NAEP
FLORIDA
NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS

Grade 4 Mathematics and Science

Answer Key

This booklet contains the answers to the sample items from the National Assessment of Educational Progress (NAEP) included in the Grade 4 Mathematics and Science Sample Questions Booklet and provides the corresponding Common Core State Standards (CCSS) for Mathematics and the Next Generation Sunshine State Standards (NGSSS) for Science. Additional NAEP 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 answer key and the Grade 4 Mathematics and Science Sample Questions Booklet are posted at http://www.fldoe.org/asp/naep/naep-pt.asp.

NAEP GRADE 4 ANSWER KEY
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

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

GRADE 4 MATHEMATICS

Alignment to Mathematics Common Core (MACC) State Standards (CCSS) and Answers to NAEP Sample Questions

Question 1, MACC.4.NBT.2.5 and MACC.4.NBT.2.6

Description: Compute value using multiplication and division
Content Area: Number Properties and Operations
Difficulty: Easy
Complexity: Low

Correct answer is **A**

Answers	Percent chosen by Florida's participating students
*A	84%
B	3%
C	11%
D	1%
Omitted	1%

Question 2, MACC.4.NBT.2.6

Description: Solve a story problem involving division
Content Area: Number Properties and Operations
Difficulty: Easy
Complexity: Low

Correct answer is **A**

Answers	Percent chosen by Florida's participating students
*A	65%
B	4%
C	7%
D	23%
Omitted	1%

Question 3, MACC.4.NBT.2.5

Description: Solve a story problem involving multiplication
Content Area: Number Properties and Operations
Difficulty: Medium
Complexity: Low

Correct answer is **D**

Answers	Percent chosen by Florida's participating students
*D	55%
A	29%
B	6%
C	9%
Omitted	1%

Question 4, MACC.4.NBT.2.4, MACC.4.NBT.2.5, MACC.4.OA.1.1, and MACC.4.OA.1.2

Description: Compare numbers of cubes in two solids
Content Area: Measurement
Difficulty: Medium
Complexity: Low

Correct answer is **D**

Answers	Percent chosen by Florida's participating students
*B	55%
A	11%
C	14%
D	19%
Omitted	1%

Question 5, MACC.4.NBT.2.4

Description: Create a pictograph of a set of data
Content Area: Data Analysis and Probability
Difficulty: Medium
Complexity: Moderate

Solution:
Sample Correct Response:

Number who chose vanilla: 3 faces (30)

Number who chose chocolate: 5 faces (50)

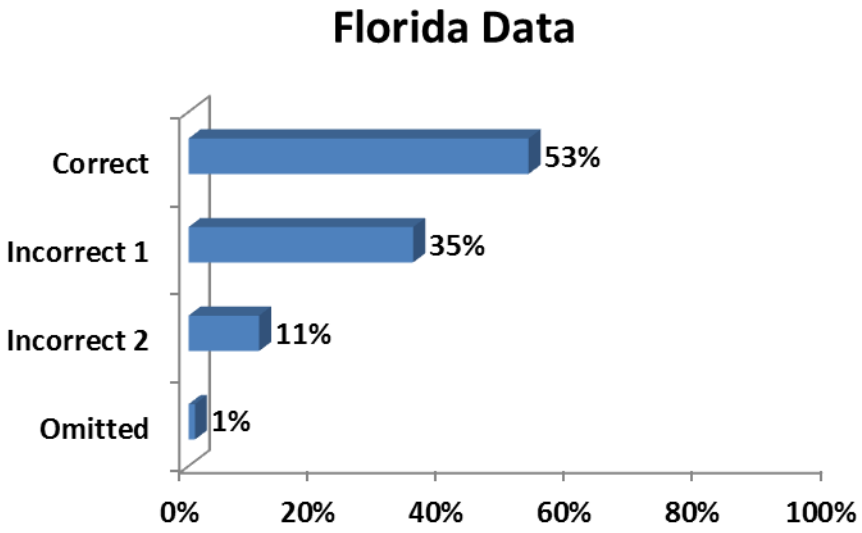
Any adequate graph. In order for the graph to be counted as correct, each category must have the correct number of faces (but the eyes and mouth do not have to be drawn.) The use of numbers rather than faces is an incorrect response.

