NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS

Science

Grade 8 Released Items

NAEP 2009 Science - Grade 8 Released Items

Description: *Explain what causes an object to change its motion*	Type	Grade	Difficulty
	MC	8	Easy

1. Kelly slides a flat rock across the smooth ice of a frozen pond. The rock slows down after several seconds. What causes the rock to slow down?

   A. The thickness of the ice
   B. The temperature of the air above the ice
   C. The force of friction between the ice and the rock
   D. The gravitational force between the ice and the rock

2009 Percentage of 8th Grade Students in Each Response Category					
Public Schools	Choice A	Choice B	Choice C*	Choice D	Omitted
National	3	3	74	20	#
Delaware	1	2	78	18	1

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Description: *Identify a characteristic of Earth's structure*	Type	Grade	Difficulty
	MC	8	Medium

2. Which layer of Earth is divided into plates?

   A. Mantle
   B. Crust
   C. Inner core
   D. Outer core

2009 Percentage of 8th Grade Students in Each Response Category					
Public Schools	Choice A	Choice B*	Choice C	Choice D	Omitted
National	30	51	11	8	1
Delaware	28	44	17	11	1

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Description: *Relate oxygen level to atmospheric conditions at higher elevations*	Type	Grade	Difficulty
	MC	8	Easy

3. Why do mountain climbers at high elevations use oxygen tanks to help them breathe?

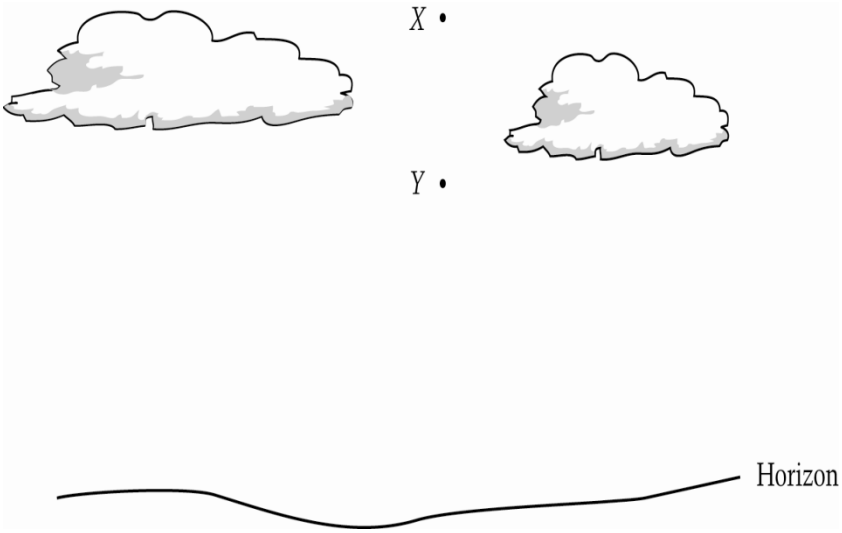
   A. At high elevations the ozone layer draws oxygen out of the atmosphere.
   B. The atmosphere is less dense at higher elevations so there is less oxygen available.
   C. Oxygen is heavier than the other gases in the atmosphere and sinks to lower elevations.
   D. Radiation from the Sun splits oxygen molecules into atoms making the oxygen unbreathable.

2009 Percentage of 8th Grade Students in Each Response Category					
Public Schools	Choice A	Choice B*	Choice C	Choice D	Omitted
National	17	68	10	4	1
Delaware	16	70	9	5	1

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Description: *Predict the Sun's position in the sky*	Type	Grade	Difficulty
	MC	8	Hard



4. Point X in the diagram above shows the highest point above the horizon that the Sun reaches in the spring at noon.

   When is the Sun's position most likely to be at point Y?

   A. In the afternoon on a winter day
   B. In the afternoon on a summer day
   C. At noon on a winter day
   D. At noon on a summer day

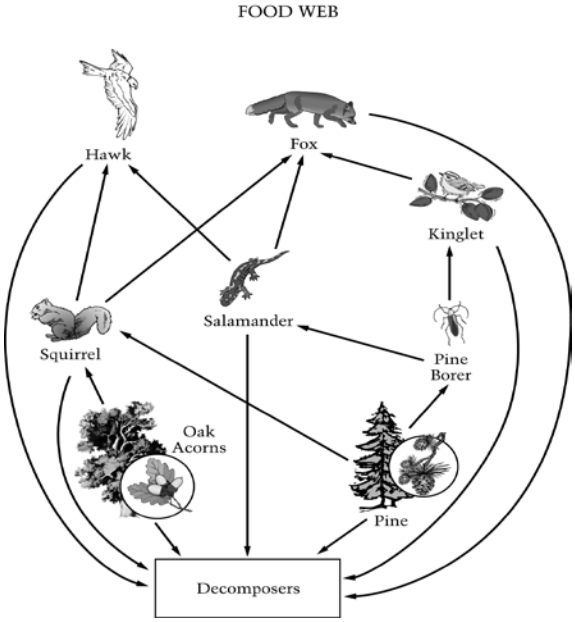
2009 Percentage of 8th Grade Students in Each Response Category					
Public Schools	Choice A	Choice B	Choice C*	Choice D	Omitted
National	20	27	33	18	1
Delaware	20	23	32	24	1

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Description: *Recognize the role of decomposers*	Type	Grade	Difficulty
	MC	8	Easy

The following question refers to the diagram below, showing a food web. The arrows show the direction of energy flow. Each arrow points from the organism that is consumed to the organism that consumes it. Use the information in the food web to answer the



5. Which statement best explains why decomposers are an important part of this food web?

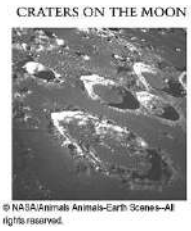
   A. They use sunlight to make their own food.
   B. They give off oxygen for animals to breathe.
   C. They provide camouflage for small animals.
   D. They make nutrients available to plants.

2009 Percentage of 8th Grade Students in Each Response Category					
Public Schools	Choice A	Choice B	Choice C	Choice D*	Omitted
National	13	17	5	64	1
Delaware	15	17	4	63	#

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Description: *Identify how some Lunar surface features formed*	Type	Grade	Difficulty
	MC	8	Easy



6. The surface of the Moon is covered with craters, as shown above. How were most of these craters formed?

   A. By eruptions of active volcanoes
   B. By impacts of many meteoroids
   C. By shifting rock on the Moon's surface (moonquakes)
   D. By tidal forces caused by Earth and the Sun

2009 Percentage of 8th Grade Students in Each Response Category					
Public Schools	Choice A	Choice B*	Choice C	Choice D	Omitted
National	6	73	13	6	1
Delaware	8	67	17	7	1

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Description: *Recognize the direction of force of friction*	Type	Grade	Difficulty
	MC	8	Hard

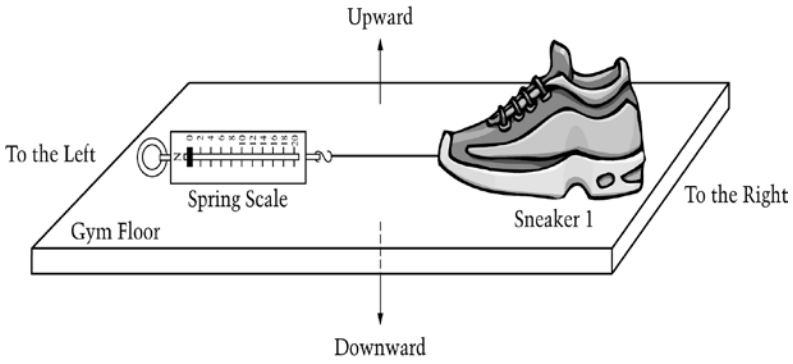
The following question refers to the following information.

Meg designs an experiment to see which of three types of sneakers provides the most friction.

She uses the equipment listed below.

