

**OAT** Optometry  
Admission Test

A SERVICE OF  
**ASCO** ASSOCIATION of  
SCHOOLS and COLLEGES  
of OPTOMETRY

# Optometry Admission Test (OAT) User's Guide

## Table of Contents

	Page
<b>Part One: Introduction and Background</b>	
History of the Optometry Admission Test (OAT) Program	2
Content of the OAT	2
Test Construction	3
Interpreting OAT Scores	3
Evaluation of the OAT Program	5
Introduction to the Tables	5
References	5
<b>Part Two: 2023 Data Tables</b>	
Table 1. Overall Descriptive Statistics	6
Table 2. Biology Score by Gender	7
Table 3. General Chemistry Score by Gender	8
Table 4. Organic Chemistry Score by Gender	9
Table 5. Reading Comprehension Score by Gender	10
Table 6. Physics Score by Gender	11
Table 7. Quantitative Reasoning Score by Gender	12
Table 8. Total Science Score by Gender	13
Table 9. Academic Average Score by Gender	14
Table 10. Biology Score by Ethnic Identification	15
Table 11. General Chemistry Score by Ethnic Identification	16
Table 12. Organic Chemistry Score by Ethnic Identification	17
Table 13. Reading Comprehension Score by Ethnic Identification	18
Table 14. Physics Score by Ethnic Identification	19
Table 15. Quantitative Reasoning Score by Ethnic Identification	20
Table 16. Total Science Score by Ethnic Identification	21
Table 17. Academic Average Score by Ethnic Identification	22
Table 18. OAT scores by Examinees of Hispanic Origin	23
Table 19. Correlations among OAT Disciplines	24
<b>Part Three: Content Specifications</b>	
Biology Content Specifications	25
General Chemistry Content Specifications	26
Organic Chemistry Content Specifications	27
Reading Content Specifications	28
Physics Content Specifications	28
Quantitative Reasoning Content Specifications	29

## **Part One: Introduction and Background**

### **History of the Optometry Admission Test Program**

In 1987, the format of the Optometry College Admission Test (OCAT) was changed to include four tests: the Survey of the Natural Sciences (biology, general chemistry, and organic chemistry); Reading Comprehension; Physics; and Quantitative Reasoning. At that time the name of the test was changed to the Optometry Admission Test (OAT™).

The Optometry Admission Test (OAT) is administered under the auspices of the Association of Schools and Colleges of Optometry (ASCO) for applicants seeking admission to schools and colleges of optometry. This testing program is designed to measure general academic ability and comprehension of scientific information. While the majority of optometry schools in the United States and Canada require applicants to participate in the OAT Program, test results are only one factor considered in evaluating an applicant's readiness and potential.

Validity studies conducted by the testing program have shown that test scores in conjunction with collegiate records are useful in predicting optometry school performance. The relative importance of these predictors in the admission process is determined by each optometry school.

### **Content of the Optometry Admission Test**

The OAT is a battery consisting of four individual tests: the Survey of the Natural Sciences, Reading Comprehension Test, Physics Test, and Quantitative Reasoning Test.

The Survey of the Natural Sciences is an achievement test covering content from first-year courses in Biology, General Chemistry, and Organic Chemistry. The 90-minute test contains a total of 100 items, including 40 Biology items, 30 General Chemistry items, and 30 Organic Chemistry items. The three subtests are subdivided into several topic areas.

The Reading Comprehension Test consists of three reading passages varying in length from 950 to 1,500 words. Each passage is accompanied by 12 to 20 items which relate to the concepts and ideas developed in the corresponding passage. There are a total of 50 items divided among the three passages. The subject matter of these passages is drawn from aspects of the basic sciences. The time limit for the test is 60 minutes.

The Physics Test is an achievement test covering content from a two-semester physics course. It is a 50-minute test containing 40 items.

The Quantitative Reasoning Test measures an examinee's ability to reason with numbers, employing critical thinking with quantitative materials. This 45-minute test contains 40 items.

Additional content specifications for these four tests are presented in Part Three of this *User Guide*. Practice test material can be found at <https://oat.ada.org/>.

## Test Construction

Test construction for the OAT is a complex, multi-step process. Undergraduate faculty specializing in each of these disciplines develop new items for the Survey of the Natural Sciences, Physics, and Quantitative Reasoning Tests. Test Construction Teams (TCTs) specific to each discipline review new items for accuracy and relevance. Items that pass this initial review process are then pre-tested. After pretesting, the appropriate TCT may review item content and performance, and, if necessary, revise the content to meet psychometric standards established for the test. Subject matter experts with backgrounds in science and English language arts develop topics for new Reading Comprehension Test passages and work to develop these passages and accompanying items. New reading passages undergo the same review and pretesting process as other test items.

TCTs and trained psychometricians select the items to be included on each edition of the test, based on content specifications and various standards of item quality. Item quality is determined by an item's performance when administered to examinees. Two statistics in particular are of chief interest: the difficulty of the item and its discrimination index.

Item difficulty is measured by the percent of individuals who answered the item correctly. The difficulty level of the item is thus inversely related to the percentage of examinees who answer the item correctly. As the percentage of examinees who answer the item correctly increases, the difficulty of the item decreases. The recommended item-difficulty level for OAT items ranges from 40 percent to 89 percent.

The discrimination index is a point-biserial correlation coefficient, where the coefficient associated with an item represents the correlation between scores on that item and the total score on that particular test. A low correlation coefficient, such as 0.01, would indicate the average test score of individuals who answered the item correctly was roughly the same as the average score of individuals who answered the item incorrectly. In this case, item performance would be unrelated to overall test performance, thus indicating that the item does not discriminate and should therefore be discarded. A higher correlation coefficient, such as .30, would indicate the item is effective at discriminating between high scoring and low scoring examinees. Items with higher discrimination index values are more useful in determining a rank order of examinees according to the ability being measured. OAT items with insufficient discrimination indices are either revised or discarded.

## Interpreting OAT Scores

Each test in the OAT battery yields a raw score, which is the sum of an examinee's correct answers. The raw score is converted to a scale score which can range from 200 to 400. Using scale scores it is possible to compare the performance of examinees who attempted different editions of the examination.

In addition to the scale scores provided for each test, scale scores are also reported to represent overall performance across the science tests, and overall performance in academic areas appearing on the OAT. The total science score is based on the raw scores for the 100 items from the Survey of the Natural Sciences — including Biology, General Chemistry, and Organic Chemistry — and the 40 Physics items. The academic average is a composite score computed from the mean of the Quantitative Reasoning, Reading Comprehension, Biology, General Chemistry, Organic Chemistry, and Physics standard scores. If an examinee does not

take a section of the test, they would receive a raw score of zero and a standard score of 200 on that section.

