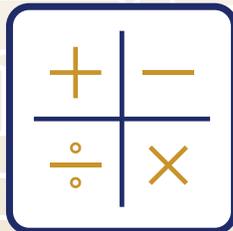


Sample Questions

General Information About The Nation's Report Card

Grade 8

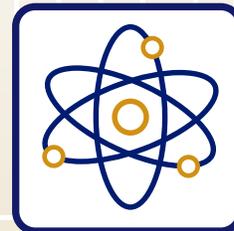
Mathematics



Reading



Science



National Assessment of Educational Progress

Mathematics, Reading, and Science

2019 Grade 8 Sample Questions

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Letter From Dr. Peggy Carr, NCES

As Associate Commissioner of the National Center for Education Statistics (NCES), and on behalf of the National Assessment of Educational Progress (NAEP), I want to thank you for your participation in the NAEP 2019 assessments. The NAEP program is an essential measure of student achievement in the United States. NAEP results provide valuable information on what students in our country know and can do in various subjects.

In 2019, most fourth-, eighth-, and twelfth-grade students will take the NAEP mathematics, reading, and science assessments on NAEP-provided tablets, while a small subset of students will take paper-and-pencil versions. Administering assessments via both tablets and paper booklets helps to evaluate any difference in student performance between the two types of administration.

At the end of each NAEP assessment, students voluntarily complete a 15-minute survey questionnaire about themselves and their educational experiences in and outside of the classroom. To learn more about NAEP survey questionnaires, visit https://nces.ed.gov/nationsreportcard/experience/survey_questionnaires.aspx.

Results of the 2019 mathematics, reading, and science assessments will be reported as The Nation's Report Card. Assessment results are widely discussed in the press and are used by educators, researchers, policymakers, and elected officials to make decisions about education policy and funding.

This booklet provides helpful information on the NAEP 2019 assessments for grade 8 in mathematics, reading, and science. You'll also find details on sample questions for these three subjects in order to promote understanding of the assessment, as well as links to the 2019 survey questionnaires. Additional information for teachers and schools can be found at <http://nces.ed.gov/nationsreportcard/educators>, including more details about the NAEP assessment and the critical role of educators in the NAEP program.

If you have any questions or comments regarding NAEP or would like to view previous report cards, please visit the NAEP website at <http://nces.ed.gov/nationsreportcard>. To learn more about NAEP digitally based assessments and view tutorials, visit <https://nces.ed.gov/nationsreportcard/dba>.

Peggy G. Carr, Ph.D.
Associate Commissioner
National Center for Education Statistics
Institute of Education Sciences

Paperwork Reduction Act Statement

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this voluntary information collection is 1850-0928. The time required to complete this information collection is estimated to average 90 minutes, including the time to review instructions, search existing data resources, gather the data needed, and complete and review the information collection. If you have any comments concerning the accuracy of the time estimate, suggestions for improving this collection, or any comments or concerns regarding the status of your individual submission, please write to: *National Assessment of Educational Progress (NAEP), National Center for Education Statistics (NCES), Potomac Center Plaza, 550 12th St., SW, 4th floor, Washington, DC 20202.*

OMB No. 1850-0928 APPROVAL EXPIRES 9/30/2021

Authorization and Confidentiality Assurance

National Center for Education Statistics (NCES) is authorized to conduct NAEP by the National Assessment of Educational Progress Authorization Act (20 U.S.C. §9622). All of the information provided by participants may be used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose except as required by law (20 U.S.C. §9573 and 6 U.S.C. §151). By law, every NCES employee as well as every NCES agent, such as contractors and NAEP coordinators, has taken an oath and is subject to a jail term of up to 5 years, a fine of \$250,000, or both if he or she willfully discloses ANY identifiable information about you. Electronic submission of your information will be monitored for viruses, malware, and other threats by Federal employees and contractors in accordance with the Cybersecurity Enhancement Act of 2015. The collected information will be combined across respondents to produce statistical reports.

A project of the National Center for Education Statistics (NCES), Institute of Education Sciences, U.S. Department of Education.