1. Sneaker 1
2. Sneaker 2
3. Sneaker 3
4. Spring scale

She uses the setup illustrated below and pulls the spring scale to the left



7. In what direction does the force of friction act?
   A. To the left
   B. To the right
   C. Upward
   D. Downward

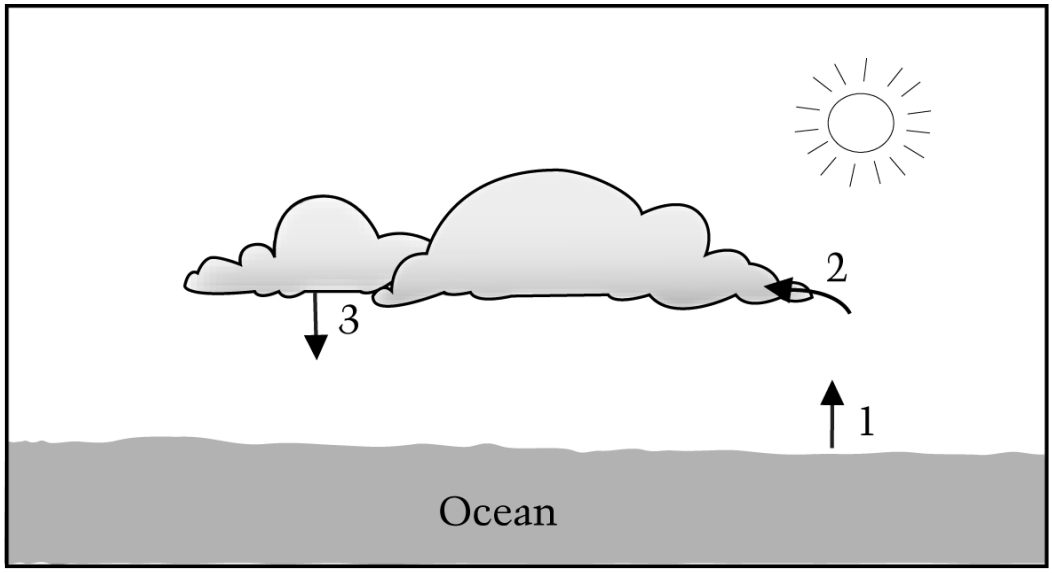
2009 Percentage of 8th Grade Students in Each Response Category					
Public Schools	Choice A	Choice B*	Choice C	Choice D	Omitted
National	45	32	8	15	1
Delaware	45	32	7	13	3

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Description: *Identify a step of the water cycle*	Type	Grade	Difficulty
	MC	8	Medium

The following question refers to the following diagram, which represents a portion of Earth's water cycle.



8. Which process is represented by 2?
   A. Liquid water evaporating
   B. Cool air warming as it rises
   C. Clouds blocking the Sun's energy
   D. Water vapor condensing

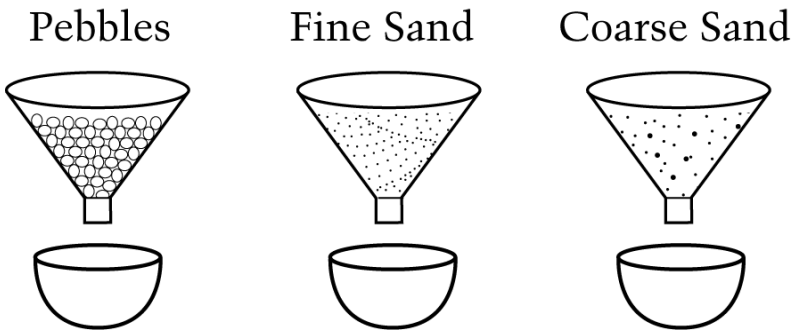
2009 Percentage of 8th Grade Students in Each Response Category					
Public Schools	Choice A	Choice B	Choice C	Choice D*	Omitted
National	23	12	7	58	#
Delaware	21	12	5	60	1

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Description: *Order soils in terms of permeability*	Type	Grade	Difficulty
	MC	8	Medium

9. Three funnels were filled with equal volumes of pebbles, fine sand, and coarse sand, as shown in the diagram below. The same amount of water was poured into each funnel.



Which correctly lists the order in which the water passed through the funnels, from fastest to slowest?

A. Pebbles, fine sand, coarse sand
B. Pebbles, coarse sand, fine sand
C. Fine sand, coarse sand, pebbles
D. Coarse sand, pebbles, fine sand

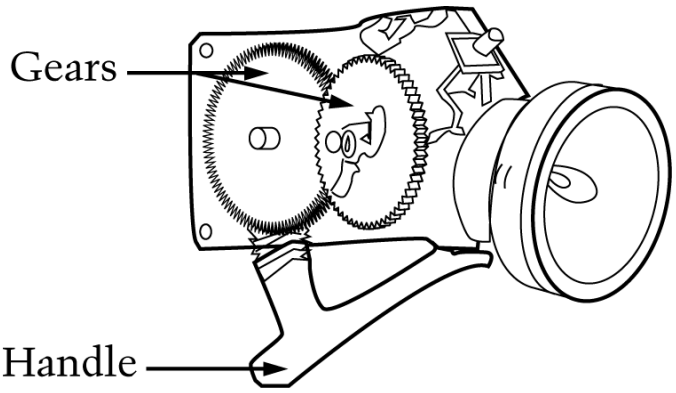
2009 Percentage of 8th Grade Students in Each Response Category					
Public Schools	Choice A	Choice B*	Choice C	Choice D	Omitted
National	19	45	33	3	1
Delaware	17	51	28	3	1

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Description: *Identify energy transfers in the appliance*	Type	Grade	Difficulty
	MC	8	Easy

10. The flashlight shown below has no batteries. It is operated by squeezing and letting go of the handle. Inside the body of the flashlight are gears, which are shown below



Which sequence best identifies the energy transfers that take place within the flashlight to produce light?

A. Kinetic ⟶ electrical ⟶ light
B. Kinetic ⟶ chemical ⟶ light
C. Chemical ⟶ kinetic ⟶ light
D. Chemical ⟶ electrical ⟶ light

2009 Percentage of 8th Grade Students in Each Response Category					
Public Schools	Choice A*	Choice B	Choice C	Choice D	Omitted
National	70	13	9	8	#
Delaware	71	15	8	5	#

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

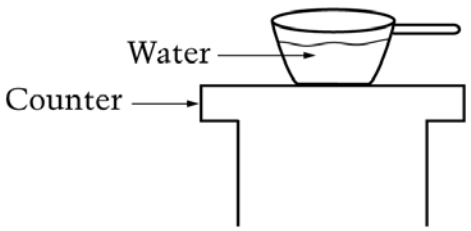
NAEP 2009 Science - Grade 8 Released Items

Science Constructed Response Questions

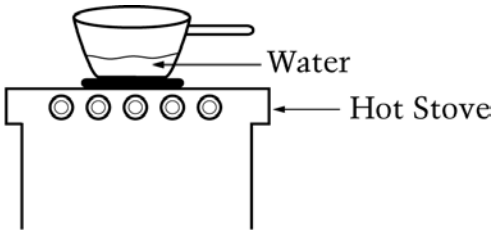
Description: *Explain change in volume due to evaporation*	Type	Grade	Difficulty
	SCR	4	Easy

6. Anita puts the same amount of water in two pots of the same size and type. She places one pot of water on the counter and one pot of water on a hot stove.

After ten minutes, Anita 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?

2009 Percentage of 4th Grade Students in Each Response Category					
Public Schools	Unsatisfactory/Incorrect	Partial	Complete	Omitted	Off task
National	21%	27%	47%	4%	#
Delaware	18%	26%	50%	6%	#

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Scoring Guide

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.

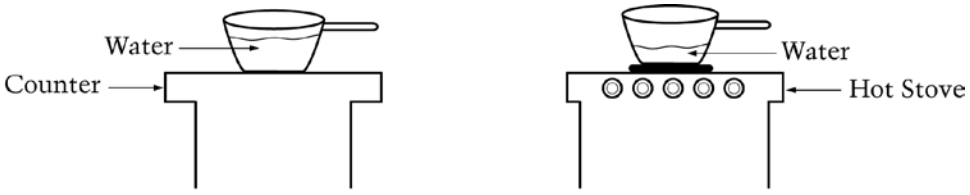
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Complete - Student Responses

Anita puts the same amount of water in two pots of the same size and type. She places one pot of water on the counter and one pot of water on a hot stove.

After ten minutes, Anita 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

Student response #1

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

hot ; because as the water got hotter and hotter it evaporated

Where did the water go?

to the atmisphere

Student response #2

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

Theres less water because the water comes out when it's boiling.

Where did the water go?

The water rised in the air and just turned into air.

Scorer Comments:

The first response addresses evaporation; the second response addresses boiling. Both responses correctly indicate where the water went.

