



Mohammed Choudhury
State Superintendent of Schools

TO: Members of the State Board of Education

FROM: Mohammed Choudhury, State Superintendent of Schools

DATE: July 25, 2023

SUBJECT: Teacher Certification Assessments
ADOPTION OF REGENERATED ASSESSMENTS

PURPOSE

The purpose of this item is to seek approval from the State Board of Education (SBOE) to adopt five Educational Testing Service (ETS) Praxis subject assessments: Biology Content Knowledge (5236), Chemistry Content Knowledge (5246), Earth and Space Sciences (5572), Physics Content Knowledge (5266), and School Psychologist (5403). These assessments have been regenerated from previous versions currently adopted in Maryland.

HISTORICAL BACKGROUND

Since 1987, the Maryland State Department of Education (MSDE) has required state certification tests to assess basic skills, content knowledge, and pedagogy. These tests provide a means to validate that teacher candidates have entry-level skills to begin their professional careers. To maintain currency in various content fields, ETS revises most tests on a five-year schedule and at the same time works to create new tests based on a demonstrated need.

To support the decision-making process for state departments of education regarding establishing a passing score, research staff from ETS design and conduct two Multistate Standards Setting Studies for each test (25 educators on each team). The two, non-overlapping panels represent and provide a replication of the judgment process to strengthen the technical quality of the recommended passing score. The panelists, selected from states that will use the test, are recommended by state departments of education to participate as experts for the Multistate Standards Setting Studies.

The panelists judge the extent to which the knowledge and/or skills reflected by the content specifications are important for entry-level teachers. ETS also collects content-related validity evidence to confirm the importance of the content specifications for entry-level teachers. The recommended cut scores from the two panels are averaged and then converted to a scale score with a range from 100 to 200. This score becomes the recommended qualifying score for the study.

ETS guidelines seek to adopt a score that does not exceed a plus or minus two standard errors of measurement from the recommended qualifying score. In this way, ETS is able to assure states that they have engaged in a process that ensures legal defensibility of the score.

EXECUTIVE SUMMARY

The Praxis Biology Content Knowledge (5236), Chemistry Content Knowledge (5246), Earth and Space Sciences (5572), Physics Content Knowledge (5266), and School Psychologist (5403) have been regenerated from previous versions currently adopted in Maryland. ETS is scheduled to remove the older versions of the assessments from its catalog in January 2024.

ACTION

Requesting that the SBOE approve the adoption of the following regenerated Praxis subject assessments for certification:

Test Code	Test Name	Qualifying Score	Scale
5236	Biology Content Knowledge	154	100-200
5266	Physics Content Knowledge	145	100-200
5246	Chemistry Content Knowledge	146	100-200
5572	Earth and Space Sciences	154	100-200
5403	School Psychologist	155	100-200



Praxis®

Overview of Regenerated Assessments

Biology (5236)
Chemistry (5426)
Earth & Space Science (5572)
Physics (5266)
School Psychologist (5403)

