Interpreting PCAT Scores

Effective: July 2020

For inquiries or reordering:
800.622.3231
www.pearsonassessments.com/pcat

Copyright © 2004, 2008, 2012, 2014, 2015, 2016, 2020 NCS Pearson, Inc. All rights reserved.

Warning: No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without the express written permission of the copyright owner.

Pearson, PCAT, and the **PCAT logo** are trademarks in the U.S. and/or other countries of Pearson PLC or its affiliates.

NCS Pearson, Inc. 5601 Green Valley Drive Bloomington, MN 55437

Produced in the United States of America.

v.A

Product Number 66107

Table of Contents

Acknowledgments iv

Introduction 1

Scoring Procedures 2
- How the Multiple-Choice Subtests Are Scored 2
- How the Writing Subtest Is Scored 2

Interpreting PCAT Scores 8
- Interpreting Scaled Scores and Percentile Ranks 8
- Understanding Raw Score to Scaled Score to Percentile Rank Relationships 9
- Interpreting the Writing Score 10
- Sample Essays 11
- Comparing Older PCAT Scores to Current Scores 17
- Using PCAT Scores as Criteria for Admission 17

Glossary 20

Figures

1 PCAT Writing Scoring Rubric 4

Copyright © 2020 NCS Pearson, Inc. All rights reserved.

Acknowledgments

This document was prepared by the following members of the Pearson Clinical Assessment group:

Donald G. Meagher, EdD
Senior Research Director

Tianshu Pan, PhD
Senior Psychometrician

Natividad Ybarra, PhD
Test Development Manager

Rachel Wegner, MA
Research Director

Jeffrey R. Miller, MA
Digital Editor

Copyright © 2020 NCS Pearson, Inc. All rights reserved.

Introduction

The *Pharmacy College Admission Test* (PCAT®) is a norm-referenced, standardized test that measures the abilities, knowledge, and skills that pharmacy schools deem essential for success in basic pharmacy curricula. To ensure the continuing relevance and usefulness of the PCAT for assessing the prerequisite knowledge and skills of candidates for admission to professional pharmacy programs, the test content is periodically reviewed and revised so that it accurately reflects current pharmacy school entrance requirements in the sciences, math, and language arts. The most recent PCAT test blueprint includes passage-based items in the Biological Processes and Chemical Processes subtests and word problem scenarios in Quantitative Reasoning to emphasize critical thinking skills.

The current PCAT scaled score range of 200–600 was first determined based on a 1998–2003 normative sample, and these scaled scores continue to represent unchanging criteria against which candidates can be evaluated from year to year going back to March 2004. Though changes in the population of PCAT candidates do not affect the relevance of the scaled scores, new percentile ranks must be calculated periodically, based on the performance of a current normative sample. The scaled score and percentile rank information presented in this document is based on all PCAT candidates who took the test for the first time between July 2015 and April 2019 (N = 52,882), with the current percentile ranks in effect for all PCAT test administrations since July 2020.

This publicly available document provides information useful in interpreting all PCAT scaled scores, percentile ranks, and Writing scores. The PCAT currently includes a Writing subtest consisting of a prompt that states a problem for which candidates must suggest a solution, and four multiple-choice subtests: a Biological Processes subtest and a Chemical Processes subtest both containing stand-alone and passage-based items; a Critical Reading subtest containing passage-based items; and a Quantitative Reasoning subtest containing stand-alone items, many presented as word problems.

The following additional publications are also available on the PCAT website: PCAT Basics, with information about PCAT history, contents, structure, administration, and score reporting; and PCAT Reliability and Validity, with information and research results related to the reliability and validity of the test. Also available only to qualified professionals is the printed *PCAT Technical Manual,* which contains detailed data for the current normative sample, the current 2019 percentile ranks, and compendium tables that can be used to compare the previous 2015 percentile ranks with the current percentile ranks.

To request a copy of the *PCAT Technical Manual*, or to offer suggestions regarding the PCAT or about this or any other related publications, contact PCAT Customer Relations at Scoring.Services@Pearson.com.

Copyright © 2020 NCS Pearson, Inc. All rights reserved.

Scoring Procedures

PCAT test forms are developed several months prior to the test administrations for which they are intended and are constructed to address specific test blueprint content objectives (see the separately available PCAT Basics document). At the time a new test form is developed, the multiple-choice operational items (items that are counted toward a candidate's score) are selected based on content requirements specified in the test blueprint and according to specific difficulty estimate range criteria. The operational writing prompt is selected based on criteria regarding mean-score and score-point distribution data obtained when the prompt was originally field-tested. After a test administration, all candidates' multiple-choice score data are processed electronically, and the essays are scored through a combination of electronic and manual methods.

How the Multiple-Choice Subtests Are Scored

When constructing multiple forms of the same test, there are always slight variations in the level of difficulty between forms, regardless of the stringent item selection criteria used. For this reason, a given raw score obtained from different test forms may not always reflect the same level of performance. To adjust for these differences, PCAT test forms are equated by converting raw scores to scaled scores on a common scale (determined through IRT analysis and linear conversions of IRT ability scores). The use of psychometric procedures to equate raw scores on a common scale also facilitates the determination of percentile ranks—the percent of candidates in the current norm group who received a scaled score lower than a given score.