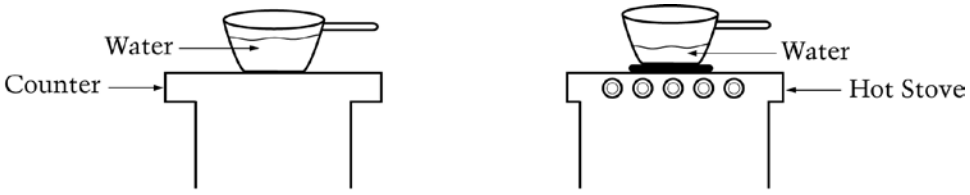
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Partial - Student Responses

Anita puts the same amount of water in two pots of the same size and type. She places one pot of water on the counter and one pot of water on a hot stove.

After ten minutes, Anita 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

Student response #1

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

The heat of the stove make it evaporate.

Where did the water go?

It evaporated

Student response #2

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

the hot disolves the water.

Where did the water go?

the water went in the air and made it moist.

Scorer Comments:

The first response indicates evaporation; the second response indicates where the water went.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Unsatisfactory/Incorrect - Student Responses

Anita puts the same amount of water in two pots of the same size and type. She places one pot of water on the counter and one pot of water on a hot stove.

After ten minutes, Anita 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

Student response #1

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

Because it contracted.

Where did the water go?

The heat disinigraded it.

Student response #2

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

the heat melts the water

Where did the water go?

it melted

Scorer Comments:

Both responses indicate that heat played a factor but show misconceptions of what happened to the heated water.

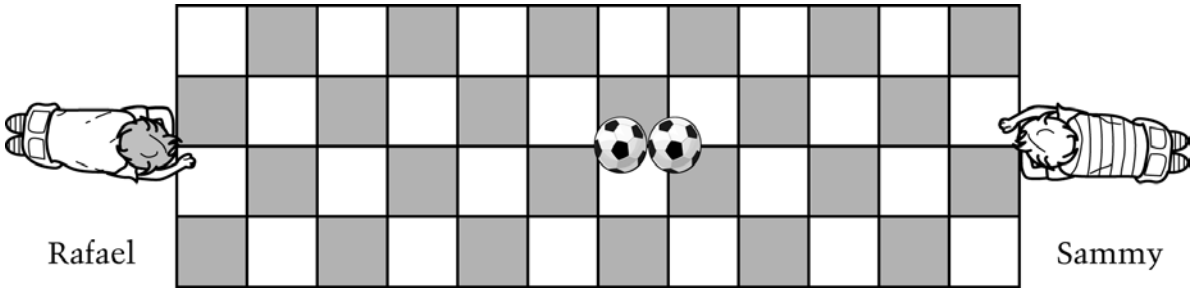
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Science Constructed Response Questions

Description: *Compare the relative speeds of two balls*	Type	Grade	Difficulty
	SCR	4	Hard

11. Rafael and Sammy were playing with soccer balls on a flat tile floor. Each boy rolled a soccer ball at the same time, and the balls hit, as shown below.



Which boy rolled his ball faster?

How do you know?

2009 Percentage of 4th Grade Students in Each Response Category					
Public Schools	Unsatisfactory/Incorrect	Partial	Complete	Omitted	Off task
National	26%	66%	6%	2%	#
Delaware	24%	66%	9%	2%	#

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Scoring Guide

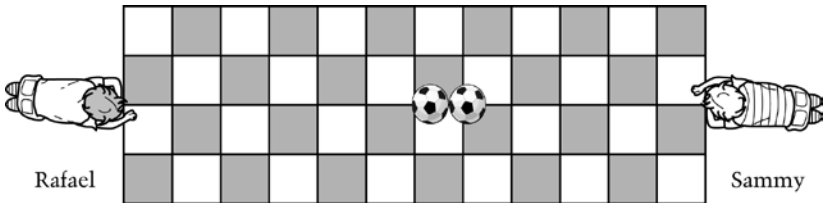
Score & Description
Complete Student response indicates Rafael and compares the number of rows of tiles over which each boy's ball rolled. Student response may or may not include quantitative information in the comparison. Partial Student response indicates Rafael and indicates that Rafael's ball traveled farther, but does not compare the number of rows of tiles over which each boy's ball rolled. Unsatisfactory/Incorrect Student response is inadequate or incorrect.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Complete - Student Response

Rafael and Sammy were playing with soccer balls on a flat tile floor. Each boy rolled a soccer ball at the same time, and the balls hit, as shown below.



Student response #1

Which boy rolled his ball faster?

Rafael's ball.

How do you know?

I counted how many tiles the ball passed Rafael's ball passed 6 tiles, but Sammy's ball passed 5 tiles

Student response #2

Which boy rolled his ball faster?

Rafael did.

How do you know?

He did because I counted the squares on Rafael's and Sammy's and Rafael has more.

Scorer Comments:

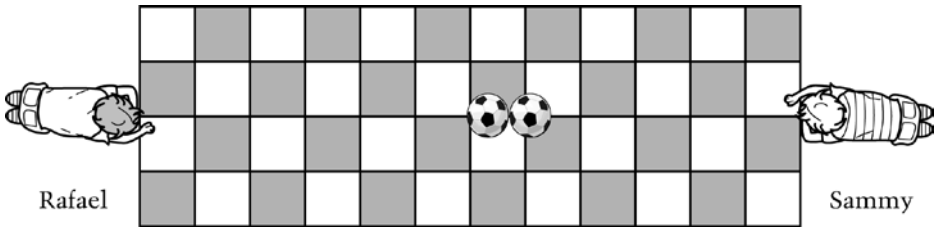
Both responses indicate that Rafael rolled his ball faster. The first response includes a quantitative comparison of the number of rows of tiles over which each boy's ball rolled, while the second response includes a qualitative comparison.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Partial - Student Response

Rafael and Sammy were playing with soccer balls on a flat tile floor. Each boy rolled a soccer ball at the same time, and the balls hit, as shown below.



Student response #1

Which boy rolled his ball faster?

Rafael

How do you know?

because his ball was farther away from him than Sammy's ball

Student response #2

Which boy rolled his ball faster?

Rafael

How do you know?

Because his ball is past the middle

Scorer Comments:

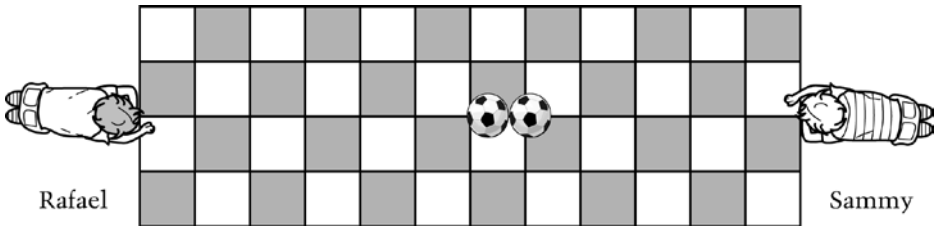
Both responses indicate that Rafael rolled his ball faster and that his ball traveled farther. The responses do not provide a comparison of the number of rows of tiles over which each boy's ball rolled.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Unsatisfactory/Incorrect - Student Response

Rafael and Sammy were playing with soccer balls on a flat tile floor. Each boy rolled a soccer ball at the same time, and the balls hit, as shown below.



Student response #1

Which boy rolled his ball faster?

Rafael

How do you know?

I know It beacyse his ball hit Sammy ball and made it stop.

Student response #2

Which boy rolled his ball faster?

sammy rolled faster.

How do you know?

I know becaues I can see it in the picter.

Scorer Comments:

The first response indicates that Rafael rolled his ball faster, but does not provide a valid explanation. The second response indicates that Sammy rolled his ball faster.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Science Constructed Response Questions

Description: *Choose and critique setups for investigating the growth of plants*	Type	Grade	Difficulty
	ECR	4	Hard

2. 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 seeds in each pot.

The students set up their investigations 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?

	2009 Percentage of 4th Grade Students in Each Response Category					
Public Schools	Unsatisfactory/ Incorrect	Partial	Essential	Complete	Omitted	Off task
National	76%	14%	8%	#	1%	#
Delaware	75%	13%	9%	1%	1%	#

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Scoring Guide

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.

NAEP 2009 Science - Grade 8 Released Items

Complete - Student Responses

Student response # 1

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 seeds in each pot.

The students set up their investigations 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?

- Michael
- Carmen

Explain why you chose this student's setup.

Because the water and temperature was the same for each pot, and the sunlight was different for each pot, the only thing that affected the growth is the sun. Each plant would grow differently depending on the amount of sun

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

You could learn how the temperature affected the growth of plants because every thing was the same for each pot, except the temperature.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Student response # 2

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 seeds in each pot.