Ideally, the mean score for each test on the OAT would always be exactly 300, assuming a comparably skilled set of examinees is completing the test. However, in any testing program, some variation in scores is inevitable; therefore the amount of drift from the ideal mean of 300 is constantly monitored. The OAT Program provides frequency tables for each OAT subtest regularly. This information provides guidance in interpreting the scores and insight into any drift from the expected mean score of 300. For example, in the frequency tables for 2023, the mean scores were 306 for Biology, 304 for General Chemistry, 298 for Organic Chemistry, 331 for Reading Comprehension, 320 for Quantitative Reasoning, and 284 for Physics.

As part of the ongoing validation process for the OAT, ASCO requested the OAT scale be recalibrated so the mean scale score would return to 300 with a standard deviation of 40. The data for this recalibration study was based on a “reference group” of examinees taking the OAT for the first time in 2008. The rescaling for each subtest on the OAT was accomplished through the use of the Rasch model, which takes both examinee ability and item difficulty into account. The score scales for all OAT subtests were recalibrated and the new scale score of 300 took effect May 1, 2009.

The new scale had the following major implications for OAT scores:

- Scores obtained under the new and old scales were not directly comparable. A score of 300 on the old scale, for example, does not have the same conceptual meaning as a score of 300 on the new scale.
- When reviewing examinees’ scores, the date the test was taken and differences in the scale should be considered.
- The recalibration did not change the OAT’s difficulty. Scores achieved after May 1, 2009 might be somewhat lower than those achieved prior to the recalibration date because the mean score was set back to be as close as possible to 300. This does not indicate a change in test takers’ skill levels.
- Scores achieved prior to May 2009 can be compared with other scores from within that time period, and scores achieved after May 2009 are comparable with other scores from the same period. However, scores from different time periods (e.g., scores from May 2008 vs. scores from May 2010) are not considered directly comparable.
  - For example, an examinee who tests in May 2009 and December 2009 will be scored on the same score scale, and the two sets of scores can be directly compared.
  - The scores of an examinee who tested in January 2009 and retested in July 2009 should not be directly compared, because the test’s scale scores were different in the two time periods.
  - When comparing scores involving two or more examinees, take care to determine whether the scores are from a comparable period.

Information on the details of this change was distributed to all optometry schools, pre-health education advisors, and potential examinees in March of 2009. Frequency distributions, or

percentile equivalents of scale scores, for the new OAT subtest scales were generated, and the means and standard deviations for the scale scores were computed.

### **Evaluation of the Optometry Admission Test Program**

When considering an examination's effectiveness, two basic psychometric aspects of tests—reliability and validity must be considered.

Reliability is the precision or consistency of the assessment. For the OAT Program, a measure of internal consistency reliability, KR-20, is calculated for each scale (with the exception of the Academic Average for which a composite reliability estimate is determined). Table 1 lists reliability estimates based on administrations of the OAT occurring in 2023.

To ensure the OAT is capable of fulfilling its purpose, it is essential to understand the content and predictive validity evidence available for each section of the test. For the OAT, Test Construction Team members provide support for content validity. These individuals are experts in the subject areas corresponding to their team. For the Reading Comprehension Test, passages and questions are written by subject matter experts who have 1) a minimum of a master's degree in English language arts or 2) an advanced degree in the biomedical sciences or health care. Those falling in the second category must also have educational writing experience.

Predictive validity is assessed by examining correlations among OAT scores and students' grades in their first and second years of optometry school. The predictive power of the OAT varies from school to school and from one OAT section to another. The *OAT Validity Study* report provides detailed information on this topic, and is available at [ADA.org/OAT](https://ada.org/OAT). Validity is also addressed in the article, *Validity of the Optometry Admission Test in Predicting Performance in Schools and Colleges of Optometry* (Kramer & Johnston, 1997).

### **Introduction to the Tables**

The tables in this report describe performance on the OAT by gender (Tables 2-9), ethnic identification (Tables 10-17), and Hispanic origin (Table 18). The data in the tables is based on examinees who answered the questions on gender and ethnic identification. Not all examinees chose to answer these demographic questions. The total count for each table varies because some examinees chose not to answer the questions, but the percentages will add up to 100% because the data is based solely on respondents. The columns for gender, ethnicity, Hispanic origin, total percentage, and total count can be added vertically. The statistics in the tables in this User Guide were based on all participating examinees. Correlations among the OAT disciplines are also provided (Table 19).

The OAT Program publishes an *OAT Candidate Guide* each year with information about testing policies, procedures, and eligibility requirements for the calendar year. For additional information concerning the requirements that were applicable to the tested group, please consult the *OAT Candidate Guide* which is available at [ADA.org/OAT](https://ada.org/OAT).

### **References**

Kramer, G.A. & Johnston, J. (1997). Validity of the Optometry Admission Test in predicting performance in schools and colleges of optometry. *Optometric Education*, 22(2), 53-59.

## Part Two: 2023 Data Tables

**Table 1**  
**Overall Descriptive Statistics**  
**2023**

N = 3,146	Number of Items	Mean	S.D.	Reliability
Quantitative Reasoning	40	318.1	48.4	.86
Reading Comprehension	50	328.8	43.2	.82
Biology	40	302.7	53.4	.88
General Chemistry	30	301.5	49.1	.81
Organic Chemistry	30	295.0	48.0	.85
Physics	40	281.4	47.4	.88
Total Science	140	292.3	50.7	.95
Academic Average	230	305.4	40.3	.96

N = Number of administrations.  
S.D. = Standard deviation.

**Table 2**  
**Optometry Admission Test**  
**2023**  
**Biology Score by Gender**

Score	Females	Males	Total	Count
200	3.1%	2.5%	2.9%	92
210	1.5%	1.3%	1.5%	46
220	2.8%	1.8%	2.5%	79
230	4.2%	2.6%	3.8%	118
240	4.6%	4.4%	4.5%	142
250	5.7%	6.3%	5.8%	182
260	5.8%	4.1%	5.4%	168
270	5.4%	5.4%	5.4%	169
280	7.9%	9.3%	8.2%	257
290	7.7%	6.0%	7.3%	227
300	6.4%	5.0%	6.1%	189
310	6.5%	8.3%	7.0%	217
320	4.7%	6.5%	5.2%	161
330	6.2%	6.0%	6.1%	192
340	4.7%	5.8%	5.0%	155
350	4.4%	4.6%	4.5%	139
360	3.9%	5.2%	4.2%	131
370	3.1%	3.1%	3.1%	98
380	2.1%	2.0%	2.1%	66
390	1.8%	2.1%	1.9%	58
400	7.6%	7.5%	7.6%	236
Percentage	74.50%	25.50%	100.00%	3122
Mean	301.37	306.52	302.68	
SD	53.86	52.17	53.48	
Count	2326	796	3122	



