists by names. It is acceptable to write questions related to the application of their theories, such as those related to child development.
- Questions should not provide cues that make it easier for test-takers who guess at the correct answer. Practice wordsmithing to ensure the correct response blends in with the other options by being similar in length and complexity. What to look for:
    - If a significant term used in the stem is only repeated in the key, try to remove the term or repeat it in at least one of the distractors.
    - If the correct response is longer and contains more detail than the distractors, try to fix by either shortening the key or adding more detail to at least one distractor.

SAMPLE QUESTION	
When working to create parallel structure among the options, try to ensure balance in their complexity. For example, If one option includes an "**and**" or even a comma, so should another option, especially if one of those options is the correct response.	Xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx: a. aaaaaa aaaaaa aaaaaa aaaaaaaaaa. b. bbbbbb **and** bbbbbbb bbbbb bbbbbbb. c. cccccccccc **and** ccccccc cccccccc ccccccccc. d. ddddd dddddddd dddddd dddddddddddd.

- When options containing numeric ranges, ensure that they are distinct with no overlap. *(see example: 3rd item, pg. 15)*
- Verify that the option identified as the key (correct response), is the ONLY correct option.

Additional guidelines that promote sensitivity and fairness:

- Persons are not defined by their disease or disability. For example, use "a child with diabetes" instead of "the diabetic child." This **person-centered** orientation is more appropriate for ensuring the fair representation of individuals.
- Children do not come exclusively from two-parent families, and two-parent families are not exclusively comprised of a father and a mother. The individual responsible for the child's care may not even be a parent. When feasible, use the term **caregiver** as opposed to "parent" to promote balance in this representation within your items.
- A physician may not be the only healthcare professional on the team prescribing care, medications or treatments. For that reason, it is more appropriate, where applicable, to use the **healthcare provider** as opposed to the **physician**.
- Specific words, when included in the stem, are capitalized to help ensure that the test-taker does not overlook emphasis related to the question's task. These terms include the following words: **MOST, BEST, NEXT, FIRST, FIRST-LINE, INITIAL, PRIORITY, IMMEDIATE, and CONTRAINDICATION.**

Rule #2: Distract with your distractors

The incorrect responses in a multiple-choice question are called **distractors.** They are intended to distract by appealing to those test-takers who do not have the knowledge and might be guessing. Distractors help questions differentiate between those who possess the knowledge from others that do not. Work to ensure distractors have some plausibility, because if any are easily dismissed or discounted, then the odds are improved for those who will be guessing. Each distractor should be incorrect under any plausible interpretation. The exception to this is when the stem's task is asking that the test-taker identify the BEST or MOST appropriate option. In these questions, options are correct, just not the BEST. Remember when writing this style of question that the reference and evidence-based practice must support the key, as opposed to being based on the item writer's opinion.

When crafting distractors, it can be helpful to consider commonly mistaken or misunderstood aspects related to what is being tested—such as concepts that are confusing to students. Another way of developing distractors is to include information that is correct but related to another or similar problem. It can also be effective to base distractors on an exaggeration of a correct action or finding.

When a question is constructed with each of the **options containing a list,** such as three risk factors, include one term from the key's list in each of the other options (see example below). This helps improve the "distraction of the distractors." Also try to include one term from the distractors in other options. These techniques reduce the likelihood that a test-taker who lacks full knowledge but recognizes one of the listed items will get the question correct.

EXAMPLE
Which of the following are risk factors for Sudden Infant Death Syndrome (SIDS)? a. maternal smoking during pregnancy, overheating, and winter season **<< KEY** b. firstborn, maternal smoking during pregnancy, and frequent awakening c. frequent awakening, overheating, and recent immunizations d. firstborn, recent immunizations, and winter season

Additional rules when creating distractors:

- NEVER use universal terms such as “never” or “always” to make an option incorrect. Few things in life are absolutes and universal truths, so using these terms can contribute to the test-taker quickly dismissing the distractor. The same applies to using qualifiers such as “usually,” “often,” “rarely,” “seldom,” or “commonly.”
- NEVER try to be tricky to create a distractor.
- NEVER make up information to create a distractor, such as inventing a name for a nonexistent medication.

Rule #3: Ensure each item’s legal defensibility

The correct response to any item used in the exam must be supported in a current PNCB-approved pediatric reference. This requirement is part of ensuring the exam’s legal defensibility. To further validate accuracy and currency, all newly written items will also be reviewed by other subject matter experts from both the Exam and Form Review Committees.