The students set up their investigations 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?

- Ⓐ Michael
- ● Carmen

Explain why you chose this student's setup.

I chose this students set up because if you want to see how sunlight effects plants growth then everything should be the same except the amount of sunlight.

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

You could learn how defferent temperaturer can effect the growth of plants.

Scorer Comments:

Both responses select (B) and indicate that all variables were kept constant except the amount of sunlight which was varied. Both responses recognize what can be learned from the setup not chosen.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Essential - Student Responses

Student response #1

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 seeds in each pot.

The students set up their investigations 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?

- Michael
- Carmen

Explain why you chose this student's setup.

Because Carmen's She put the same amount of water and the same temputre. She put different sun light

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

Because He gave them the same amount and I won't under stand because they will all grouw the same. But I want to know how they grow in dif frent sun li

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Student response #2

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 seeds in each pot.

The students set up their investigations 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?

- Ⓐ Michael
- ● Carmen

Explain why you chose this student's setup.

Because Carmen had the plants in different places.

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

How well the thempathure effects the plants

Scorer Comments:

Both responses select (B). The first response recognizes which variables were kept constant and which variable was varied. The second response recognizes what can be learned from the setup not chosen.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Partial - Student Responses

Student response # 1

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 seeds in each pot.

The students set up their investigations 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?

- Ⓐ Michael
- ● Carmen

Explain why you chose this student's setup.

Because Carmen put the pots in different spots so they got different amounts of sunlight.

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

You could learn how they grow with the same amount of sunlight.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Student response # 2

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 seeds in each pot.

The students set up their investigations 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?

- Ⓐ Michael
- ● Carmen

Explain why you chose this student's setup.

I chose camren because he put the same amount of water for each pot and he put the same amount of tempeture for each pot.

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

I think I can learn from the setup I did not chose because evry plant should get the same amount of tempeture.

Scorer Comments:

Both responses select (B). The first response recognizes which variable was varied. The second response recognizes which variables were kept constant.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Unsatisfactory/Incorrect - Student Responses

Student response # 1

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 seeds in each pot.

The students set up their investigations 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?

- Michael
- Carmen

Explain why you chose this student's setup.

I chose Carmen because there the same plant so not every thing should be the same.

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

I learned that any plant way can work on the same plant.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Student response # 2

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 seeds in each pot.

The students set up their investigations 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.

The reason I chose this Michaels's setup is because he got enough water and sunlight to make the pea plant grow.

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

I think about the plant growth that I did not pick is a little plant and not good because of how much sunlight it got.

Scorer Comments:

The first response selects (B) with an incorrect explanation. The second response selects (A) with an incorrect explanation.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Science Constructed Response Questions

Description: *Explain differences between related individuals*	Type	Grade	Difficulty
	SCR	4	Hard

9. Jaime and Manuel visit the zoo. They see two male tigers who are brothers. Jaime points out that the fur of one of the tigers has stripes that are a darker brown than the other tiger's stripes.

   Manuel says the tigers cannot be brothers.

   How can Jaime explain to Manuel that tigers with different-colored stripes can be brothers? In your answer, use a specific example of what you have observed about similarities and differences between people who are related.

2009 Percentage of 4th Grade Students in Each Response Category					
Public Schools	Unsatisfactory/Incorrect	Partial	Complete	Omitted	Off task
National	73%	15%	7%	5%	1%
Delaware	70%	17%	6%	6%	1%

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Scoring Guide

Score & Description
Complete Student response correctly indicates that people or animals that are related can look different and provides a comparison of a specific characteristic of individuals. Partial Student response correctly indicates that people or animals that are related can look different, but does not provide a comparison of a specific characteristic of individuals. Unsatisfactory/Incorrect Student response is inadequate or incorrect.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

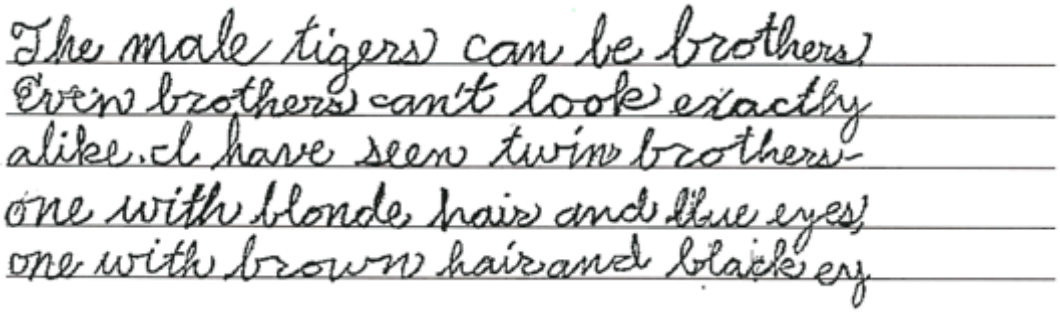
Complete - Student Responses

Student response #1

Jaime and Manuel visit the zoo. They see two male tigers who are brothers. Jaime points out that the fur of one of the tigers has stripes that are a darker brown than the other tiger's stripes.

Manuel says the tigers cannot be brothers.

How can Jaime explain to Manuel that tigers with different-colored stripes can be brothers? In your answer, use a specific example of what you have observed about similarities and differences between people who are related.

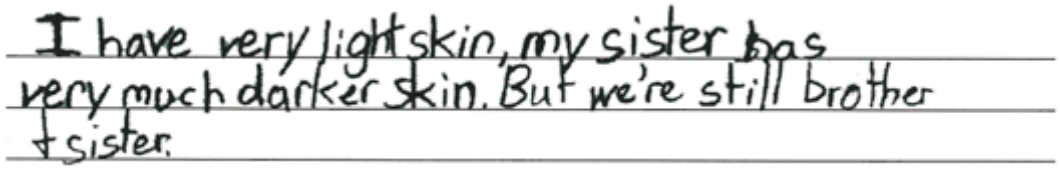


Student response #2

Jaime and Manuel visit the zoo. They see two male tigers who are brothers. Jaime points out that the fur of one of the tigers has stripes that are a darker brown than the other tiger's stripes.

Manuel says the tigers cannot be brothers.

How can Jaime explain to Manuel that tigers with different-colored stripes can be brothers? In your answer, use a specific example of what you have observed about similarities and differences between people who are related.



Scorer Comments:

Both responses correctly explain that people or animals that are related can look different and provide a specific characteristic of individuals. The first response indicates that twin brothers can have different hair and eye color, and the second response indicates that brothers and sisters can have different skin color.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Partial - Student Responses

Student response #1

Jaime and Manuel visit the zoo. They see two male tigers who are brothers. Jaime points out that the fur of one of the tigers has stripes that are a darker brown than the other tiger's stripes.

Manuel says the tigers cannot be brothers.

How can Jaime explain to Manuel that tigers with different-colored stripes can be brothers? In your answer, use a specific example of what you have observed about similarities and differences between people who are related.

pepole who are relted dont have to look alike.

Student response #1

Jaime and Manuel visit the zoo. They see two male tigers who are brothers. Jaime points out that the fur of one of the tigers has stripes that are a darker brown than the other tiger's stripes.

Manuel says the tigers cannot be brothers.

How can Jaime explain to Manuel that tigers with different-colored stripes can be brothers? In your answer, use a specific example of what you have observed about similarities and differences between people who are related.

Well; I have a brother and sister who are twins but they look different.

Scorer Comments:

Both responses correctly explain that people or animals that are related can look different, but do not provide a specific characteristic of individuals. The first response indicates that people who are related can look different, and the second response indicates that twins can look different.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Unsatisfactory/Incorrect - Student Responses

Student response #1

Jaime and Manuel visit the zoo. They see two male tigers who are brothers. Jaime points out that the fur of one of the tigers has stripes that are a darker brown than the other tiger's stripes.

Manuel says the tigers cannot be brothers.

How can Jaime explain to Manuel that tigers with different-colored stripes can be brothers? In your answer, use a specific example of what you have observed about similarities and differences between people who are related.

Everybody and everything is different.

Student response #2

Jaime and Manuel visit the zoo. They see two male tigers who are brothers. Jaime points out that the fur of one of the tigers has stripes that are a darker brown than the other tiger's stripes.

Manuel says the tigers cannot be brothers.

How can Jaime explain to Manuel that tigers with different-colored stripes can be brothers? In your answer, use a specific example of what you have observed about similarities and differences between people who are related.