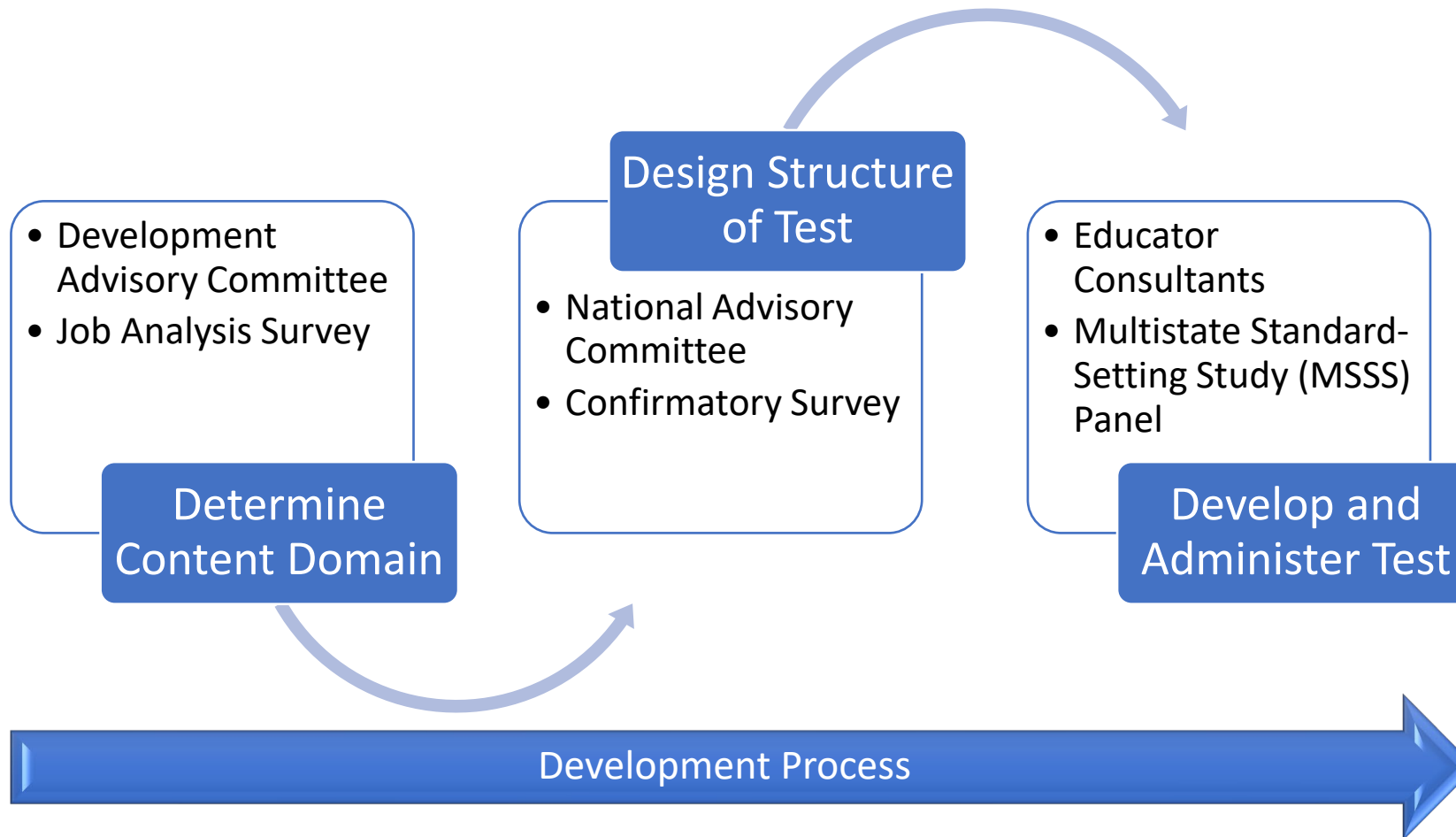
ETS Background

- Non-profit organization
- World's largest private educational assessment and research organization
- Our mission is to help advance quality and equity in education by providing fair and valid assessments, research, and related services



Developing Teacher Licensure Tests

From Design through Implementation



Practicing educators involved throughout the process



Biology (5236)



Overview of the Test

Praxis Biology is designed to measure knowledge and competencies important for safe and effective beginning practice as a teacher of biology.

- Developed with practicing biology teachers, teacher educators, and higher education biology specialists.
- Designed to reflect:
 - National Science Teaching Association Preparation Standards for biology.
 - Disciplinary Core Ideas (DCIs) and Science and Engineering Practices (SEPs) established by the National Research Council in A Framework for K-12 Science Education and included in the Next Generation Science Standards
 - Content topics span the areas of (I) Nature and Impact of Science and Engineering, (II) Cell Biology: Cell Structure and Function, (III) Genetics and Evolution, (IV) Diversity of Life and Organismal Biology, and (V) Ecology: Organisms and Environments.