PNCB provides a list of **approved references** on their website for each of the certification exams. These are the references used to support exam content; inclusion of any textbook as a reference is based on committee recommendation. **PNCB does not endorse nor have any proprietary relationship with the textbooks or handbooks included in their reference lists.**

If a test-taker challenges his or her exam results, PNCB may be called upon to defend the accuracy of scoring, a process that may include validating the accuracy of items as supported by their references. For that reason, questions written for the exam must be referenced to textbooks included on PNCB’s reference list.

There are a few exceptions to exclusively using textbooks identified on PNCB’s exam reference lists, such as using **nationally recognized guidelines**, which are evidence- or consensus-based, such as those from AAP, AAPA, CDC, and FDA. If your item writing efforts are for PNCB’s other certification-related products, such as continuing education modules, journal articles may be used as references.

When documenting the reference for an item, you will need to provide the name of the textbook, the edition, and the specific page numbers where content supports the correct response. However, the reference citation may also include support for the incorrectness of distractors. **Record the full citation for the reference that supports an item early in your writing process so you won’t need to backtrack when it’s time to submit your item.**

Rule #4: Use of style guide for formatting of questions

While your items will be reviewed and edited by other volunteer subject matter experts and PNCB staff, it is very helpful if you can learn and incorporate the appropriate style into the questions as you write them.

Basic formatting and style requirements

A. When the stem is written as an **open stem** for sentence completion, the following apply:
   - there is NO punctuation at the end of the stem (*avoid inserting a colon*)
   - the first word in each option begins with a lowercase letter

- each option is punctuated at the end with a period
- each option flows with the stem *(see sample below)*
- options are similar in structure, grammar, complexity and length

Sample OPEN STEM QUESTION with sentence completion
The style rules for formatting an item written with an open stem include a. placing a colon at the end of the stem. b. ending the stem with a question mark. c. punctuating each option with a period at the end. **<<KEY** d. beginning the first word of each option with an uppercase letter.

B. When the stem is written as an **open stem**, but the four options are single words or terms, such as names of medications, microorganisms, or diagnoses, the following apply:
   - a colon is placed at the end of the stem
   - the options do NOT end with a period

Sample OPEN STEM QUESTION with options as a list
When the options in an open stem question are a list of single terms, the stem ends punctuated with a: a. colon **<<KEY** b. comma c. question mark d. period

C. When the stem is written as a **closed stem**, the following apply:
   - stem ends in a question mark
   - the first word of each options begin with a lower-case letter, unless each option is a complete sentence
   - options end with a period ONLY when each option is a complete sentence.
   - if each option is a complete sentence, the first word in each option is capitalized and each option ends with a period
   - each option flows with the stem *(see sample below)*
   - options are similar in structure, grammar, complexity and length

Sample CLOSED STEM QUESTION
When an item is written with a closed stem, which of the following BEST describes the formatting requirements? a. stems end with a colon b. options begin with an uppercase letter c. stems end with a question mark **<<KEY** d. options are written as complete sentences

D. When to ask "**what**" versus "**which**"?

"What" is appropriately used in a question when there is only one possible correct answer. "Which" is appropriately used when there are many possible answers, but the focus of the question is only on the one possibility included as the key.

Examples: STEMS USING 'WHAT' vs. 'WHICH"
What is the normal range for blood glucose? **For which** of the following infants is the monthly administration of palivizumab (Synagis) injections recommended? The monthly administration of palivizumab (Synagis) injections is recommended for **which** of the following infants?

E. Avoid repeating the same words at the beginning of each option. When this occurs, the item can usually be revised by moving the repeated words into the stem.

Examples

ORIGINAL

When educating the parents of a newborn with physiologic jaundice, it is important to include that bilirubin levels

a. peak at the second post-natal day.
b. peak at the third post-natal day.
c. peak at the fifth post-natal day.
d. peak at the seventh post-natal day.

IMPROVED

When educating the parents of a newborn with physiologic jaundice, it is important to include that bilirubin levels peak on which of the following post-natal days?

a. second
b. third
c. fifth
d. seventh

☆IMPROVED with MORE CONCISE STEM☆

On which post-natal day do bilirubin levels peak in a newborn with physiologic jaundice?

a. second day
b. third day
c. fifth day
d. seventh day

Advanced formatting and style requirements

A. When medications have recognizable brand names, the generic name is listed first, followed by the capitalized brand name contained in parentheses.
Example:
(A) atomoxetine (Strattera)
(B) clonidine (Catapres)
(C) methylphenidate (Concerta)
(D) paroxetine (Paxil)

B. When including the name of a bacterium or bacteria in an item, the genus name is italicized and the first letter capitalized, and the species name is italicized, but not capitalized.
Example:
(A) Adenovirus
(B) *Chlamydia trachomatis* <<<
(C) Group B streptococcus
(D) *Neisseria gonorrhoeae* <<<

C. When temperature is included, the Fahrenheit measurement is listed first, followed by the Celsius measurement which is contained within parentheses.
Example:
102° F (38.9° C)

D. For weight measurements, the use of kilograms is standard. For volume measurements, Milliliters (mL) is standard use as opposed to ounces.