**Table 3**  
**Optometry Admission Test**  
**2023**  
**General Chemistry Score by Gender**

Score	Females	Males	Total	Count
200	2.6%	2.3%	2.5%	79
210	0.6%	0.5%	0.6%	18
220	2.7%	1.8%	2.4%	76
230	3.4%	3.0%	3.3%	104
240	3.8%	3.8%	3.8%	119
250	5.6%	2.9%	4.9%	154
260	7.1%	4.8%	6.5%	203
270	6.1%	5.8%	6.1%	189
280	9.2%	8.7%	9.1%	284
290	8.6%	8.9%	8.7%	271
300	6.1%	6.8%	6.2%	195
310	8.0%	8.4%	8.1%	252
320	6.1%	6.4%	6.1%	192
330	6.3%	8.2%	6.8%	211
340	5.2%	6.0%	5.4%	169
350	4.2%	4.9%	4.4%	137
360	3.9%	3.6%	3.8%	119
370	1.8%	1.5%	1.7%	53
380	3.1%	3.0%	3.1%	97
390	1.1%	1.9%	1.3%	40
400	4.5%	6.9%	5.1%	160
Percentage	74.50%	25.50%	100.00%	3122
Mean	299.42	307.49	301.48	
SD	48.85	49.21	49.06	
Count	2326	796	3122	

**Table 4**  
**Optometry Admission Test**  
**2023**  
**Organic Chemistry Score by Gender**

Score	Females	Males	Total	Count
200	1.8%	1.1%	1.6%	50
210	1.5%	1.8%	1.6%	49
220	2.4%	2.3%	2.4%	74
230	4.6%	3.8%	4.4%	137
240	5.5%	3.6%	5.0%	157
250	5.9%	5.4%	5.8%	181
260	9.2%	9.0%	9.2%	286
270	6.2%	6.4%	6.2%	195
280	8.4%	8.2%	8.3%	260
290	10.7%	9.8%	10.5%	328
300	6.2%	6.8%	6.4%	199
310	7.2%	7.3%	7.2%	225
320	5.8%	6.3%	5.9%	184
330	4.9%	5.2%	5.0%	155
340	4.4%	4.4%	4.4%	137
350	3.6%	4.0%	3.7%	115
360	2.4%	3.5%	2.7%	83
370	2.6%	2.6%	2.6%	82
380	1.7%	1.8%	1.7%	54
390	1.2%	1.5%	1.3%	41
400	3.8%	5.3%	4.2%	130
Percentage	74.50%	25.50%	100.00%	3122
Mean	293.59	299.10	295.00	
SD	47.62	48.64	47.94	
Count	2326	796	3122	

**Table 5**  
**Optometry Admission Test**  
**2023**  
**Reading Comprehension Score by Gender**

Score	Females	Males	Total	Count
200	0.4%	0.3%	0.4%	11
210	0.0%	0.0%	0.0%	1
220	0.5%	0.8%	0.5%	17
230	0.6%	0.9%	0.6%	20
240	1.8%	1.6%	1.7%	54
250	1.5%	1.3%	1.5%	46
260	2.4%	2.3%	2.4%	74
270	3.2%	3.8%	3.4%	105
280	5.4%	3.8%	5.0%	155
290	7.7%	7.4%	7.7%	239
300	7.2%	9.2%	7.7%	241
310	7.3%	7.2%	7.2%	226
320	8.2%	7.2%	7.9%	247
330	10.4%	9.9%	10.2%	320
340	8.3%	7.9%	8.2%	255
350	7.6%	8.3%	7.8%	243
360	5.0%	4.4%	4.9%	152
370	4.4%	6.0%	4.8%	151
380	6.1%	5.9%	6.0%	188
390	3.4%	3.4%	3.4%	106
400	8.7%	8.7%	8.7%	271
Percentage	74.50%	25.50%	100.00%	3122
Mean	328.48	329.13	328.65	
SD	43.29	43.42	43.31	
Count	2326	796	3122	

**Table 6**  
**Optometry Admission Test**  
**2023**  
**Physics Score by Gender**

Score	Females	Males	Total	Count
200	3.1%	1.9%	2.8%	86
210	3.7%	1.9%	3.2%	100
220	4.7%	4.1%	4.5%	142
230	7.0%	4.4%	6.3%	198
240	7.3%	5.4%	6.8%	212
250	10.7%	8.3%	10.1%	314
260	8.2%	6.5%	7.8%	242
270	7.4%	7.2%	7.4%	230
280	7.7%	9.2%	8.1%	252
290	8.1%	11.7%	9.0%	282
300	4.7%	4.5%	4.6%	145
310	6.7%	7.9%	7.0%	218
320	4.5%	4.6%	4.5%	141
330	3.7%	4.1%	3.8%	120
340	4.0%	4.0%	4.0%	126
350	2.2%	2.0%	2.1%	67
360	1.7%	2.1%	1.8%	56
370	0.7%	0.6%	0.7%	21
380	1.5%	3.3%	2.0%	62
390	0.9%	1.5%	1.0%	32
400	1.7%	4.6%	2.4%	76
Percentage	74.50%	25.50%	100.00%	3122
Mean	278.04	290.79	281.29	
SD	46.21	49.41	47.37	
Count	2326	796	3122	

**Table 7**  
**Optometry Admission Test**  
**2023**  
**Quantitative Reasoning Score by Gender**

Score	Females	Males	Total	Count
200	0.7%	0.4%	0.6%	19
210	0.6%	0.3%	0.5%	17
220	1.2%	1.0%	1.2%	37
230	1.8%	0.6%	1.5%	46
240	3.6%	1.4%	3.0%	94
250	3.1%	1.8%	2.7%	85
260	5.6%	2.6%	4.8%	151
270	5.3%	3.6%	4.9%	152
280	8.0%	5.2%	7.2%	226
290	7.5%	6.8%	7.3%	228
300	8.6%	8.0%	8.4%	263
310	7.7%	7.8%	7.7%	241
320	6.5%	7.7%	6.8%	213
330	7.2%	7.4%	7.3%	227
340	5.9%	6.0%	6.0%	186
350	6.1%	5.5%	5.9%	185
360	4.0%	6.8%	4.7%	147
370	3.2%	4.6%	3.6%	112
380	2.7%	4.0%	3.0%	94
390	3.4%	5.9%	4.0%	126
400	7.4%	12.6%	8.7%	273
Percentage	74.50%	25.50%	100.00%	3122
Mean	313.60	330.72	317.97	
SD	48.18	47.03	48.46	
Count	2326	796	3122	

