



**NEW ENGLAND  
COMMON ASSESSMENT PROGRAM**

**Released Items  
Support Materials  
2010**

**Grade 4  
Science**

**NECAP 2010 RELEASED ITEMS  
GRADE 4 SCIENCE**

**Grade 4 Science Released Item Information**

Item Number	Big Idea <sup>1</sup>	Assessment Target	Depth of Knowledge Code	Item Type <sup>2</sup>	Answer Key	Total Possible Points
1	INQ	PS 1-1	2	MC	A	1
2	SAE	PS 2-4	1	MC	B	1
3	SAE	PS 3-7	2	MC	B	1
4	POC	PS 1-2	2	CR		4
5	INQ	ESS 1-1	1	MC	C	1
6	SAE	ESS 1-4	1	MC	D	1
7	FAF	ESS 1-6	2	MC	A	1
8	SAE	LS 2-5	1	MC	D	1
9	SAE	LS 2-6	2	MC	B	1
10	POC	LS 4-9	2	MC	B	1

**Grade 4 Science Released Inquiry Task Information**

Item Number	Big Idea <sup>1</sup>	Inquiry Construct	Depth of Knowledge Code	Item Type <sup>2</sup>	Total Possible Points
1	INQ	8	2	CR	3
2	INQ	12	3	SA	2
3	INQ	10	2	SA	2
4	INQ	6	2	SA	2
5	INQ	6	2	SA	2
6	INQ	13	3	SA	2
7	INQ	4	2	SA	2
8	INQ	13	3	CR	3

<sup>1</sup>Big Idea: FAF = Form and Function, INQ = Scientific Inquiry, MAS = Models and Scale, NOS = Nature of Science, POC = Patterns of Change, SAE = Systems and Energy

<sup>2</sup>Item Type: MC = Multiple Choice, CR = Constructed Response, SA = Short Answer

**NECAP 2010 RELEASED ITEMS  
GRADE 4 SCIENCE**

<b>PS1 (K–4) INQ-1</b>	Students will collect and organize data about physical properties in order to classify objects or draw conclusions about objects and their characteristic properties (e.g., temperature, color, size, shape, weight, flexibility).
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- 1 A student flattened a 25-g ball of clay. The flattened clay also weighed 25 g. Which conclusion is **best** supported by this information?
- A. Weight does not change when the shape of an object changes.
  - B. Weight does not change when the texture of an object changes.
  - C. Weight does not change when the flexibility of an object changes.
  - D. Weight does not change when the temperature of an object changes.

<b>PS2 (K–4) SAE-4</b>	Students will, given a specific example or illustration (e.g., simple closed circuit, rubbing hands together), predict the observable effects of energy (i.e., light bulb lights, bell rings, hands warm up) (e.g., a test item might ask, “What will happen when . . . ?”).
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- 2 Which of the following is an example of heat made by friction?
- A. a candle burning
  - B. hands rubbing together
  - C. water heating on a stove
  - D. sunlight warming a sidewalk

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GRADE 4 SCIENCE**

<b>PS3 (K–4) SAE-7</b> Students will use data to predict how a change in force (greater/less) might affect the position, directions of motion, or speed of an object (e.g., a ramp and a ball).
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- 3 Kristen pushes an 8 kg ball and a 5 kg ball toward Jeremy. She wants the balls to reach Jeremy at the same time.

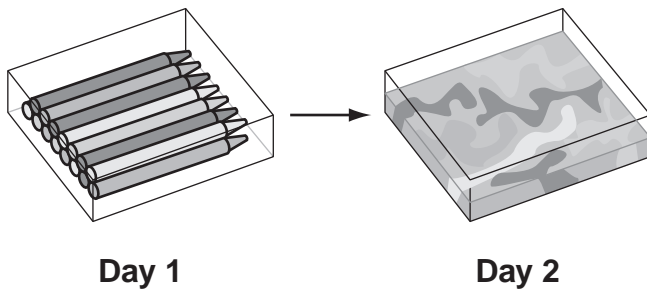
How does Kristen push the balls?

- A. She pushes the 8 kg ball more gently than she pushes the 5 kg ball.
- B. She pushes the 8 kg ball harder than she pushes the 5 kg ball.
- C. She pushes the 8 kg ball in a different direction than she pushes the 5 kg ball.
- D. She pushes the 8 kg ball and the 5 kg ball equally.

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**PS1 (K–4) POC-2** Students will make a prediction about what might happen to the state of common materials when heated or cooled or categorize materials as a solid, liquid, or gas.

- 4 On Day 1, a tray of crayons is left inside a car on a hot afternoon. On Day 2, the temperature is cool. The crayons form one piece of solid wax that takes the shape of the tray.



- Explain how the crayons formed one piece of solid wax.
- Explain why the crayons took the shape of the tray.

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**Scoring Guide**

<b>Score</b>	<b>Description</b>
<b>4</b>	Response demonstrates a thorough understanding of what might happen to the state of common materials when heated or cooled. The response explains how crayons formed one piece of solid wax. The response explains why the crayons took the shape of the tray.
<b>3</b>	Response demonstrates a general understanding of what might happen to the state of common materials when heated or cooled. The overall response is general.
<b>2</b>	Response demonstrates a limited understanding of what might happen to the state of common materials when heated or cooled. The overall response is limited.
<b>1</b>	Response demonstrates a minimal understanding of what might happen to the state of common materials when heated or cooled. The overall response is minimal.
<b>0</b>	Response is incorrect or irrelevant to the skill or concept being measured.
<b>Blank</b>	No response

**Training Notes:**

- a. The crayons melted into a liquid and blended together (turned from a solid to a liquid) when it was hot, and then the crayons formed one piece of solid wax when it was cool.
- b. When the crayons were a liquid, they took the shape of the tray because that is a property of liquids.

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SCORE POINT 4

4

The crayons formed one piece of solid wax because they were left in the car on a hot day, so they melted. The next day was cool, so they cooled off and became a block.

The crayons took the shape of the tray because when they melted, they became a liquid. Liquid takes the shape of the thing it's in. For this case the melted crayon was in a tray, so the liquid took the shape of the tray. When it cooled off, it hardened, making a piece of solid wax.

Response demonstrates a thorough understanding of the changes in the state of materials when heated or cooled ("hot . . . melted," "cool . . . became a block"). Response explains why crayons take the shape of the tray ("Liquid takes the shape of the thing it's in").

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SCORE POINT 3

4 .A. The crayons formed one piece of wax because it was hot outside so the crayons melted. Also since it was cool the next day the wax hardened. B. They took the shape of the container because it changed from a solid to a liquid and hardened.

Response demonstrates a general understanding of the changes in the state of materials when heated ("hot . . . melted," "cool . . . hardened"). Response generally explains that crayons take the shape of the tray because "it changed from a solid to a liquid and hardened."

SCORE POINT 2  
(EXAMPLE A)

4 The crayons are getting so hot that they melt into a liquid and then when it gets cool they harden into a solid.

Response demonstrates a limited understanding of the changes in the state of materials when cooled.

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SCORE POINT 2  
(EXAMPLE B)

4 a. The crayons melted and when they cooled, they froze together.

b. The crayons were a liquid so they took shape of tray like milk does when it gets put into a carton.

Response demonstrates a limited understanding of the changes in the state of materials when cooled. Part b does not address solidifying when the crayons cooled in the car, although the response does state that they "were a liquid so they took shape of tray."

SCORE POINT 1

4 It was a hot day so the crayons melted into a thick liquid. They dried up and turned into one big rainbow crayon.

Response demonstrates a minimal understanding of the changes in the state of materials when heated. Response contains an error related to the crayons "drying up."

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SCORE POINT 0

4 because solid wax can  
not melt.

Response is incorrect.

