



Early Adolescence

SCIENCE

Assessment at a Glance

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*National Board Certification
Promotes Better Teaching,
Better Learning, Better Schools*

Choosing the Right Certificate

The National Board Certification® process offers experienced teachers the professional development opportunity to demonstrate their knowledge, skills, and practices against high and rigorous standards. Candidates pursue certification by completing two major assessment components: a portfolio of classroom teaching practice and an assessment of content knowledge administered at a computer-based testing center.

The Early Adolescence/Science certificate is appropriate for teachers who teach students ages 11–15 and who know the full range of the school science curriculum: physical sciences, life sciences, and earth and space sciences. Read this document to learn the content and pedagogical knowledge you will be required to demonstrate for this certificate area and to measure your readiness to pursue National Board Certification.

Below is a set of questions to ask yourself about your teaching practice. If you answer “yes” to these questions, you are ready to apply. For eligibility requirements and application instructions, read the *Guide to National Board Certification* on the NBPTS Web site (www.nbpts.org).

If you answer “no” to one or more of these questions, you may need to discuss your teaching situation with professional colleagues, your school faculty, a National Board Certified Teacher®, your faculty support group, or a local-level administrator who is directing a National Board program.

For the portfolio, will you be able to:

- demonstrate that your teaching practice meets the Early Adolescence/Science Standards?
- have access to a class of at least 6 students, in which 51% of the students are ages 11–15 during the 12 months prior to the submission of your portfolio entries?
- submit student work samples and video recordings in English and/or Spanish showing your interactions with your students?
- demonstrate how you help students make important conceptual connections in science during a sequence of instruction?
- demonstrate how you use assessment to target important science understanding and to analyze and make sense of student performance?
- show how you use inquiry strategies to uncover students' conceptions of important ideas in science?
- show how you support students in a scientific inquiry discussion as they explore, analyze, and synthesize data that have been collected during the course of investigating an important concept in science?
- present evidence of how you impact student learning through your work with students' families and community and through your development as a learner and as a leader/ collaborator?

For the assessment center, will you be able to demonstrate content knowledge in:

- data analysis?
- interrelationships in science?
- unifying concepts?
- changes over time?
- student misconceptions?
- issues in science, society, and technology?

Reviewing the Standards

The requirements for National Board Certification in the field of Early Adolescence/Science (EA/Science) are organized into the following Standards. The ordering of the Standards is designed to facilitate understanding, not to assign priorities.

Preparing the Way for Productive Student Learning

I. Understanding Early Adolescents

Accomplished science teachers know the unique characteristics of their students and use this knowledge to determine students' understanding of science and to design and implement appropriate instruction to enhance student learning.

II. Knowledge of Science

Accomplished science teachers have a broad and current knowledge of science, along with in-depth knowledge of one of the subfields of science, on which they draw to set appropriate learning goals for their students.

III. Instructional Resources

Accomplished science teachers are innovative in their ability to select, adapt, and create instructional resources, including print, technology, laboratory, and community resources, to support active student explorations of science.

Establishing a Favorable Context for Student Learning

IV. Diversity, Equity, and Fairness

Accomplished science teachers take steps to understand and value the diversity of all students, promote equity in the classroom and beyond, and uphold fairness in their daily interactions with all students.

V. Engagement

Accomplished science teachers engage students in science through creative and innovative experiences.

VI. Learning Environment

Accomplished science teachers create stimulating and safe learning environments that foster high expectations for the success of all students and in which students experience the values inherent in the practice of science.

Advancing Student Learning

VII. Understanding Science Pedagogy

Accomplished science teachers understand and use a variety of instructional strategies to enhance student learning and help students make real-world connections from their scientific explorations.

VIII. Science Inquiry

Accomplished science teachers involve students in the processes of inquiry that challenge students' thinking as they construct an understanding of nature and technology.

IX. Contexts of Science

Accomplished science teachers create opportunities for students to explore science in a variety of contexts, including its history, its reciprocal relationship with technology, and its impact on society.

X. Assessment

Accomplished science teachers employ a variety of assessment methods to obtain useful information about student learning and development, to guide instructional decisions, to report student progress, and to assist students in reflecting on their own learning.

Supporting Teaching and Student Learning

XI. Family and Community Outreach

Accomplished science teachers proactively work with families and communities to serve the interests of students.

XII. Professional Collaboration and Leadership

Accomplished science teachers collaborate with colleagues and take leadership roles in their own educational community, as well as the larger community, to advance student learning.