Regeneration Description

Purpose of Redesign

- To address an emphasis change in the new national science standards

Standards

- 2020 National Science Teacher Association (NSTA) Teacher Preparation Standards, now including the new Next Generation Science Standards (NGSS)
- State science standards were also considered

Overall Design Changes

- One half or more of the test questions now integrate a Science and Engineering Practice from the Next Generation Science Standards. The previous test included questions that integrated only some of the Science and Engineering Practices and did not have a prescribed percentage included in the test specifications.
- One quarter to one third of the test questions now assess content applied to a Task of Teaching of Science. This change does not include science pedagogy.

What has Changed?

Previous 5235		Redesigned 5236	
Content Categories	Approximate Percentage of Examination	Content Categories	Approximate Percentage of Examination
I. Nature of Science: Scientific Inquiry, Methodology, Techniques, and History VI. Science, Technology, and Social Perspectives	24%	I. Nature and Impact of Science and Engineering	13%
II. Molecular and Cellular Biology	20%	II. Cell Biology: Cell Structure and Function	22%
III. Genetics and Evolution	20%	III. Genetics and Evolution	26%
IV. Diversity of Life and Organismal Biology	20%	IV. Diversity of Life and Organismal Biology	20%
V. Ecology: Organisms and Environments	16%	V. Ecology: Organisms and Environments	19%

Timing Timing remains the same at 150 minutes (about 2 hours and 30 minutes)

Any Addition or Subtraction of Content

- Biology topics are much the same as the previous test. However, Category I, which includes biology topics from II thru V, but in a different context, was given less weight, and more weight was given to Categories II, III, and V.
- Number of Score Categories were reduced from six to five with some changes in weighting of content.

Professional Organization

- National Science Teacher Association (NSTA)

Test at a Glance (TAAG) – Biology

Test Name	Biology		
Test Code	5236		
Time	2.5 hours		
Number of Questions	150 selected-response questions		
Format	The test consists of a variety of selected-response questions, where you select one or more answer choices, and other types of questions. You can review the possible question types in “Understanding Question Types.”		
Test Delivery	Computer Delivered		
	Content Categories	Approximate Number of Questions	Approximate Percentage of Examination
	I. Nature and Impact of Science and Engineering	19	13%
	II. Cell Biology: Cell Structure and Function	33	22%
	III. Genetics and Evolution	39	26%
	IV. Diversity of Life and Organismal Biology	30	20%
	V. Ecology: Organisms and Environments	29	19%
<p><i>All questions assess content from the above Biology domains. More than 40 percent of questions integrate a Science and Engineering Practice, and approximately 25 percent of questions assess content applied to a Task of Teaching Science.</i></p>			

The image features a dark blue background with a gradient that transitions to a lighter blue and yellowish hue on the right side. In the top-left and bottom-left corners, there are several parallel diagonal lines in white, light blue, green, and orange. The text "Chemistry (5246)" is centered on the left side of the image.

Chemistry (5246)

Overview of the Test

Praxis Chemistry is designed to measure knowledge and competencies important for safe and effective beginning practice as a teacher of chemistry.

- Developed with practicing chemistry teachers, teacher educators, and higher education chemistry specialists.
- Designed to reflect:
 - National Science Teaching Association Preparation Standards for chemistry.
 - Disciplinary Core Ideas (DCIs) and Science and Engineering Practices (SEPs) established by the National Research Council in A Framework for K-12 Science Education and included in the Next Generation Science Standards
 - Content topics span the areas of (I) Nature and Impact of Science and Engineering, (II) Principles and Models of Matter and Energy, (III) Chemical Composition, Bonding, and Structure, (IV) Chemical Reactions and Periodicity, and (V) Solutions and Acid-Base Chemistry.

Regeneration Description

Purpose of Redesign

- To address an emphasis change in the new national science standards

Standards

- 2020 National Science Teacher Association (NSTA) Teacher Preparation Standards, now including the new Next Generation Science Standards (NGSS)
- State science standards were also considered

Overall Design Changes

- One half or more of the test questions now integrate a Science and Engineering Practice from the Next Generation Science Standards. The previous test included questions that integrated only some of the Science and Engineering Practices and did not have a prescribed percentage included in the test specifications.
- One quarter to one third of the test questions now assess content applied to a Task of Teaching of Science. This change does not include science pedagogy.

What has Changed?