E. The use of the term “radiograph” is standard, as opposed to x-ray.

F. When terms are readily recognized by their acronym, the term appears first followed by the acronym contained within parentheses. An acronym is only used in a stem if it is then further used in the options.

SECTION 2: Item Writing Guidance through Examples

Examples of Items, Stems, Options, and Editing
A review to help build item writing skills

Building item writing skills takes practice. These examples have been selected to reinforce your learning. We suggest you first focus on the "original" version of the stem or item before looking at any edits or comments. Test yourself and try to identify any flaw(s). Then review any provided edits and read the comments to learn more about writing good test items.

Original Stem	Edited Stem
Which of the following should be monitored in a 12 year old being treated for absence seizures with ethosuximide?	Monitoring during treatment with ethosuximide includes:

Comments

- The test-taker should not be distracted considering information that is not relevant to the knowledge being assessed. In this stem neither the age of the patient or the indication for treatment changes the monitoring.
- The phrase "which of the following" is not necessary to ask in this question; however, there are times when its use is appropriate – in particular, if there are multiple options and the options include only one of the possibilities as the key. "Which of the following" is also used when asking for the MOST appropriate option or the next step.

Original Stem	Edited Stem
When counseling parents of a 3 year old who is prescribed tacrolimus for atopic dermatitis, which of the following is to be included?	Appropriate education for caregivers of a 3 year old treated with tacrolimus for atopic dermatitis includes

Comments

- The inclusion of age in this stem is appropriate to demonstrate consistency with FDA approved usage. Inclusion of the diagnosis is also relevant to specifically address the topical form of the drug; an alternative would be to use "topical tacrolimus" in the stem.
- The editing of this stem and changing the stem from a closed stem to an open stem style (sentence completion), allows the stem to be more concise.
- Using the term caregivers is suggested when feasible, since the individual with the child may not always be a parent.

Original Stem	Edited Stem
Which population of adolescents has the lowest level of contraceptive use?	Latino adolescents prefer which method of contraception?

Comments

Based on the stem in the original version of the question, the options listed ethnic groups. By changing the stem, the question's focus is now about clinically pertinent contraceptive options, rather than ethnic groups.

Original Stem
A mother brings her 4 month old in for a well-child visit and is seeking advice on what she can do to help her child's development. Which of the following activities does not promote cognitive development?
Comments
PNCB exams DO NOT use negatively worded stems, such as asking "Which of the following DOES NOT…" or "All of the following EXCEPT…" While these are easier questions to write, the reason for excluding this style is test-taker fairness. An anxious test-taker can easily overlook the negative term when attempting to "think in reverse" when identifying an exception.

Original Stem with Options
Which of the following devices provides an objective method of measuring asthma severity and is most helpful in assessing changes in pulmonary function that can affect the child's functional status? a. metered dose inhaler b. peak expiratory flow meter **<< KEY** c. spacer d. nebulizer
Comments
• Always consider the appropriateness of content for the purpose and level of the exam. This item was written for the CPN Exam, but the level of knowledge may be more appropriate for a general nursing course. Knowledge about peak flow meters and measuring the severity of asthma is important. The item writer should delve into other aspects of this topic important to practice to consider other objectives for a question. • Distractors need to be plausible. Notice that all three distractors in this item are devices used for administration of medications, and only the device in Option B, the key, is used for measuring. • It is important for the key to blend in with the other options. In this question the key is longer (more detailed) and it uses the word "meter" which readily cues to it being a measuring device. These kinds of cues make it easy for the savvy test-taker or the person who will be guessing to select the correct answer. • A well written item avoids teaching the test-taker. Refer to the highlighted text in the stem. This question can be answered without that information. • When critiquing a question and realizing the key is too obvious, if there is no solution for a revision, this is a chance to consider other important content to know about the same topic. This item was rewritten (see below) to instead ask why ongoing assessments of a child's correct use of the peak flow meter is important: The MOST important reason to frequently review a child's use of a peak expiratory flow device is because a. noncompliance is prevalent. b. values and technique vary by brand. c. technique and effort affect measurements. **<< KEY** d. personal best measurement must be validated.