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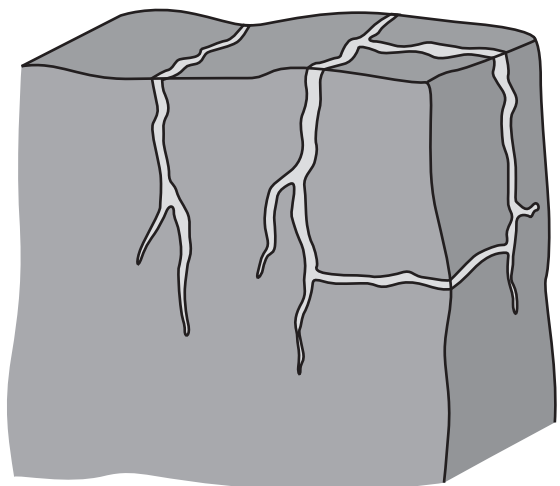
**ESS1 (K–4) INQ-1** Students will, given certain earth materials (soils, rocks, or minerals), use physical properties to sort, classify, and describe them.

- 5 A student has an earth material. Which is the **best** way for the student to find out if the earth material is soil?
- A. weigh the earth material
  - B. heat the earth material
  - C. look for pieces of dead plants in the earth material
  - D. measure the size of the pieces in the earth material

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ESS1 (K-4) SAE-4 Students will explain how wind, water, or ice shape and reshape Earth's surface.

- 6 The picture below shows a rock with water in its cracks.



What is the **most likely** cause of the rock breaking apart?

- A. wind making the rock fall
- B. wind eroding the cracks
- C. water changing to vapor
- D. water changing to ice

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**ESS1 (K–4) FAF-6** Students will, given information about earth materials, explain how their characteristics lend themselves to specific uses.

7 An earth material is used to make the products listed below.

- automobile parts
- airplanes
- tennis rackets

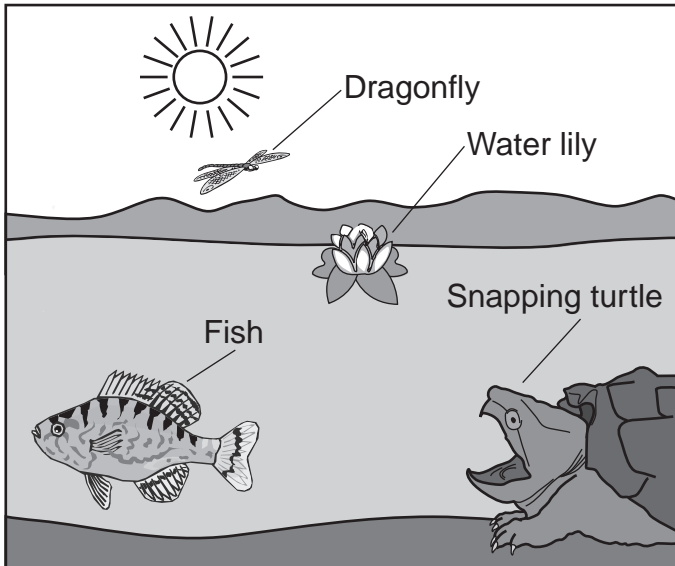
Which characteristics make this earth material useful for these products?

- A. strong and lightweight
- B. magnetic and flexible
- C. easily shaped and soft
- D. conducts electricity and heat

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**LS2 (K–4) SAE-5** Students will recognize that energy is needed for all organisms to stay alive and grow or will identify where a plant or animal gets its energy.

- 8 The diagram below shows living things in a pond.



Which living thing changes the energy from sunlight into food energy?

- A. dragonfly
- B. fish
- C. snapping turtle
- D. water lily

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LS2 (K–4) SAE-6 Students will describe ways plants and animals depend on each other (e.g., shelter, nesting, food).

- 9 Eagles nest high in dead trees. All of the dead trees in an area are knocked down. Why does the number of eagles in the area decrease?
- A. The eagles start nesting in live trees instead of dead trees.
  - B. The eagles no longer have a good place to build nests.
  - C. The eagles no longer have materials with which to build nests.
  - D. The eagles start nesting on the ground instead of in dead trees.

LS4 (K–4) POC-9 Students will distinguish between characteristics of humans that are inherited from parents (i.e., hair color, height, skin color, eye color) and others that are learned (e.g., riding a bike, singing a song, playing a game, reading).

- 10 A basketball player is seven feet tall. Why did he **most likely** grow that tall?
- A. His birth parents played basketball.
  - B. His birth parents are also tall.
  - C. He stretched his legs every day.
  - D. He learned how to play sports.

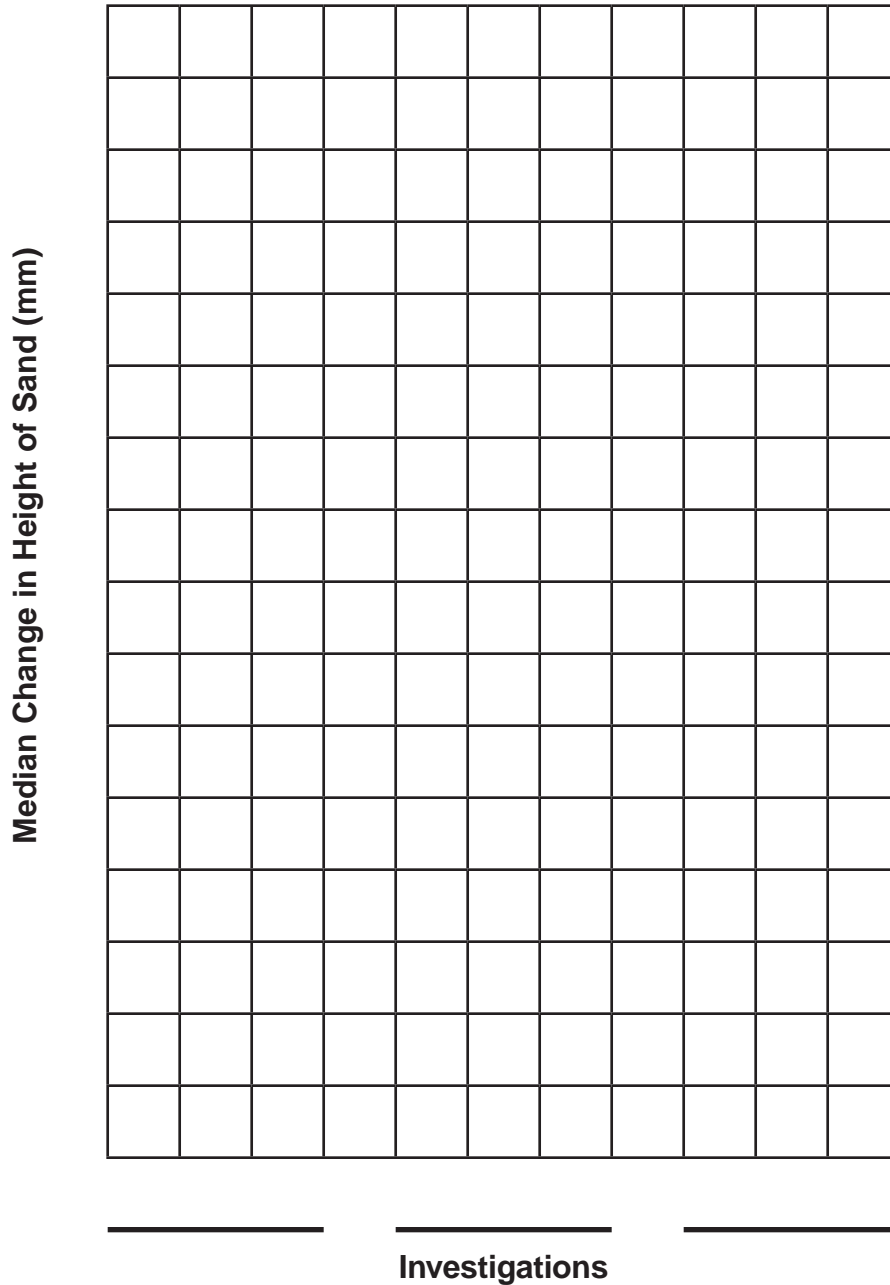
NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE

**Broad Area of Inquiry:** Conducting Investigations

**Inquiry Construct 8:** Use accepted methods for organizing, representing, and manipulating data.

- ① Use the data collected for each of the three investigations—**Sand Only**, **Sand with Sticks**, and **Sand with a Fence**—to make a bar graph of the median change in height.