XIII. Reflective Practice

Accomplished science teachers continually analyze, evaluate, and strengthen their practice in order to improve the quality of their students' learning experiences.

Read the Standards on the NBPTS Web site to ensure that you will be able to demonstrate your accomplishments and confidently satisfy the defined expectations for National Board Certification.

Demonstrating Your Teaching Practice and Content Knowledge

This section describes the portfolio entries and assessment center exercises for the EA/Science certificate area.

Portfolio Entries

You will be required to submit four portfolio entries. One entry is based on student work samples, and two entries feature video recordings of student–teacher interactions in the classroom. The fourth entry relates to your accomplishments outside of the classroom—with families, the community, or colleagues—and how they impact student learning.

Following is a description of each portfolio entry.

**Entry 1:
Designing Science
Instruction**

In this entry, you demonstrate how you link instructional activities together to promote students' understanding of one important scientific concept along with the development of one or more related process goals. The students chosen should represent different kinds of challenges for you. You choose three instructional activities, related instructional materials, and two student responses to each activity, and submit a Written Commentary.

**Entry 2:
Probing Student
Understanding**

In this entry, you submit a 20-minute video recording of a lesson in which you introduce an important concept in science, and demonstrate how you use classroom discourse and questioning to elicit students' initial conceptions of an important concept in science and how you use their understanding to influence your instruction. You also submit a Written Commentary that provides a context for the video-recorded discussion and describes, analyzes, and reflects on the discussion, student understanding, and your teaching.

**Entry 3:
Inquiry Through
Investigation**

In this entry, you submit a 20-minute video recording of a lesson in which you conduct an investigation of an important scientific concept and demonstrate how you support students in a scientific inquiry discussion as they interpret data that have been collected during the course of the investigation. You also submit a Written Commentary that provides a context for the video-recorded discussion and describes, analyzes, and reflects on the discussion and students' development of inquiry skills.
Entry 3 is the preselected *Take One!* portfolio entry.

**Entry 4:
Documented
Accomplishments:
Contributions to
Student Learning**

In this entry, you illustrate your partnerships with students' families and community, and your development as a learner and collaborator with other professionals by submitting descriptions and documentation of your activities and accomplishments in those areas. Your description must make the connection between each accomplishment and its impact on student learning.

Read the *Portfolio Instructions* on the NBPTS Web site to learn more about the requirements for preparing, developing, and submitting the portfolio component of your assessment.

Assessment Center Exercises

This assessment is composed of six exercises that examine content knowledge specified in the NBPTS Standards. You are given up to 30 minutes to respond to each exercise.

Following is a description of each assessment center exercise.

- | | |
|---|---|
| Exercise 1:
Data Analysis | In this exercise, you demonstrate sound principles of data analysis. You read a student-designed experiment, study a student collection of data, and analyze a student conclusion concerning the experiment. |
| Exercise 2:
Interrelationships | In this exercise, you show your knowledge of interrelationships that exist within science. You give explanations of two concepts and explain the interrelationships. |
| Exercise 3:
Unifying Concepts | In this exercise, you focus on your knowledge of unifying concepts. You describe a major idea in science, explain a concept from each of the major sciences, and relate the concepts to the major idea. |
| Exercise 4:
Change over Time | In this exercise, you demonstrate knowledge of change that occurs over time. You describe a concept from one of the major sciences and explain the mechanisms involved in a change over time involving that concept. |
| Exercise 5:
Student
Misconceptions | In this exercise, you use your knowledge of science to identify student misconceptions and to appropriately address the misconceptions. You identify student misconceptions in a sample of student work, describe the scientific content needed to correct the misconceptions, and briefly explain how to pedagogically address the misconceptions. |
| Exercise 6:
Science, Technology,
and Society | In this exercise, you focus on your knowledge and understanding of science, technology, and society issues. You describe a science, technology, and society issue and discuss the scientific knowledge that students need to know in order to understand the issue. |

Read *Assessment Center Policy and Guidelines* on the NBPTS Web site for more information about the assessment center component of the certification process. To locate an assessment center, visit the NBPTS computer-based testing Web site (www.pearsonvue.com/nbpts/).

Selected Assessment Center Exercises

The following sections contain selected exercises administered in a previous assessment cycle. These exercises present information that candidates saw on screen at the assessment center and include instructions for using the computer, stimulus materials (if applicable), and prompts requiring responses. These exercises have been included to help you become familiar with the structure of assessment center exercises and to help you understand the scoring rubrics. The exercise prompts in this section **do not** represent actual prompts candidates will see at assessment centers in the future.