II. The NAEP Assessments

NAEP Overview

NAEP serves a different role than state assessments. While states have their own unique assessments with different content standards, the same NAEP assessment is administered in every state, providing a common measure of student achievement.

Each student answers questions in only one subject and one format—either a digitally based or a paper-based assessment. Each NAEP assessment takes approximately 90 to 125 minutes for a student to complete (including transition time, instructions, and completion of a survey questionnaire).

NAEP assessment results for grade 8 are reported for the nation in various subjects, and for states and selected large urban districts in certain subjects, but not for individual schools or students. All data collected from the assessment results will be used for statistical purposes only.*

NAEP Frameworks

Each NAEP assessment is built around an organizing framework, which is the blueprint that guides the development of the assessment. The National Assessment Governing Board oversees the development of the NAEP frameworks, which describe the specific knowledge and skills to be assessed in each subject. Frameworks incorporate ideas and input from subject area experts, school administrators, policymakers, teachers, parents, and others. Learn more about NAEP frameworks at <https://www.nagb.gov/naep-frameworks/frameworks-overview.html>.

NAEP Digitally Based Assessments

Many of our nation's schools are equipped with computers, and an increasing number of schools are making digital tools an integral component of the learning environment, reflecting that the knowledge and skills needed for future educational and workplace success involve the use of new technologies. The NAEP program is evolving to address the changing educational landscape through its transition to digitally based assessments. These assessments allow for the collection of new types of data that provide in-depth understanding of what students know and can do in various subjects. Some questions

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may include multimedia, such as audio and video. Other questions may allow the use of embedded technological features (such as a scratchwork tool) to form a response, or may engage students in solving problems within realistic scenarios.

The NAEP digitally based assessments incorporate cutting-edge learning technologies. At the beginning of each assessment, students take a brief interactive tutorial designed to teach them about the system and the tools they use to take the assessment. Some parts of the tutorials are the same across subjects, while other parts are specific to each subject. For example, because mathematics uses different tools at each grade, there are different tutorials for each grade in mathematics.

To learn more about NAEP digitally based assessments and view a NAEP tutorial, visit <https://nces.ed.gov/nationsreportcard/dba/>.

Mathematics

Grade 8

The NAEP 2019 mathematics assessment is a digitally based assessment that is administered on touchscreen tablets with keyboards. The assessment measures students' ability to solve problems in five mathematics content areas: number properties and operations; measurement; geometry; data analysis, statistics, and probability; and algebra. Within each of these five content areas, students are asked questions of low, moderate, or high mathematical complexity. Mathematical complexity is a measure of the level of demand placed on a student's thinking in order to answer a question correctly.

The NAEP mathematics assessment includes selected-response, short constructed-response, and extended constructed-response questions. The selected-response items may include single- and multiple-selection multiple choice, inline choice, zone (hot spot), matching, and interactive items. The short and extended constructed-response questions allow students to communicate their ideas and demonstrate the reasoning they used to solve problems. The short constructed-response and extended constructed-response questions combine to make up approximately 50 percent of student assessment time, and the selected-response items combine to make up the other 50 percent of student assessment time.

During the digitally based assessment, students will have access to onscreen tools that will help them interact with the assessment. Some of these tools include a scratchwork tool, a calculator, a math keyboard, magnification, a read-aloud option, and a progress bar and timer.

Calculator use is permitted on approximately 35 percent of the test questions. NAEP provides a four-function calculator for students who receive a section of questions where calculator use is permitted.

For more information regarding the mathematics assessment framework, please visit the National Assessment Governing Board's website at <https://www.nagb.gov/naep-frameworks/mathematics.html>.

NAEP Mathematics Framework Distribution of Questions Across Content Areas

Number Properties and Operations	20%
Measurement	15%
Geometry	20%
Data Analysis, Statistics, and Probability	15%
Algebra	30%

Directions

Below are the General Directions for the mathematics digitally based assessment. Students will see these instructions on the screen prior to beginning the assessment.