The are with darker stripes is a boy.

Scorer Comments:

The first response is inadequate and does not explain that people or animals that are related can look different, but instead states that everybody and everything is different. The second response incorrectly explains that the differences in the color of the tigers are because one is male and one is female.

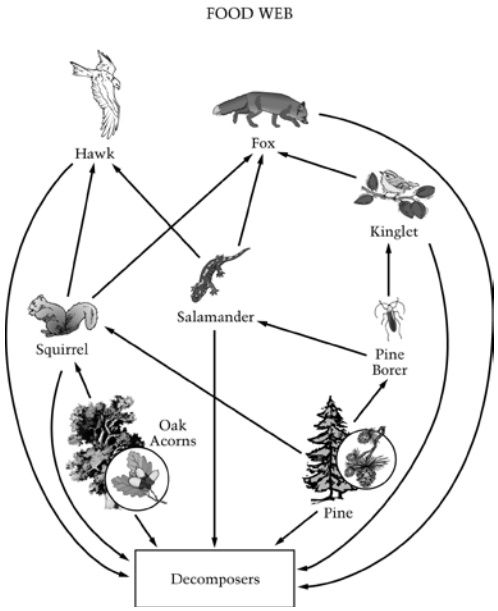
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Science Constructed Response Questions

Description: *Identify relationships in a food web*	Type	Grade	Difficulty
	SCR	8	Easy

The following question s refer to the diagram below, showing a food web. The arrows show the direction of energy flow. Each arrow points from the organism that is consumed to the organism that consumes it. Use the information in the food web to answer the questions.



12. Give one example of an organism from this food web that makes its own food using energy from sunlight.

Organism: _____

Give one example of an organism from this food web that eats only plants.

Organism: _____

Give one example of an organism from this food web that eats only animals.

Organism: _____

2009 Percentage of 8th Grade Students in Each Response Category					
Public Schools	Unsatisfactory/Incorrect	Partial	Complete	Omitted	Off task
National	2%	23%	73%	2%	#
Delaware	2%	25%	70%	3%	#

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Scoring Guide

Solution:

This item was scored in 3 parts.
Part A: Organism makes its own food.
Part B: Organism eats only plants.
Part C: Organism eats only animals.

Part A:
Complete
Student response indicates oak or pine tree and no other organism.
Unsatisfactory/Incorrect
Student response is inadequate or incorrect.

Part B:
Complete
Student response indicates pine borer or squirrel and no other organism.
Unsatisfactory/Incorrect
Student response is inadequate or incorrect.

Part C:
Complete
Student response indicates hawk, fox, kinglet, or salamander, and no other organism.
Unsatisfactory/Incorrect
Student response is inadequate or incorrect.

Composite Score:

Student response received one of three possible composite scores (Complete, Partial, Unsatisfactory/Incorrect) based on the student's combined performance on Parts A, B, and C of the item. For example, a student response Complete for Part A, Complete for Part B, and Unsatisfactory/Incorrect for Part C received a composite score of Partial.

Composite Score	Part A	Part B	Part C
Complete	Complete	Complete	Complete
Partial	Complete	Complete	Unsatisfactory/ Incorrect
	Complete	Unsatisfactory/ Incorrect	Complete
	Unsatisfactory/ Incorrect	Complete	Complete
	Complete	Unsatisfactory/ Incorrect	Unsatisfactory/ Incorrect
	Unsatisfactory/ Incorrect	Complete	Unsatisfactory/ Incorrect
	Unsatisfactory/ Incorrect	Unsatisfactory/ Incorrect	Complete
Unsatisfactory/ Incorrect	Unsatisfactory/ Incorrect	Unsatisfactory/ Incorrect	Unsatisfactory/ Incorrect

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Parts A, B and C: Complete - Student Response

Give one example of an organism from this food web that makes its own food using energy from sunlight.
Organism: _____
A pine tree

Give one example of an organism from this food web that eats only plants.

Organism: _____
A pine borer

Give one example of an organism from this food web that eats only animals.

Organism: _____
A kinglet

Scorer Comments:

Part A:
The response identifies a producer from the food web.
Part B:
The response identifies an herbivore from the food web.
Part C:
The response identifies a carnivore from the food web.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Part A: Unsatisfactory/Incorrect, Parts B and C: Complete - Student Response

Give one example of an organism from this food web that makes its own food using energy from sunlight.
Organism: _____
Hawk

Give one example of an organism from this food web that eats only plants.

Organism: _____
pine borer

Give one example of an organism from this food web that eats only animals.

Organism: _____
fox

Scorer Comments:

Part A:
The response does not identify a producer from the food web.
Part B:
The response identifies an herbivore from the food web.
Part C:
The response identifies a carnivore from the food web.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Parts A and C: Complete, Part B: Unsatisfactory/Incorrect - Student Response

Give one example of an organism from this food web that makes its own food using energy from sunlight.
Organism: _____
Pine tree

Give one example of an organism from this food web that eats only plants.

Organism: _____
kinglet

Give one example of an organism from this food web that eats only animals.

Organism: _____
hawk

Scorer Comments:

Part A:
The response identifies a producer from the food web.
Part B:
The response does not identify an herbivore from the food web.
Part C:
The response identifies a carnivore from the food web.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Part A: Complete, Parts B and C: Unsatisfactory/Incorrect - Student Response

Give one example of an organism from this food web that makes its own food using energy from sunlight.
Organism: _____

pine

Give one example of an organism from this food web that eats only plants.

Organism: _____

salamander

Give one example of an organism from this food web that eats only animals.

Organism: _____

squirrel

Scorer Comments:

Part A:
The response identifies a producer from the food web.
Part B:
The response does not identify an herbivore from the food web.
Part C:
The response does not identify a carnivore from the food web.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Parts A and B: Unsatisfactory/Incorrect, Part C: Complete - Student Response

Give one example of an organism from this food web that makes its own food using energy from sunlight.
Organism: _____
squirrel

Give one example of an organism from this food web that eats only plants.

Organism: _____
hungry

Give one example of an organism from this food web that eats only animals.

Organism: _____
FOX

Scorer Comments:

Part A:
The response does not identify a producer from the food web.
Part B:
The response does not identify an herbivore from the food web.
Part C:
The response identifies a carnivore from the food web.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Parts A, B and C: Unsatisfactory/Incorrect - Student Response

Give one example of an organism from this food web that makes its own food using energy from sunlight.
Organism: _____
Kinglet

Give one example of an organism from this food web that eats only plants.

Organism: _____
Oak Acorns

Give one example of an organism from this food web that eats only animals.

Organism: _____
Pine

Scorer Comments:

Part A:
The response does not identify a producer from the food web.
Part B:
The response does not identify an herbivore from the food web.
Part C:
The response does not identify a carnivore from the food web.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Science Constructed Response Questions

Description: *Design an experiment to investigate inheritance in plants*	Type	Grade	Difficulty
	ECR	8	Hard

15. Two farmers notice that some bean plants are much taller than others, even though they are growing in the same field. One farmer thinks the difference in height is due to inheritance. The other farmer thinks it is because some plants in the field get more water than others.

    Describe an experiment that will provide evidence for which farmer is right. You can use seeds from both tall and short plants.

    Describe the steps you will follow.

    Describe how you will collect your data.

    How will you conclude if tallness is inherited or caused by getting more water?

	2009 Percentage of 8th Grade Students in Each Response Category						
Public Schools	Unsatisfactory/ Incorrect	Partial	Essential	Satisfactory	Complete	Omitted	Off task
National	21%	19%	39%	8%	2%	10%	1%
Delaware	15%	17%	39%	10%	4%	13%	1%

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Scoring Guide

Score & Description
Complete Student response describes the essential components of an experiment that will provide evidence to determine whether plant height is inherited or caused by getting more water. Method 1: The same types of seeds are used in each group and the amount of water is varied. Response consists of five components as follows: 1) Plant seeds from tall plants, short plants, or both types of plant; 2) Treat plants with different amounts of water; 3) Control for at least one environmental condition such as amount of sunlight, available nutrients, soil type; 4) Measure the heights of the plants in each group; and 5) Explain that if plants are taller in the group that got lots of water, then tallness is controlled by the amount of water. Method 2: The same amount of water is given to each group and the types of seeds are varied. Response consists of five components as follows: 1) Plant seeds from both types of plant; 2) Treat plants with the same amount of water; 3) Control for at least one environmental condition such as amount of sunlight, available nutrients, soil type; 4) Measure the heights of the plants in each group; and 5) Explain that if the resulting plants are different heights under the same watering conditions, then tallness is inherited. **Satisfactory** Student response describes an experiment that will provide evidence to determine whether plant height is inherited or caused by getting more water, but is missing one of the essential components. **Essential** Student response describes an experiment that will provide evidence to determine whether plant height is inherited or caused by getting more water, but is missing two or three essential components. **Partial** Student response describes one essential component of an experiment that will provide evidence to determine whether plant height is inherited or caused by getting more water. **Unsatisfactory/Incorrect** Student response is inadequate or incorrect.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Complete - Student Responses

Student response #1

Two farmers notice that some bean plants are much taller than others, even though they are growing in the same field. One farmer thinks the difference in height is due to inheritance. The other farmer thinks it is because some plants in the field get more water than others.

