NAEP
FLORIDA
NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS

Grade 4 Mathematics and Science Sample Questions

This booklet contains sample Grade 4 Mathematics and Science items from the National Assessment of Educational Progress (NAEP). Additional items can be accessed at www.nces.ed.gov/nationsreportcard/itmrls.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics (NCES), National Assessment of Educational Progress (NAEP).

This booklet and the companion answer document are posted at http://www.fldoe.org/asp/naep/naep-pt.asp.

NAEP GRADE 4 SAMPLE QUESTIONS
CONTENTS

Mathematics Common Core (MACC) State Standards (CCSS) Domains

NBT = Number and Operations in Base Ten

NF = Number and Operations Fractions

OA = Operations and Algebraic Thinking

G = Geometry

MD = Measurement and Data

Florida's Science Next Generation Sunshine State Standards (NGSSS)

L = Life Science

P = Physical Science

E = Earth and Space Science

N = Nature of Science

INTRODUCTION

The sample items included in this document are taken from previously administered, publicly released Grade 4 National Assessment of Educational Progress (NAEP) Mathematics and Science assessments. The answers to the sample items are included in a companion document. For the multiple-choice questions, the correct answers (indicated by an asterisk) and the distracters; the percentage of the Florida's responses to each of the possible answers; and the Description, Difficulty, and Complexity of each item are provided. Score descriptors are shown for short- and extended-constructed response items. All released NAEP items and sample responses can be found in the NAEP Questions Tool (NQT) at http://nces.ed.gov/nationsreportcard/itmrlsx/default.aspx.

The NQT is an interactive tool containing over 2,000 released questions from NAEP assessments in all NAEP subject areas. The questions are an example of what NAEP asks students on the assessments and can be used as a supplement to classroom instruction. Also available are the scoring rubrics; sample student responses; and scoring results by subject, grade, item type, difficulty, content classification, framework, year, and key words.

For more information about NAEP results, go to the NAEP Data Explorer (NDE) at http://nces.ed.gov/nationsreportcard/naepdata/. The NDE is an interactive tool that provides access to a wide variety of data about what students know and can do, as well as demographic and contextual factors that may affect their performance. The NDE produces charts, customized tables, and graphics based on NAEP results by year and jurisdiction; significance between jurisdictions, within variables, and across years; and gap analyses between jurisdictions or across years and between groups, between years, and between groups and years.

Additional information about the knowledge and skills the mathematics and science assessments are designed to measure can be found in the NAEP 2011 Mathematics Framework, http://www.nagb.org/publications/frameworks/math-2011-framework.pdf and the NAEP 2011 Science Framework, http://www.nagb.org/content/nagb/assets/documents/publications/frameworks/science-2011.pdf. The current NAEP Mathematics Framework has guided the development of all mathematics assessments since 2005. The previous framework guided the development of the mathematics assessments between 1990 and 2003. The current NAEP Science Framework was the basis of the NAEP 2009 and 2011 science assessments. The previous framework was the basis of the NAEP Science assessments administered in 1996, 2000, and 2005.

NAEP GRADE 4 MATHEMATICS

Question 1, Compute value using multiplication and division

(47 x 75) ÷ 25 =

a. 141
b. 1,175
c. 3,525
d. 4,700

Question 2, Solve a story problem involving division

Park School has 316 students. For Field Day, the students are divided into 4 teams with the same number of students on each team. How many students are on each team?

a. 79
b. 312
c. 320
d. 1,264

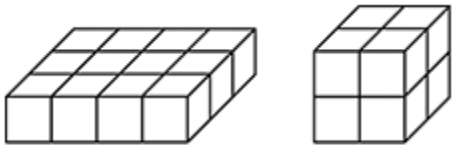
Question 3, Solve a story problem involving multiplication

Patty expects that each tomato plant in her garden will bear 24 tomatoes. If there are 6 tomato plants in her garden, how many tomatoes does she expect?

a. 4
b. 18
c. 30
d. 144

Question 4, Compare numbers of cubes in two solids

How many <u>more</u> small cubes were used to make Solid *A* than Solid *B*?