This assessment has several sections of mathematics questions. When you are finished with these sections, you will be asked to answer questions about yourself and your experiences in and out of school.

If time runs out before you complete a section, your work will be saved.

Tap the Next arrow to begin.

Here is an example of directions a student might see during the mathematics assessment.

This section has 20 mathematics questions. You have 30 minutes to complete this section.

You cannot use the calculator in this section.

If you finish before time is up, you may review your work.

Tap the Next arrow to continue.

Sample Questions

Mathematics was most recently assessed at grade 8 in 2017. Sample questions from that digitally based assessment are now available online.

Each sample question contains the following:

- a brief description of the item
- the format type (selected response or constructed response)
- the content area (number properties and operations; measurement; geometry; data analysis, statistics, and probability; or algebra)
- details on student performance
- percentage of students who answered a selected-response question correctly or who received full credit for their answer to a constructed-response question

View the sample questions for grade 8 from the NAEP 2017 mathematics assessment and try some of the questions yourself at https://www.nationsreportcard.gov/math_2017/#/sample-questions?grade=8.

A complete list of questions released from the 2017 mathematics assessment is available in the NAEP Questions Tool at <https://nces.ed.gov/nationsreportcard/nqt/>.

Learn more about NAEP digitally based assessments and view interactive tutorials at <https://nces.ed.gov/nationsreportcard/dba/>.

Reading

Grade 8

The NAEP 2019 reading assessment measures students' ability to understand, interpret, and think critically about grade-appropriate texts. Recognizing that readers vary their approach according to the demands of different types of text, the NAEP framework specifies the assessment of reading in two major text types: literary text and informational text. The assessment includes reading materials selected from publications and other resources typically available to students in and out of school.

The framework for the NAEP reading assessment conceptualizes reading as a dynamic cognitive process. The framework suggests reading is a complex process that includes

- understanding written text;
- developing and interpreting meaning; and
- using meaning as appropriate to type of text, purpose, and situation.

The NAEP reading assessment contains selected-response questions, as well as short and extended constructed-response questions. At grade 8, students spend approximately 60 percent of their assessment time providing written answers to constructed-response questions.

In 2019, students will take a digitally based version of the reading assessment on touch-screen tablets with keyboards. During the digitally based assessment, students will have access to onscreen tools that will help them navigate the assessment. Some of these tools include a help window, zoom tool, progress bar and timer, a read-aloud option, and an annotation tool, which will allow them to use an onscreen pencil and highlighter tools to mark up passages and items.

For more information regarding the reading assessment framework, please visit the National Assessment Governing Board's website at <https://www.nagb.gov/naep-frameworks/reading.html>.

NAEP Reading Framework Distribution of Literary and Informational Passages at Grade 8

Literary text	45%
Informational text	55%

Directions

Below are the General Directions for the reading digitally based assessment. Students will see these instructions on the screen prior to beginning the assessment.

This assessment has several sections of reading passages and questions. When you are finished with these sections, you will be asked to answer questions about yourself and your experiences in and out of school.

If time runs out before you complete a section, your work will be saved.

Tap the Next arrow to begin.

Here is an example of directions a student might see during the reading assessment.

In this section, you have 30 minutes to read a story and answer 10 questions about it.

If you finish before time is up, you may review your work.

Tap the Next arrow to continue.

Sample Questions

Reading was most recently assessed at grade 8 in 2017. Sample questions from that digitally based assessment are now available online.

Each sample question contains the following:

- a brief description of the item
- the format type (selected response or constructed response)
- the content area (literary text or informational text)
- details on student performance
- percentage of students who answered a selected-response question correctly or who received full credit for their answer to a constructed-response question

View the sample questions for grade 8 from the NAEP 2017 reading assessment and try some of the questions yourself at https://www.nationsreportcard.gov/reading_2017/#/sample-questions?grade=8.

A complete list of questions released from the 2017 reading assessment is available in the NAEP Questions Tool at <https://nces.ed.gov/nationsreportcard/nqt/>.