Original Stem	Edited Stem
Your 16 year old patient has a history of severe motion sickness. What medication would **you** recommend?	An adolescent has a history of severe motion sickness. Which of the following medications is the MOST appropriate recommendation?
Comments	
NEVER write a stem asking what action "you" would do! When a question asks what action "you" would take, it is not asking the correct action to take, but instead asking for a personal choice. Consider how any answer could be marked wrong when the question is posed like the original stem.	

Original Stem	Edited Stem
A child with HIV on lipophilic ARV drugs has had persistent poor diet. What pharmacologic conditions does this cause?	What pharmacologic condition is associated with poor nutritional intake for a child on lipophilic antiretroviral therapy?
Comments	
The revised stem is more direct and succinct, and presents a clearer task for the test-taker.	

Original Stem with Options

Duration of action of onabotulinumtoxinA is:

a. 1-2 months
b. 3-8 months
c. 9-12 months
d. 12-14 months

Options C and D BOTH include 12 months

Comments

The flaw with this item in that options C & D each include 12 months. Ensure that when ranges are used, that options do not contain overlapping answers.

Original Stem

Common adverse effects from pharmacologic treatment of congenital toxoplasmosis include:

a. bone marrow suppression **<< KEY**
b. hypertension
c. headaches
d. rash **<< KEY**

Comments

Questions must have only ONE correct response. When references were checked to verify the key for this question, both A and D could be correct. Sometimes the fix for this problem is to use a qualifier and instead ask, "Which is the MOST common…" This remedy would be appropriate ONLY if it is supported by the reference.

Original Stem
A 13 month old has been fed whole milk since 9 months of age and currently has a Hgb of 10 g/dL. Which laboratory test will BEST evaluate ~~this child for~~ iron deficiency? a. serum ferritin and CRP b. serum transferring receptor concentration (TfR1) c. complete blood count d. peripheral smear of the red blood cells
Comments
• **Distractors need to be plausible**. In this question Option C is a weak distractor because the stem already mentions a Hgb result, which implies that a CBC has already been done. • The 2nd sentence in the stem can be shortened by removing the reference to the child.

Original Stem and Options	Edited Stem and Options
When assessing heart sounds of a child, the nurse hears fixed splitting. This is an important manifestation of a. atrial septal defect. **<< KEY** b. ventral septal defect. c. truncus arteriosus. d. patent ductus arteriosus.	When auscultating a child's heart sounds, fixed splitting of the S_2 sound is considered a manifestation of: a. atrial septal defect **<< KEY** b. patent ductus arteriosus c. truncus arteriosus d. ventricular septal defect
Comments	
• The use of "nurse" in the stem is not needed, as the nurse is the test-taker and the implied audience. Except for the unnecessary use of the term "nurse," the reading load of the original version of this item is direct and concise. • Because this item uses the open stem style, but the options represent a list of conditions, the stem ends with a colon and the options require no ending punctuation.	

Original Stem and Options	Edited Stem and Options
A 6 month old drops a block, spins it, makes it hit another block, slides it across the floor, and finally places it on top of another block. The nurse defines this activity as a. learning the properties of the object by manipulating it through various schemes.<< KEY b. demonstrating boredom with the toy and need for more challenging objects. c. demonstrating the concept of object constancy as defined by Piaget. d. illustrating the establishment of anticipatory reactions.	A 6 month old drops a block, spins it, makes it hit another block, slides it across the floor, and finally places it on top of another block. This activity is interpreted as a. learning the properties of the object.<< KEY b. expressing boredom with the toy. c. demonstrating object constancy. d. anticipating reactions.

Comments

- The use of "nurse" in the stem is not needed, as the nurse is the implied audience.
- The reading load of the options can be reduced by editing.
- Test-takers are not expected to know the names of specific theorists, such as Piaget. However, recognizing the concept of object permanence and the significance related to child development is appropriate content.
- The key should blend in with the other options. To accomplish this the key or other options can be shortened and/or lengthened.