Describe an experiment that will provide evidence for which farmer is right. You can use seeds from both tall and short plants.

Describe the steps you will follow.

First, I would gather the materials. Second, I would fill 2 flower pots with the same soil and put 2 seeds of the same plant in the pots. Then, I would water one of the pots more than the other pot. Finally, I would write down my results.

Describe how you will collect your data.

I would record the growth of both plants weekly for about six to eight weeks. Then, I would compare the results

How will you conclude if tallness is inherited or caused by getting more water?

If the taller plant is in the flower pot with more water, then the tallness of a plant is caused by getting more water. If not, then tallness is inherited.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Student response #2

Two farmers notice that some bean plants are much taller than others, even though they are growing in the same field. One farmer thinks the difference in height is due to inheritance. The other farmer thinks it is because some plants in the field get more water than others.

Describe an experiment that will provide evidence for which farmer is right. You can use seeds from both tall and short plants.

Describe the steps you will follow.

Take a pot of soil from the same area in a field and dry it. Then add the same amount of water to both. Plant the seeds, one type in each pot. Put them both in the same amount of light and give each the same amount of water.

Describe how you will collect your data.

I will measure the height of each plant every day.

How will you conclude if tallness is inherited or caused by getting more water?

If the height is different, then the difference would be inherited. If the height is the same, it would be from getting more water, because here they both got the same amount of water.

Scorer Comments:

Both responses describe the essential components of an experiment that will provide evidence to determine whether plant height is inherited or caused by getting more water. The first response describes planting the same type of seed and treating the groups with different amounts of water, while the second response describes planting both types of seeds and treating the groups with the same amount of water. Both responses include a procedure that controls for at least one environmental factor other than water and collects data about plant height. Both responses also describe how the results can be used to draw a valid conclusion.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Satisfactory - Student Responses

Student response #1

Two farmers notice that some bean plants are much taller than others, even though they are growing in the same field. One farmer thinks the difference in height is due to inheritance. The other farmer thinks it is because some plants in the field get more water than others.

Describe an experiment that will provide evidence for which farmer is right. You can use seeds from both tall and short plants.

Describe the steps you will follow.

get two seeds from both small and large plants. put them in the same field out give one small plant seed more water. same as the large plant seed.

Describe how you will collect your data.

come back at harvest and see if one is taller than the other.

How will you conclude if tallness is inherited or caused by getting more water?

If the small ones are still small than it is inherited. If the ones with more water are talles. its because of more water.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Student response #2

Two farmers notice that some bean plants are much taller than others, even though they are growing in the same field. One farmer thinks the difference in height is due to inheritance. The other farmer thinks it is because some plants in the field get more water than others.

Describe an experiment that will provide evidence for which farmer is right. You can use seeds from both tall and short plants.

Describe the steps you will follow.

Get seeds from each. Plant them in the same area. Make sure they get the same amount of water.

Describe how you will collect your data.

Use a ruler and notepad to keep height. Measure the amount of water given to each.

How will you conclude if tallness is inherited or caused by getting more water?

If the seeds from the tall plant are taller than the other plant again, it's inherting If they are the same height, it's the water.

Scorer Comments:

Both responses describe components of an experiment that will provide evidence to determine whether plant height is inherited or caused by getting more water, but neither procedure controls for an environmental factor other than water.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Essential - Student Responses

Student response #1

Two farmers notice that some bean plants are much taller than others, even though they are growing in the same field. One farmer thinks the difference in height is due to inheritance. The other farmer thinks it is because some plants in the field get more water than others.

Describe an experiment that will provide evidence for which farmer is right. You can use seeds from both tall and short plants.

Describe the steps you will follow.

First, I would divide the seeds into three groups. One is a control group that gets no water, another recieves a small amount of water, and the third recieves a large amount of water. Then I experiment.

Describe how you will collect your data.

Keep a chart on the height of each plant as time goes on. Compare results.

How will you conclude if tallness is inherited or caused by getting more water?

There is at least one tall and one short seed in each group. Compare tall seed's growth to short seed's.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Student response #2

Two farmers notice that some bean plants are much taller than others, even though they are growing in the same field. One farmer thinks the difference in height is due to inheritance. The other farmer thinks it is because some plants in the field get more water than others.

Describe an experiment that will provide evidence for which farmer is right. You can use seeds from both tall and short plants.

Describe the steps you will follow.

step 1: would be to plant them. step 2: to give them the same amount of water. Step 3: put them in the same type of soil.

Describe how you will collect your data.

by making a reference of the plants traits and characteristics.

How will you conclude if tallness is inherited or caused by getting more water?

By checking my data.

Scorer Comments:

Both responses describe components of an experiment that will provide evidence to determine whether plant height is inherited or caused by getting more water. The first response does not indicate controlling for at least one environmental factor other than water, or describe how the results can be used to draw a valid conclusion. The second response does not specify the types of seeds to plant, the data to collect, or how the results can be used to draw a valid conclusion.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Partial - Student Responses

Student response #1

Two farmers notice that some bean plants are much taller than others, even though they are growing in the same field. One farmer thinks the difference in height is due to inheritance. The other farmer thinks it is because some plants in the field get more water than others.

Describe an experiment that will provide evidence for which farmer is right. You can use seeds from both tall and short plants.

Describe the steps you will follow.

You can grow a seperate patch of beans and water them differently than the others.

Describe how you will collect your data.

I will grow 10 bean plants. I will water 5 of them once a day and the other 5 once a week.

How will you conclude if tallness is inherited or caused by getting more water?

the plants that get more water will be able to produce more sugars and grow taller.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

Student response #2

Two farmers notice that some bean plants are much taller than others, even though they are growing in the same field. One farmer thinks the difference in height is due to inheritance. The other farmer thinks it is because some plants in the field get more water than others.

Describe an experiment that will provide evidence for which farmer is right. You can use seeds from both tall and short plants.

Describe the steps you will follow.

I will compare the height of beans plants by forming an experiment.

Describe how you will collect your data.

I will measure the height of the plants with a yard stick

How will you conclude if tallness is inherited or caused by getting more water?

I will see weather by hypothesis was correct after forming the experiment

Scorer Comments:

Both responses describe one component of an experiment that will provide evidence to determine whether plant height is inherited or caused by getting more water. The first response describes treating the groups with different amounts of water. The second response describes collecting data about plant height.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Unsatisfactory/Incorrect - Student Responses

Student response #1

Two farmers notice that some bean plants are much taller than others, even though they are growing in the same field. One farmer thinks the difference in height is due to inheritance. The other farmer thinks it is because some plants in the field get more water than others.

Describe an experiment that will provide evidence for which farmer is right. You can use seeds from both tall and short plants.

Describe the steps you will follow.

The farmer that thinks the reason why the plants are short or tall due to inheritance is correct because each plant has different genetics determining whether or not it'll be tall or short.

Describe how you will collect your data.

I would look at the DNA code of the plants.

How will you conclude if tallness is inherited or caused by getting more water?

if the gene that is related to height different from the other, I can conclude that this is why the plant is tall/short.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Student response #2

Two farmers notice that some bean plants are much taller than others, even though they are growing in the same field. One farmer thinks the difference in height is due to inheritance. The other farmer thinks it is because some plants in the field get more water than others.

Describe an experiment that will provide evidence for which farmer is right. You can use seeds from both tall and short plants.

Describe the steps you will follow.

It is possible that that part of the field is getting more water.

Describe how you will collect your data.

It depends on were their watering system is set up.