Using item response theory (IRT; the Rasch model), item difficulty values generated by field testing are used to determine an ability estimate for each possible raw score total (the number of correct responses to operational items in a multiple-choice subtest). Each ability estimate is then translated linearly into a scaled-score point to create a raw-score-to-scaled-score table for each subtest. Scaled-score-to-percentile-rank tables that were created based on the performance of all PCAT candidates who made up the current normative sample are then used for all test forms to determine percentile ranks that correspond to scaled scores.

After a test administration, candidates' raw-score totals are calculated, the appropriate raw-score-to-scaled-score tables are used to determine each candidate's scaled score, and the scaled-score-to-percentile-rank tables are then used to determine the appropriate percentile rank that corresponds to each scaled score. Quality assurance checks are in place at various stages in the scoring process to ensure that no errors are made and that there are no delays in processing candidates' scores.

How the Writing Subtest Is Scored

Each essay is assigned a Writing score ranging from 1.0–6.0, with 6.0 representing the highest earned score possible and 1.0 representing the lowest earned score possible. Essays are scored as 0 (invalid) if left blank, if written in a language other than English, if written on a topic other than the one assigned, or if answered in a manner that otherwise indicates a refusal to write. Each writing score is determined by averaging together two assigned scores, one from a trained human scorer and a second from either another human scorer or by Pearson's Intelligent Essay Assessor™ (IEA), an Internet-based tool designed to automatically score electronically submitted essays.

Copyright © 2020 NCS Pearson, Inc. All rights reserved.

All scoring is preceded by training done in advance of a testing window using multiple essays representing examples of each score point for the prompts being administered. Human scorers are trained on and guided by example essays selected from either the original field-testing or from previous operational use that represent each score point (1.0–6.0) earned by candidates who wrote on these prompts in the past. IEA assigned scores are determined using a scoring engine that analyzes text through a combination of latent semantic analysis (LSA) and methods widely used in automatic speech recognition, computational linguistics, and other forms of statistical artificial intelligence. LSA analyzes text by determining semantic similarities for words and extended passages, which enables the IEA tool to evaluate essays for both substantive content and mechanical aspects of writing. Programing of the IEA automatic scorer is done by providing thousands of PCAT essays written by candidates in response to the same prompts being administered during a given testing window, along with all assigned scores earned on these essays during previous administrations of the prompt.

All scoring for the Writing subtest is also guided by a scoring rubric that describes the characteristics of each score point, as shown on the following pages.

Copyright © 2020 NCS Pearson, Inc. All rights reserved.

Score Point 6: Superior

Conventions of Language

- The writer skillfully applies the conventions of language.
- The writer makes very few, if any, mistakes in sentence formation, usage, and mechanics, and no errors are serious enough to interfere with the overall flow of the response or with its meaning.

Problem Solving

- The response exhibits a more sophisticated structural pattern that incorporates a greater variety of transitional words/phrases and shows some evidence of advanced rhetorical techniques.
- The response represents a persuasive essay showing strong evidence of efficient composition skills.
- The solution discussed is clearly related to the problem and is developed with relevant, convincing support (e.g., facts, examples, anecdotes).
- The main tenets of the problem and the solution are discussed and explained with in-depth support and detail.
- One or more alternative solutions, or multiple possible solutions, are included with clear discussion, analysis, and evaluation.
- The response is a logical and effectively organized argument that is purposefully presented.

Score Point 5: Proficient

Conventions of Language

- The writer is proficient in applying the conventions of language.
- Though some mistakes in sentence formation, usage, or mechanics are present, these errors do not interfere with the overall flow of the response or with its meaning.
- The response proficiently exhibits a structural pattern of multiple paragraphs with a clear beginning, middle, and end.

Problem Solving

- This response represents a persuasive essay showing evidence of effective compositional skills.
- The discussion of the problem and solution is clear.
- The solution discussed is clearly related to the problem, and the support presented is appropriate and relevant, but the response lacks the detailed, in-depth support characteristic of the highest score point.
- One or more alternative solutions or multiple possible solutions are discussed, with some attempt at analysis or evaluation.
- The argument progresses logically with an organizational plan consisting of clear, transitional elements.

Figure 1 PCAT Writing Scoring Rubric

Copyright © 2020 NCS Pearson, Inc. All rights reserved.

Score Point 4: Effective

Conventions of Language

- The writer is generally successful in applying the conventions of language.
- Mistakes in sentence formation, usage, or mechanics are present that may interfere with the overall flow of the response, but these errors do not interfere with its meaning.
- The response exhibits a structural pattern of multiple paragraphs with a beginning, middle, and end.

Problem Solving

- This response is generally successful in using important principles of effective composition.
- Though the presentation may be general, the discussion of the problem and solution is reasonably clear.
- The solution discussed is generally related to the problem, and most of the support presented is appropriate and relevant, but the response lacks the depth of support characteristic of the higher score points.
- The argument may be rather loosely organized or may contain digressions in the organizational structure that lessen the effectiveness of the presentation.