Please note that assessment center exercises cover the **entire** age range of the certificate. Be aware that you are expected to demonstrate knowledge of developmentally appropriate content across the full range of your certificate.

Sample Exercise 2: Interrelationships

Exercise 2 - Interrelationships - Candidate Name

🕒 Time Remaining 29:31

Introduction

In this exercise, you will use your knowledge of science to give explanations of two concepts and explain the interrelationships between them. You will be asked to respond to three prompts.

Criteria for Scoring

To satisfy the highest level of the scoring rubric, your responses must provide clear, consistent, and convincing evidence of the following:

- a detailed explanation of two scientific concepts; and
- an accurate and thorough explanation of the interrelationships that exist between the two concepts.

Directions

You may preview all of the prompts by clicking the "Next" button. The "Previous" button will enable you to return to any of the prompts in order to compose or revise your response in the space provided.

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Retired Prompt 1

Provide an explanation of **genes**.

Retired Prompt 2

Provide an explanation of **heredity**.

Retired Prompt 3

Explain the most significant interrelationships that exist between **genes** and **heredity**.

Sample Exercise 5: Student Misconceptions

Exercise 5 - Student Misconceptions - Candidate Name

🕒 Time Remaining 29:31

Introduction

In this exercise, you will use your knowledge of science to identify student misconception(s) in a sample of student work, describe the scientific content needed to correct the misconception(s), and briefly explain how to pedagogically address the misconception(s). You will be asked to respond to three prompts.

Criteria for Scoring

To satisfy the highest level of the scoring rubric, your responses must provide clear, consistent, and convincing evidence of the following:

- an accurate identification of a student's misconception(s) through the examination of the student's work;
- an accurate description of the scientific concepts the student would need to understand in order to correct the misconception(s); and
- an informed description of the instruction you would use to enhance student understanding and to address the student's misconception(s).

Directions

You may preview all of the prompts by clicking the "Next" button. The "Previous" button will enable you to return to any of the prompts in order to compose or revise your response in the space provided.

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Stimulus

Read the following work sample turned in by a student as a preassessment during the study of seasonal changes:

Some places on Earth have seasonal changes. These changes cause certain regions to have warmer and colder temperatures that we commonly think of as summer and winter. When the Northern Hemisphere is having summer, the Southern Hemisphere is having winter. We have seasons because Earth is closer to the sun in the summer and further away from the sun in the winter. I really wish we had summer all year.

Retired Prompt 1

Identify the student's misconception(s).

Retired Prompt 2

Describe in detail the scientific concepts the student would need to understand in order to correct the misconception(s).

Retired Prompt 3

Briefly describe what you would do next in an instructional context to address the student's misconception(s).

Understanding the National Board Scoring Process

All portfolio entries and assessment center exercises are scored by teachers practicing in the same content area as the assessment they are scoring. The National Board's carefully trained assessors use scoring rubrics to evaluate candidate responses. The rubrics clearly articulate the criteria that are to be applied in the evaluation of your responses. These criteria reflect the Standards that the entry is designed to measure.

Assessors use a four-level rubric to score each candidate's response as shown below.

Rubric Level	Score Range	Quality of Evidence
Level 4	3.75–4.25	Clear, consistent, and convincing
Level 3	2.75–3.74	Clear
Level 2	1.75–2.74	Limited
Level 1	0.75–1.74	Little or no

The Level 4 and Level 3 score ranges represent accomplished teaching practice. You do not have to receive Level 4 or Level 3 scores for every entry and exercise. A high score on one may compensate for a lower score elsewhere. Read the *Scoring Guide for Candidates* on the NBPTS Web site for your assessment.

Your Total Weighted Scaled Score

When your portfolio entries and assessment center exercises are completed and scored, your Total Weighted Scaled Score is computed. This is done by applying a set of weights to each of your entry and exercise scores.

For the EA/Science certificate, these are the weights:

- 16% for each of the three classroom-based portfolio entries
- 12% for the Documented Accomplishments portfolio entry
- 6.67% for each of the six assessment center exercises

Your weighted scaled score for each entry or exercise is calculated by multiplying the raw score by the appropriate weight, shown above. Your Total Weighted Scaled Score is the sum of the weighted scaled scores for all entries and exercises plus a 12-point uniform constant. For example, if your weighted scaled score is 263, you would receive a 12-point uniform constant score, and your Total Weighted Scaled Score would be 275. This number is then compared to 275, the performance standard established by the NBPTS Board of Directors.