Learn more about NAEP digitally based assessments and view interactive tutorials at <https://nces.ed.gov/nationsreportcard/dba/>.

Science

Grade 8

The NAEP 2019 science assessment includes selected-response questions, short constructed-response questions, and extended constructed-response questions. At least 50 percent of the assessment time is devoted to constructed-response questions. These questions measure students' knowledge of facts, ability to integrate this knowledge into larger constructs, and capacity to use the tools, procedures, and reasoning processes of science to develop an increased understanding of the natural world.

In 2019, some students will take the paper-and-pencil version of the science assessment, and some will take a digitally based assessment on touchscreen tablets with keyboards. During the digitally based assessment, students will have access to onscreen tools that will help them interact with the assessment. Some of these in-system tools include magnification, a read-aloud option, and a progress bar and timer.

The NAEP 2019 science assessment is organized according to science content and practices in the NAEP science framework. For more information regarding the science assessment framework, please visit the National Assessment Governing Board's website at <https://www.nagb.gov/naep-frameworks/science.html>.

NAEP Science Framework Distribution of Questions Across Content Areas

Physical Science (30%)*	Life Science (30%)*	Earth and Space Science (40%)*
<p>Matter</p> <ul style="list-style-type: none"> • Properties of matter • Changes in matter <p>Energy</p> <ul style="list-style-type: none"> • Forms of energy • Energy transfer and conservation <p>Motion</p> <ul style="list-style-type: none"> • Motion at the macroscopic level • Forces affecting motion 	<p>Structures and Functions of Living Systems</p> <ul style="list-style-type: none"> • Organization and development • Matter and energy transformations • Interdependence <p>Changes in Living Systems</p> <ul style="list-style-type: none"> • Heredity and reproduction • Evolution and diversity 	<p>Earth in Space and Time</p> <ul style="list-style-type: none"> • Objects in the universe • History of the Earth <p>Earth Structures</p> <ul style="list-style-type: none"> • Properties of Earth materials • Tectonics <p>Earth Systems</p> <ul style="list-style-type: none"> • Energy in Earth systems • Climate and weather • Biogeochemical cycles

* Item distribution for the content areas is measured by percentage of student response time.

Science Practices

The framework reflects these four science practices**:

- Identifying science principles (25%)
- Using science principles (35%)
- Using scientific inquiry (30%)
- Using technological design (10%)

** Item distribution for the science practices is measured by percentage of student response time.

Directions

Below are the General Directions for the science digitally based assessment. Students will see these instructions on the screen prior to beginning the assessment.

This assessment has several sections of science questions. When you are finished with these sections, you will be asked to answer questions about yourself and your experiences in and out of school.

If time runs out before you complete a section, your work will be saved.

Tap the Next arrow to begin.

Here is an example of directions a student might see during the science assessment.

This section has 20 science questions. You have 30 minutes to complete this section.

If you finish before time is up, you may review your work.

Tap the Next arrow to continue.

Sample Questions

The following science sample questions and correct student responses are available in the NAEP Questions Tool. For additional sample questions and responses, visit <https://nces.ed.gov/nationsreportcard/nqt/>.

Learn more about NAEP digitally based assessments and view interactive tutorials at <https://nces.ed.gov/nationsreportcard/dba/>.

PERIODIC TABLE OF THE ELEMENTS

GROUP IA (1)												GROUP IIB (8)					
1 H 1.0079												2 He 4.0026					
3 Li 6.941	4 Be 9.012											5 B 10.811	6 C 12.011	7 N 14.007	8 O 16.00	9 F 19.00	10 Ne 20.179
11 Na 22.99	12 Mg 24.30	IIIA (3)	IVA (4)	VA (5)	VIA (6)	VIIA (7)	VIII (8)		IB (1)	IIB (2)	13 Al 26.98	14 Si 28.09	15 P 30.974	16 S 32.06	17 Cl 35.453	18 Ar 39.948	
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.90	23 V 50.94	24 Cr 52.00	25 Mn 54.938	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.39	31 Ga 69.72	32 Ge 72.59	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (98)	44 Ru 101.1	45 Rh 102.91	46 Pb 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.75	52 Te 127.60	53 I 126.91	54 Xe 131.29