Solid *A* Solid *B*

a. 2
b. 4
c. 6
d. 7

Question 5, Create a pictograph of a set of data

FAVORITE ICE-CREAM FLAVORS OF FOURTH GRADERS

Class	Number Who Chose Vanilla	Number Who Chose Chocolate
Mr. Kennedy	6	12
Ms. Ying	8	10
Mrs. Delgado	7	13
Mrs. Findley	9	15

The table above lists the favorite ice-cream flavors of four classes of fourth graders. On the graph below, use one ☺ to represent 10 children. Draw the correct number of faces on the graph to show the favorite flavors of the grade 4 students.

FAVORITE ICE-CREAM FLAVORS

Number Who Chose Vanilla	
Number Who Chose Chocolate	

☺ = 10 children

Question 6, Perform computations with data from table

Mr. Johnson's class voted for where they want to go on their school trip. The chart below shows the students' votes.

SCHOOL TRIP

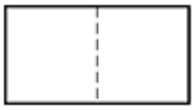
Place	Votes
City park	𝍸
Museum	𝍸 𝍸 ||
Theater	𝍸 𝍸 𝍸

How many more students voted to go to the theatre than to go to the city park?

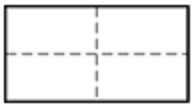
a. 3
b. 4
c. 11
d. 15

Question 7, Recognize and extend a growing pattern

Sam folds a piece of paper in half once. There are 2 sections.



Sam folds the paper in half again. There are 4 sections.



Sam folds the paper in half again. There are 8 sections.
Sam folds the paper in half two more times.
Which list shows the number of sections there are each time Sam folds the paper?

a. 2, 4, 8, 10, 12
b. 2, 4, 8, 12,24
c. 2, 4, 8 ,16, 24
d. 2, 4, 8, 16, 32

Question 8, Identify the growth relationship from a table

Every 30 minutes, Dr. Kim recorded the number of bacteria in a test tube.

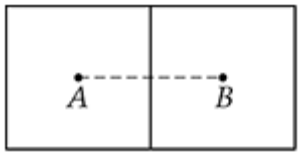
Time	Number of Bacteria
1:00 P.M.	600
1:30 P.M.	1,190
2:00 P.M.	2,390
2:30 P.M.	4,800

Which best describes what happened to the number of bacteria every 30 minutes?

a. The number of bacteria increased by 500
b. The number of bacteria increased by 1,000
c. The number of bacteria doubled
d. The number of bacteria tripled

Question 9, Determine distance between centers of adjacent squares

Each square below is 10 units on a side. Points *A* and *B* are the centers of the squares. What is the distance between *A* and *B*?



a. 5 units
b. 10 units
c. 15 units
d. 20 units

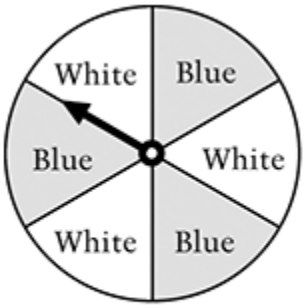
Question 10, Identify appropriate unit for measuring length

Which unit would probably be used to measure the length of a book?

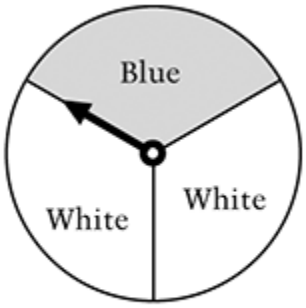
a. Inches
b. Yards
c. Square Inches
d. Square Yards

Question 11, Determine spinner with greater probability of an outcome

Lori has a choice of two spinners. She wants the one that gives her a greater probability of landing on blue. Which spinner should she choose? Explain why the spinner you chose gives Lori the greater probability of landing on blue.



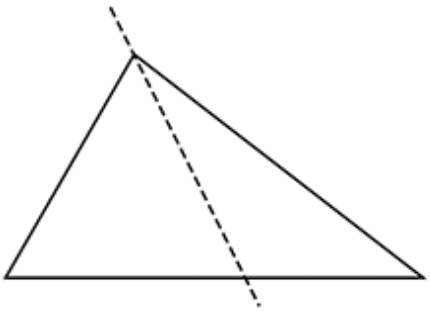
Spinner A



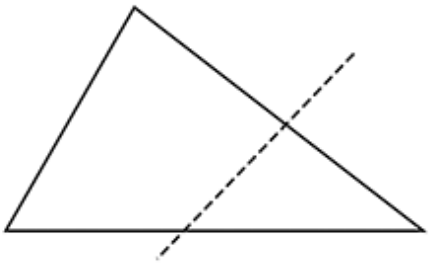
Spinner B

Question 12, Divide a square into various shapes

When a triangle is divided by a straight line, these results are possible.