Original Item and Options	Edited Item and Options
A child is seen in the clinic. His parents report that over several days he has periorbital edema, especially in the morning, poor appetite, and a decreasing amount of urine that looks like coke. The nurse should evaluate this child for which disease process? a. pyelonephritis b. nephrotic syndrome c. vesicoureteral reflux d. acute glomerulonephritis << KEY	A child recently treated for strep throat has had a poor appetite over several days, decreasing amounts of urine that is now cola-colored, and periorbital swelling that is especially evident in the morning. These symptoms are MOST consistent with: a. pyelonephritis b. nephrotic syndrome c. vesicoureteral reflux d. acute glomerulonephritis << KEY

Comments

- When editing an item, consider if the test-taker really needs to know
  - the specific care setting.
  - that caregivers reported the symptoms.

  Because the test-taker does not need to know these details to answer the question, they were removed during edits to improve the item's conciseness and clarity.
- Since the nurse is the test-taker, it is not necessary to include "the nurse" in the stem.

Original Stem and Options	Edited Stem and Options
Jason weighs 7.50 kg and is evaluated as being 10% dehydrated. The doctor orders IV fluids at one and one half maintenance. How many mL's of fluid should Jason receive over a 24-hour period? a. 375 mL per 24 hr. b. 750 mL per 24 hr. c. 1125 mL per 24 hr. << KEY d. 1500 mL per 24 hr.	An infant weighing 7.5 kg has IV fluids ordered for 1.5 times the maintenance rate. How many mL of fluid should be given over a 24-hour period? a. 375 mL b. 750 mL c. 1125 mL << KEY d. 1500 mL

Comments

- **Do not identify the child by a name**. An exam that includes some items that name children and other items that do not would look inconsistent to test-takers. Proper names are also NOT used because their use would require ensuring equitable representation of gender, culture, or ethnicity within exams. In this question, gender is also not relevant.
- The objective of the question is to assess knowledge of the appropriate fluid maintenance rate for an infant of that weight, and to then calculate at 1.5 times. To answer this question correctly it is not necessary to know that the infant is evaluated at 10% dehydrated. In fairness to the test-taker, it is important to avoid any unnecessary reading load that may distract the test-taker with irrelevant information.
- When information is repeated in each option, consider if it can be added to the stem to avoid the repetition. The 24-hour period was already mentioned in the stem, so it was removed from the options.

Original Stem and Options	Edited Stem and Options
Your teenage patient requests a copy of the radiograph of his tibia/fibula fracture so he can post it on Facebook. Your response is: a. Sure, I'll print you a copy b. You need to have your parent's permission c. You need to request a copy from medical records d. Sure, do you need a copy of my notes as well?	An adolescent requests a copy of the radiograph of his fracture to post on social media. The appropriate response is to a. provide a printed copy based on verbal request after removing identifiers. b. explain that any copy of the radiograph must be provided directly to parents. c. explain that medical record requests must be submitted in writing. << KEY d. direct the adolescent and his parents to radiology for a copy of the radiograph.

Comments

- Avoid the use of "you" in the question. Reread the stem of the original item and consider how to decide the correct answer. The original version of the question does not ask for the appropriate action, it asks what you would do, a choice which may be appropriate or inappropriate.
- Avoid the use of "patient," instead referring to the child.
- Create parallel structure in the options. Beginning each option with a leading verb can be an effective way to achieve this when an item leads with an open stem.

Section 3: Developing Questions and Refining Skills

Developing your question

There are many ways to begin the process of writing a question, but your first step is to review the content outline to identify an area, and write down the:

- general content area or clinical problem you wish to focus on;
- specific behavior (e.g., assessment, diagnosis, treatment, management, or referral) you are interested in testing;
- rationale (in terms of clinical outcomes) or an objective for a question. Think about why it is important to be able to assess, diagnose, order the correct diagnostic study, treat, manage, or appropriately refer for the specific problem.

The basic idea for the clinical content or behavior to be assessed can come from a number of sources. You may have been asked to write items on a specific topic or you may already have some ideas in mind. Other ideas can come from:

- personal clinical experience
- courses or classes taken
- current literature (journals and review articles)
- textbooks
- common mistakes in practice
- frequently confused concepts
- clinical practice guidelines, or evidence-based reviews
- outdated beliefs or practice
- recent clinical advances or discoveries
- medication side effects and interactions

VALIDITY

Regardless of the source of inspiration for a question, to be valid for use on an exam it MUST relate to an area in the content outline. Validity is also supported by identifying an approved reference with the page citation(s) that support the correct response.

Explore your topic idea and consider creating a list of knowledge related to the topic that is important to know. Reading about the topic in textbooks can be helpful in focusing on the most important aspects that your question might assess.