Score & Description

Correct
Correct response

Incorrect 1
Only one row correct (except if both rows have 3 faces, or both rows have 5 faces)

Incorrect 2
Any incorrect response other than the response described in Incorrect 1



Question 6, MACC.4.NBT.2.4

Description: Perform computations with data from table
Content Area: Data Analysis and Probability
Difficulty: Low
Complexity: Moderate

Correct answer is **C**

Answers	Percent chosen by Florida's participating students
*C	82%
A	4%
B	2%
D	12%

Question 7, MACC.3.OA.4.9 and MACC.4.OA.3.5

Description: Recognize and extend a growing pattern
Content Area: Algebra
Difficulty: Hard
Complexity: Moderate

Correct answer is **D**

Answers	Percent chosen by Florida's participating students
*D	23%
A	54%
B	12%
C	10%
Omitted	2%

Question 8, MACC.4.OA.3.5

Description: Identify the growth relationship from a table
Content Area: Algebra
Difficulty: Hard
Complexity: Moderate

Correct answer is **C**

Answers	Percent chosen by Florida's participating students
*C	35%
A	31%
B	18%
D	14%
Omitted	2%

Question 9, MACC.4.MD.1.2

Description: Determine distance between centers of adjacent squares
Content Area: Geometry
Difficulty: Medium
Complexity: Moderate

Correct answer is **B**

Answers	Percent chosen by Florida's participating students
*B	47%
A	34%
C	5%
D	12%
Omitted	2%

Question 10, MACC.4.MD.1.1

Description: Identify appropriate unit for measuring length
Content Area: Measurement
Difficulty: Easy
Complexity: Low

Correct answer is **A**

Answers	Percent chosen by Florida's participating students
*A	84%
B	3%
C	11%
D	1%
Omitted	1%

Question 11, MACC.4.NF.1.2, MACC.4.NF.2.3a, MACC.4.NF.2.3b, MACC.4.NF.2.3c, and MACC.4.NF.2.3d

Description: Determine spinner with greater probability of an outcome
Content Area: Data Analysis and Probability
Difficulty: Hard
Complexity: Moderate

Solution:
Sample Correct Response:

Correct answer: Spinner A

Explanation:

On Spinner A, 3 out of the 6 regions are blue, giving a probability of $\frac{3}{6}$, which equals $\frac{1}{2}$.

On Spinner B, 1 out of the 3 regions is blue, giving a probability of $\frac{1}{3}$.

An acceptable explanation must address either:

- probability or area for both spinners, or
- the probability or area for one spinner with a comparison to the other spinner (the comparison cannot be to the number of sections in the spinner).

Note(s):
An explanation based only on the number of sections is incorrect.

Question 11, continued

Score & Description

Correct
Correct oval filled in with acceptable explanation

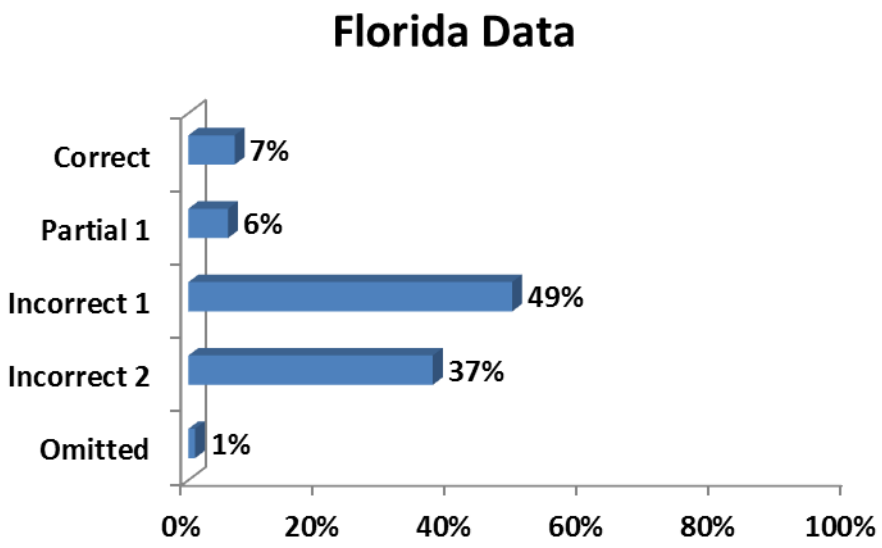
Partial 1
Correct oval filled in with incomplete explanation