**Table 8**  
**Optometry Admission Test**  
**2023**  
**Total Science Score by Gender**

Score	Females	Males	Total	Count
200	2.0%	1.3%	1.8%	56
210	2.9%	1.9%	2.7%	83
220	3.8%	2.4%	3.5%	108
230	5.1%	4.3%	4.9%	152
240	7.1%	5.8%	6.7%	210
250	7.3%	6.2%	7.0%	218
260	8.2%	6.5%	7.8%	242
270	6.7%	6.8%	6.7%	210
280	7.9%	7.4%	7.8%	243
290	6.2%	7.5%	6.6%	205
300	7.2%	7.9%	7.4%	231
310	5.7%	6.5%	5.9%	184
320	4.7%	5.0%	4.8%	149
330	5.2%	5.8%	5.3%	167
340	4.0%	5.2%	4.3%	134
350	3.5%	4.0%	3.7%	114
360	2.8%	3.8%	3.1%	96
370	2.8%	2.6%	2.8%	87
380	1.6%	1.4%	1.6%	49
390	1.5%	2.0%	1.7%	52
400	3.7%	5.8%	4.2%	132
Percentage	74.50%	25.50%	100.00%	3122
Mean	289.94	298.98	292.25	
SD	50.56	50.62	50.72	
Count	2326	796	3122	

**Table 9**  
**Optometry Admission Test**  
**2023**  
**Academic Average Score by Gender**

Score	Females	Males	Total	Count
200	0.0%	0.0%	0.0%	0
210	0.2%	0.1%	0.2%	5
220	0.7%	0.3%	0.6%	19
230	1.7%	0.9%	1.5%	47
240	3.3%	2.6%	3.1%	97
250	5.2%	3.5%	4.8%	150
260	6.7%	5.8%	6.4%	201
270	9.3%	7.0%	8.7%	273
280	9.2%	7.4%	8.7%	273
290	10.0%	9.0%	9.7%	304
300	8.2%	10.1%	8.7%	271
310	8.3%	7.7%	8.2%	255
320	7.8%	9.4%	8.2%	256
330	6.7%	8.4%	7.1%	223
340	5.2%	5.2%	5.2%	163
350	4.9%	5.8%	5.1%	159
360	4.2%	6.3%	4.7%	147
370	3.7%	3.6%	3.7%	114
380	2.0%	2.6%	2.2%	68
390	1.9%	2.9%	2.1%	67
400	0.8%	1.4%	1.0%	30
Percentage	74.50%	25.50%	100.00%	3122
Mean	303.30	311.46	305.38	
SD	40.24	40.14	40.37	
Count	2326	796	3122	

**Table 10**  
**Optometry Admission Test**  
**2023**  
**Biology Score by Ethnic Identification**

Score	Native American	Asian	Black	Pacific Islander	White	Multi	Total	Count
200	6.5%	2.1%	8.2%	0.0%	2.6%	4.2%	2.9%	89
210	9.7%	0.8%	2.2%	0.0%	1.5%	1.7%	1.4%	43
220	0.0%	0.9%	6.0%	28.6%	2.9%	4.0%	2.6%	77
230	3.2%	3.9%	6.7%	0.0%	2.8%	5.7%	3.7%	113
240	6.5%	3.0%	11.2%	0.0%	4.8%	4.7%	4.5%	135
250	16.1%	4.6%	7.5%	0.0%	4.9%	11.0%	5.8%	176
260	12.9%	5.0%	3.7%	57.1%	5.8%	5.0%	5.5%	167
270	6.5%	4.9%	7.5%	0.0%	5.3%	5.5%	5.3%	160
280	16.1%	7.7%	11.2%	14.3%	8.7%	6.7%	8.3%	251
290	6.5%	6.9%	7.5%	0.0%	8.0%	6.7%	7.4%	224
300	6.5%	5.7%	4.5%	0.0%	6.2%	6.5%	6.0%	180
310	3.2%	7.2%	6.0%	0.0%	6.6%	8.7%	7.0%	211
320	0.0%	5.2%	5.2%	0.0%	5.2%	5.5%	5.2%	156
330	0.0%	6.5%	7.5%	0.0%	5.7%	6.0%	6.0%	182
340	6.5%	5.6%	0.0%	0.0%	5.5%	3.2%	5.0%	150
350	0.0%	4.4%	1.5%	0.0%	5.0%	3.7%	4.4%	134
360	0.0%	4.9%	0.7%	0.0%	4.4%	3.7%	4.2%	128
370	0.0%	4.1%	0.7%	0.0%	3.0%	2.2%	3.1%	94
380	0.0%	3.2%	0.0%	0.0%	1.9%	1.0%	2.1%	63
390	0.0%	2.5%	0.0%	0.0%	2.0%	0.5%	1.9%	56
400	0.0%	10.9%	2.2%	0.0%	7.2%	3.5%	7.6%	230
Percentage	1.03%	33.12%	4.44%	0.23%	47.90%	13.28%	100.00%	3019
Mean	262.58	313.60	270.97	251.43	303.22	288.48	302.73	
SD	36.14	53.73	45.54	22.68	52.70	50.11	53.45	
Count	31	1000	134	7	1446	401	3019	



**Table 11**  
**Optometry Admission Test**  
**2023**  
**General Chemistry Score by Ethnic Identification**

Score	Native American	Asian	Black	Pacific Islander	White	Multi	Total	Count
200	6.5%	1.7%	6.0%	0.0%	2.6%	2.5%	2.5%	74
210	0.0%	0.4%	1.5%	0.0%	0.5%	1.2%	0.6%	18
220	3.2%	2.0%	4.5%	14.3%	2.2%	4.0%	2.5%	76
230	6.5%	1.9%	5.2%	0.0%	3.8%	4.7%	3.4%	102
240	6.5%	2.8%	8.2%	14.3%	3.9%	4.7%	3.9%	117
250	3.2%	3.6%	11.9%	0.0%	4.2%	8.2%	4.9%	147
260	19.4%	4.1%	9.0%	28.6%	6.8%	9.0%	6.5%	196
270	9.7%	6.1%	7.5%	0.0%	6.3%	5.7%	6.2%	188
280	9.7%	8.6%	9.7%	14.3%	8.4%	11.7%	9.0%	271
290	9.7%	8.6%	8.2%	0.0%	8.3%	8.5%	8.4%	254
300	6.5%	5.7%	7.5%	14.3%	6.6%	5.7%	6.3%	189
310	6.5%	9.2%	4.5%	14.3%	7.4%	8.7%	8.0%	243
320	3.2%	5.7%	1.5%	0.0%	7.3%	5.0%	6.1%	185
330	9.7%	7.3%	2.2%	0.0%	7.3%	6.2%	6.9%	209
340	0.0%	6.3%	6.7%	0.0%	5.9%	1.7%	5.4%	164
350	0.0%	5.5%	3.0%	0.0%	4.4%	3.0%	4.5%	135
360	0.0%	5.1%	1.5%	0.0%	3.7%	2.2%	3.8%	116
370	0.0%	2.4%	0.0%	0.0%	1.9%	0.5%	1.8%	53
380	0.0%	3.7%	0.7%	0.0%	3.0%	3.2%	3.1%	94
390	0.0%	1.1%	0.7%	0.0%	1.2%	1.2%	1.1%	34
400	0.0%	8.2%	0.0%	0.0%	4.4%	2.0%	5.1%	154
Percentage	1.03%	33.12%	4.44%	0.23%	47.90%	13.28%	100.00%	3019
Mean	271.61	311.89	273.73	267.14	301.36	287.76	301.43	
SD	35.60	49.21	42.54	32.00	48.34	46.05	49.02	
Count	31	1000	134	7	1446	401	3019	