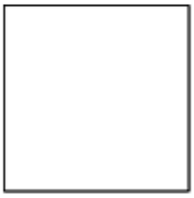


Two triangles



A triangle and
a quadrilateral

Draw one straight line to divide the square below into two rectangles.



Draw one straight line to divide each square below into two shapes that are <u>not</u> rectangles. The results should be <u>different</u> for each square.

You do <u>not</u> need to give the names of your shapes.

NAEP GRADE 4 SCIENCE

Question 1, Identify the organism with a change in habitat from young to adult

Which animal lives in water when very young and then lives on land as an adult?

A.

Shark

B.

Snake

C.

Frog

D.

Penguin

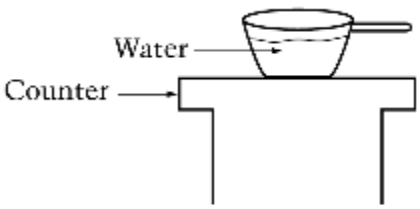
Question 2, Identify the organism with the type of life cycle

Which animal develops inside its mother before it is born alive?

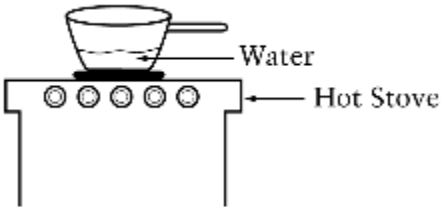
a. Butterfly
b. Cat
c. Duck
d. Frog

Question 3, Explain change in volume due to evaporation

Manny puts the same amount of water in two pots of the same size and type. He places one pot of water on the counter and one pot of water on a hot stove. After 10 minutes, Manny observes that there is less water in the pot on the hot stove than in the pot on the counter, as shown below.



Pot of Water on Counter



Pot of Water on Hot Stove

Why is there less water in the pot on the hot stove?

Where did the water go?

Question 4, Identify the best tool to measure rainfall

Which tool is used to measure how much rain falls during a storm?

A.

© Feng Yu/iStockphoto #2868652

B.

© Karen Harrison/iStockphoto #2898026

C.

© Solymosi Tamas/iStockphoto #4139567

D.

© Jason Cheever/iStockphoto #878906

Question 5, Explain example of heat (thermal energy) transfer

A thermometer shows that the outside air temperature is colder than the temperature at which water turns to ice. However, ice on the sidewalk melts. What probably causes this?

a. The air heating the sidewalk
b. The sidewalk reflecting the sunlight into the air
c. The wind causing the ice on the sidewalk to melt
d. The sunlight making the sidewalk warmer than the air

Question 6, Recognize that light is a form of energy

Which statement explains why light from the Sun can warm up water in a glass?

a. Light travels very fast
b. Light travels in straight lines
c. Water reflects light energy
d. Water absorbs light energy

Question 7, Design an investigation to find the volume of a container

A student wants to know whether two cups will hold the same volume of water. The two cups have different weights (masses).

Cup 1 Cup 2

The student completely fills Cup 1 with water. The student wants to measure if Cup 2 holds the same volume of water. What should the student do next to complete the measurements?

a. Completely fill Cup 2 with water and then look at the cups side by side
b. Pour half of the water from Cup 1 into Cup 2, weigh each cup, and then compare their weights
c. Pour all of the water from Cup 1 into Cup 2 to see if the water completely fills Cup 2 without spilling over
d. Completely fill Cup 2 with water, weigh each filled cup, and then compare the weights

Question 8, Recognize the best conductor of electricity

Which material is the best conductor of electricity?

a. Wood
b. Metal
c. Stone
d. Plastic

Question 9, Recognize an example of a change of state

Which is an example of melting?

a. Flowing water making a rock smooth
b. A carrot becoming soft when cooked
c. Sugar mixed into tea making the tea sweet
d. Butter changing into liquid in a warm pan