How will you conclude if tallness is inherited or caused by getting more water?

on how wet the soil is near the taller ones vs. the smaller ones

Scorer Comments:

The first response provides a conclusion without experimentation. The second response describes some variables, but does not provide any details of an experiment.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Science Constructed Response Questions

Description: *Critique a conclusion about chemical change based on observations*	Type	Grade	Difficulty
	SCR	8	Hard

14. A class observes two demonstrations: water changing into steam and a piece of wood burning and producing smoke. A student concludes that both demonstrations must be examples of a chemical change because a gas is produced in each.

Is the student's conclusion accurate? Explain your answer, referring to both demonstrations.

2009 Percentage of 8th Grade Students in Each Response Category					
Public Schools	Unsatisfactory/Incorrect	Partial	Complete	Omitted	Off task
National	68%	18%	7%	6%	2%
Delaware	79%	9%	2%	9%	1%

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Scoring Guide

Score & Description
Complete Student response indicates that the student's conclusion is not accurate and correctly explains why water changing into steam is not a chemical change and why wood burning and producing smoke is a chemical change. Response demonstrates understanding that water changing to steam is a physical change, is a reversible process, or does not produce a new substance. Response demonstrates understanding that wood burning produces new substances or is not a reversible process. **Partial** Student response indicates that the student's conclusion is not accurate and correctly addresses why water changing to steam is not a chemical change or why wood burning and producing smoke is a chemical change. OR Student response indicates that the student's conclusion is accurate or fails to address the accuracy of the conclusion, and correctly addresses why water changing to steam is not a chemical change or why wood burning and producing smoke is a chemical change, supporting that the student's conclusion is not accurate. **Unsatisfactory/Incorrect** Student response is inadequate or incorrect.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Complete - Student Responses

Student response #1

A class observes two demonstrations: water changing into steam and a piece of wood burning and producing smoke. A student concludes that both demonstrations must be examples of a chemical change because a gas is produced in each.

Is the student's conclusion accurate? Explain your answer, referring to both demonstrations.

No, Burning wood is a chemical change because it creates something new. Water changing into steam is physical change, because it can be changed back into water.

Student response #2

A class observes two demonstrations: water changing into steam and a piece of wood burning and producing smoke. A student concludes that both demonstrations must be examples of a chemical change because a gas is produced in each.

Is the student's conclusion accurate? Explain your answer, referring to both demonstrations.

NO. The first demonstration was a physical change because it changed states from a liquid to a gas but the second demonstration is correct because a new thing was produced.

Scorer Comments:

Both responses state that the student's conclusion is not accurate and indicate that water changing to steam is a physical change, while wood burning is a chemical change because it produces a new substance. The first response also recognizes that a physical change is reversible.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Partial - Student Responses

Student response #1

A class observes two demonstrations: water changing into steam and a piece of wood burning and producing smoke. A student concludes that both demonstrations must be examples of a chemical change because a gas is produced in each.

Is the student's conclusion accurate? Explain your answer, referring to both demonstrations.

No, because when steam from water evaporates it doesnt change the chemicals, the particles have more energy.

Student response #2

A class observes two demonstrations: water changing into steam and a piece of wood burning and producing smoke. A student concludes that both demonstrations must be examples of a chemical change because a gas is produced in each.

Is the student's conclusion accurate? Explain your answer, referring to both demonstrations.

It can't be chemical change because when a liquid turns to gas, its a physical change and same with wood a solt to a gas

Scorer Comments:

The first response states that the student's conclusion is not accurate and indicates that water changing to steam does not produce a new substance. The second response indicates that the conclusion is not accurate because water changing to gas is a physical change, but incorrectly states that wood burning is a physical change.

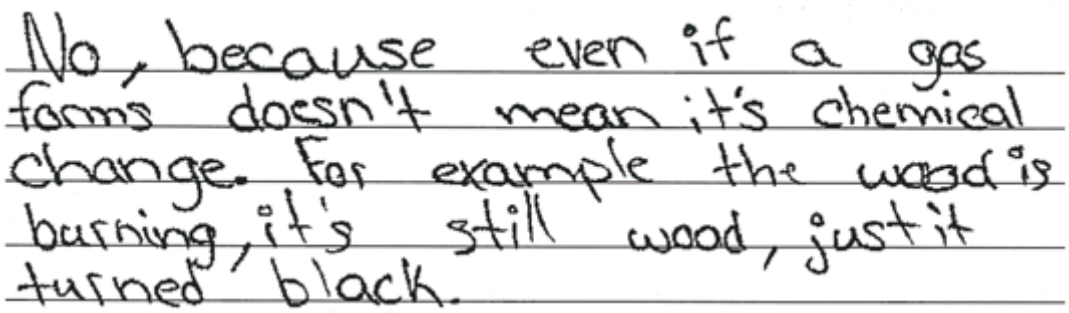
NAEP 2009 Science - Grade 8 Released Items

Unsatisfactory/Incorrect - Student Responses

Student response #1

A class observes two demonstrations: water changing into steam and a piece of wood burning and producing smoke. A student concludes that both demonstrations must be examples of a chemical change because a gas is produced in each.

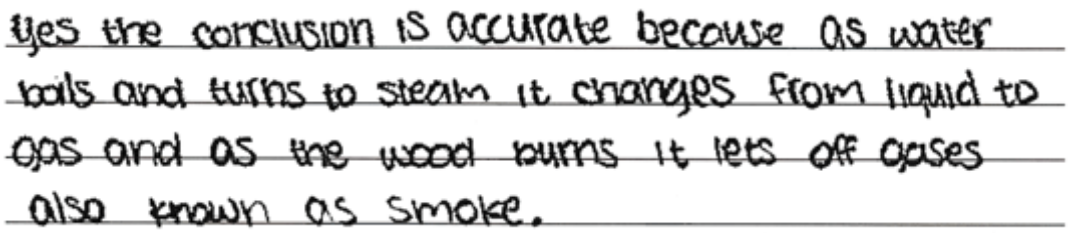
Is the student's conclusion accurate? Explain your answer, referring to both demonstrations.



Student response #2

A class observes two demonstrations: water changing into steam and a piece of wood burning and producing smoke. A student concludes that both demonstrations must be examples of a chemical change because a gas is produced in each.

Is the student's conclusion accurate? Explain your answer, referring to both demonstrations.



Scorer Comments:

Neither response correctly explains why water changing to steam is not a chemical change or why wood burning is a chemical change. The first response incorrectly indicates that wood burning does not produce a new substance. The second response incorrectly indicates that both demonstrations are examples of chemical changes because gas forms in each case.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Science Constructed Response Questions

Description: *Explain and critique two plans to prevent erosion*	Type	Grade	Difficulty
	SCR	8	Hard

18. Some homes were built near the shoreline of the ocean. Sand dunes lie between the homes and the water. Each year a portion of the sand dunes is eroded by the ocean. To prevent erosion, some citizens suggest planting grasses on the sand dunes, and others suggest building a seawall, a solid barrier along the shoreline.

    Explain how each plan would prevent erosion of the dunes.

    Give an environmental advantage and disadvantage of each plan.

    Environmental advantage of planting grasses:

    Environmental disadvantage of planting grasses:

    Environmental advantage of building a seawall:

    Environmental disadvantage of building a seawall:

Composite

	2009 Percentage of 8th Grade Students in Each Response Category						
Public Schools	Unsatisfactory /Incorrect	Partial	Essential	Satisfactory	Complete	Omitted	Off task
National	22%	43%	19%	2%	#	12%	1%
Delaware	22%	42%	19%	1%	#	14%	1%

Part A

2009 Percentage of 8th Grade Students in Each Response Category					
Public Schools	Unsatisfactory/Incorrect	Partial	Complete	Omitted	Off task
National	33%	34%	17%	14%	2%
Delaware	29%	36%	16%	18%	2%

Part B

2009 Percentage of 8th Grade Students in Each Response Category					
Public Schools	Unsatisfactory/Incorrect	Partial	Complete	Omitted	Off task
National	43%	31%	8%	17%	2%
Delaware	39%	30%	8%	22%	1%

Part C

2009 Percentage of 8th Grade Students in Each Response Category					
Public Schools	Unsatisfactory/Incorrect	Partial	Complete	Omitted	Off task
National	50%	26%	2%	21%	2%
Delaware	47%	23%	1%	27%	2%

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Scoring Guide

Solution:

This item was scored in 3 parts.
Part A: Explain each plan.
Part B: Advantage and disadvantage of grasses
Part C: Advantage and disadvantage of seawall

Part A:

Complete
Student response correctly explains how planting grasses and building a seawall would prevent erosion.

Partial
Student response correctly explains either how planting grasses or building a seawall would prevent erosion.