Score Point 3: Satisfactory

Conventions of Language

- The writer adequately applies the conventions of language.
- Several mistakes in sentence formation, usage, or mechanics are present that may interfere with the overall flow of the response and with its meaning.
- The response exhibits a structural pattern of multiple paragraphs with elements of a beginning, middle, and end.

Problem Solving

- This response is fairly successful in using important principles of effective composition.
- Though the presentation may remain too general to be convincing, the discussion of the problem and solution is adequate.
- The solution discussed is adequately related to the problem, and most of the support presented is appropriate and relevant.
- The argument may progress logically, but the loosely organized presentation results in digressions from the organizational plan or unnecessary redundancies that make the presentation less straightforward and compromise its effect.

Figure 1 PCAT Writing Scoring Rubric (continued)

Copyright © 2020 NCS Pearson, Inc. All rights reserved.

Score Point 2: Marginal

Conventions of Language

- The writer is marginally successful in applying the conventions of language.
- Patterns of mistakes in sentence formation, usage, and mechanics significantly detract from the presentation.
- At times the meaning of the response may be impaired.

Problem Solving

- The response is marginally successful in using important principles of effective composition.
- The response may not always exhibit a cohesive structural pattern.
- The writer may seem more concerned with self-expression than with presenting a logical argument.
- The problem is discussed and a solution related to the problem may be discussed, though the solution may be either implicit or not clearly stated.
- Support is sketchy and, at times, interrupted with redundancies, digressions, irrelevancies, and/or conditions/qualifications not clearly related to the problem.
- Organization of the argument may be rather haphazard, with a loose structuring of ideas that weakens the effectiveness of the discussion.

Score Point 1: Inadequate

Conventions of Language

- The writer's achievement in applying the conventions of language is limited.
- Frequent and serious mistakes in sentence formation, usage, and mechanics make the response difficult to understand.

Problem Solving

- The response does not successfully embody important principles of effective composition.
- It is unclear how the discussion of the problem or solution presented relates to the problem stated in the prompt.
- The support is either fragmentary, unconvincing or is a combination of material that does not contribute to the presentation (e.g., contradictions, digression, redundancies, and outright irrelevancies).
- Chaotic organization may make it hard to follow the logic of the presentation.

Figure 1 PCAT Writing Scoring Rubric *(continued)*

Copyright © 2020 NCS Pearson, Inc. All rights reserved.

Writing Scoring Rules

The following scoring rules are used when assigning the Writing scores:

- Following the scoring rubric (see Figure 1), each essay is assigned two separate scores ranging from 1–6 (or 0 if deemed invalid). One score is assigned by a trained human scorer and one score either by a second trained human scoring or by the IEA scoring tool.
- The scoring of candidates' essays is done with consideration for the criteria for both conventions of language and problem solving.
- Scorers are instructed to give candidates the benefit of the doubt by assigning scores based on the overall quality of the writing, even if a candidate seems to have done such things as only tangentially address the topic of the prompt or run out of time without adding a clear conclusion.
- When the two assigned scores are the same (e.g., 3 and 3), or differ by no more than one score point (e.g., 3 and 4), the two scores are averaged, resulting in a final score represented to one decimal place (e.g., 3.0, 3.5).
- If the two assigned scores differ by more than one score point (e.g., 3 and 5), a human resolution leader reads the essay and assigns a score. The resolution score is then combined with the higher of the two original scores, with the average of these two scores representing the final score (e.g., an original high score of 5 and a resolution score of 4 would result in a final score of 4.5).

Writing Score Verification Procedures

Specific verification procedures are followed that allow supervisory staff to monitor the reliability of assigned scores and each individual scorer's work. These procedures include the following:

- Daily and cumulative inter-rater reliability reports for each scorer and essay prompt provide information about how frequently scorers are in exact agreement or assign adjacent scores.
- Daily and cumulative frequency distributions are generated that show supervisors whether any individual scorers are scoring consistently high or low.
- Pre-scored essays are randomly assigned to scorers, which allow supervisors to monitor each scorer's validity agreement rate.
- Scoring supervisors back-read a sample of essays after scores have been assigned to monitor how consistently each scorer is performing in accord with the scoring rubrics and with other training materials.

These reliability and validity methods ensure that each scorer meets and maintains the quality metrics established for PCAT in order to continue scoring. If a scorer fails to meet the expected validity criteria, the person receives a warning and specific feedback. If a scorer fails to meet validity criteria a second time, the person must then take and pass a scoring precision assessment in order to continue work as a PCAT essay scorer.

Copyright © 2020 NCS Pearson, Inc. All rights reserved.

Interpreting PCAT Scores

Immediately after a candidate completes the PCAT exam, an unofficial preliminary score report is provided to the candidate at the test center. After verifying that no irregularities occurred that could have affected a candidate's performance, and after the candidate's essay has been scored, Pearson provides a personal Official Score Report to the candidate, sends Official Transcripts directly to schools and colleges of pharmacy as requested by the candidate, and sends score data to the Pharmacy College Application Service (PharmCAS) for subscribing institutions (see the PCAT Basics document for a sample Official Score Report and Transcript).