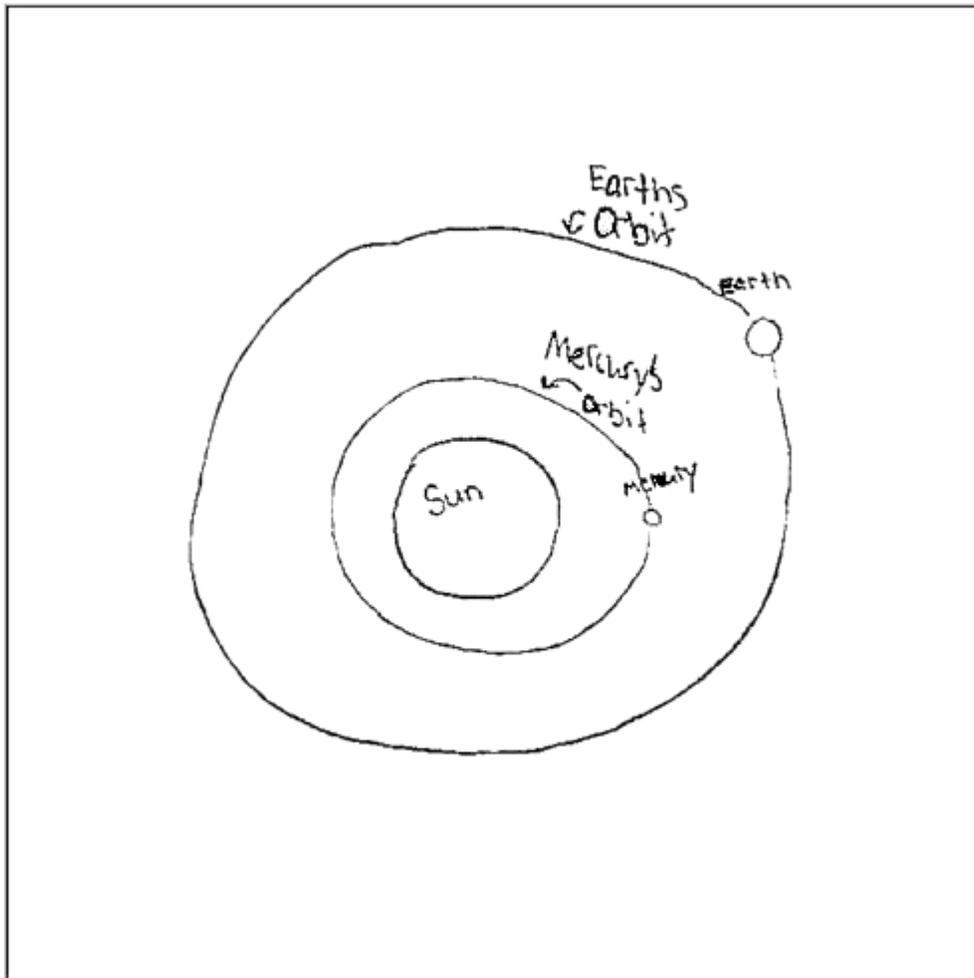
Element	Symbol
Argon	Ar
Chlorine	Cl
Helium	He
Nitrogen	N
Zinc	Zn

4. Based on its location on the partial periodic table shown above, which element would you predict has chemical properties that are most similar to argon (Ar)?
- A Chlorine (Cl)
- B Helium (He)
- C Nitrogen (N)
- D Zinc (Zn)

GO ON TO THE NEXT PAGE 

5. Mercury is the planet closest to the Sun. In the box below, draw a diagram showing each of the following. Label all parts of your diagram.