Unsatisfactory/Incorrect
Student response is inadequate or incorrect.

Part B:

Complete
Student response correctly provides a plausible advantage and disadvantage of planting grasses.

Partial
Student response correctly provides a plausible advantage or a plausible disadvantage of planting grasses.

Unsatisfactory/Incorrect
Student response is inadequate or incorrect.

Part C:

Complete
Student response correctly provides a plausible advantage and disadvantage of building a seawall.

Partial
Student response correctly provides a plausible advantage or a plausible disadvantage of building a seawall.

Unsatisfactory/Incorrect
Student response is inadequate or incorrect.

NAEP 2009 Science - Grade 8 Released Items

Composite Score:

Student response received one of five possible composite scores (Complete, Satisfactory, Essential, Partial, Unsatisfactory/Incorrect) based on the student's combined performance on Parts A, B, and C of the item. For example, a student response Complete for Part A, Complete for Part B, and Partial for Part C received a composite score of Satisfactory.

Composite Score	Part A	Part B	Part C
Complete	Complete	Complete	Complete
Satisfactory	Complete	Complete	Partial
	Complete	Partial	Complete
	Partial	Complete	Complete
Essential	Complete	Partial	Partial
	Partial	Complete	Partial
	Partial	Partial	Complete
	Complete	Complete	Unsatisfactory/ Incorrect
	Complete	Unsatisfactory/ Incorrect	Complete
	Unsatisfactory/ Incorrect	Complete	Complete
	Partial	Partial	Partial
	Complete	Partial	Unsatisfactory/ Incorrect
	Partial	Complete	Unsatisfactory/ Incorrect
	Complete	Unsatisfactory/ Incorrect	Partial
	Partial	Unsatisfactory/ Incorrect	Complete
	Unsatisfactory/ Incorrect	Complete	Partial
	Unsatisfactory/ Incorrect	Partial	Complete
Partial	Partial	Partial	Unsatisfactory/ Incorrect
	Partial	Unsatisfactory/ Incorrect	Partial
	Unsatisfactory/ Incorrect	Partial	Partial
	Complete	Unsatisfactory/ Incorrect	Unsatisfactory/ Incorrect
	Unsatisfactory/ Incorrect	Complete	Unsatisfactory/ Incorrect
	Unsatisfactory/ Incorrect	Unsatisfactory/ Incorrect	Complete
	Partial	Unsatisfactory/ Incorrect	Unsatisfactory/ Incorrect
	Unsatisfactory/ Incorrect	Partial	Unsatisfactory/ Incorrect
	Unsatisfactory/ Incorrect	Unsatisfactory/ Incorrect	Partial
Unsatisfactory/ Incorrect	Unsatisfactory/ Incorrect	Unsatisfactory/ Incorrect	Unsatisfactory/ Incorrect

Score & Description

Parts A, B and C: Complete

Parts A, B and C: Partial

Parts A and C: Partial, Part B: Unsatisfactory/Incorrect

Parts A and C: Unsatisfactory/Incorrect, Part B: Partial

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Parts A, B and C: Complete - Student Responses

Student response #1

Some homes were built near the shoreline of the ocean. Sand dunes lie between the homes and the water. Each year a portion of the sand dunes is eroded by the ocean. To prevent erosion, some citizens suggest planting grasses on the sand dunes, and others suggest building a seawall, a solid barrier along the shoreline.

Explain how each plan would prevent erosion of the dunes.

The grass roots will keep the sand in place as water goes over it and the sea wall will reduce the amount of water going over the sand.

Give an environmental advantage and disadvantage of each plan.

Environmental advantage of planting grasses:

The air gets cleaner

Environmental disadvantage of planting grasses:

Some animals environments do not include grass

Environmental advantage of building a seawall:

animal homes in the dunes will not be destroyed

Environmental disadvantage of building a seawall:

animals needing to go in and out of the ocean now have more trouble

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Student response #2

Explain how each plan would prevent erosion of the dunes.

Planting grass would produce roots that would hold the sand together. A sea wall would stop the ocean from hitting the sand.

Give an environmental advantage and disadvantage of each plan.

Environmental advantage of planting grasses:

You get fresh oxegen and greenery.

Environmental disadvantage of planting grasses:

Plants could take over the reagon of the beach.

Environmental advantage of building a seawall:

To help homes of animals from being flooded.

Environmental disadvantage of building a seawall:

Could stop animals from travelling from ocean to land.

Scorer Comments:

Both responses provide correct explanations for how planting grasses and building a seawall would prevent erosion. The responses also provide plausible environmental advantages and disadvantages of planting grasses and building a seawall.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Parts A, B and C: Partial - Student Response

Student response #1

Some homes were built near the shoreline of the ocean. Sand dunes lie between the homes and the water. Each year a portion of the sand dunes is eroded by the ocean. To prevent erosion, some citizens suggest planting grasses on the sand dunes, and others suggest building a seawall, a solid barrier along the shoreline.

Explain how each plan would prevent erosion of the dunes.

A sea wall would prevent the water from reaching the dunes, acting as a barricade. The planting of grasses would prevent water reaching the sand dunes because the water would be absorbed in the grasses.

Give an environmental advantage and disadvantage of each plan.

Environmental advantage of planting grasses:

This is good for the enviorment and visually satisfying.

Environmental disadvantage of planting grasses:

some water would seep through the grasses and reach the dunes.

Environmental advantage of building a seawall:

It will last a long time and keep water out.

Environmental disadvantage of building a seawall:

Doing this may be harmful to the enviornment and cause visual blight.

Scorer Comments:

The response provides a correct explanation for how building a seawall would prevent erosion and a plausible advantage of building a seawall. The response also provides a plausible disadvantage of planting grasses.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Parts A and C: Partial, Part B: Unsatisfactory/Incorrect - Student Response

Student response #1

Some homes were built near the shoreline of the ocean. Sand dunes lie between the homes and the water. Each year a portion of the sand dunes is eroded by the ocean. To prevent erosion, some citizens suggest planting grasses on the sand dunes, and others suggest building a seawall, a solid barrier along the shoreline.

Explain how each plan would prevent erosion of the dunes.

wall = less wind
grass = provides a stable material to help keep sand in place

Give an environmental advantage and disadvantage of each plan.

Environmental advantage of planting grasses:

pretty, may produce flowers

Environmental disadvantage of planting grasses:

weeds

Environmental advantage of building a seawall:

prevents wind

Environmental disadvantage of building a seawall:

ugly and blocks new

Scorer Comments:

The response provides a correct explanation for how planting grasses would prevent erosion and a plausible advantage of building a seawall. The response also provides an inadequate advantage and disadvantage of planting grasses.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Parts A and C: Unsatisfactory/Incorrect, Part B: Partial - Student Response

Student response #1

Some homes were built near the shoreline of the ocean. Sand dunes lie between the homes and the water. Each year a portion of the sand dunes is eroded by the ocean. To prevent erosion, some citizens suggest planting grasses on the sand dunes, and others suggest building a seawall, a solid barrier along the shoreline.

Explain how each plan would prevent erosion of the dunes.

Each one would Stop it because of the oxygen in the tree

Give an environmental advantage and disadvantage of each plan.

Environmental advantage of planting grasses:

Gives oxygen

Environmental disadvantage of planting grasses:

makes more land just to float away

Environmental advantage of building a seawall:

slow it down, the land wash out

Environmental disadvantage of building a seawall:

just more land to be given off as well

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.

NAEP 2009 Science - Grade 8 Released Items

Student response #2

Some homes were built near the shoreline of the ocean. Sand dunes lie between the homes and the water. Each year a portion of the sand dunes is eroded by the ocean. To prevent erosion, some citizens suggest planting grasses on the sand dunes, and others suggest building a seawall, a solid barrier along the shoreline.

Explain how each plan would prevent erosion of the dunes.

A plant could reduce the movement of the sand. A wall could stop the sand.

Give an environmental advantage and disadvantage of each plan.

Environmental advantage of planting grasses:

stop some erosion.

Environmental disadvantage of planting grasses:

hard to plant the plants

Environmental advantage of building a seawall:

could stop erosion.

Environmental disadvantage of building a seawall:

big and ugly

Scorer Comments:

Both responses provide an incorrect explanation for how planting grasses and building a seawall would prevent erosion and inadequate advantage and disadvantage of building a seawall. The first response provides a plausible advantage of planting grasses. The second response provides a plausible disadvantage of planting grasses.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009 Assessment.