



**NEW ENGLAND
COMMON ASSESSMENT PROGRAM**

**Released Items
Support Materials
2015**

**Grade 8
Science**

**NECAP 2015 RELEASED ITEMS
GRADE 8 SCIENCE**

Grade 8 Science Released Item Information

Item Number	Big Idea ¹	Assessment Target	Depth of Knowledge Code	Item Type ²	Answer Key	Total Possible Points
1	SAE	PS 1-4	2	MC	B	1
2	SAE	PS 2-6	2	MC	D	1
3	INQ	PS 3-8	2	MC	A	1
4	SAE	PS 2-7	3	CR4		4
5	POC	ESS 1-3	1	MC	C	1
6	MAS	ESS 2-6	2	MC	C	1
7	POC	ESS 2-8	1	MC	B	1
8	POC	LS 1-3	2	MC	B	1
9	SAE	LS 2-7	2	MC	D	1
10	INQ	LS 4-10	3	MC	B	1

Grade 8 Science Released Inquiry Task Information

Item Number	Big Idea ¹	Inquiry Construct	Depth of Knowledge Code	Item Type ²	Total Possible Points
1	INQ	3-8	2	SA	2
2	INQ	3-8	2	CR3	3
3	INQ	1-2	2	SA	2
4	INQ	4-13	3	SA	2
5	INQ	3-8	2	CR3	3
6	INQ	2-4	2	SA	2
7	INQ	1-1	3	SA	2
8	INQ	4-13	3	SA	2

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

²Item Type: MC = Multiple Choice, CR = Constructed Response, SA = Short Answer

NECAP 2015 RELEASED ITEMS
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PS1 (5-8) SAE-4 Represent or explain the relationship between or among energy, molecular motion, temperature, and states of matter.

- 1 A student puts 5 g of sodium bicarbonate into a balloon. The student then fills a test tube with 10 mL of a weak acetic acid. Finally, the student carefully places the balloon tightly over the test tube and empties its contents into the test tube.

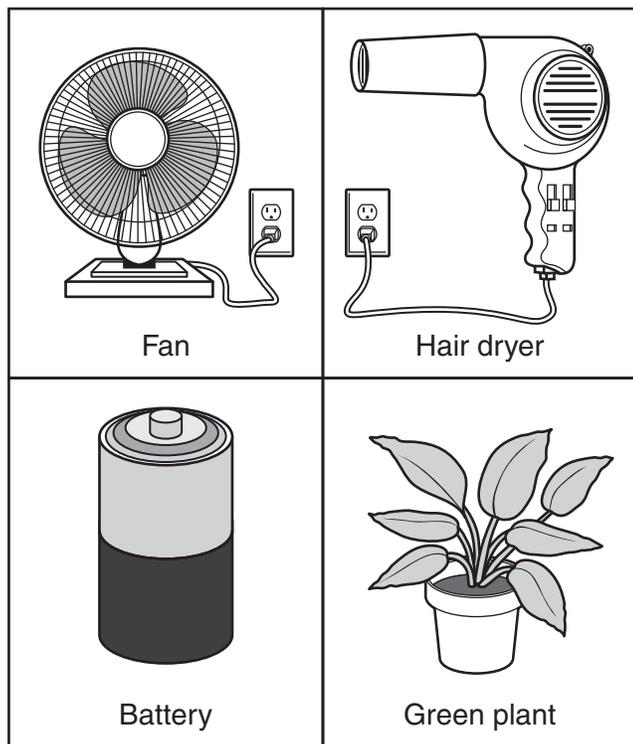
Carbon dioxide gas is produced in the test tube. Which prediction about what will happen to the test tube and balloon is the **most likely**?

- A. The gas molecules inside the test tube and balloon will grow larger, and the balloon will expand.
- B. The gas molecules inside the test tube and balloon will move farther apart, and the balloon will expand.
- C. The gas molecules inside the test tube and balloon will move closer together, and the balloon will be sucked into the test tube.
- D. The gas molecules inside the test tube and balloon will grow smaller, and the balloon will be sucked into the test tube.

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PS2 (5-8) SAE-6 Given a real-world example, show that within a system, energy transfers from one form to another (i.e., chemical, heat, electrical, gravitational, light, sound, mechanical).

2 The picture below shows four objects.



What do all four objects have in common?

- A. They store energy.
- B. They make energy on their own.
- C. They produce the same amount of energy.
- D. They change energy from one form to another.

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PS3 (5-8) INQ-8 Use data to determine or predict the overall net effect of multiple forces (e.g., friction, gravitational, magnetic) on the position, speed, and direction of motion of objects.

- 3 The diagram below shows a car experiencing unbalanced forces.