**Table 12**  
**Optometry Admission Test**  
**2023**  
**Organic Chemistry Score by Ethnic Identification**

Score	Native American	Asian	Black	Pacific Islander	White	Multi	Total	Count
200	0.0%	1.1%	4.5%	0.0%	1.5%	2.7%	1.7%	50
210	3.2%	0.8%	3.0%	14.3%	1.9%	1.2%	1.6%	47
220	3.2%	2.1%	9.7%	0.0%	1.7%	2.7%	2.3%	70
230	12.9%	3.3%	3.0%	0.0%	4.6%	7.2%	4.5%	136
240	3.2%	4.2%	10.4%	0.0%	4.8%	6.7%	5.1%	153
250	6.5%	5.2%	8.2%	14.3%	5.5%	6.5%	5.7%	172
260	22.6%	6.7%	11.9%	28.6%	9.4%	12.7%	9.2%	279
270	12.9%	6.6%	2.2%	14.3%	5.8%	6.7%	6.1%	185
280	6.5%	7.8%	9.7%	0.0%	8.2%	9.0%	8.2%	247
290	6.5%	10.1%	8.2%	0.0%	10.9%	11.5%	10.5%	318
300	3.2%	5.5%	6.0%	14.3%	7.8%	4.7%	6.5%	197
310	9.7%	8.6%	4.5%	14.3%	6.7%	5.7%	7.2%	216
320	3.2%	5.7%	6.7%	0.0%	6.5%	5.0%	6.0%	181
330	0.0%	5.6%	3.0%	0.0%	4.9%	4.5%	4.9%	149
340	3.2%	5.1%	3.7%	0.0%	4.4%	2.5%	4.3%	130
350	0.0%	4.0%	2.2%	0.0%	3.9%	3.2%	3.7%	113
360	0.0%	3.7%	0.0%	0.0%	2.4%	2.5%	2.7%	82
370	3.2%	3.4%	3.0%	0.0%	2.3%	1.0%	2.5%	76
380	0.0%	2.0%	0.0%	0.0%	2.2%	0.5%	1.8%	54
390	0.0%	1.6%	0.0%	0.0%	1.5%	0.7%	1.3%	40
400	0.0%	6.9%	0.0%	0.0%	3.1%	2.5%	4.1%	124
Percentage	1.03%	33.12%	4.44%	0.23%	47.90%	13.28%	100.00%	3019
Mean	270.65	304.10	271.79	265.71	294.75	282.84	294.93	
SD	36.05	49.56	42.83	33.09	46.73	44.71	47.95	
Count	31	1000	134	7	1446	401	3019	

**Table 13**  
**Optometry Admission Test**  
**2023**  
**Reading Comprehension Score by Ethnic Identification**

Score	Native American	Asian	Black	Pacific Islander	White	Multi	Total	Count
200	3.2%	0.4%	0.7%	0.0%	0.1%	0.7%	0.4%	11
210	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	1
220	0.0%	0.2%	0.7%	0.0%	0.5%	1.7%	0.6%	17
230	3.2%	0.6%	0.0%	0.0%	0.8%	0.2%	0.7%	20
240	3.2%	1.6%	3.7%	0.0%	1.2%	3.0%	1.7%	52
250	0.0%	0.9%	6.0%	0.0%	1.2%	2.2%	1.4%	43
260	0.0%	2.5%	6.7%	14.3%	2.0%	2.2%	2.4%	73
270	3.2%	2.6%	6.7%	0.0%	3.2%	4.7%	3.3%	101
280	12.9%	4.4%	11.2%	0.0%	4.1%	6.7%	5.0%	150
290	9.7%	7.3%	8.2%	14.3%	6.9%	8.7%	7.4%	223
300	9.7%	7.3%	6.0%	0.0%	7.3%	10.7%	7.7%	233
310	9.7%	7.9%	14.2%	28.6%	5.9%	8.0%	7.3%	220
320	3.2%	8.7%	11.9%	14.3%	7.8%	6.0%	8.0%	242
330	6.5%	10.8%	6.7%	0.0%	10.7%	7.7%	10.1%	304
340	12.9%	7.8%	3.7%	0.0%	8.9%	8.2%	8.2%	248
350	6.5%	8.0%	2.2%	0.0%	8.3%	7.5%	7.8%	235
360	3.2%	5.5%	3.0%	14.3%	4.8%	4.2%	4.9%	148
370	3.2%	4.5%	3.0%	0.0%	5.5%	4.0%	4.8%	145
380	3.2%	6.3%	1.5%	14.3%	6.8%	4.7%	6.1%	185
390	6.5%	3.4%	0.7%	0.0%	4.3%	1.5%	3.5%	105
400	0.0%	9.3%	3.0%	0.0%	9.5%	7.0%	8.7%	263
Percentage	1.03%	33.12%	4.44%	0.23%	47.90%	13.28%	100.00%	3019
Mean	312.58	330.96	302.84	318.57	332.86	319.03	328.82	
SD	45.24	42.26	39.71	40.59	42.83	44.84	43.41	
Count	31	1000	134	7	1446	401	3019	