One style of question used in PNCB's exams incorporates a clinical-based scenario into the stem of the question. This foundational part of the stem provides essential background information and precedes the definition of the test-taker's task. This "scenario" is referred to as the **clinical stem.**

Developing a clinical stem

In general the clinical stem should be the longest part of an item, containing the essential information required to select the correct option. As you develop this part of the stem you may need to edit it several times to remove "window dressing" and unnecessary details. Information that may be significant includes: age, gender, medical history, presenting symptoms, and laboratory values/examination results for the patient. As a rule, the stem should not include irrelevant information unless it is linked to misconceptions regarding the management-treatment decision represented in any of the distractors.

Below are two examples of the types of **clinical stem** used in items:

> **Example:** A 2 month old **[*age*]** presents with bilious vomiting **[*symptom*]** for 24 hours. Physical examination is unremarkable **[*examination result*]**, and there is no weight loss **[*examination result*]**.
>
> **Example:** A 14-year-old **[*age*]**, mildly obese, otherwise healthy male **[*gender*]** presents with a limp and pain in the right knee that has been increasing in intensity for the past few days **[*symptom*]**. There is no history of trauma **[*clinical history*]**. Physical examination is significant for external rotation and limited abduction of the right hip and knee **[*examination result*]**.

Finalizing the stem to define the test-taker's task: lead-in question or incomplete sentence

You have a choice of two ways to format the ending of your stem: as a lead-in question or as an incomplete statement that immediately follows the clinical stem. Each serves as the link to the answer options. PNCB does not prefer one style over the other. Most item writers use both styles.

Incomplete statements and lead-in questions should be short and to the point, clearly directing the test-taker to the desired cognitive task. Using the first stem from above, the two options below show the final development of the stem to define a task for the test-taker, one written as an incomplete statement or open stem, and the other written as a closed stem:

Open Stem Question: Clinical Stem **+** Incomplete Statement *(options will complete sentence)*	A 2 month old presents with bilious vomiting for 24 hours. Physical examination is unremarkable, and there is no weight loss. The MOST appropriate diagnostic study to establish the diagnosis of malrotation is
Closed Stem Question: Clinical Stem **+** Lead-in Question	A 2 month old presents with bilious vomiting for 24 hours. Physical examination is unremarkable, and there is no weight loss. What is the MOST appropriate diagnostic study to establish the diagnosis of malrotation?

Developing the test-taker's task

As discussed previously (pg. 4), it is more appropriate for PNCB's exams to have more questions that are directed at assessing higher cognitive levels such as those that require application or analysis of knowledge, as opposed to questions that rely on memory or rote recall. Below are examples of questions that follow the *clinical stem*, formatted as either a lead-in closed stem question or as a parallel open-stem style, that are more likely to assess higher level cognitive processes.

Examples of questions (lead-in and sentence completion) used with clinical stems to develop test items with higher cognitive levels	
Assessment	• Which of the following findings indicates a need for further assessment? • Which assessment finding is a PRIORITY concern? • The MOST important history information is… • Which of the following would be the MOST appropriate initial question? • Which of the following is the MOST important piece of information to gather from this child? • What should be interpreted from this data? • Which of the following tests should be ordered? • Which of the following abnormal findings should be expected when performing the assessment? • Which of the following findings needs further investigation? • Which of the following is an expected finding? • Which is the MOST important factor to consider? • Which of the following laboratory results would be expected for this child?
Diagnosis	• The MOST likely diagnosis is… • The MOST likely cause is… • Which of the following findings would help support this diagnosis? • Which of the following is the MOST common presenting sign of xxxx? • These signs and symptoms are MOST consistent with… • This finding is MOST likely… • The vital signs are suggestive of which of the following? • This clinical description is indicative of… • Associated risks include which of the following? • Which of the following manifestations should be expected? • Which of the following symptoms would be expected with this diagnosis?
Management	• Which of the following is appropriate management? • Which is the MOST important first step? • Which of the following is the BEST treatment choice? • The NEXT step in management is to… • After xxxx, the BEST action would be to… • Which of the following treatments is MOST appropriate? • Which of the following is an appropriate nursing intervention? • The best INITIAL management includes… • Which of the following is the MOST appropriate medication? • Which of the following would be recommended or prescribed? • Which of the following is the MOST appropriate NEXT step to add in treatment? • Which exam finding will require a referral to a(n) xxxx? • Monitoring for which of the following common complications is indicated?