**Title:** \_\_\_\_\_



**NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE**

**Scoring Guide**

<b>Score</b>	<b>Description</b>
<b>3</b>	The response demonstrates a general understanding of how to make a bar graph of the data collected for the three investigations. The response includes a bar graph of the data with an appropriate title and scale and appropriate labels.
<b>2</b>	The response demonstrates a limited understanding of how to make a bar graph of the data collected for each of the three investigations. One element of the graph may be missing or incorrect.
<b>1</b>	The response demonstrates a minimal understanding of how to make a bar graph of the data collected for each of the three investigations. The response must include accurate graphical representation of data to score a 1.
<b>0</b>	Response is incorrect or irrelevant to the skill or concept being measured.
<b>Blank</b>	No response

**Training Notes:**

A bar graph must include a title, a scale, and labels on the x-axis. Sample responses for the title and x-axis labels include

Title: appropriately related to the investigation

- Note: “Bar Graph” and “Graph” are not appropriate titles.

x-axis labels:

- “Sand Only” or “Sand”
- “Sand with Sticks,” “Sticks,” or “Grass”
- “Sand with a Fence” or “Fence”

Scale:

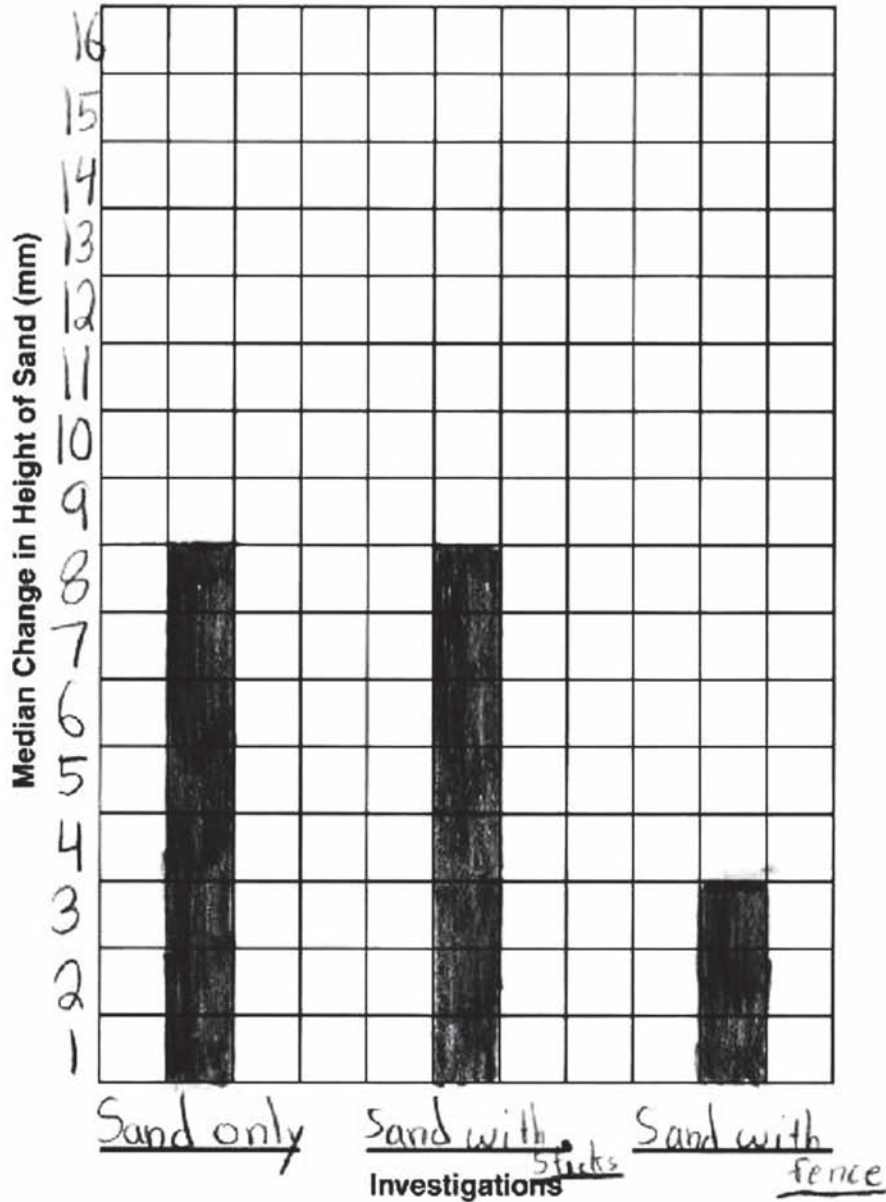
- Evenly spaced values
- Range of values that fit on graph

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SCORE POINT 3

- ① Use the data collected for each of the three investigations—**Sand Only**, **Sand with Sticks**, and **Sand with a Fence**—to make a bar graph of the median change in height.

Title: Sand investigations.



The response demonstrates a general understanding of how to make a bar graph of the data collected for the three investigations. All parts of the bar graph are properly graphed based on the Data Table (on next page). The x- and y-axes are appropriately labeled and scaled, and the title is appropriate.

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SCORE POINT 3 (CONTINUED)

**Data Table**  
**Median Change in Height**

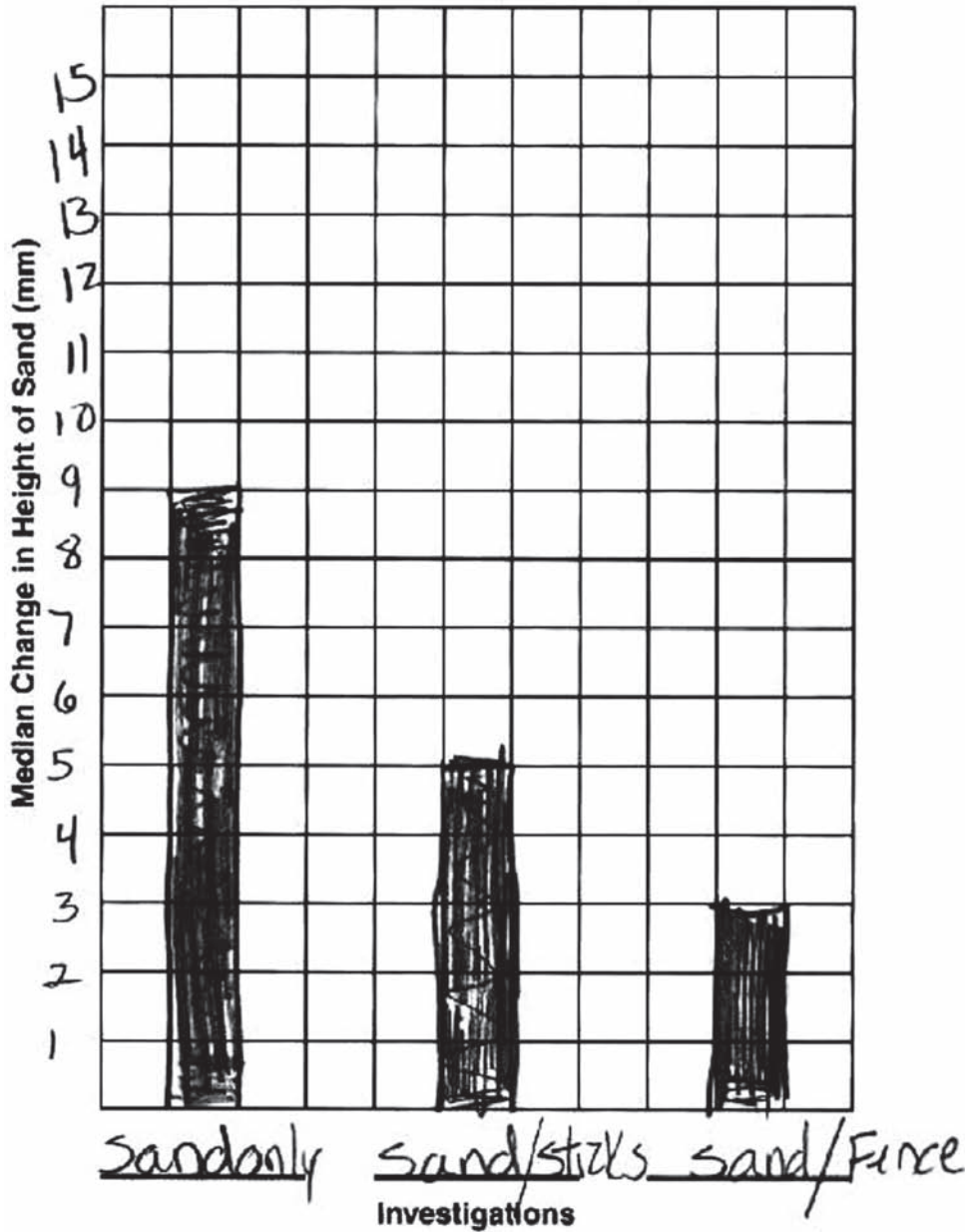
Investigations	Median Change in Height (mm)
Sand Only	8
Sand with Sticks (dune grass)	8
Sand with a Fence	3

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SCORE POINT 2

- ① Use the data collected for each of the three investigations—**Sand Only**, **Sand with Sticks**, and **Sand with a Fence**—to make a bar graph of the median change in height.