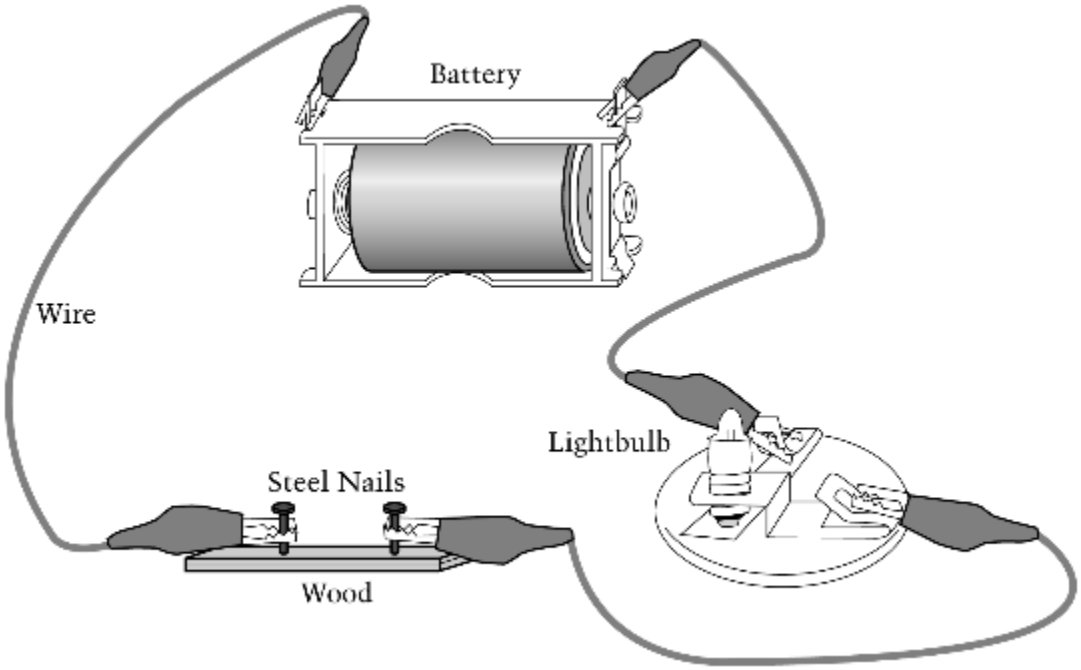
Question 10, Classify an observation as an example of erosion

Roger poured water over a pile of sand. Some of the sand washed away. This process is similar to which of the following?

a. The eruption of a volcano
b. The erosion of the walls of a canyon
c. The uplifting of mountain ranges
d. The forming of dunes or mounds in a desert

Question 11, Decide how to make a closed circuit

A student tried to connect an electrical circuit as shown below. The light bulb did not light up. What can the student do to make the light bulb light up?



a. Connect a second battery to the first battery
b. Replace the wires with thicker wires
c. Replace the steel nails with aluminium nails
d. Connect the steel nails with a short piece of wire

Question 12, Explain choice of material on protection of the environment

When people buy groceries, they may have their groceries packed in plastic bags, paper bags, or cloth bags they bring with them. Which type of grocery bag is best to use to help protect the environment?

a. Plastic
b. Paper
c. Cloth

Explain why your choice helps protect the environment.

Question 13, Predict and explain the phenomenon based on evaporation

A student poured the same amount of water into two identical cups. He put one cup in the refrigerator and left one cup out in a warm room. Neither cup was touched. The diagram below shows how much water was left in the cups two days later.

A B

Which cup was in the refrigerator, A or B? Explain your answer.

Question 14, Choose and critique setups for investigating the growth of plants

Two students investigated the growth of pea plants. Each student had three pots. All of the pots contained the same type and amount of soil. They planted pea pods in each pot. The students set up their investigation as shown in the table below.

	Volume of Water Added to Pots	Temperature of the Environment	Amount of Sunlight Pots Received
Michael	The same for each pot	Different for each pot	The same for each pot
Carmen	The same for each pot	The same for each pot	Different for each pot

Which student had the best setup to find out how the amount of sunlight affects the growth of pea plants?

a. Michael
b. Carmen

Explain why you chose this student's setup.

What do you think you could learn about plant growth from the setup that you did **NOT** choose?

Question 15, Design investigation to compare types of bird food

A bird-watcher wants to see many birds in a one-hour period. She decides to investigate which type of food will attract more birds in her backyard. She has a choice of two types of bird food.

1. Sunflower seeds
2. Thistle seeds

Describe a fair test the bird-watcher could conduct to help her decide which food will attract more birds.

What information should the bird-watcher collect from her test to help decide which type of food attracts more birds?