Previous 5245		Redesigned 5246	
Content Categories	Approximate Percentage of Examination	Content Categories	Approximate Percentage of Examination
VI. Scientific Inquiry and Social Perspectives of Science	24%	I. Nature and Impact of Science and Engineering	14%
VII. Science Procedures and Techniques			
I. Basic Principles of Matter and Energy; Thermodynamics	26%	II. Principles and Models of Matter and Energy	25%
II. Atomic and Nuclear Structure			
III. Nomenclature; Chemical Composition; Bonding and Structure	15%	III. Chemical Composition, Bonding, and Structure	20%
IV. Chemical Reactions; Periodicity	20%	IV. Chemical Reactions and Periodicity	23%
V. Solutions and Solubility; Acid-Base Chemistry	15%	V. Solutions and Acid-Base Chemistry	18%

Timing Timing remains the same at 150 minutes (about 2 hours and 30 minutes)

Any Addition or Subtraction of Content

- Chemistry topics are much the same as the previous test. However, Category I, which includes chemistry topics from II thru V, but in a different context, was given less weight, and more weight was given to Categories III, IV, and V.
- Number of Score Categories were reduced from seven to five with some changes in weighting of content.

Professional Organization

- National Science Teacher Association (NSTA)

Test at a Glance (TAAG) - Chemistry

Test Name	Chemistry		
Test Code	5246		
Time	2 hours 30 minutes		
Number of Questions	125 selected-response questions		
Format	The test consists of a variety of selected-response questions, where you select one or more answer choices, and other types of questions. You can review the possible question types in Understanding Question Types.		
Test Delivery	Computer Delivered		
	Content Categories	Approximate Number of Questions	Approximate Percentage of Examination
	I. Nature and Impact of Science and Engineering	17	14%
	II. Principles and Models of Matter and Energy	31	25%
	III. Chemical Composition, Bonding, and Structure	25	20%
	IV. Chemical Reactions and Periodicity	29	23%
	V. Solutions and Acid-Base Chemistry	23	18%
<i>Half or more of the questions integrate a Science and Engineering Practice, and approximately one-quarter to one-third of the questions assess content applied to a Task of Teaching of Science.</i>			



Earth and Space Sciences (5572)



Overview of the Test

Praxis Earth and Space Science is designed to measure knowledge and competencies important for safe and effective beginning practice as a teacher of Earth and space sciences.

- Developed with practicing Earth and space sciences teachers, teacher educators, and higher education content specialists.
- Designed to reflect:
 - National Science Teaching Association Preparation Standards for Earth and space sciences.
 - Disciplinary Core Ideas (DCIs) and Science and Engineering Practices (SEPs) established by the National Research Council in A Framework for K-12 Science Education and included in the Next Generation Science Standards
 - Content topics span the areas of (I) Nature and Impact of Science and Engineering, (II) Earth's Processes and Materials, (III) Earth's Hydrosphere and Atmosphere, and (IV) Astronomy.

Regeneration Description

Purpose of Redesign

- To address an emphasis change in the new national science standards

Standards

- 2020 National Science Teacher Association (NSTA) Teacher Preparation Standards, now including the new Next Generation Science Standards (NGSS)
- State science standards were also considered

Overall Design Changes

- One half or more of the test questions now integrate a Science and Engineering Practice from the Next Generation Science Standards. The previous test included questions that integrated only some of the Science and Engineering Practices and did not have a prescribed percentage included in the test specifications.
- One quarter to one third of the test questions now assess content applied to a Task of Teaching of Science. This change does not include science pedagogy.

What has Changed?