A candidate whose Total Weighted Scaled Score is 275 or greater is recognized as an accomplished teacher and is awarded National Board Certification. A candidate whose Total Weighted Scaled Score does not meet 275 is not yet certified and for the following two years has the opportunity to retake certain portfolio entries or assessment center exercises in order to meet the performance standard of 275.

Things to Keep in Mind

The National Board Standards for the EA/Science certificate area are addressed within the portfolio and assessment center process. Therefore, you should keep the following in mind:

- Although the portfolio entries address many of the Standards, they may not address all of them. Standards the portfolio does not address may be included in the assessment center portion of the certification process.
- Each entry is scored independently of the others. When an entry asks for background or contextual information, be complete, since an assessor for one entry will not see your other entries.
- At each of the four levels of the scoring rubric, the same Standards-related criteria are applied. However, each level of the scoring rubric represents a difference in the quality of evidence demonstrated by the entry or exercise. For example, if “Knowledge of Students” is a Standard measured by an entry, the Level 4 rubric will refer to “clear, consistent, and convincing” evidence of that Standard while the Level 2 rubric will refer to “limited” evidence of the same Standard.
- One of the fundamental principles underlying the evaluation is that responses are scored only on what candidates are specifically asked to do. For example, if the directions specifically ask you to demonstrate how to use assessment in the featured instructional sequence, evidence supporting your use of assessment will be evaluated based on the scoring rubric. Conversely, if an entry does not require you to demonstrate how to use assessment, it will not be evaluated.

Beginning Your Journey toward National Board Certification

The first step on this journey is to make a commitment, but what does this commitment involve? First-time candidates apply and complete their assessments in an initial candidacy period as shown in the timeline below. For candidates who are not successful in their first try, there is a 24-month window, following the receipt of scores, in which to retake assessments and/or resubmit portfolio entries in order to achieve certification.

You may wish to start with the *Take One!* program that requires submission of a single portfolio entry for scoring. The preselected portfolio entry required for *Take One!* is identified as part of the portfolio entry descriptions on page 4. You can choose to transfer your *Take One!* score to National Board Certification within three years of completing the *Take One!* process. Read *Becoming a Take One! Participant* on the NBPTS Web site to learn more about the requirements.

If you choose to pursue National Board Certification, there is also a financial commitment for which support is available. Visit the NBPTS Web site to learn about federal, state, and/or local funds available to support National Board Certification and *Take One!* fees. Be sure to check with your local, district, or state educational officials for incentives (such as salary increases and bonuses) that may be offered for achieving National Board Certification.

The following timeline provides a snapshot of your schedule of commitments. Read the *Guide to National Board Certification* on the NBPTS Web site for complete information.

Certification Planner

Step	To Do	Year 1	Year 2	Year 3	Year 4
1	Send forms and fees to NBPTS:				
	<ul style="list-style-type: none"> application nonrefundable initial fee (\$500) all eligibility forms balance of full fee (totaling \$2,500) 	Jan. 1 — Dec. 31			
2	Develop portfolio entries and submit them to NBPTS:				
	<ul style="list-style-type: none"> Receive portfolio box after submitting initial fees. Submit all four portfolio entries at once after submitting all fees and eligibility forms. 	Jan. 1 — Mar. 31			
3	Schedule your assessment center exercises:				
	<ul style="list-style-type: none"> after submitting all fees and eligibility forms at least 30 days before the test date 		Jan. 1 — Jun. 15		
4	Obtain your scores online:				
	<ul style="list-style-type: none"> Access <i>My Profile</i> to learn about your scores and certification status. 		Dec. 31	Dec. 31	Dec. 31
5	Continue the journey:				
	<ul style="list-style-type: none"> If you did not achieve certification, decide whether to retake assessment center exercises and/or portfolio entries. Submit retake application and fees. 			Jan. 31	Jan. 31
	<ul style="list-style-type: none"> Retake selected assessment center exercises. Submit selected portfolio entries. 			Jan. 1 — Jun. 15	Jan. 1 — Jun. 15
				Jan. 1 — Apr. 15	Jan. 1 — Apr. 15

Having made the commitment, many teachers who pursue National Board Certification become role models and leaders in their schools and districts, earning a greater voice in what happens and having a very positive effect on their students' experiences. On your journey, you will benefit directly from your candidacy, taking part in what many have described as the best professional development experience of their lives.

Produced for the



by

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