**Table 14**  
**Optometry Admission Test**  
**2023**  
**Physics Score by Ethnic Identification**

Score	Native American	Asian	Black	Pacific Islander	White	Multi	Total	Count
200	6.5%	1.6%	7.5%	0.0%	2.4%	5.2%	2.7%	83
210	0.0%	2.5%	8.2%	14.3%	2.8%	4.2%	3.1%	95
220	22.6%	2.6%	10.4%	0.0%	4.7%	6.2%	4.6%	140
230	9.7%	4.9%	12.7%	28.6%	5.3%	11.2%	6.4%	192
240	12.9%	5.3%	9.7%	14.3%	6.4%	10.2%	6.8%	204
250	16.1%	9.0%	13.4%	28.6%	9.9%	10.7%	10.0%	301
260	6.5%	7.9%	6.0%	0.0%	7.9%	6.7%	7.6%	230
270	16.1%	6.6%	5.2%	0.0%	8.0%	7.5%	7.4%	224
280	3.2%	8.2%	8.2%	0.0%	8.4%	7.5%	8.1%	246
290	3.2%	8.7%	5.2%	14.3%	9.5%	9.5%	9.0%	272
300	0.0%	4.1%	2.2%	0.0%	5.6%	3.2%	4.6%	138
310	0.0%	9.3%	3.7%	0.0%	7.1%	3.5%	7.1%	215
320	0.0%	5.1%	2.2%	0.0%	4.7%	4.0%	4.6%	138
330	3.2%	4.9%	1.5%	0.0%	3.9%	2.2%	3.9%	117
340	0.0%	4.8%	1.5%	0.0%	3.9%	3.5%	4.0%	120
350	0.0%	2.7%	0.7%	0.0%	2.5%	1.0%	2.3%	68
360	0.0%	2.8%	0.7%	0.0%	1.5%	0.7%	1.8%	54
370	0.0%	1.1%	0.0%	0.0%	0.6%	0.2%	0.7%	20
380	0.0%	2.8%	0.7%	0.0%	1.9%	0.0%	1.9%	57
390	0.0%	1.3%	0.0%	0.0%	1.0%	1.2%	1.1%	32
400	0.0%	3.8%	0.0%	0.0%	2.1%	1.2%	2.4%	73
	1.03%	33.12%	4.44%	0.23%	47.90%	13.28%	100.00%	3019
Percentage								
Mean	245.48	291.66	252.54	242.86	282.10	265.94	281.34	
SD	27.91	48.81	38.32	24.98	45.81	43.55	47.32	
Count	31	1000	134	7	1446	401	3019	

**Table 15**  
**Optometry Admission Test**  
**2023**  
**Quantitative Reasoning Score by Ethnic Identification**

Score	Native American	Asian	Black	Pacific Islander	White	Multi	Total	Count
200	0.0%	0.2%	2.2%	0.0%	0.4%	1.7%	0.6%	18
210	0.0%	0.2%	2.2%	0.0%	0.7%	0.5%	0.6%	17
220	0.0%	0.7%	3.0%	0.0%	1.0%	2.7%	1.2%	36
230	0.0%	0.6%	2.2%	0.0%	1.3%	4.0%	1.5%	44
240	6.5%	1.9%	6.7%	0.0%	2.8%	5.7%	3.1%	94
250	0.0%	1.8%	6.7%	14.3%	2.3%	5.5%	2.7%	83
260	12.9%	3.9%	15.7%	0.0%	3.7%	6.5%	4.8%	144
270	12.9%	4.9%	7.5%	14.3%	3.5%	7.7%	4.8%	146
280	3.2%	7.3%	11.9%	0.0%	6.1%	9.7%	7.2%	217
290	0.0%	7.6%	9.0%	28.6%	7.3%	7.2%	7.4%	224
300	9.7%	7.2%	5.2%	0.0%	8.9%	9.2%	8.2%	247
310	3.2%	6.9%	7.5%	28.6%	7.9%	7.5%	7.5%	226
320	9.7%	6.9%	3.7%	0.0%	7.1%	6.5%	6.8%	206
330	6.5%	8.0%	6.0%	0.0%	7.3%	5.5%	7.2%	218
340	9.7%	6.1%	2.2%	0.0%	6.8%	3.7%	6.0%	181
350	9.7%	7.8%	1.5%	14.3%	5.8%	3.5%	6.0%	182
360	6.5%	4.6%	2.2%	0.0%	5.4%	4.0%	4.8%	145
370	3.2%	3.7%	2.2%	0.0%	3.9%	2.7%	3.6%	109
380	6.5%	3.2%	0.7%	0.0%	3.6%	1.5%	3.1%	93
390	0.0%	4.6%	0.0%	0.0%	5.0%	2.0%	4.2%	126
400	0.0%	11.9%	1.5%	0.0%	9.1%	2.5%	8.7%	263
Percentage	1.03%	33.12%	4.44%	0.23%	47.90%	13.28%	100.00%	3019
Mean	310.65	326.11	282.54	295.71	322.47	295.79	318.17	
SD	42.58	46.91	41.65	32.07	47.89	46.38	48.61	
Count	31	1000	134	7	1446	401	3019	

**Table 16**  
**Optometry Admission Test**  
**2023**  
**Total Science Score by Ethnic Identification**

Score	Native American	Asian	Black	Pacific Islander	White	Multi	Total	Count
200	6.5%	0.8%	5.2%	0.0%	1.9%	2.0%	1.8%	53
210	3.2%	2.1%	9.0%	14.3%	2.1%	4.2%	2.7%	82
220	0.0%	2.2%	8.2%	0.0%	3.4%	6.0%	3.5%	106
230	9.7%	2.7%	10.4%	14.3%	4.6%	9.2%	4.9%	148
240	22.6%	6.0%	11.2%	28.6%	5.8%	8.2%	6.7%	201
250	12.9%	6.1%	6.7%	14.3%	6.7%	9.2%	6.9%	209
260	16.1%	6.2%	8.2%	0.0%	8.0%	8.5%	7.5%	227
270	6.5%	6.6%	6.0%	14.3%	7.0%	6.2%	6.7%	203
280	6.5%	7.3%	9.7%	0.0%	8.6%	6.7%	7.9%	239
290	3.2%	6.0%	5.2%	14.3%	6.9%	7.7%	6.6%	200
300	6.5%	7.5%	5.2%	0.0%	7.7%	7.7%	7.5%	226
310	3.2%	7.5%	2.2%	0.0%	5.9%	3.2%	5.9%	177
320	3.2%	5.0%	3.7%	0.0%	4.8%	5.2%	4.8%	146
330	0.0%	5.1%	3.0%	0.0%	6.2%	3.5%	5.3%	159
340	0.0%	4.8%	1.5%	0.0%	4.7%	2.7%	4.3%	129
350	0.0%	4.5%	2.2%	0.0%	4.1%	1.7%	3.8%	114
360	0.0%	4.7%	0.0%	0.0%	2.4%	2.7%	3.1%	93
370	0.0%	3.6%	0.7%	0.0%	2.9%	1.2%	2.8%	84
380	0.0%	2.1%	0.7%	0.0%	1.6%	0.7%	1.6%	48
390	0.0%	2.3%	0.7%	0.0%	1.5%	1.0%	1.6%	49
400	0.0%	6.9%	0.0%	0.0%	3.4%	2.0%	4.2%	126
Percentage	1.03%	33.12%	4.44%	0.23%	47.90%	13.28%	100.00%	3019
Mean	254.84	303.93	260.60	247.14	292.55	276.41	292.27	
SD	29.42	51.88	42.60	26.28	49.02	47.03	50.66	
Count	31	1000	134	7	1446	401	3019	