Previous 5571		Redesigned 5572	
Content Categories	Approximate Percentage of Examination	Content Categories	Approximate Percentage of Examination
I. Basic Scientific Principles and Processes	12%	I. Nature and Impact of Science and Engineering	15%
II. Tectonics and Internal Earth Processes	54%	II. Earth's Processes and Materials	45%
III. Earth Materials and Surface Processes		III. Earth's Hydrosphere and Atmosphere	22%
IV. History of the Earth and its Life-Forms		IV. Astronomy	18%
V. Earth's Atmosphere and Hydrosphere	19%		
VI. Astronomy	15%		

Timing Timing remains the same at 150 minutes (about 2 hours and 30 minutes)

Any Addition or Subtraction of Content

- Earth and Space Sciences topics included in the questions are much the same as the previous test in terms of specific topics. However, the relative weighting of the nature and impact of science and engineering was increased as the National Advisory Committee (NAC) considered the greater emphasis on these topics in the classroom. The weighting of the basic principles of matter and energy was also increased, and this topic area was merged into Category II. The increase in these two topic areas, in addition to the smaller increases into the percentages of the two other categories, resulted in a larger decrease in the weighting of the physical geology and historical geology topics in Category II.
- Number of Score Categories were reduced from six to four with some changes in weighting of content.

Professional Organization

- National Science Teacher Association (NSTA)

Test at a Glance (TAAG) – Earth and Space Science

Test Name	Earth and Space Science		
Test Code	5572		
Time	2 hours 30 minutes		
Number of Questions	125 selected-response questions		
Format	The test consists of a variety of selected-response questions, where you select one or more answer choices, and other types of questions. You can review the possible question types in “Understanding Question Types.”		
Test Delivery	Computer Delivered		
	Content Categories	Approximate Number of Questions	Approximate Percentage of Examination
	I. Nature and Impact of Science and Engineering	19	15%
	II. Earth's Processes and Materials	56	45%
	III. Earth's Hydrosphere and Atmosphere	28	22%
	IV. Astronomy	22	18%
<p><i>Half or more of the questions integrate a Science and Engineering Practice, and approximately one-quarter to one-third of the questions assess content applied to a Task of Teaching of Science.</i></p>			

The background is a dark blue gradient that transitions to a lighter blue and then a yellowish-orange gradient on the right side. There are several sets of parallel diagonal lines in the corners: top-left (white, blue, green, orange), bottom-left (blue, green, orange), and bottom-right (white, yellow).

Physics (5266)

Overview of the Test

Praxis Physics is designed to measure knowledge and competencies important for safe and effective beginning practice as a teacher of physics.

- Developed with practicing physics teachers, teacher educators, and higher education physics specialists.
- Designed to reflect:
 - National Science Teaching Association Preparation Standards for physics.
 - Disciplinary Core Ideas (DCIs) and Science and Engineering Practices (SEPs) established by the National Research Council in A Framework for K-12 Science Education and included in the Next Generation Science Standards
 - Content topics span the areas of (I) Nature and Impact of Science and Engineering, (II) Principles and Models of Matter and Energy, (III) Mechanics, (IV) Electricity and Magnetism, and (V) Waves.

Regeneration Description

Purpose of Redesign

- To address an emphasis change in the new national science standards

Standards

- 2020 National Science Teacher Association (NSTA) Teacher Preparation Standards, now including the new Next Generation Science Standards (NGSS)
- State science standards were also considered

Overall Design Changes

- One half or more of the test questions now integrate a Science and Engineering Practice from the Next Generation Science Standards. The previous test included questions that integrated only some of the Science and Engineering Practices and did not have a prescribed percentage included in the test specifications.
- One quarter to one third of the test questions now assess content applied to a Task of Teaching of Science. This change does not include science pedagogy.

What has Changed?

Previous 5265		Redesigned 5266	
Content Categories	Approximate Percentage of Examination	Content Categories	Approximate Percentage of Examination
VI. Scientific Inquiry, Processes, and Social Perspectives	12%	I. Nature and Impact of Science and Engineering	12%
IV. Heat, Energy, and Thermodynamics V. Modern Physics, and Atomic and Nuclear Structure	24%	II. Principles and Models of Matter and Energy	15%
I. Mechanics	32%	III. Mechanics	35%
II. Electricity and Magnetism	19%	IV. Electricity and Magnetism	21%
III. Optics and Waves	13%	V. Waves	17%

Timing Timing remains the same at 150 minutes (about 2 hours and 30 minutes)

Any Addition or Subtraction of Content

- Physics topics included in the questions are much the same as the previous test in terms of specific topics. However, the relative weighting of some matter and energy relationships were reduced somewhat as the National Advisory Committee (NAC) deemed some of those topics to be more relevant to a chemistry test. The decrease resulted in a very small percentage increase in each of Categories, III, IV, and V.
- Number of Score Categories were reduced from six to five with some changes in weighting of content.