Partial 2
Neither oval filled in with acceptable explanation

Partial 3
Incorrect oval filled in with acceptable explanation that supports the choice of Spinner A

Incorrect 1
Correct oval filled in with no explanation or incorrect explanation

Incorrect 2
Other incorrect responses

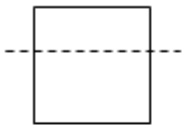


Question 12, MACC.4.G.1.1 and MACC.4.G.1.2

Description: Divide a square into various shapes
Content Area: Geometry
Difficulty: Medium
Complexity: High

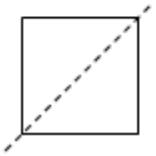
Solution:
Sample Correct Response:

2 rectangles

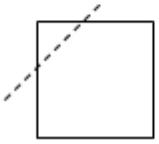


Any three of the following:

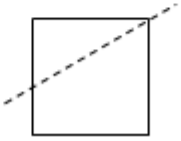
2 triangles



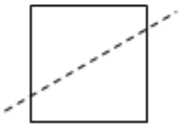
A triangle and a pentagon



A triangle and a quadrilateral



2 quadrilaterals



Score & Description

Extended
Correct response

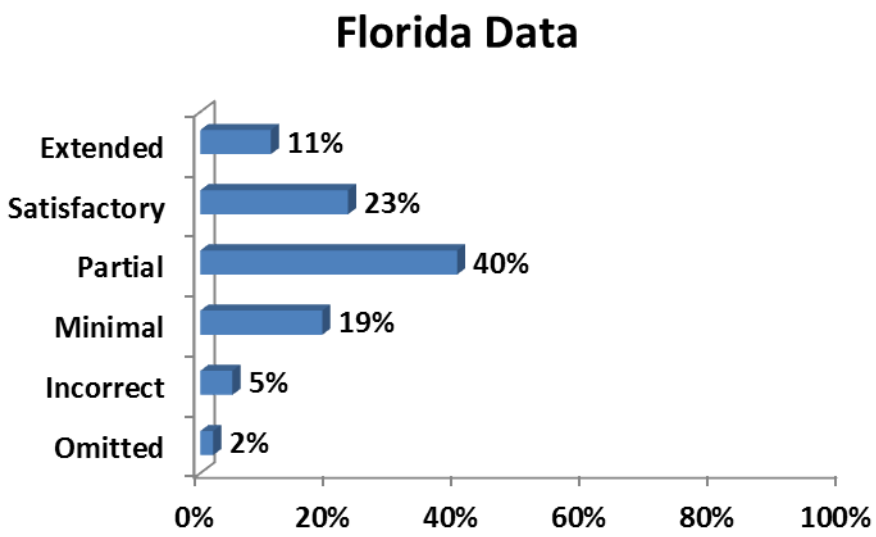
Satisfactory
Shows 3 different possibilities

Partial
Shows 2 different possibilities

Minimal
Shows 1 possibility

Incorrect
Incorrect response

Question 12, continued



GRADE 4 SCIENCE

Alignment to Florida's Next Generation Sunshine State Standards (NGSSS) and Answers to NAEP Sample Questions