**Table 17**  
**Optometry Admission Test**  
**2023**  
**Academic Average Score by Ethnic Identification**

Score	Native American	Asian	Black	Pacific Islander	White	Multi	Total	Count
200	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0
210	0.0%	0.1%	0.0%	0.0%	0.1%	0.5%	0.2%	5
220	3.2%	0.3%	2.2%	0.0%	0.4%	1.2%	0.6%	18
230	3.2%	0.5%	4.5%	0.0%	1.7%	2.5%	1.5%	46
240	6.5%	1.9%	7.5%	14.3%	2.8%	6.0%	3.2%	96
250	0.0%	3.4%	11.2%	0.0%	4.1%	9.2%	4.8%	146
260	16.1%	5.3%	17.9%	0.0%	5.5%	8.2%	6.4%	194
270	12.9%	6.6%	13.4%	57.1%	8.4%	10.7%	8.5%	256
280	22.6%	9.0%	9.7%	14.3%	8.0%	9.2%	8.7%	263
290	9.7%	9.5%	8.2%	0.0%	9.8%	11.5%	9.8%	296
300	3.2%	7.7%	5.2%	0.0%	10.1%	7.0%	8.6%	259
310	9.7%	8.7%	2.2%	14.3%	8.4%	8.2%	8.2%	249
320	9.7%	8.1%	6.7%	0.0%	8.6%	7.7%	8.2%	248
330	3.2%	8.9%	6.0%	0.0%	7.1%	4.5%	7.2%	218
340	0.0%	5.8%	3.0%	0.0%	5.9%	3.5%	5.3%	161
350	0.0%	5.9%	0.7%	0.0%	5.8%	2.0%	5.0%	152
360	0.0%	5.4%	0.7%	0.0%	5.1%	3.5%	4.7%	143
370	0.0%	4.6%	0.7%	0.0%	3.7%	2.2%	3.6%	109
380	0.0%	3.3%	0.0%	0.0%	2.0%	1.0%	2.2%	66
390	0.0%	3.1%	0.0%	0.0%	2.1%	1.2%	2.2%	66
400	0.0%	1.9%	0.0%	0.0%	0.6%	0.0%	0.9%	28
Percentage	1.03%	33.12%	4.44%	0.23%	47.90%	13.28%	100.00%	3019
Mean	279.35	313.85	276.94	272.86	307.05	290.80	305.44	
SD	27.32	40.48	32.47	20.59	39.32	38.34	40.38	
Count	31	1000	134	7	1446	401	3019	

**Table 18**  
**Optometry Admission Test**  
**2023**  
**OAT Scores by Examinees of Hispanic Origin**

Score	BIO	GCH	OCH	RCT	PHY	QRT	TS	AA
200	4.5%	7.5%	0.0%	0.0%	3.0%	0.0%	4.5%	0.0%
210	1.5%	0.0%	0.0%	0.0%	6.0%	0.0%	0.0%	0.0%
220	3.0%	0.0%	6.0%	0.0%	3.0%	1.5%	3.0%	1.5%
230	4.5%	3.0%	1.5%	0.0%	9.0%	1.5%	3.0%	1.5%
240	6.0%	1.5%	6.0%	3.0%	10.4%	0.0%	9.0%	0.0%
250	9.0%	9.0%	11.9%	4.5%	13.4%	3.0%	11.9%	4.5%
260	3.0%	7.5%	7.5%	0.0%	14.9%	6.0%	22.4%	6.0%
270	11.9%	1.5%	10.4%	3.0%	9.0%	9.0%	9.0%	20.9%
280	6.0%	17.9%	17.9%	3.0%	7.5%	11.9%	6.0%	14.9%
290	4.5%	22.4%	9.0%	20.9%	11.9%	4.5%	6.0%	10.4%
300	11.9%	9.0%	4.5%	6.0%	4.5%	19.4%	6.0%	14.9%
310	9.0%	9.0%	10.4%	7.5%	1.5%	14.9%	7.5%	6.0%
320	4.5%	1.5%	3.0%	6.0%	1.5%	4.5%	3.0%	10.4%
330	6.0%	3.0%	0.0%	11.9%	3.0%	10.4%	3.0%	3.0%
340	1.5%	3.0%	6.0%	4.5%	0.0%	3.0%	4.5%	1.5%
350	6.0%	3.0%	3.0%	11.9%	0.0%	3.0%	0.0%	3.0%
360	4.5%	0.0%	0.0%	6.0%	1.5%	4.5%	0.0%	1.5%
370	1.5%	0.0%	1.5%	4.5%	0.0%	1.5%	0.0%	0.0%
380	1.5%	0.0%	0.0%	3.0%	0.0%	1.5%	0.0%	0.0%
390	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%	0.0%
400	0.0%	1.5%	1.5%	4.5%	0.0%	0.0%	0.0%	0.0%
Mean	286.27	282.09	282.09	319.25	260.90	301.49	271.64	289.40
SD	45.02	37.56	37.11	38.90	32.55	32.63	36.46	27.57
Count	67	67	67	67	67	67	67	67

BIO=Biology, GCH=General Chemistry, OCH=Organic Chemistry, RCT=Reading Comprehension Test, PHY=Physics, QRT=Quantitative Reasoning Test, TS=Total Science, and AA=Academic Average.



**Table 19**  
**Correlations among OAT Disciplines (N=3,146)**  
**2023**

	BIO	GEN	ORG	QRT	RCT	PHY	TS
BIO							
GEN	0.74						
ORG	0.70	0.72					
QRT	0.61	0.66	0.56				
RCT	0.53	0.50	0.44	0.59			
PHY	0.74	0.78	0.72	0.69	0.52		
TS	0.89	0.89	0.87	0.70	0.56	0.91	
AVG	0.87	0.88	0.83	0.82	0.70	0.89	0.97

BIO = Biology; GEN = General Chemistry; ORG=Organic Chemistry; QRT = Quantitative Reasoning Test; RCT=Reading Comprehension Test; PHY = Physics; TS= Total Science; AVG=Academic Average.