Professional Organization

- National Science Teacher Association (NSTA)

Test at a Glance (TAAG) – Physics

Test Name	Physics		
Test Code	5266		
Time	2 hours 30 minutes		
Number of Questions	125 selected-response questions		
Format	The test consists of a variety of selected-response questions, where you select one or more answer choices and other types of questions. You can review the possible question types in Understanding Question Types.		
Test Delivery	Computer Delivered		
	Content Categories	Approximate Number of Questions	Approximate Percentage of Examination
	I. Nature and Impact of Science and Engineering	15	12%
	II. Principles and Models of Matter and Energy	19	15%
	III. Mechanics	44	35%
	IV. Electricity and Magnetism	26	21%
	V. Waves	21	17%
<i>Half or more of the questions integrate a Science and Engineering Practice, and approximately one-quarter to one-third of the questions assess content applied to a Task of Teaching of Science.</i>			



School Psychologist (5403)



Overview of the Test

Praxis School Psychologist is designed to measure knowledge and competencies important for safe and effective beginning practice as a school psychologist.

- Developed with practicing school psychologists and higher education content specialists.
- Designed to reflect:
 - National Association of School Psychologist (NASP) 2020 Standards.
 - Content topics span the areas of (I) Professional Practices that Permeate All Aspects of Service Delivery, (II) Direct and Indirect Services for Children, Families, and Schools (Student-Level Services) , (III) Direct and Indirect Services for Children, Families, and Schools (Systems-Level Services), and (IV) Foundations of School Psychological Service Delivery.

Regeneration Description

Purpose of Redesign

- Standards updated in 2020

Standards

- NASP 2020 Professional Standards

Overall Design Changes

- Adjusted the weightings of the categories to be reflective of the field and the coursework that is being taught.
- Reduced the number of items to better align with the content knowledge necessary for a beginning school psychologist
 - Reduced number of questions from 140 to 125
 - Reduced testing time from 140 minutes to 125 minutes

What has Changed?

Previous 5402		Redesigned 5403	
Content Categories	Approximate Percentage of Examination	Content Categories	Approximate Percentage of Examination
I. Professional Practices that Permeate All Aspects of Service Delivery	30%	I. Professional Practices that Permeate All Aspects of Service Delivery	32%
II. Direct and Indirect Services for Children, Families, and Schools (Student-Level Services)	23%	II. Direct and Indirect Services for Children, Families, and Schools (Student-Level Services)	23%
III. Systems-Level Services	15%	III. Direct and Indirect Services for Children, Families, and Schools (Systems-Level Services)	20%
IV. Foundations of School Psychological Service Delivery	32%	IV. Foundations of School Psychological Service Delivery	25%

Timing Timing reduced from 140 minutes to 125 minutes

Any Addition or Subtraction of Content

- Emphasize student knowledge of Multi-tiered Systems of Support.
- Minor revisions made to the Legal and Ethical statements to remove specific mention of laws to avoid issues of datedness.
- Adjusted weightings of the content categories

Professional Organization

- National Association of School Psychologist (NASP)

Test at a Glance (TAAG) – School Psychologist

Test Name	School Psychologist		
Test Code	5403		
Time	2 hours 5 minutes		
Number of Questions	125 selected-response questions		
Format	The test consists of a variety of selected-response questions, where you select one or more answer choices, and other types of questions. You can review the possible question types in Understanding Question Types.		
Test Delivery	Computer Delivered		
	Content Categories	Approximate Number of Questions	Approximate Percentage of Examination
	I. Professional Practices that Permeate All Aspects of Service Delivery	40	32%
	II. Direct and Indirect Services for Children, Families, and Schools (Student-Level Services)	28	23%
	III. Direct and Indirect Services for Children, Families, and Schools (Systems-Level Services)	25	20%
	IV. Foundations of School Psychological Service Delivery	32	25%