Question 1, NGSSS.SC.4.L.16.4

Description: Identify the organism with a change in habitat from young to adult
Difficulty: Easy
Content Area/Science Practices: Life Science, Identifying Science Principles

Correct answer is **C**

Answers	Percent chosen by Florida's participating students
*C	85%
A	4%
B	3%
D	7%
Omitted	1%

Question 2, NGSSS.SC.3.L.15.1

Description: Identify the organism with the type of life cycle
Difficulty: Easy
Content Area: Life Science, Identifying Science Principles

Correct answer is **B**

Answers	Percent chosen by Florida's participating students
*B	75%
A	8%
C	9%
D	7%
Omitted	1%

Question 3, NGSSS.SC.4.L.17.4 and NGSSS.SC.4.E.6.3

Description: Explain change in volume due to evaporation
Difficulty: Easy
Content Area/Sciences Practices: Physical Science, Using Science Principles

Score & Description

Complete
Student response indicates that the water evaporated or boiled. Response also indicates that the water went into the atmosphere.

Partial
Student response indicates that the water evaporated or boiled.
OR
Student response indicates that the water went into the atmosphere.

Unsatisfactory/Incorrect
Student response is inadequate or incorrect.

Answers	Percent chosen by Florida's participating students
*Complete	53%
Partial	25%
Unsatisfactory/Incorrect	18%
Omitted	4%

Question 4, NGSSS.SC.4.E.6.5

Description: Identify the best tool to measure rainfall
Difficulty: Easy
Content Area/Science Practices: Earth and Space Sciences, Identifying Science Principles

Correct answer is **B**

Answers	Percent chosen by Florida's participating students
*B	89%
A	4%
C	1%
D	5%
Omitted	1%

Question 5, NGSSS.SC.5.E.7.3

Description: Explain example of heat (thermal energy) transfer
Difficulty: Easy
Content Area: Physical Science, Using Science Principles

Correct answer is **D**

Answers	Percent chosen by Florida's participating students
*D	67%
A	15%
B	11%
C	7%

Question 6, NGSSS.SC.3.E.5.2 and NGSSS.SC.3.E.6.1

Description: Recognize that light is a form of energy
Difficulty: Medium
Content Area: Physical Science, Identifying Science Principles

Correct answer is **D**

Answers	Percent chosen by Florida's participating students
*D	57%
A	14%
B	6%
C	22%

Question 7, NGSSS.SC.4.E.6.4

Description: Design an investigation to find the volume of a container
Difficulty: Hard
Content Area: Physical Science, Using Scientific Inquiry

Correct answer is **C**

Answers	Percent chosen by Florida's participating students
*C	32%
A	16%
B	25%
D	24%
Omitted	3%

Question 8, NGSSS.SC.4.P.11.2

Description: Recognize the best conductor of electricity
Difficulty: Medium
Content Area: Physical Science, Identifying Science Prinicples

Correct answer is **B**

Answers	Percent chosen by Florida's participating students
*B	84%
A	5%
C	3%
D	8%
Omitted	1%

Question 9, NGSSS.SC.5.P.9.1

Description: Recognize an example of a change of state
Difficulty: Easy
Content Area: Physical Science, Identifying Science Principles

Correct answer is **D**

Answers	Percent chosen by Florida's participating students
*D	82%
A	5%
B	8%
C	6%

Question 10, NGSSS.SC.5.P.10.1, NGSSS.SC.5.P.10.4, and NGSSS.SC.5.P.11.1

Description: Classify an observation as an example of erosion
Difficulty: Hard
Content Area/Sciences Practices: Earth and Space Sciences, Identifying Science Principles

Correct answer is **B**

Answers	Percent chosen by Florida's participating students
*B	30%
A	24%
C	10%
D	36%
Omitted	1%

Question 11, NGSSS.SC.3.P.9.1

Description: Decide how to make a closed circuit
Difficulty: Hard
Content Area/Sciences Practices: Physical Science, Using Science Principles