PCAT scores are intended to be only one set of indicators among several sources of candidate information considered in admissions decisions. Even though research has consistently shown the PCAT to be a strong predictor of subsequent academic performance (see the PCAT Reliability and Validity document), PCAT scores are not intended to be used as the sole criteria for admission, nor are they intended to suggest any rigid performance standard, which may inadvertently exclude otherwise worthy candidates. Neither the AACP nor Pearson establishes passing scores for individual PCAT subtests or for the PCAT as a whole.

PCAT scores represent a common standard against which candidates can be compared, regardless of educational background or other personal variables. When used along with other information available to admissions committees, PCAT scores represent a valuable tool for evaluating applicants to pharmacy programs. However, it is the responsibility of each college or school of pharmacy to determine how it can best use PCAT scores with its candidates.

Interpreting Scaled Scores and Percentile Ranks

PCAT scaled scores and percentile ranks reflect the general academic ability and specific content knowledge of the candidates in the normative sample.

Scaled Scores

The PCAT scaled scores represent equal units on a continuous scale, ranging from 200–600. Scaled scores are calculated separately for each of the four PCAT multiple-choice subtests, with a total Composite score that is the unweighted average of the four multiple-choice subtest scaled scores. Subtest scaled scores earned for a given subtest during one PCAT test administration are comparable to scaled scores earned for the same subtest during other test administrations, even though different forms of the test are administered. Composite scaled scores are also comparable in the same way. The method used to determine the scaled scores and the scale on which they are reported (200–600) have remained unchanged since March 2004, making the PCAT scaled scores especially useful for longitudinal tracking.

Percentile Ranks

Percentile ranks range from 1–99. Percentile ranks for the multiple-choice subtests are comparable across subtests because they are based on performance relative to the current norm group. For this reason, the percentile ranks are more useful than the scaled scores for comparing individual candidates and for determining

Copyright © 2020 NCS Pearson, Inc. All rights reserved.

a candidate's relative strengths and weaknesses. The subtest percentile ranks are most useful for comparing abilities in the specific subject areas, and the Composite percentile rank is most useful for general comparisons.

PCAT percentile ranks are based on the performance of the current normative sample—all first-time PCAT candidates from July 2015 through April 2019 (N = 52,882). However, percentile ranks obtained prior to July 2020 were based on the performance of the previous normative sample—all first-time PCAT candidates from July 2011 through January 2015. For this reason, the current percentile ranks are not directly comparable to previously earned percentile ranks.

Understanding Raw Score to Scaled Score to Percentile Rank Relationships

Since the introduction of the current PCAT scaled scores in 2004, a raw-score-to-scaled-score correspondence has been calculated separately for each multiple-choice subtest in each new test form, based on difficulty statistics for the operational items making up a subtest.

Each item difficulty statistic is based on candidates' performance on the item when it was field-tested and then calibrated (using the Rasch model) on the same scale as all other items of the same content area in an item bank. All test form subtests are constructed from calibrated items chosen from the appropriate content area item bank. This makes subtest scaled scores comparable across test forms and test administrations, even though the overall difficulty of the set of items on each test form may vary slightly across test forms.

The PCAT scaled score means were set at 400 when the 200–600 range was established in 2004, with standard deviations of 25 for the subtests and 20 for the Composite score, but both the means and standard deviations have changed slightly each year since then. The percentile ranks that correspond to the scaled scores have been recalculated each time the test has been normed since 2004 (2007, 2011, 2015, 2019), with the most recent renorming occurring during 2019 for release in 2020.

Each raw score point on a given subtest (i.e., 1–40) corresponds to a unique scaled score. Because each PCAT multiple-choice subtest includes 40 operational items and there are 401 possible scaled score points (200–600), a change of one raw score point necessarily results in a change of more than one scaled score point. This does not mean, however, that a change of one raw score point (one more item answered correctly) necessarily results in an equal unit change in scaled score points (e.g., 10 scaled score points).

Because the overall difficulty of each test form subtest varies, the difference in one raw score point on a given test form subtest reflects differing ability estimates required for candidates to have answered a given number of items correctly. Because the difference between each difficulty estimate varies, the scaled score change associated with each change in raw score point also varies.

For each subtest, a given raw score corresponds to a specific scaled score that corresponds to a theoretical percentile rank that describes the position of the individual's scaled score in the norm-sample distribution of scaled scores.

Copyright © 2020 NCS Pearson, Inc. All rights reserved.

Interpreting the Writing Score

Every candidate taking the PCAT currently receives a Writing score on a scale of 1.0–6.0. For comparison, candidates are also provided with a mean score that represents the average of all Writing scores earned by candidates taking the PCAT during the 12 months prior to the national test administration window during which the candidate took the test. The candidate's Writing score reflects the individual's ability to apply conventions of language and problem solving skills in the composition of an original essay.

The Writing score represents valuable information in the admissions process that can be used to identify a candidate's written communication skill as a guide for placement purposes. Because the ability to create organized and coherent reports or correspondences under deadline pressure is a common feature of academic and professional life, it is important to assess a writing sample produced under time constraints, and the results of that assessment are important for college admission committees to consider.