Examples of questions (lead-in and sentence completion) used with clinical stems to develop test items with higher cognitive levels	
Priorities	• Which of the following findings is the most IMMEDIATE concern? • Which of the following evaluations should occur FIRST? • The IMMEDIATE action should be to initiate… • Which of the following laboratory tests should be performed FIRST? • Which of the following is the FIRST intervention? • Which of the following would be the PRIORITY in the plan of care? • What is the MOST appropriate NEXT step?
Guidance	• Which of the following is the MOST appropriate advice? • The BEST anticipatory guidance includes… • The caregiver's readiness to learn can best be assessed by asking which of the following questions? • Which of the following should be included in teaching? • Which of the following statements demonstrates an understanding of the diagnosis and treatment plan? • Which of the following is the MOST important information to address caregiver concerns about xxxx?

When developing the options for the question, take care to ensure grammatically consistent links between the question and the options.

Item Shells

Item writers, especially when new to the process, can jumpstart their creativity and develop ideas for questions by using an **item shell**. Haladyna and Shindoll (1989) have suggested that the use of item shells can be helpful to beginning item writers. An item shell is a "hollow" item containing a structure or framework that is used to write similar items by exchanging certain details to create a new question. An example of an item shell format is:

> Which of the following is the MOST common side effect associated with long-term use of [INSERT MEDICATION]?
>
> A. **KEY** [correct side effect]
>
> B. **DISTRACTOR** [plausible side effect]
>
> C. **DISTRACTOR** [plausible side effect]
>
> D. **DISTRACTOR** [plausible side effect]

Using this question as an item shell, this same stem could be used to create multiple questions by substituting a different medication usually taken for longer periods, and then creating a new key and distractors.

Clinical stems adapt well to item shells too. Simply create new stems by changing the lead-in question at the end of the stem. In the example below, consider all the other questions that might be asked related to this clinical stem other than asking about the most appropriate diagnostic study.

EXAMPLE

A 2 month old presents with bilious vomiting for 24 hours. Physical examination is unremarkable, and there is no weight loss. What is the MOST appropriate diagnostic study to establish the diagnosis of malrotation?

Item shells can also be created by identifying multiple elements in the stem that could be changed. In the stem above, a new question could be created by changing elements such as the age of the child, the symptoms, the period of symptoms, and perhaps the lead-in question or diagnosis. The steps for creating an item shell from an item you have written is to:

1. Identify the stem
2. Underline key words or phrases that indicate the content of the item
3. Identify potential variations for each key word or phrase (e.g., age of person, disease, treatment, complications, type of accident, vital signs)
4. Select one (or more) of the variations
5. Write the stem with the variation
6. Write the correct answer
7. Write plausible distractors

An additional way to write new items is to create a different version of an item, whereby you keep the stem the same (or modify it only slightly), but change the key and some of the distractors, thereby developing a new item. The original and new version of the item would not appear on the same exam form together; however, the similar versions may appear on different exam forms.

Below is an exercise that provides three questions. Create an item shell from each question. In the area to the right of each question, write a new item, modifying the stem, key, and distractors as appropriate.

EXERCISE: Use an item shell to create new items by changing information	
For each of the following, identify the key words or phrases that represent the content of the item in the stem. Select a variation for the key word(s) and write a new stem using the variation along with a new correct answer, and distractors.	
1. Which of the following conditions would restrict a high school student from participating in wrestling? a. asthma b. absence of one testicle c. facial herpes simplex d. controlled epileptic seizures	New Stem: _____ _____ _____ a. _____ b. _____ c. _____ d. _____

EXERCISE: Use an item shell to create new items by changing information	
2. Which of the following medications is MOST effective in the treatment of localized impetigo? a. Topical Bacitracin b. Oral Penicillin VK c. Oral Amoxicillin/clavulanic acid (Augmentin®) d. Topical Mupirocin (Bactroban®)	New Stem: _____ _____ _____ a. _____ b. _____ c. _____ d. _____
3. Which is the MOST appropriate recommendation for a child with irritable bowel syndrome? a. adhere to a low-residue diet b. begin a trial of an antispasmodic drug c. empty the bowel daily d. apply cold compresses to the abdomen	New Stem: _____ _____ _____ a. _____ b. _____ c. _____ d. _____

(Source: Haladyna, T. M. (1994). Developing and Validating Multiple-Choice Test Items. Hillsdale, N.J.: Lawrence Erlbaum, Inc.)