Title: \_\_\_\_\_



The response demonstrates a limited understanding of how to make a bar graph of the data collected for each of the three investigations. The response correctly graphs the values from the Data Table (on next page). The scales and labels are appropriate. Having no title prevents a 3 score.

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SCORE POINT 2 (CONTINUED)

**Data Table**  
**Median Change in Height**

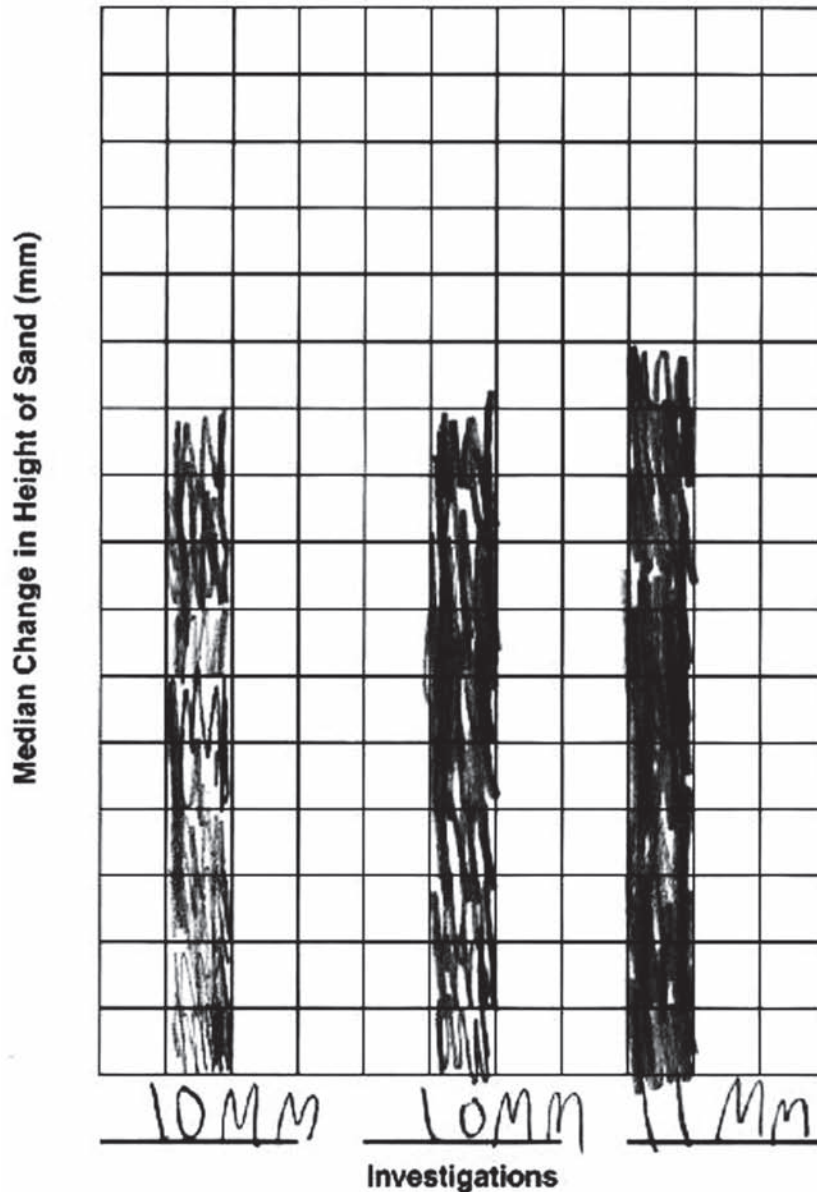
Investigations	Median Change in Height (mm)
Sand Only	9mm
Sand with Sticks (dune grass)	5mm
Sand with a Fence	3

NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE

SCORE POINT 1

- ① Use the data collected for each of the three investigations—**Sand Only**, **Sand with Sticks**, and **Sand with a Fence**—to make a bar graph of the median change in height.

Title: Sand



The response demonstrates a minimal understanding of how to make a bar graph of the data collected for each of the three investigations. The response includes an acceptable title and shows an attempt to graphically represent the data from the table (on next page). The inappropriately labeled x-axis and the lack of a scale make this response earn a 1 score.

NECAP 2010 RELEASED INQUIRY TASK  
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SCORE POINT 1 (CONTINUED)

**Data Table**  
**Median Change in Height**

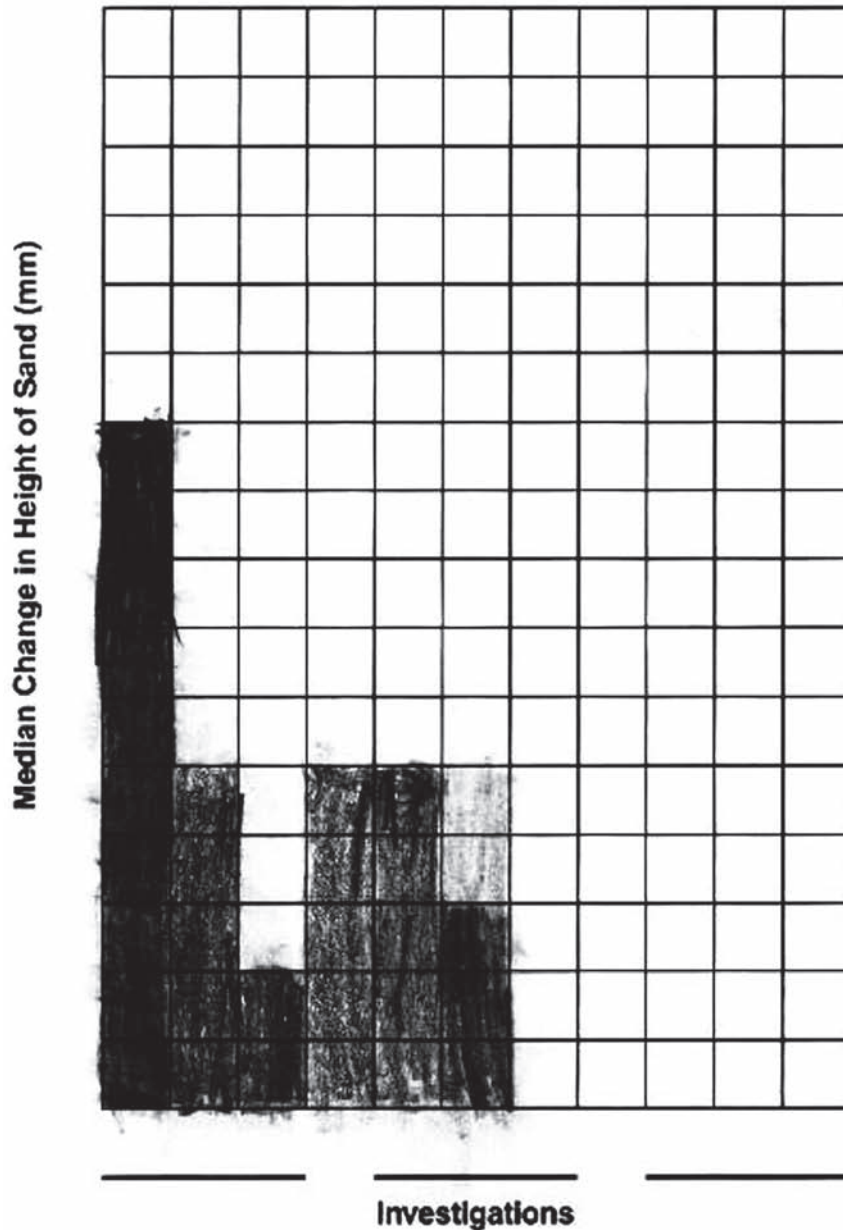
Investigations	Median Change in Height (mm)
Sand Only	-1
Sand with Sticks (dune grass)	+1
Sand with a Fence	3

NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE

SCORE POINT 0

- ① Use the data collected for each of the three investigations—**Sand Only**, **Sand with Sticks**, and **Sand with a Fence**—to make a bar graph of the median change in height.