Correct answer is **D**

Answers	Percent chosen by Florida's participating students
*D	30%
A	32%
B	13%
C	24%
Omitted	1%

Question 12, NGSSS.SC.3.P.9.1

Description: Explain choice of material based on protection of the environment
Difficulty: Medium
Content Area/Sciences Practices: Earth and Space Science, Using Technological Design

Score & Description

Complete
Student response indicates one type of grocery bag and correctly explains why using this type of bag helps protect the environment. Response indicates reusing, recycling, or biodegradation of the bags, as appropriate.
OR
Student response indicates one type of grocery bag and correctly explains why not using bags made of one of the other materials helps protect the environment.

Unsatisfactory/Incorrect
Student response is inadequate or incorrect.

Answers	Percent chosen by Florida's participating students
*Complete	59%
Unsatisfactory/Incorrect	40%
Omitted	1%

Question 13, NGSSS.SC.3.N.1.7, NGSSS.SC.3.P.8.2, and NGSSS.SC.4.P.8.1

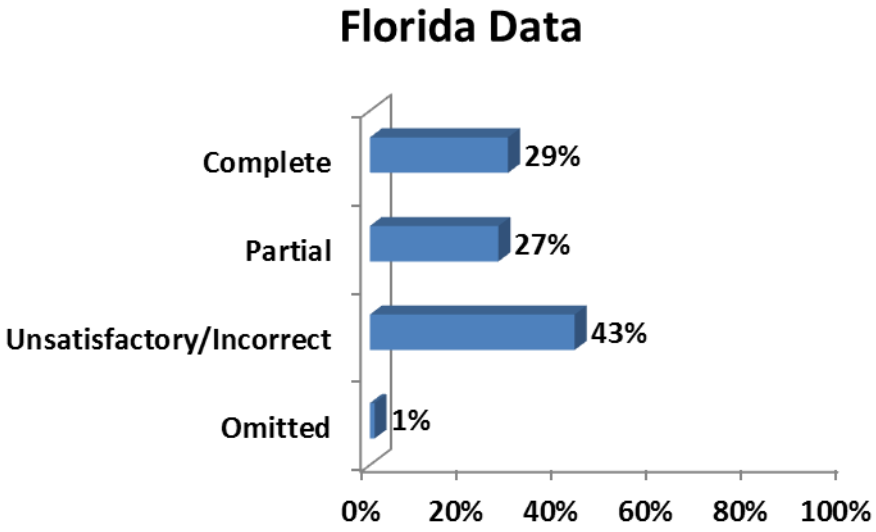
Description: Predict and explain the phenomenon based on evaporation
Difficulty: Medium
Content Area/Sciences Practices: Physical Science, Using Science Priciples

Score & Description

Complete
Student response selects (A) Cup A and either indicates that the water in Cup A evaporated less because the temperature in the room is warmer than in the refrigerator, or indicates that the water in Cup A expands as it freezes.
OR
Student response selects (B) Cup B and indicates that the water in Cup B evaporated more because the air in the refrigerator is drier than in the room.

Partial
Student response is partially correct.

Unsatisfactory/Incorrect
Student response is inadequate or incorrect.



Question 14, NGSSS.SC.3.N.1.1, NGSSS.SC.3.N.1.2, NGSSS.SC.3.N.1.3, NGSSS.SC.4.N.1.1, and NGSSS.SC.4.N.1.2

Description: Choose and critique setups for investigating the growth of plants
Difficulty: Hard
Content Area/Sciences Practices: Life Science, Using Scientific Inquiry