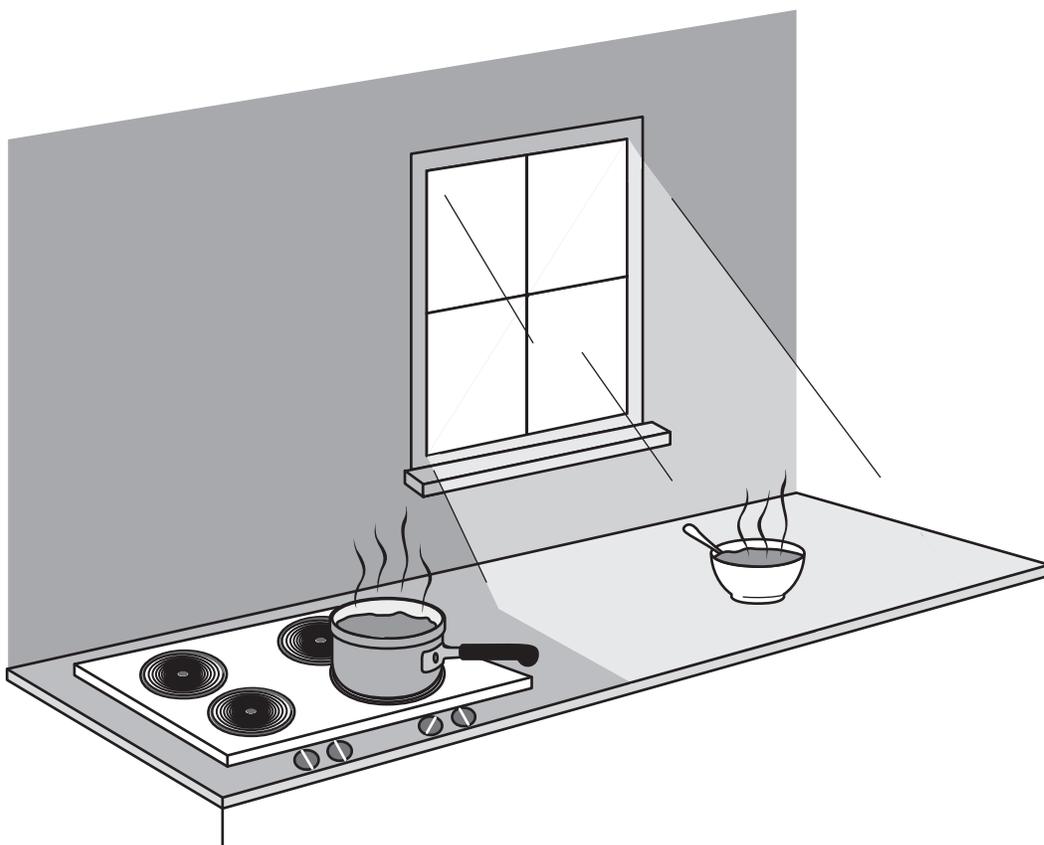
There is greater force in the forward direction than in the opposite direction. Which statement **best** describes how these unbalanced forces will affect the motion of the car?

- A. The car will speed up.
- B. The car will slow down.
- C. The car will come to a stop.
- D. The car will slowly go backward.

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PS2 (5-8) SAE-7 Use data to draw conclusions about how heat can be transferred (convection, conduction, radiation).

- 4 The picture below shows part of a kitchen. Sunlight is shining through the window. A metal pot contains soup that is being heated on the stove. A metal spoon is in a bowl of hot soup on the countertop.



- a. Identify **two** types of heat transfer occurring in the kitchen. Using specific details from the picture, describe **one** example of **each** type of heat transfer you identified.
- b. Explain how the motion of molecules causes **one** type of heat transfer occurring in the kitchen.

**NECAP 2015 RELEASED ITEMS
GRADE 8 SCIENCE**

Scoring Guide

Score	Description
4	The response demonstrates a thorough understanding of how heat can be stored, transferred, and transformed. The response identifies two types of heat transfer occurring in the kitchen and describes one example using specific information from the picture. The response also explains how the motion of molecules causes heat transfer.
3	The response demonstrates a general understanding of how energy can be stored, transferred, and transformed. The overall response is general.
2	The response demonstrates a limited understanding of how energy can be stored, transferred, and transformed. The overall response is limited.
1	The response demonstrates a minimal understanding of how energy can be stored, transferred, and transformed. The overall response is minimal.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response

Part a./b. A thorough response can be exemplified by the following sample responses:

Heat is being transferred in the kitchen in the following ways:

- Radiation:
 - Heat can be transferred from the sunlight into the room (e.g., direct sunlight is heating the air or the specific objects) when the sunlight (electromagnetic waves) is absorbed by the air/object and the molecules in the air/object vibrate more quickly.
 - Heat can be transferred from the pot or bowl of hot soup into the air. When heated [by infrared, electromagnetic waves] the molecules in the air/object vibrate more quickly.
 - Heat can be transferred from the stove's electric burner to the air. When heated [by infrared, electromagnetic waves] the molecules in the air vibrate more quickly.
- Conduction:
 - Heat can be transferred from the stove's electric burner to the pot when the molecules in the pot/spoon heat up and vibrate faster. The vibrating molecules collide with other molecules, transferring the heat and causing them to vibrate faster.
 - Heat can be transferred from the bowl of hot soup into the metal spoon when the molecules in the pot/spoon heat up and vibrate faster. The vibrating molecules collide with other molecules, transferring the heat and causing them to vibrate faster.
- Convection:
 - Heat can be transferred within the soup in the pot or the bowl when the warmer soup molecules (that are moving quicker and are less dense) rise and carry the heat with them. This causes the cooler soup molecules (that are moving more slowly and are more dense) to move and replace the rising molecules. [These cooler molecules are then above the heat source and warm up.]