Examples of Item Shells

The chart below provides more information about developing item shells that includes considering the desired objective or test-taker's task to create the appropriate lead-in question. [Adapted from Haladayna & Shindoll (1989)]

TEST-TAKER'S TASK	CLINICAL STEM	LEAD-IN QUESTION
Make correct diagnosis	Information about disease or injury	What is the correct diagnosis for this patient?
Evaluate situation and anticipate consequences	Combination of information about situation	What is the MOST common (cause, complication, symptom, consequence) of this (procedure, drug therapy, problem)?
Select most effective treatment	Information about disease or injury and suggested diagnosis	Which of the following treatments is appropriate?
Evaluate potential causes and select correct one	Describe symptoms of patient disease or problem	What is the MOST likely cause of the (disease or problem)?
Evaluate alternative treatments and select step to be implemented	Diagnosis, history, and information about patient management	What is the appropriate drug therapy at the time of treatment? What is the NEXT step in the management of this patient?
Identify symptoms or characteristics of a disease or injury	Information about a specific disease or condition	What set of symptoms can be expected?
Determine information needed to make correct diagnosis	Medical history given for particular problem	What additional information is necessary for a proper diagnosis?
Determine unwanted event or complication likely for given problem and/or treatment	Disease or problem and treatment described	What is the MOST likely complication of this (procedure, treatment, drug therapy)?

Section 4: Critiquing your Items before Submission

Does your item:		Notes
STEMS	☐ Provide a clear task for test-taker without reading options? (p. 5) ☐ AVOID use of teaching statements? (p. 5) ☐ Minimize reading load by eliminating unnecessary words? (p. 5) ☐ Promote fairness using person-centered language? (p. 8) ☐ Assess for higher cognitive levels of application and analysis? (p. 4) ☐ Include relevant details to allow knowledgeable test-takers to select the correct response? (p. 19)	
OPTIONS	☐ Include four options that relate and flow with the stem? (p. 9-10) ☐ Provide parallel structure to blend the key in with other options? (p. 7) ☐ AVOID use of "none of the above" or "all of the above"? (p. 3) ☐ Offer mutually exclusively options when numeric ranges are used? (p. 7, 15)	
DISTRACTORS	☐ Include plausible but incorrect distractors, and avoid "giveaways"? (p. 7) ☐ AVOID the use of "universal" terms such as ALWAYS, ALL, or NEVER, minor distinctions, or being tricky to make distractor incorrect? (p. 9)	
ITEMS	**AVOID** THE USE OF: ☐ negative stems? (p. 3, 6) ☐ terms such as "you", "nurse" or "patient" or naming individuals? (p. 6-7) ☐ gender or specific age when not critical? (p. 6)	
	☐ Include appropriate punctuation? **Closed stems** end with "?" If **options** are complete sentences, they end in periods. If **options** are phrases, the first letter of first word in each **option** is lower case, and options end without punctuation. (p. 10) **Open stems** end without punctuation when options are written to complete the sentence begun in the stem. Each options' first word begins with a lower case letter, and each option ends with a period. (p. 9) **Open stems** end in a colon if the options are single terms, such as medications, conditions or microorganisms, and each option ends without punctuation. (p. 10)	
OVERALL	☐ Identify a correct response (key) for each question and each question has ONLY one correct response? (p. 7) ☐ Represent individuals fairly without potential bias (e.g., gender, cultural)? (p. 7-8)	
	☐ Provide a complete reference citation for each item including the page number(s)? (p. 9) **Example**: Hockenberry MJ, Wilson D. Wong's Nursing Care of Infants and Children. 10th ed. Philadelphia, PA: Elsevier Mosby; 2015. P. 557 ☐ Include a reference citation that support the key? (p. 9)	
	☐ Include the content outline area that each item belongs too? (p. 4) **Example:** I.A.2	

Section 5: The Documented Item and Resource Links

How your items are submitted to PNCB will vary based on whether you are writing for exams, exam prep products, or continuing education (CE) modules. Instructions received with your PNCB assignment will include details on how your items are to be submitted.

Questions? We're here to help! Email us at itemwriting@pncb.org.

Below are links to key support resources for your item writing efforts, such as exam content outlines and approved reference lists.

Exams and Products	Resources
ALL	Visual Guide to the Basics of Item Writing
	Item Review Worksheet
CPN Exam	**Approved Reference List**
	Content Outline
CPNP-AC Exam	**Approved Reference List**
	Content Outline
CPNP-PC Exam	**Approved Reference List**
	Content Outline
PMHS Exam	**Approved Reference List**
	Content Outline
CE Products	Alternate Item Types

Thank you!

Volunteering your time and expertise to support PNCB's programs is greatly appreciated.
Thank you so much for making a difference for your profession, pediatrics, peers and future colleagues.