The Writing score should be interpreted with reference to the mean score listed on the Official Transcript, as well as to the score-point descriptions in the scoring rubric and the sample essays of each score that are included in this document. For pharmacy schools already requiring candidates to submit an essay or other written statement, the PCAT Writing score can be useful as an indication of a candidate's writing ability that is obtained through rigorous standardized administration and scoring processes.

Comparisons between candidates' Writing scores must be made with some caution because these scores are reported for performances on specific prompts, and each test administration includes multiple operational prompts. Nevertheless, even though no equating method is applied to scores to make them precisely equivalent, all operational prompts are selected based on criteria requiring that a similar mean was obtained when each was originally field-tested.

When used with other information available to admissions committees, the PCAT Writing score represents a valuable tool for evaluating applicants to pharmacy programs. It is the responsibility of each college or school of pharmacy to determine how the PCAT Writing score is used.

Copyright © 2020 NCS Pearson, Inc. All rights reserved.

Sample Essays

The six essays on the following pages represent examples of each earned Writing score point (1.0, 2.0, 3.0, 4.0, 5.0, and 6.0). Each sample essay is shown with the assigned score, and with brief summary notes (in parentheses following each score) to explain what a score point indicates.

Each sample essay represents a response to one of the following three prompts, which were field-tested and then used operationally on PCAT test forms, but will never again be used on a PCAT test:

- According to the U.S. Agency for International Development (USAID), poor management and distribution efforts threaten water shortages for as many as one-third of all people on earth. Discuss a solution to the problems resulting from limited freshwater supplies coupled with the demands for water by an increasing world population.
- The U.S. Department of Health and Human Services suggests that regular physical activity has important health benefits for people of all ages. Discuss a solution to the problems that many adults face in maintaining a healthy regimen of physical exercise.
- The Organisation for Economic Co-operation and Development reports that changes in the earth's climate may have profound direct and indirect economic impacts on societies around the world. Discuss a solution to the problem of addressing the possible economic consequences of climate change.

The sample essays that follow are based on candidates' essays that have been modified enough so that none are identifiable regarding authorship. The sample essays include errors in spelling, sentence structure, and word usage that illustrate the types of errors commonly made by candidates.

While reviewing these sample essays—and indeed when considering a candidate's Writing score—it is important to note that all candidates who write a PCAT essay are basically composing a rough draft under the pressure of a high-stakes testing situation without access to any reference materials. With a 30-minute time limit to plan and write the essay, candidates have very little time to proofread and make any desired revisions to their draft, and few have time to entirely rewrite an essay.

Copyright © 2020 NCS Pearson, Inc. All rights reserved.

Sample Essay 1

Writing Score: 1.0 (Inadequate—very weak skills, many serious errors, difficult to understand; ineffective organization, development, and presentation):

So that everyone can have a fresh clean water supply, it is important for every person to take some action. Everyone should evaluate their use of personal water. To me it seems like lawn watering is a huge waste of fresh water, so number one thing for the US should ban lawn watering to conserve the water.

Why don't we worry about what is happening on this planet instead of wasting money on outer space and NASA? The only good answer is use that money to try to find a cheap way to purify our water. It would not be fair to limit people on how many offsprings they can have in order to conserve water. It think there must be other solutions before this action or other similar is taken.

Sample Essay 2

Writing Score: 2.0 (Marginal—marginal skills, patterns of errors, some impairment of meaning; disorganized, unclear development; unconvincing presentation):

Regular exercising is a challenge for many people, especially individuals who have to go to work. The most important reason is that many people just aren't interested, even though lack of time is a major significant factor. Work can give adults a lot of stress, and activities such as going out to eat or staying home watching TV are ways to relieve stress without too much effort. But people are either not aware of all the benefits of exercise, or more likely don't care enough to give it a try.

I think that to encourage people to try exercising and raise their awareness, companies should plan events for their employees to do physical activities together. While this idea might seem not related to work, it is a way to bond with other co-workers and very effectively help them work better as a team. It also a way to make the image of the company more a healthy positive. Some companies sometimes have lunches anyway from the office anyway, so just add a little creativity effert to promote bonding between employees and healthy lifestyles!

For an individual person, this would be a chance to exercise that will be hard to refuse. People are often less likely to go out and take things related to work more seriously. If a company organizes interesting outside activities like minature golf or rockclimbing, employees will have opportunities to try new things that they wouldn't have time to before.

Copyright © 2020 NCS Pearson, Inc. All rights reserved.

Sample Essay 3

Writing Score: 3.0 (Satisfactory—adequate skills; several errors; clear beginning, middle, and end; some elements of organization, incomplete development, less-than-effective presentation):

Population increases and pollution are making a limited amount of freshwater become common in many parts of the world today. This concerns me as time passes everyday, even though many people do not see limited freshwater water supplies as a big problem in society. Americans should be concerned about our water supply as well as the water supply in other countries. There are many ways we can try in order to prevent limited supplies of freshwater.