Score & Description

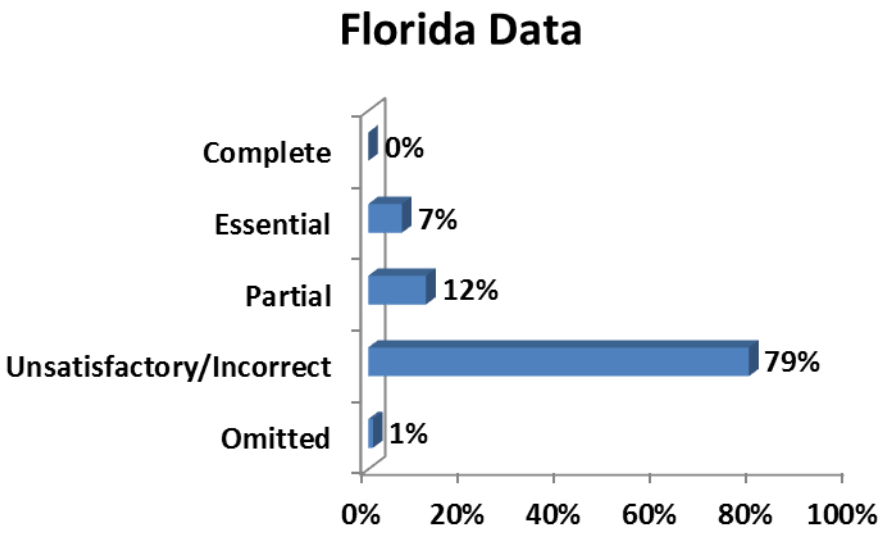
Complete
Student response selects (B) and indicates that Carmen varied the amount of sunlight and kept the amount of water added and the temperature of the environment the same. Response also indicates that Michael could learn how temperature affects plant growth.

Essential
Student response selects (B) and indicates that Carmen varied the amount of sunlight and kept the amount of water added and the temperature of the environment the same.
OR
Student response selects (B) and indicates that Carmen varied the amount of sunlight. Response also indicates that Michael could learn how temperature affects plant growth.
OR
Student response selects (B) and indicates that Carmen kept the amount of water added and the temperature of the environment the same. Response also indicates that Michael could learn how temperature affects plant growth.
OR
Student response selects (B) and indicates that Michael could learn how temperature affects plant growth.

Partial
Student response selects (B) and indicates that Carmen varied the amount of sunlight.
OR
Student response selects (B) and indicates that Carmen kept the amount of water added and the temperature of the environment the same.

Unsatisfactory/Incorrect
Student response is inadequate or incorrect.

Question 14 continued



Question 15, NGSSS.SC.3.N.1.1, NGSSS.SC.3.N.1.2, NGSSS.SC.4.N.1.1, and NGSSS.SC.4.N.1.2

Description: Design investigation to compare types of bird food
Difficulty: Hard
Content Area/Sciences Practices: Life Science, Using Scientific Inquiry

Score & Description

Complete
Student response describes a complete investigation whose objective is to count the number of birds that go to each type of food in a particular time period. Investigation consists of five components: 1) using two containers that are the same type, 2) testing both types of food, keeping them separate from each other, 3) placing the containers in the same location, 4) counting the number of birds seen eating the seeds, and 5) observing for the same amount of time.

Satisfactory
Student response describes four components of an investigation whose objective is to count the number of birds that go to each type of food in a particular time period.
OR
Student response describes a valid investigation or five components of an investigation whose objective is to compare the amount of each type of bird food that remains after a certain time period. This investigation does not get full credit because some birds may eat more than other birds. Investigation consists of six components: 1) using two containers that are the same type, 2) testing both types of food, keeping them separate from each other, 3) placing containers in the same location, 4) using the same amount of each type of seed, 5) measuring the amount of each type of food remaining, and 6) observing for the same amount of time.

Essential
Student response describes two or three components of an investigation whose objective is to count the number of birds that go to each type of food in a particular time period.
OR
Student response describes three or four components of an investigation whose objective is to compare the amount of each type of bird food that remains after a certain time period.

Partial
Student response describes one component of an investigation whose objective is to count the number of birds that go to each type of food in a particular time period.
OR
Student response describes one or two components of an investigation whose objective is to compare the amount of each type of bird food that remains after a certain time period.

Unsatisfactory/Incorrect
Student response is inadequate or incorrect.