Title: \_\_\_\_\_



The response does not demonstrate an understanding of how to construct a graph based on the data on next page. There are no correct elements.

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SCORE POINT 0 (CONTINUED)

**Data Table**  
**Median Change in Height**

Investigations	Median Change in Height (mm)
Sand Only	2
Sand with Sticks (dune grass)	5
Sand with a Fence	3

**NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE**

**Broad Area of Inquiry:** **Developing and Evaluating Explanations**

**Inquiry Construct 12:** Use evidence to support and justify interpretations and conclusions or explain how the evidence refutes the hypothesis.

**2** Read your prediction on page 2. Check the box for the statement that **best** describes your data.

The data **supported** my prediction.

The data **did not support** my prediction.

I know this because \_\_\_\_\_

**Scoring Guide**

<b>Score</b>	<b>Description</b>
<b>2</b>	The response demonstrates a general understanding of how to support a prediction with data. The response identifies whether the data did or did not support the prediction and supports the answer with reasoning.
<b>1</b>	The response demonstrates a limited understanding of how to support a prediction with data. The response may or may not indicate if data supports or does not support the prediction.
<b>0</b>	Response is incorrect or irrelevant to the skill or concept being measured.
<b>Blank</b>	No response

**Training Notes:**

Response indicates whether the data supported or did not support the prediction and provides reasoning.

Sample response:

The data supported my prediction. I know this because I predicted that the wind will make the sand dunes smaller. In each investigation, we blew on the sand and the height of the sand dune got smaller.

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SCORE POINT 2

2 Read your prediction on page 2. Check the box for the statement that **best** describes your data.

The data **supported** my prediction.

The data **did not support** my prediction.

I know this because I predicted that over time the wind blows on sand dunes and the sand dunes get smaller. The data supported my prediction because before we blow on the sand (with no sticks or fence) the height was 11mm and after blowing the height was 7mm.

The response demonstrates a general understanding of how to support a prediction with data. The response takes a position ("The data supported my prediction") and provides supporting evidence with a clear discussion of the investigation ("after blowing the height was 7mm").

**Making a Prediction**

I predict that wind changes height and shape of sand dunes

because over time when wind blows on the sand dunes the sand breaks away and the sand dunes get smaller.

NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE

SCORE POINT 2 (CONTINUED)

**Data Table**  
**Median Change in Height**

<b>Investigations</b>	<b>Median Change in Height (mm)</b>
<b>Sand Only</b>	3
<b>Sand with Sticks (dune grass)</b>	2
<b>Sand with a Fence</b>	3

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SCORE POINT 1

2 Read your prediction on page 2. Check the box for the statement that **best** describes your data.

The data **supported** my prediction.

The data **did not support** my prediction.

I know this because ~~in~~ my prediction I said  
the wind would move the sand I  
was wright

The response demonstrates a limited understanding of how to support a prediction with data. The response takes a position ("The data supported my prediction"). The prediction said the sand would move, and the sand did move during the investigation. No specific examples from the investigation are used to support the position.

**Making a Prediction**

I predict the wind will move the sand dune

because sand is not too heavy sand is easy  
to move

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SCORE POINT 1 (CONTINUED)

**Data Table**  
**Median Change in Height**

<b>Investigations</b>	<b>Median Change in Height (mm)</b>
<b>Sand Only</b>	<b>7</b>
<b>Sand with Sticks (dune grass)</b>	<b>11</b>
<b>Sand with a Fence</b>	<b>3</b>

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SCORE POINT 0

- 2 Read your prediction on page 2. Check the box for the statement that **best** describes your data.

The data **supported** my prediction.

The data **did not support** my prediction.

I know this because I reread my prediction and looked over the information that I gathered from my experiment.

The response does not correctly respond to the item and demonstrates no understanding of how to use data to support a prediction.

### Making a Prediction

I predict that the wind will make larger sand dunes in some places and smaller sand dunes in another. I also think that the sticks we are using as grass will move too. because the wind will hit one spot and make sand move to another's spot. When the sand moves, one spot won't be as high as another.

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SCORE POINT 0 (CONTINUED)

**Data Table**  
**Median Change in Height**

<b>Investigations</b>	<b>Median Change in Height (mm)</b>
<b>Sand Only</b>	10 mm
<b>Sand with Sticks (dune grass)</b>	10 mm
<b>Sand with a Fence</b>	3 mm

**NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE**

**Broad Area of Inquiry:** Conducting Investigations  
**Inquiry Construct 10:** Summarize results based on data.

**3** Look at your graph on page 3 and think about your data.

Describe how your data for **Sand with Sticks** is different from your data for **Sand Only**. Use the data to support your answer.

**Scoring Guide**

<b>Score</b>	<b>Description</b>
<b>2</b>	The response includes a general description of how the data for the sand with sticks is different from the data for sand only and uses data to support the answer.
<b>1</b>	The response includes a limited description of how the data for the sand with sticks is different from the data for sand only and may or may not use data to support the answer.
<b>0</b>	Response is incorrect or irrelevant to the skill or concept being measured.
<b>Blank</b>	No response

**Training Notes:**

Sample response:

The median height change for the sand with sticks was \_\_\_\_\_, which is less than the median height change for sand only, which was \_\_\_\_\_.

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SCORE POINT 2

- 3 Look at your graph on page 3 and think about your data.

Describe how your data for **Sand with Sticks** is different from your data for **Sand Only**. Use the data to support your answer.

The difference between the data for sand with sticks and the data for sand only is huge! Sand only had 5mm and sand with sticks had 1mm. That's a 4 mm difference.

The response demonstrates a general understanding of how the data for the sand with sticks is different from that for the sand only. The response describes how the data are different ("huge!") and uses quantitative data from the investigation as support ("1mm" for the sand with sticks versus "5mm" for sand only), as represented in the table below and on the graph on the next page.