- Earth
- Mercury
- Sun
- Orbits



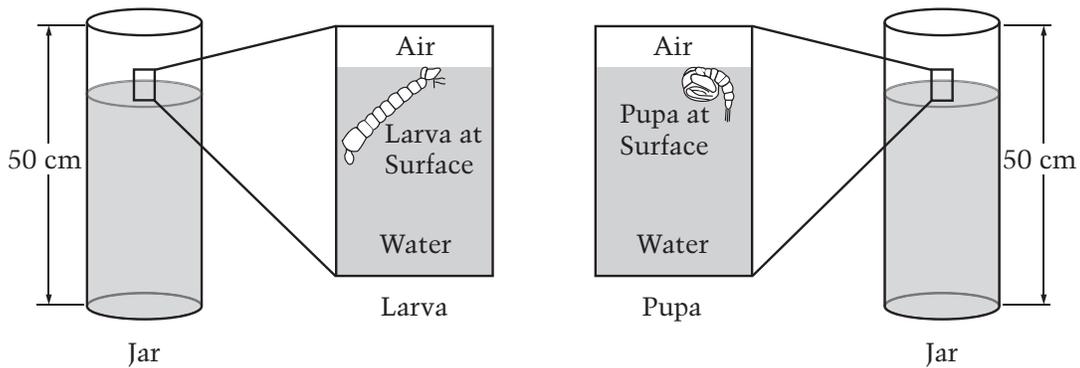
GO ON TO THE NEXT PAGE 

This question refers to the following investigation.

Some students were studying the life cycle of mosquitoes. They learned that mosquito larvae and pupae spend part of their time at the surface of water.

The students wanted to find out how a larva and pupa behaved when the jars they were in were disturbed. They put one larva and one pupa in identical tall jars of water at 20°C as shown below.

JARS WITH LARVA AND PUPA



The students tapped on the jars when the larva and pupa were at the surface of the water. The larva and pupa dove down into the jars, and then slowly came to the surface.

The students measured the depth each larva and pupa reached and the amount of time each stayed underwater. The students repeated this step five times and calculated the average of each of their measurements.

Their results are summarized in the table below.

DATA TABLE

Number of Trials	Larva		Pupa	
	Average Depth Reached (centimeters)	Average Length of Time Underwater (seconds)	Average Depth Reached (centimeters)	Average Length of Time Underwater (seconds)
5	22	90	38	120

GO ON TO THE NEXT PAGE

13. Larvae and pupae normally float. They must use their muscles in order to dive down through water. What type of energy is used by the muscles?
- Ⓐ Sound energy from the air
 - Ⓑ Thermal energy from the water
 - Chemical potential energy from their cells
 - Ⓓ Gravitational potential energy from Earth



III. NAEP 2019 Survey Questionnaires

Each year, students, teachers, and school administrators who participate in the NAEP assessments voluntarily complete survey questionnaires. Student survey questionnaires collect valuable information about students' educational experiences, opportunities to learn both in and out of the classroom, and other factors related to student learning.

In 2019, students who take the NAEP mathematics, reading, and science assessments will be asked to complete a survey questionnaire. Students have 15 minutes to complete the questionnaire, which is located at the end of each NAEP assessment. While they are encouraged to answer as many questions as they feel comfortable with, students can skip any part of the questionnaire by leaving a response blank.

All data collected from the survey questionnaires will be used for statistical purposes only.* This data can help educators, policymakers, and researchers to better understand the context in which students learn, and, in turn, can help improve education in our nation's classrooms.

To view the NAEP 2019 student survey questionnaires for the eighth-grade mathematics, reading, and science assessments, visit https://nces.ed.gov/nationsreportcard/experience/survey_questionnaires.aspx. You'll also find student, teacher, and school survey questionnaires for other NAEP subjects, FAQs, and general information about NAEP survey questionnaires.

Parents can view and download the *NAEP Survey Questionnaires: Facts for Parents* PDF at https://nces.ed.gov/nationsreportcard/subject/parents/pdf/naep_sq_parent_fact_sheet_2018.pdf.

Survey Questionnaire Directions

Below are the directions students will see on the screen prior to beginning the NAEP survey questionnaire.

This section contains questions about you and your experiences in and out of school. You may skip any question you do not want to answer. Answer questions about your home based on where you live most of the time during the school year.