One way is that oil companies should be severely penalized for polluting our freshwaters with particles of trash and oil. Dumping oil into our freshwater decreases our supply of drinking water and also the populations of animals. Also, some chemical companies put many toxic chemicals into our freshwater. Our water is not longer safe for drinking or bathing once it has been polluted with toxic chemicals. With our population increasing everyday, you can see it is a huge problem that these companies are limiting our freshwater supply. This country can not afford to lose all of there freshwater supplies, which is a part of everyday life. We must not only stop the oil and chemical companies from polluting our freshwater, but we also can try to decrease the birth rate to help prevent a shortage of water in the future as decreasing the population will decrease the amount of water used. We can save our freshwater supply and the supply of other countries by putting these solutions together. We all need freshwater to survive.

Our water supply is not limited yet, but it could be in a couple of years. It will help tremendously if we prevent companies from polluting our water and decrease the birth rate. This will allow us to have abundant amounts of fresh water which will allow us to share with other countries. Doing so will end our problem of limited freshwater supplies.

Copyright © 2020 NCS Pearson, Inc. All rights reserved.

Sample Essay 4

Writing Score: 4.0 (Effective—effective skills, minimal errors; clear structure, loose organization; appropriate development, adequate presentation):

Climate change is a significant issue facing the world today. Altering the earth's climate could result in economic consequences for nations of this planet. Of the many ways existing to find a solution or reduce the negative effects of climate change, three are to educate people about the issue, reduce the environmental impact of society, and research ways to increase economic productivity if climate change occurs.

Governmental and environmental agencies should utilize media outlets such as magazine advertisements, television commercials, and publicly displayed signs to inform people about the economic effects climate change can have. These institutions could also educate people on the causes of climate change. Many people now recognize that pollution from modern industries and cars has damaged the environment and the ozone layer, which is often viewed as a significant contributing factor to changes in the climate. People should be reminded of their impact as individuals that causes climate change and of ways of reducing it. This may be accomplished by such things as using reusable shopping bags, remembering to recycle plastics and other things, and forming carpools to go to work.

With climate changes occurring, we may see environmental effects causing economic effects, such as limited amounts of land available for farming. Researchers are starting to look at ways of maintaining crop productivity with limited resources. For example, the environmental center at Disney World has developed cucumber and tomato trees capable of producing hundreds and even thousands more vegetables in a very limited space compared to the typical farming methods. Other companies should follow this type of research along with ways to limit the pollution and negative impact of industry. In fact, automobile companies are developing hybrid, all electric, and other fuel efficient cars to reduce the impact of the need for oil.

With the economic effects of climate change becoming more apparent and imminent, we must look as a society for solutions to increase awareness of this issue.

Copyright © 2020 NCS Pearson, Inc. All rights reserved.

Sample Essay 5

Writing Score: 5.0 (Proficient—solid skills, some errors, effective flow; solid organization, clear development, proficient presentation):

In most industrialized societies, obesity trends are drastically increasing. Despite media reporting on the negative consequences of this disease, society still has a problem curbing these alarming rates of obesity. Some recommend that adults should have some form of physical activity everyday for half an hour. However, most aduts fail to comply with this recommendation for a healthy lifestyle. Because of the development of technological activies that has replaced physical activities and the stress and excessive hours in the work place, adults find it a challenge to keep up with a schedule of physical exercise. Nevertheless, several solutions exist in order for adults to balance work and pleasure with exercise.

An interesting obstacle in getting the recommended physical activity is the development of recreational technology such as video games and television. For most adults, playing video games and watching television means staying inactive sitting on the couch. Producers should incorporate more video games and television shows that let the adults do some form of exercise in order for this to be solved. While there are interactive games and shows for children, adults should also have something where they can get physical exercise without giving up their video games or television programs. For instance, some video game companies have already marketed games in which adults can do aerobics, yoga, balancing and strengthening exercises. Other companies should promote a healthy lifestyle by following this trend.

Also, in these times of hard economics, most adults feel compelled to work to provide for themselves and their families. For this reason, many adults fail to maintain their regular daily physical exercise. All employers should give adults at least a half hour break to do physical activities. Employers can do so by providing a room set up for a gym facility where adults can use their break to do some walking or yoga or weight lifting exercises. In addition, employers can offer incentives such as gym membership for such awards as employee of the month. Employers can also schedule a monthly class of a physical activity such as nia, dancing, or tai chi. Such beneficial forms of exercises can help make more productive workers for the company by reducing adults' stress.

Even though adults have a busy life, several solutions are available to tackle the problem of maintaining physical activities. The media producers can help by advertising games and television shows that require adults to have fun while also exercising. Work places can also accomodate the physical needs of employees by provisions such as exercise facilities and the time to do such activities. Solutions such as these can help decrease obesity in some societies.

Copyright © 2020 NCS Pearson, Inc. All rights reserved.

Sample Essay 6

Writing Score: 6.0 (Superior—impressive skills, minimal errors, clear structure, effective organization, convincing development, persuasive presentation):

Human beings have always needed fresh water to survive. However, as civilization has grown and developed, humanity's need has not always been matched by efforts to preserve water supplies. As industry pollutes potential water sources, and society diverts or drains rivers and marshes, freshwater is becoming less and less available. Freshwater sources that still exist must be preserved and currently tainted sources reclaimed, and action by governments is needed to preserve current our fresh water.