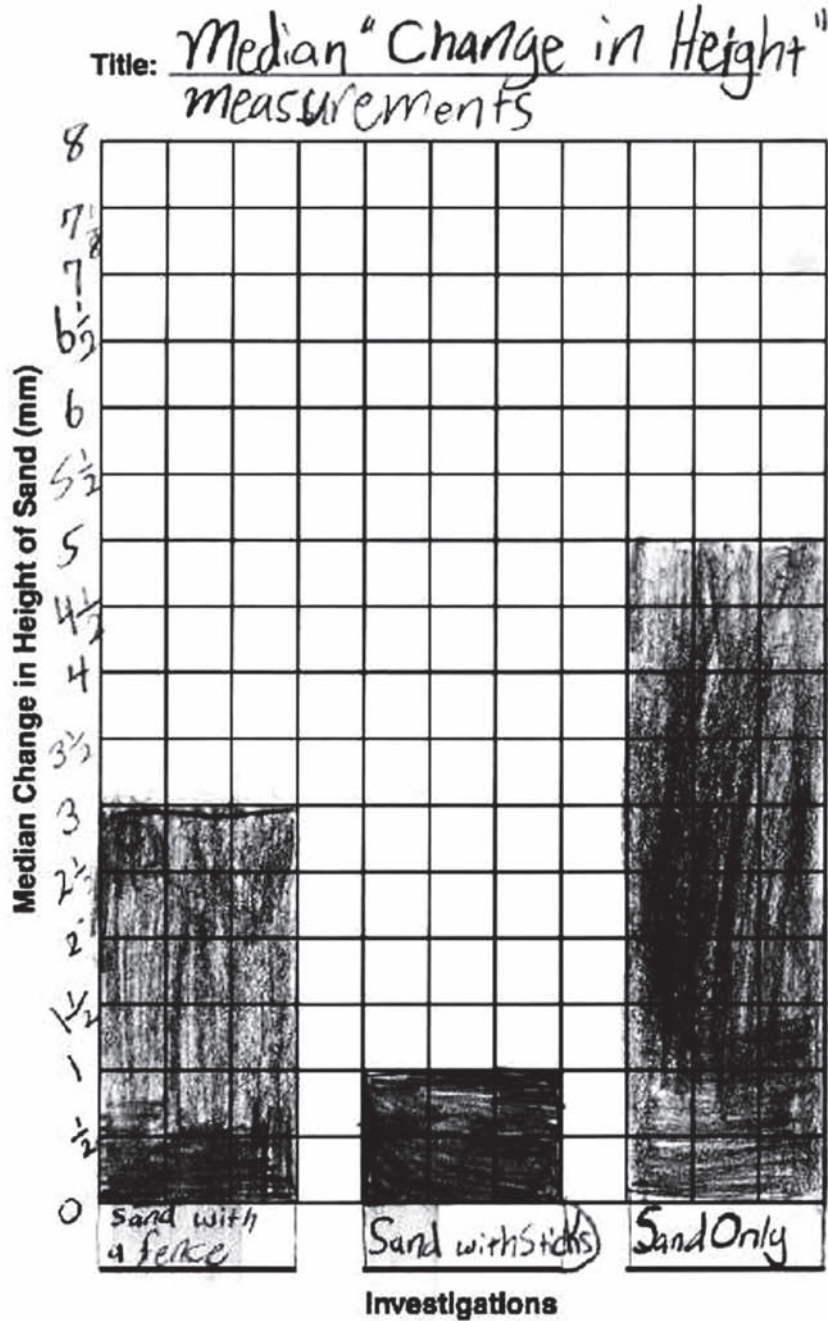
**Data Table**  
**Median Change in Height**

Investigations	Median Change in Height (mm)
Sand Only	5mm
Sand with Sticks (dune grass)	1mm
Sand with a Fence	3mm

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SCORE POINT 2 (CONTINUED)

- 1 Use the data collected for each of the three investigations—**Sand Only**, **Sand with Sticks**, and **Sand with a Fence**—to make a bar graph of the median change in height.



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SCORE POINT 1

- 3 Look at your graph on page 3 and think about your data.

Describe how your data for **Sand with Sticks** is different from your data for **Sand Only**. Use the data to support your answer.

Sand with Sticks were different from Sand Only. Because Sand Only had an bigger median than Sand with Sticks!

The response demonstrates a limited understanding of how the data for the sand with sticks is different from that for sand only. The response describes how the data are different without using quantitative data from the investigation as support, as represented in the table below and on the graph on the next page.

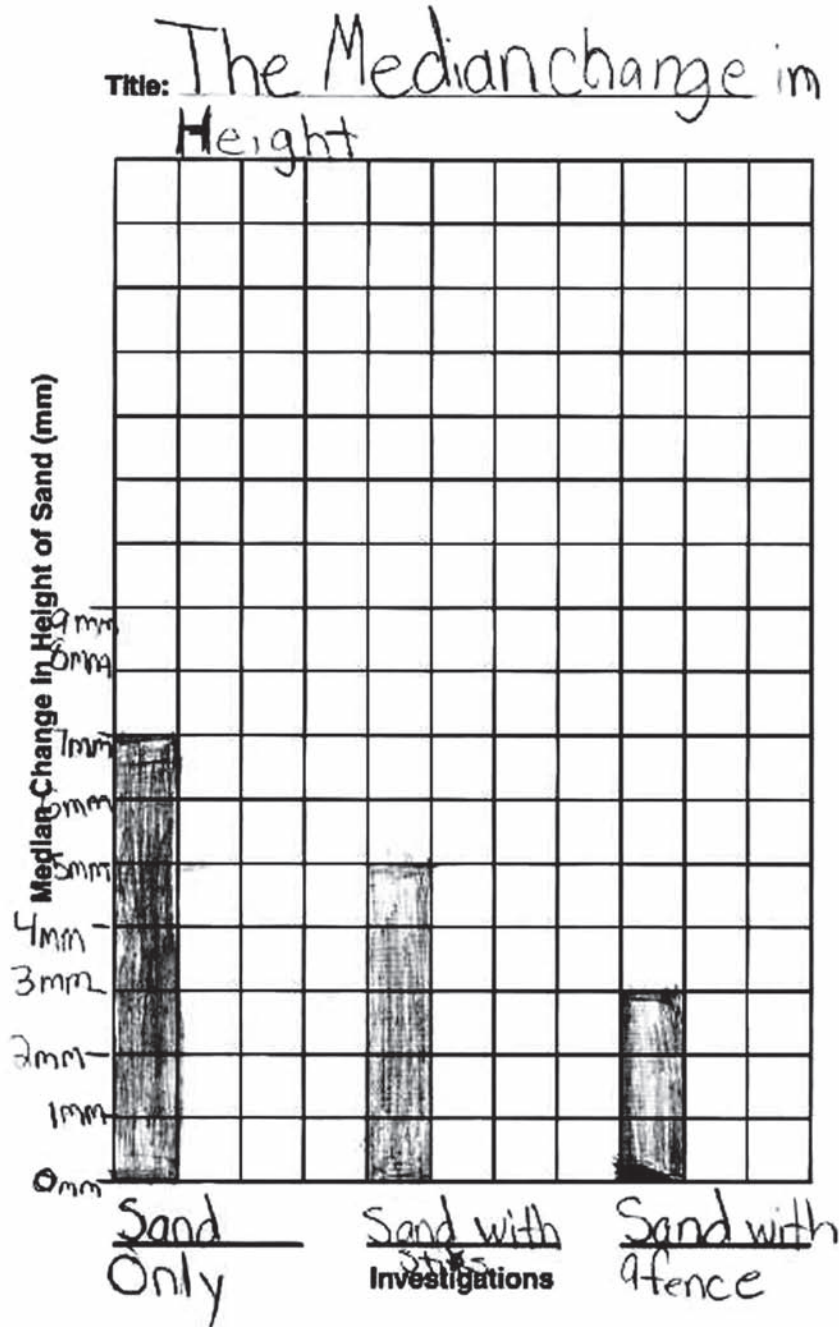
**Data Table**  
**Median Change in Height**

Investigations	Median Change in Height (mm)
Sand Only	7
Sand with Sticks (dune grass)	5
Sand with a Fence	3

NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE

SCORE POINT 1 (CONTINUED)

- 1 Use the data collected for each of the three investigations—**Sand Only**, **Sand with Sticks**, and **Sand with a Fence**—to make a bar graph of the median change in height.



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GRADE 4 SCIENCE

SCORE POINT 0

3 Look at your graph on page 3 and think about your data.

Describe how your data for **Sand with Sticks** is different from your data for **Sand Only**. Use the data to support your answer.

*It is different because with sticks it is harder to knock down.*

The response does not demonstrate understanding of how the data for the sand with sticks is different from that for sand only.