Tap the Next arrow to continue.

* All of the information provided by participants may be used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose except as required by law (20 U.S.C. §9573 and 6 U.S.C. §151). By law, every NCES employee as well as every NCES agent, such as contractors and NAEP coordinators, has taken an oath and is subject to a jail term of up to 5 years, a fine of \$250,000, or both if he or she willfully discloses ANY identifiable information about you. Electronic submission of your information will be monitored for viruses, malware, and other threats by Federal employees and contractors in accordance with the Cybersecurity Enhancement Act of 2015. The collected information will be combined across respondents to produce statistical reports.

IV. NAEP Questions Tool

Introduction

After every assessment cycle, the National Center for Education Statistics (NCES) releases dozens of assessment questions to the public. Teachers, researchers, and the public can access these released questions using the NAEP Questions Tool (NQT). The NQT allows users to search for questions by subject, grade, difficulty, and other characteristics. You can also view scoring guides, keys, national performance data, demographic group data, and student responses (for constructed-response questions only). The tool also allows users to create customized reports and to print selected questions and all associated information.

How do I access the NAEP Questions Tool?

The NQT is available at <https://nces.ed.gov/nationsreportcard/nqt>.

What can I do with the NAEP Questions Tool?

The NQT provides easy-to-follow instructions so teachers, parents, and students can

- sort and select NAEP questions;
- “test yourself” on any NAEP subject with a customizable assessment function;
- create online, self-scoring assessments that students can login to take anytime; and
- compare results to how students performed across the nation.

If you need help navigating the NQT, there is a Help button on every page.

Where can I find more information about the subjects NAEP assesses?

The NAEP website contains a wealth of information about the subjects NAEP assesses and can be accessed at <https://nces.ed.gov/nationsreportcard>.

How can I get additional help?

For more help with features on the NAEP website, click “Help” on the top right toolbar.

For additional assistance, write to us via the Contact NAEP page at <https://nces.ed.gov/nationsreportcard/contactus.aspx>.

V. About NAEP

OVERVIEW. NAEP is the largest nationally representative and continuing assessment of what our nation's students know and can do in various academic subjects. NAEP is administered by the National Center for Education Statistics (NCES), located within the U.S. Department of Education's Institute of Education Sciences. For more information about the NAEP program, visit the NAEP website at <https://nces.ed.gov/nationsreportcard>.

PARTICIPATION. States and districts that receive Title I funds are required to participate in NAEP reading and mathematics assessments at grades 4 and 8 every other year. Student participation is always voluntary. Your school's NAEP coordinator can provide you with more information. Contact your school for details.

CONTENT. The National Assessment Governing Board, an independent body of educators, community leaders, and assessment experts, sets policy for NAEP and oversees the creation of the NAEP frameworks, which describe the specific knowledge and skills that should be assessed. For additional information on framework development, visit the Governing Board's website at <https://www.nagb.gov/naep-frameworks/frameworks-overview.html>.

SAMPLE QUESTIONS. For each assessment, some of the test questions, along with performance data, are made available to the public to provide concrete samples of NAEP content and results. For every assessment, NAEP provides sample questions booklets for participating schools as well as information about the assessment design and questions. Released questions and student performance data may be viewed and downloaded from the NCES website at <https://nces.ed.gov/nationsreportcard/nqt>.

SECURE QUESTIONS. On written request, parents and educators may review NAEP questions and instruments still in use. These arrangements must be made in advance, and persons reviewing the assessment may not remove the booklets from the room, copy them, or take notes. Contact your school's NAEP coordinator for more information.

PUBLICATIONS. NAEP reports and brochures can be searched and downloaded from the NAEP website at <https://nces.ed.gov/nationsreportcard>.

FOR FURTHER INFORMATION. For prompt field staff support on these or other matters, call the NAEP help desk at 800-283-6237.

The work reported herein was supported under the National Assessment of Educational Progress (ED-07-CO-0078, ED-07-CO-0107) as administered by the National Center for Education Statistics, within the U.S. Department of Education.