The United States government has attempted this in the form of Natural Parks and, more importantly, with laws against dumping waste products into reservoirs. In the developing world, however, where the demand for freshwater sources is highest, such protections have not been taken. These governments should be encouraged to also protect their natural waterways and other natural resources, and there are two ways that the United States can help in this cause.

On a political scale, a wise approach would be to consider financial or trade bonuses or some method of debt forgiveness for nations that impliment water source protective measures. Political measures must also be carefully taken to make sure that the money is not misused and protections are legitimate and enforced. Regardless of such qualms, this sort of well-implimented foreign policy could be a valuable carrot- and-stick method for developing nations. For a more personal approach, education may also be vital. Everyone's future could be much brighter if developed countries teach developing nations how to better care for their water resources. Lessons could address the harmful effects of waste dumping, the spread of diseases and their causes, and the simple balance needed by the water cycle. A better educated developing world will be better able to care for their own resources.

In addition to such efforts to protect current sources of fresh water, governments should also of course take steps to reclaim lost water sources or create new ones. As developing countries continues to grow, water treatment technologies will be tremendously beneficial. The implementation of improvements such as simple distillation techniques would be welcome in much of the world. As an understanding of the importance of water supplies grows in these nations, a willingness to introduce better water treatment methods such as those found in the U.S. may also grow.

However, if such cooperative programs do not work, more drastic solutions may be needed in the world. Developed countries should develop more innovative technologies for future use, such as producing water from its gaseous hydrogen and oxygen components and producing potable water from salt water. Tapping into the seemingly unlimited supply of gases in the air could produce water, and desalination plants already operating in some parts of the American Southwest and could tap into the vast water supply in the oceans. Neither of these methods, however, are inexpensive or very efficient. Nevertheless, the development of new technology could make these processes to become more efficient, with new methods being developed.

The fresh water problem can be addressed by either protecting that which still exists or by creating more fresh water. Steps should now be taken to protect those water sources that we still have, especially in the developing world. And though currently expensive and inefficient, the later solution of developing more ways to produce fresh water should be worked on if the need become more dire. If given the chance, nature's marvelous ability to heal itself will prove such protective and creative efforts fruitful.

Copyright © 2020 NCS Pearson, Inc. All rights reserved.

Comparing Older PCAT Scores to Current Scores

All multiple-choice scores are currently reported on Official Transcripts as scaled scores and 2019 percentile ranks, with all percentile ranks obtained before July 2020 converted to 2019 equivalents (see the Score Reporting section of the PCAT Basics document).

PCAT percentile ranks listed on transcripts issued prior to the July 2020 PCAT administration may be compared to the current percentile ranks by using the compendium tables included in the 2020 edition of the *PCAT Technical Manual* (see The 2019 Norms section of the manual). No such compendium table is available for the Writing scores for reasons explained above.

Also note that Composite percentile ranks reported on Official Transcripts for scores earned prior to July 2016 are based on recalculated Composite scaled scores that do not include the Verbal Ability subtest, which was still part of the PCAT at that time.

To compare a candidate's overall performance on the PCAT as indicated on an Official Transcript issued prior to the July 2016 testing cycle to current Composite scores, it is necessary to recalculate the candidate's Composite scaled score. To do so, sum the scaled scores earned for Biology, Reading Comprehension, Quantitative Reasoning, and Chemistry (the former subtest titles corresponding to the current Biological Processes, Critical Reading, Quantitative Reasoning, and Chemical Processes, respectively), excluding the Verbal Ability scaled score. Divide this total by 4, and round this average to the nearest whole number (.5 and greater rounds up). Then look up the recalculated scaled score in the "2019" column in Table 24 of the current *PCAT Technical Manual* to determine the current Composite percentile rank.

Using PCAT Scores as Criteria for Admission

The PCAT can be an important tool in the admissions process and a guide for placing students appropriately. For example, PCAT standardized test results provide information about the abilities of applicants, which may offset questions regarding the variability in pre-pharmacy curriculum and grading standards among schools and geographic regions.

Colleges of pharmacy may use PCAT subtest scores to construct local norms and to evaluate subtest scores in terms of the specific nature of a pharmacy program. The PCAT may also be useful in identifying students' academic strengths and weaknesses as a means of suggesting academic support needed by candidates. By comparing percentile ranks across multiple-choice subtests, or by comparing earned Writing scores to mean Writing scores, a school may be able to determine candidates' areas of relative strengths and weaknesses and to identify those who may benefit from academic support.

In the process of reviewing PCAT scores with additional information about a candidate applying for admission to a program, schools may find some discrepancies that require further investigation. The following examples represent some common conflicting pieces of information and include suggestions for ways to resolve them.

Copyright © 2020 NCS Pearson, Inc. All rights reserved.

Candidates With High Prerequisite Course Grades and Low PCAT Scores

In the case of candidates who have been out of school for several years, low scores may indicate that subject matter has been forgotten or may suggest a lack of recent experience in taking standardized tests. In the case of younger candidates, it may be useful to know whether they came from schools with comparatively lenient academic standards. In such cases, it may have been relatively easy for a student to earn high grades, but those grades may not mean the same as those obtained at more competitive institutions.