**Part Three: Content Specifications**  
**Survey of Natural Sciences: Biology**

**40 items**

**1.1 Cell and Molecular Biology**

- 1.1.1 Cell metabolism
- 1.1.2 Cellular processes
- 1.1.3 Thermodynamics
- 1.1.4 Mitosis/meiosis
- 1.1.5 Cell structure and function
- 1.1.6 Experimental cell biology
- 1.1.7 Biomolecules
- 1.1.8 Integrated relationships

**1.2 Diversity of Life**

- 1.2.1 Viruses
- 1.2.2 Archaeobacteria
- 1.2.3 Eubacteria
- 1.2.4 Fungi
- 1.2.5 Protista
- 1.2.6 Plantae
- 1.2.7 Animalia
- 1.2.8 Integrated relationships

**1.3 Structure and Function of Systems**

- 1.3.1 Integumentary
- 1.3.2 Skeletal
- 1.3.3 Muscular
- 1.3.4 Circulatory
- 1.3.5 Lymphatic/immune
- 1.3.6 Digestive
- 1.3.7 Respiratory
- 1.3.8 Urinary
- 1.3.9 Nervous/sensory
- 1.3.10 Endocrine
- 1.3.11 Reproductive
- 1.3.12 Integrated relationships

**1.4 Genetics**

- 1.4.1 Molecular genetics
- 1.4.2 Human genetics
- 1.4.3 Classical genetics
- 1.4.4 Chromosomal genetics
- 1.4.5 Genetic technology
- 1.4.6 Developmental mechanisms
- 1.4.7 Genomics
- 1.4.8 Gene expression
- 1.4.9 Epigenetics
- 1.4.10 Integrated relationships

**1.5 Evolution and Ecology**

- 1.5.1 Natural selection
- 1.5.2 Population genetics/speciation
- 1.5.3 Animal behavior
- 1.5.4 Ecology
- 1.5.5 Integrated relationships

# Survey of Natural Sciences: General Chemistry

30 items

## 1. Stoichiometry and General Concepts

- A. Percent composition
- B. Empirical formulae
- C. Balancing equations
- D. Moles and molecular formulas
- E. Molar mass
- F. Density
- G. Calculations from balanced equations

## 2. Gases

- A. Kinetic molecular theory of gases
- B. Dalton's gas law
- C. Boyle's gas law
- D. Charles's gas law
- E. Ideal gas law

## 3. Liquids and Solids

- A. Intermolecular forces
- B. Phase changes
- C. Vapor pressure
- D. Structures
- E. Polarity
- F. Properties

## 4. Solutions

- A. Polarity
- B. Properties
  - 1. Colligative
  - 2. Non-colligative
- C. Forces
- D. Concentration calculations

## 5. Acids and Bases

- A. pH
- B. Strength
- C. Brønsted-Lowry reactions
- D. Calculations

## 6. Chemical Equilibria

- A. Molecular
- B. Acid/base
- C. Precipitation
- D. Calculations
- E. Le Chatelier's principle

## 7. Thermodynamics and Thermochemistry

- A. Laws of thermodynamics
- B. Hess's law
- C. Spontaneity
- D. Enthalpies and entropies
- E. Heat transfer

## 8. Chemical Kinetics

- A. Rate laws
- B. Activation energy
- C. Half-life

## 9. Oxidation-Reduction Reactions

- A. Balancing equations
- B. Determination of oxidation numbers
- C. Electrochemical calculations
- D. Electrochemical concepts and terminology

## 10. Atomic and Molecular Structure

- A. Electron configuration
- B. Orbital types
- C. Lewis-Dot diagrams
- D. Atomic theory
- E. Quantum theory
- F. Molecular geometry
- G. Bond types
- H. Sub-atomic particles

## 11. Periodic Properties

- A. Representative elements
- B. Transition elements
- C. Periodic trends
- D. Descriptive chemistry

## 12. Nuclear Reactions

- A. Balancing equations
- B. Binding energy
- C. Decay processes
- D. Particles
- E. Terminology

## 13. Laboratory

- A. Basic techniques
- B. Equipment
- C. Error analysis
- D. Safety
- E. Data analysis

## Survey of Natural Sciences: Organic Chemistry

30 items

### 1. Mechanisms: Energetics and Structure

- A. Elimination
- B. Addition
- C. Free radical
- D. Substitution mechanisms
- E. Other mechanisms and reactions

### 2. Chemical and Physical Properties of Molecules

- A. Spectroscopy
  - 1.  $^1\text{H}$  NMR
  - 2.  $^{13}\text{C}$  NMR
  - 3. Infrared
  - 4. Multi-spectra
- B. Structure
  - 1. Polarity
  - 2. Intermolecular forces (solubility, melting/boiling point, etc.)
- C. Laboratory theory and techniques (i.e. TLC, separations, etc.)

### 3. Stereochemistry (Structure Evaluation)

- A. Chirality
- B. Isomer relationships
- C. Conformations

### 4. Nomenclature

- A. IUPAC rules
- B. Functional groups in molecules

### 5. Individual Reactions of the Major Functional Groups and Combinations of Reactions to Synthesize Compounds

- A. Alkene/Alkyne
  - 1. General
  - 2. One-step
  - 3. Multi-step

- A. B. Aromatic
  - 1. General
  - 2. One-step
  - 3. Multi-step
- B. C. Substitution/Elimination
  - 1. General
  - 2. One-step
  - 3. Multi-step
- C. D. Aldehyde/Ketone
  - 1. General
  - 2. One-step
  - 3. Multi-step
- D. E. Carboxylic acids and derivatives
  - 1. General
  - 2. One-step
  - 3. Multi-step
- E. F. Other
  - 1. General
  - 2. One-step
  - 3. Multi-step

### 6. Acid-Base Chemistry

- A. A. Ranking Acidity/Basicity
  - 1. Structure Analysis
  - 2. pH/pKa data analysis
- C. B. Prediction of products and equilibria

### 7. Aromatics and Bonding

- A. Concept of aromaticity
- B. Resonance
- C. Atomic/molecular orbitals
- D. Hybridization
- E. Bond angles/lengths

## Reading Comprehension

The Reading Comprehension Test contains three reading passages on various scientific topics. Prior understanding of the science topics is not a prerequisite to answering the test items. The reading passages require the ability to read, comprehend, and thoroughly analyze basic scientific information.

Each reading passage is 950 -1,500 words in length and is followed by 12-20 items, which can be answered from a reading of the passage. The total number of items for all three passages is 50.

### Physics

**40 items**

- |                           |                                       |
|---------------------------|---------------------------------------|
| 1. Units and Vectors      | 8. Waves                              |
| 2. Linear Kinematics      | 9. Fluid Statics                      |
| 3. Statics                | 10. Thermal Energy and Thermodynamics |
| 4. Dynamics               | 11. Electrostatics                    |
| 5. Rotational Motion      | 12. D.C. Circuits                     |
| 6. Energy and Momentum    | 13. Optics                            |
| 7. Simple Harmonic Motion |                                       |

## Quantitative Reasoning

40 Items

### 1. Mathematical Problems

- 1.1 Algebra
  - 1.1.1 Equations and expressions
  - 1.1.2 Inequalities
  - 1.1.3 Exponential notation
  - 1.1.4 Absolute value
  - 1.1.5 Ratios and proportions
  - 1.1.6 Graphical analysis

1.2 Data Analysis

1.3 Interpretation and Sufficiency

1.4 Quantitative Comparison

1.5 Probability and Statistics

### 2. Applied Mathematics (Word) Problems

# TESTING SERVICES

ADA American Dental Association®

Optometry Admission Test Program  
Department of Testing Services  
211 East Chicago Avenue  
Chicago, Illinois 60611-2637

February 2024