**Data Table**  
**Median Change in Height**

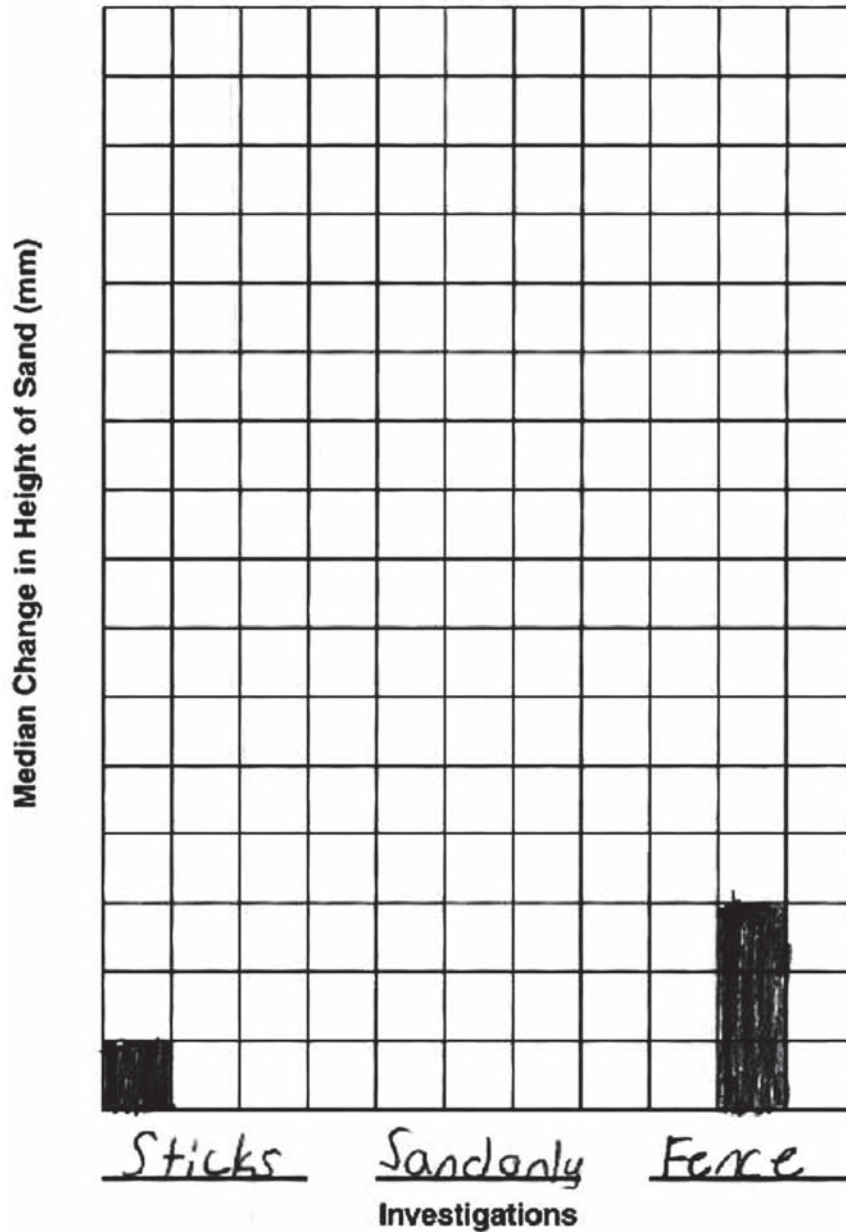
Investigations	Median Change in Height (mm)
Sand Only	0 (mm)
Sand with Sticks (dune grass)	1 (mm)
Sand with a Fence	3

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SCORE POINT 0 (CONTINUED)

- ① Use the data collected for each of the three investigations—**Sand Only**, **Sand with Sticks**, and **Sand with a Fence**—to make a bar graph of the median change in height.

Title: \_\_\_\_\_



**NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE**

**Broad Area of Inquiry:** Planning and Critiquing of Investigations  
**Inquiry Construct 6:** Provide reasoning for appropriateness of materials, tools, procedures, and scale used in the investigation.

- 4 Explain why the results for **Sand Only** are helpful for understanding the results for **Sand with Sticks** and **Sand with a Fence**.

**Scoring Guide**

<b>Score</b>	<b>Description</b>
<b>2</b>	The response includes a general explanation why the results for sand only are helpful for understanding the results for sand with sticks and sand with a fence.
<b>1</b>	The response includes a limited explanation why the results for sand only are helpful for understanding the results for sand with sticks and sand with a fence.
<b>0</b>	Response is incorrect or irrelevant to the skill or concept being measured.
<b>Blank</b>	No response

**Training Notes:**

Sample response:

So you can know what difference sticks or a fence in a sand dune makes when the wind is blowing.

NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE

SCORE POINT 2

- 4 Explain why the results for **Sand Only** are helpful for understanding the results for **Sand with Sticks** and **Sand with a Fence**.

The results for sand only are helpful for understanding the results for sand with sticks and sand with a fence because it helps to look at the original before you look at the extras.

The response includes a general explanation why the results for sand only are helpful for understanding the results for sand with sticks and sand with fence. The response indicates that the results for the "original" (sand alone) can be compared with the results for "the extras."

**Data Table**  
**Median Change in Height**

Investigations	Median Change in Height (mm)
Sand Only	10
Sand with Sticks (dune grass)	8
Sand with a Fence	3

NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE

SCORE POINT 1

- 4 Explain why the results for **Sand Only** are helpful for understanding the results for **Sand with Sticks** and **Sand with a Fence**.

The results for Sand Only are helpful for understanding Sand with Sticks and Sand with Fence because it helps us learn that if sand has something in it or near it then the wind won't effect it as much.

The response includes a limited explanation why the results for sand only are helpful for understanding the results for sand with sticks and sand with fence. The response includes a limited explanation why the results can be used to compare the effects of the wind when there are no barriers and when there are barriers.

**Data Table**  
**Median Change in Height**

Investigations	Median Change in Height (mm)
Sand Only	5
Sand with Sticks (dune grass)	4
Sand with a Fence	3

NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE

SCORE POINT 0

- 4 Explain why the results for **Sand Only** are helpful for understanding the results for **Sand with Sticks** and **Sand with a Fence**.

With sand only it blew much more sand than in the other two. With sand with a fence and sand with sticks the wind blew mostly the sticks and fence.

The response includes no explanation of comparison. The response discusses results only, not how the difference in sand only versus sand with sticks/fence can help one understand what the results mean.

**Data Table**  
**Median Change in Height**

Investigations	Median Change in Height (mm)
Sand Only	12
Sand with Sticks (dune grass)	5
Sand with a Fence	3

**NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE**

**Broad Area of Inquiry:** Planning and Critiquing of Investigations  
**Inquiry Construct 6:** Provide reasoning for appropriateness of materials, tools, procedures, and scale used in the investigation.

- 5 Explain why the models used in these investigations can be used to study how wind changes sand dunes. Use your data and observations to support your answer.

**Scoring Guide**

Score	Description
2	The response demonstrates a general understanding why the investigation of sand only, sand with sticks, and sand with a fence can be used to study how wind changes sand dunes. The response uses data and/or observations to support the explanation.
1	The response demonstrates a limited understanding why the investigation of sand only, sand with sticks, and sand with a fence can be used to study how wind changes sand dunes. The response may or may not use data and/or observations to support the explanation.
0	Response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response

**Training Notes:**

The investigation can be used to study how wind changes sand dunes because the results from these investigations are similar to what happens to real sand dunes on a beach. The students observed that sand dunes with grass stayed about the same size but sand dunes only blew away. In the investigation, the data showed that sand only lost (2 mm) more sand than sand with sticks, which is what happened on a real beach. The sticks in the model sand dune were similar to grass in a real sand dune.

NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE

SCORE POINT 2

- 5 Explain why the models used in these investigations can be used to study how wind changes sand dunes. Use your data and observations to support your answer.

The straw and you blowing into it is the wind. The pile of sand is the sand dune. The sticks are the grass. The sand only is the sand dunes with no grass. When the wind hits the sand it blows away. But when it hit's the grass, less sand blows away because it blocked.

The response demonstrates a general understanding of what the models and the investigation represented. Observations of the investigations are used as support.

**Data Table**  
**Median Change in Height**

Investigations	Median Change in Height (mm)
Sand Only	4
Sand with Sticks (dune grass)	3
Sand with a Fence	3

NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE

SCORE POINT 1

- 5 Explain why the models used in these investigations can be used to study how wind changes sand dunes. Use your data and observations to support your answer.

These models can be used to study how wind changes sand dunes because it is the same thing that happens in nature just a smaller version.

The response demonstrates a limited understanding of what the models and the investigation represented. Neither data nor observations are used as support.

**Data Table**  
**Median Change in Height**

<b>Investigations</b>	<b>Median Change in Height (mm)</b>
Sand Only	5mm.
Sand with Sticks (dune grass)	3mm.
Sand with a Fence	3

NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE

SCORE POINT 0

- 5 Explain why the models used in these investigations can be used to study how wind changes sand dunes. Use your data and observations to support your answer.

The more of the sand that is covered the less amount of it will move.

The response does not demonstrate understanding of why the investigation can be used to study how wind changes sand dunes.