It may also be useful to examine any pattern that may be apparent in course grades, such as subject areas in which a candidate received the highest grades or any noticeable changes in grades received from year to year. Because recent performance is typically thought to be the best indicator of future performance, it may be important to note any noticeable rise or decline in recent grades received. If these considerations do not help to explain a discrepancy between high grades and low PCAT scores, the candidate may be able to provide an explanation. At the time the PCAT was taken, the candidate may have been ill, been under some unusual personal stress, or be subject to high test anxiety. Other test results or other tools used to evaluate candidates for admission may provide useful comparisons by showing similarly inconsistent results in relation to grades.

Candidates With Low Prerequisite Course Grades and High PCAT Scores

Older candidates may have learned a great deal since leaving school and may have become more motivated than in the past. Competent students from highly competitive institutions might also have received grades that do not necessarily reflect their ability to succeed in a pharmacy program. For example, a student who carried an unusually heavy credit load, held a demanding job, or helped raise a family while attending school might have received lower grades than he or she would have otherwise. If nothing in the candidate's record provides an explanation of the discrepancy, the candidate may be able to help clarify the matter.

Candidates With Low PCAT Critical Reading or Writing Scores, High Scores for Other PCAT Subtests, and High Grades in Prerequisite Science and Math Courses

The Biological Processes, Chemical Processes, and Quantitative Reasoning subtests emphasize basic scientific and mathematic principles and knowledge. The content of these subtests is much more course-dependent than the Critical Reading and Writing subtest content, at least for students majoring in the sciences. Students who have taken as many science and math courses as they can in order to prepare for entry into a college of pharmacy may have taken their English composition, humanities, and social science prerequisite courses earlier in their college careers. Such candidates may receive high PCAT Biological Processes, Chemical Processes, and Quantitative Reasoning scores, but the language-oriented subtest scores may provide a more accurate picture of their general academic ability.

Copyright © 2020 NCS Pearson, Inc. All rights reserved.

In addition, English may be a second language for some candidates. As a result, candidates whose native language is one other than English may have difficulty with Critical Reading items that require the analysis and interpretation of extended text, or with the writing task that requires the composition of an original essay. Even though these individuals may be able to deal effectively with the scientific and mathematics material as reflected in prerequisite course grades or in performance on the PCAT Biological Processes, Chemical Processes, and Quantitative Reasoning subtests, they may be less able to deal with the more language-dependent content.

Candidates With High PCAT Biological Processes and Chemical Processes Scores but Low Scores on Other PCAT Subtests

Although the Biological Processes and Chemical Processes subtests do involve the application of interpretive and critical thinking skills, particularly in items associated with passages, they also include some content that is memorizable, such as specific technical knowledge in the natural and physical sciences. However, the Critical Reading, Quantitative Reasoning, and Writing subtests are much more skill-based than knowledge-based in that one requires the comprehension, analysis, and evaluation of complex ideas represented in text; one involves the performance of quantitative computation skills required to solve mathematical problems; and one involves the composition of an original essay that proposes a solution to a problem. These skills are not as dependent on identifying information as they are on knowing how to apply skills. For this reason, candidates with higher Biological Processes and Chemical Processes scores relative to their Critical Reading, Quantitative Reasoning, and Writing scores may be those whose cognitive strengths are more knowledge-based than application-based.

Copyright © 2020 NCS Pearson, Inc. All rights reserved.

Glossary

Field Test—An experimental administration of test items as a way to acquire examinee performance data in order to determine the items' suitability for use as future operational items.

Item Response Theory (IRT)—A mathematical model that relates the characteristics of test items and estimates of candidates' ability or proficiency to the probability of a positive response, such as the correct answer to an item.

Longitudinal Tracking—The tracking of particular data (e.g., mean entering PCAT scores) over a long period of time (e.g., 5 years) to establish trends.

Mean (*M*)—The average of a set of scores computed by adding all of the scores together and then dividing by the total number of scores.

***N*-count (*N* or *n*)—**The total number of individuals who make up a sample (e.g., the number of candidates who took a test).

Normative Sample/Norm Group—The group of individuals (sample) earning scores on a test over a specified time period whose score data are used to determine percentile ranks.

Norm-Referenced Standardized Test—A test that presents consistent content, using the same administration conditions and scoring procedures, to all examinees, and that is interpreted by comparing the individual's scores to the scores obtained by a normative sample.

Norms—Data that summarize the performance of a norm group (or normative sample) by showing how earned scores compare to one another, such as by listing scaled scores and corresponding percentile ranks.

Operational Items—Items on a test that are used to determine candidates' scores.

Percentile Rank (PR)—A whole number between 1 and 99 that represents the proportion of individuals from the normative sample who earned lower than a given score on a test.

Raw Score (RS)—The number of items answered correctly by a candidate on a test.

Scaled Score (SS)—A standardized test score on a specified common scale (e.g., 200–600) with a designated mean and standard deviation that is derived from a raw score (or an ability estimate). Scaled scores are especially useful for comparing performance of individuals or groups over time in a content area (e.g., biology).

Scoring Rubric—A list of detailed descriptions of the criteria that must be met in order for specific scores to be assigned to an assessment performance, such as essay results.

Copyright © 2020 NCS Pearson, Inc. All rights reserved.