**Data Table**  
**Median Change in Height**

Investigations	Median Change in Height (mm)
Sand Only	4
Sand with Sticks (dune grass)	10
Sand with a Fence	3

**NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE**

**Broad Area of Inquiry:** Developing and Evaluating Explanations

**Inquiry Construct 13:** Communicate how scientific knowledge applies to explain results, propose further investigations, or construct and analyze alternative explanations.

- 6 Explain what people could do to keep the dunes at the beach in place. Use your data to explain why this would work.

**Scoring Guide**

Score	Description
2	The response demonstrates a general understanding of what would keep the dunes in place and uses data to explain the answer.
1	The response demonstrates a limited understanding of what would keep the dunes in place and may or may not use data to explain the answer.
0	Response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response

**Training Notes:**

Sample responses:

- Dunes could be kept in place by planting beach grass; the data showed . . .
- Dunes could be kept in place by blocking the wind with fences or sticks; the data showed . . .

Note: Other reasonable creative solutions (e.g., covering a dune with tarps) need to be supported with data to be awarded full credit.

NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE

SCORE POINT 2

- 6 Explain what people could do to keep the dunes at the beach in place. Use your data to explain why this would work.

People could put a fence around sand dunes so not a lot of sand could go away from the sand dunes because when you put a fence around the model sand dune the change was only 3mm, but when there was sand only the change was 6mm.

The response demonstrates a general understanding of what may keep dunes in place ("a fence") and uses data from the investigation to support the explanation.

**Data Table**  
**Median Change in Height**

Investigations	Median Change in Height (mm)
Sand Only	6
Sand with Sticks (dune grass)	6
Sand with a Fence	3

NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE

SCORE POINT 1

- 6 Explain what people could do to keep the dunes at the beach in place. Use your data to explain why this would work.

People could use walls to keep the sand dunes in place because if walls were around it the sand wouldn't be able to move around.

The response demonstrates a limited understanding of what may keep dunes in place by suggesting a plausible solution ("walls"). This explanation is not supported by data from the investigation.

**Data Table**  
**Median Change in Height**

Investigations	Median Change in Height (mm)
Sand Only	9
Sand with Sticks (dune grass)	8
Sand with a Fence	3

NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE

SCORE POINT 0

- 6 Explain what people could do to keep the dunes at the beach in place. Use your data to explain why this would work.

The sand dunes at the beach  
there would not need wind blowing.

The response does not demonstrate an understanding of what can be done to keep the dunes in place. No solution is presented.

**Data Table**  
**Median Change in Height**

Investigations	Median Change in Height (mm)
Sand Only	5 mm
Sand with Sticks (dune grass)	5 m
Sand with a Fence	3

**NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE**

**Broad Area of Inquiry:** Planning and Critiquing of Investigations  
**Inquiry Construct 4:** Identify information/evidence that needs to be collected in order to answer the question, hypothesis, or prediction.

**7** What information does Janelle need to gather to see if piling logs stopped the river from wearing away the yard?

**Scoring Guide**

<b>Score</b>	<b>Description</b>
<b>2</b>	The response demonstrates a general understanding of the information needed to evaluate the effect piling logs had on the erosion of the yard.
<b>1</b>	The response demonstrates a limited understanding of the information needed to evaluate the effect piling logs had on the erosion of the yard.
<b>0</b>	Response is incorrect or irrelevant to the skill or concept being measured.
<b>Blank</b>	No response

**Training Notes:**

Sample responses:

- The distance between the fence and the river before and after piling the logs
- The width of the yard before and after piling the logs

NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE

SCORE POINT 2

- 7 What information does Janelle need to gather to see if piling logs stopped the river from wearing away the yard?

The information that Janelle needs to gather to see if piling logs against the river is how much, each summer, that the river is wearing away. If it decreases, her idea is working.

The response demonstrates general understanding of the information needed. The response suggests taking measurements over time to determine how much land, if any, is worn away.

SCORE POINT 1

- 7 What information does Janelle need to gather to see if piling logs stopped the river from wearing away the yard?

The amount of distance between the fence and the edge of the water.

The response demonstrates limited understanding of the information needed. The response suggests taking one measurement, not taking measurements over time.

NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE

SCORE POINT 0

- 7 What information does Janelle need to gather to see if piling logs stopped the river from wearing away the yard?

The information that she needs is that she needs to put big huge rocks and big thick logs to stop the river bank to wear away the yard.

The response does not address the question. The response proposes a solution rather than the information that should be gathered.

**NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE**

**Broad Area of Inquiry:** Developing and Evaluating Explanations

**Inquiry Construct 13:** Communicate how scientific knowledge applies to explain results, propose further investigations, or construct and analyze alternative explanations.

- 8 Describe another way Janelle could stop the river from wearing away her grandmother’s yard. Use what you learned in your sand dune investigations to explain why this would stop the river.

**Scoring Guide**

Score	Description
3	The response identifies another way to keep the river from wearing away the yard and includes a general explanation why it will work based on what was learned in the sand dune investigation.
2	The response identifies another way to keep the river from wearing away the yard and includes a limited explanation why it will work. The suggestion may or may not be based on what was learned in the sand dune investigation.
1	The response identifies another way to keep the river from wearing away the yard and includes a minimal explanation or no explanation why it will work.
0	Response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response

**Training Notes:**

Sample responses:

- Build a rock or cement wall along the edge of the water. I learned that blocking the wind will stop some of the sand from blowing away so by blocking the water in the river it might stop some of the yard from washing away.
- Build a dam downstream from the grandmother’s house. The water will stay still and not flow quickly past the yard. I learned that blocking the wind will stop some of the sand from blowing away and that stronger wind would move more sand. So, by slowing down the movement of water, it might stop the yard from washing away.

NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE

SCORE POINT 3

- 8 Describe another way Janelle could stop the river from wearing away her grandmother's yard. Use what you learned in your sand dune investigations to explain why this would stop the river.

A strong concrete dam could stop the lake from eroding grandmas yard because the dam would act as a fence. The "fence" would protect the land, like the real fence did with the sand. If the dam was made with concrete, there would be no holes in it.

The response identifies another way to keep the river from wearing away the yard ("a strong concrete dam"). The response includes a general explanation why it will work by referring to the results of the investigation with the sand dune and the fence.

- 7 What information does Janelle need to gather to see if piling logs stopped the river from wearing away the yard?

The information Janelle would need is how many feet the water goes up every summer, then multiply that by 3. By multiplying it by three, the logs would need to be that long in order to hold the water for 3 years without it overflowing.

NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE

SCORE POINT 2

- 8 Describe another way Janelle could stop the river from wearing away her grandmother's yard. Use what you learned in your sand dune investigations to explain why this would stop the river.

A. Janelle could make a stone wall so all the water will just crash off the wall and not go on land.

The response identifies a way to keep the river from wearing away the yard ("a stone wall"). The response includes a limited explanation why it will work but makes no reference to the sand dune investigation.

- 7 What information does Janelle need to gather to see if piling logs stopped the river from wearing away the yard?

Janelle would have to know how strong the water current was.  
If the logs were not tall enough the water would go over the logs.  
You need to have a big enough wall.

NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE

SCORE POINT 1

- 8 Describe another way Janelle could stop the river from wearing away her grandmother's yard. Use what you learned in your sand dune investigations to explain why this would stop the river.

She could pile up rocks so the water won't go to her grandmother's house.

The response identifies a way to keep the river from wearing away the yard ("pile up rocks"). The response has a minimal explanation ("so the water won't go" to the house) and no reference to the sand dune investigation.

- 7 What information does Janelle need to gather to see if piling logs stopped the river from wearing away the yard?

She needs to know if the river gets more water.

NECAP 2010 RELEASED INQUIRY TASK  
GRADE 4 SCIENCE

SCORE POINT 0

- 8 Describe another way Janelle could stop the river from wearing away her grandmother's yard. Use what you learned in your sand dune investigations to explain why this would stop the river.

Janelle could build a trench or mote to stop the water because the trench would stop the water from going any farther than the trench.

The response proposes an implausible solution, demonstrating a lack of understanding of the intent of the inquiry task.

- 7 What information does Janelle need to gather to see if piling logs stopped the river from wearing away the yard?

Janelle needs information like what stop water from wearing out lands.