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- Heat can be transferred within the heated air above the pot of soup or the bowl when the warmer air molecules (that are moving quicker and are less dense) rise and carry the heat with them. This causes the cooler air molecules (that are moving more slowly and are more dense) to move and replace the rising molecules. [These cooler air molecules are then above the heat source and warm up.]

SCORE POINT 4

- 4
- A) Radiation - In the picture, the sunlight is shining through the window onto the counter top. The bowl of hot soup is in the path of this sunlight. This sunlight contains infrared rays. The sunlight is radiating through the window into the bowl of soup. It is radiating infrared rays into the soup, which heats the soup. This is heat transfer by radiation. Radiation is the transfer of heat through infrared rays.
- Conduction - The metal spoon is in the bowl of hot soup on the counter top. Since the soup is hot, and it's touching the metal spoon, and metal is a conductor of heat, so the heat is being transferred from the hot soup to the metal spoon by conduction. Conduction is the transfer of heat through contact.
- B) The molecules in the soup are moving fast because it's hot, and the metal spoon is in the soup. The quick moving molecules in the soup bounce into the spoon's molecules, causing them to start moving, therefore getting hotter. This transfer of heat is called conduction.

The response demonstrates a thorough understanding of how heat can be stored, transferred, and transformed. The response identifies two types of heat transfer occurring in the kitchen (radiation, conduction) and describes one example for each type using specific information from the picture. The response also thoroughly explains how the motion of molecules causes heat transfer.

4
a) Two types of heat transfer occurring in the kitchen are radiation and conduction. Radiation is being transferred from the sun onto the bowl of soup with the metal spoon in it, heating up the metal spoon along with the hot soup. Conduction_{heat} is being transferred by the stove to the metal pot on the stove by direct contact which heats up the metal pot.

b) In the metal pot on the stove, the molecules in the soup are being heated up by direct, point-to-point contact with the stove. Since the soup is liquid, the molecules within it are bouncing around all over the place in a vibrating motion. They're not really in any sort of pattern, the molecules are just vibrating in the heated metal pot from conduction.

The response demonstrates a general understanding of how energy can be stored, transferred, and transformed. The response identifies and describes two types of heat transfer (radiation, conduction) with good descriptions in Part A. The response describes molecular motion of the soup in Part B, but misses a complete discussion of heat transfer/molecular motion from the stove and pan to the soup.

SCORE POINT 2

4 There are two different heat transfers occurring in the kitchen and they are sunlight radiation and convection. Convection is occurring with the pan on the stove. And the sunlight radiation is occurring with the bowl of soup getting heated from the light shining through the window. The motion of molecules causes one type of heat transfer by the molecules spreading in the kitchen and moving the heat around with it.

The response demonstrates a limited understanding of how energy can be stored, transferred, and transformed. The response identifies two forms of heat transfer, and gives an adequate description for radiation. However, the description of convection is insufficient, and the explanation for how the motion of molecules causes one type of heat transfer does not show understanding.

NECAP 2015 RELEASED ITEMS
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SCORE POINT 1

- 4
- A. two types of heat transfer are radiation and conduction.
- B. The motion of molecules in conduction is how they move from one hot object to a cooler one.

The response demonstrates a minimal understanding of how energy can be transferred by identifying two types of heat transfer in the kitchen. There are no descriptions for either type, and the explanation for Part B is insufficient to demonstrate any more than minimal understanding.

SCORE POINT 0

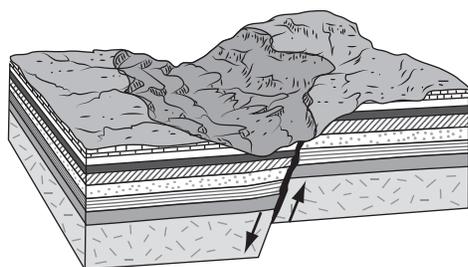
- 4
- you can heat any object like ice or soup maybe Beans.

The response is incorrect or irrelevant to the skill or concept being measured.

NECAP 2015 RELEASED ITEMS
GRADE 8 SCIENCE

ESS1 (5-8) POC-3 Explain how Earth events (abruptly and over time) can bring about changes in Earth's surface: landforms, ocean floor, rock features, or climate.

- 5 The diagram below shows rock layers that have moved.



Which of the following was **directly** responsible for moving these layers?

- A. weathering
- B. sedimentation
- C. an earthquake
- D. a volcanic eruption

**NECAP 2015 RELEASED ITEMS
GRADE 8 SCIENCE**

ESS2 (5-8) MAS-6 Compare and contrast planets based on data provided about size, composition, location, orbital movement, atmosphere, or surface features.

- 6 The table below lists the weight of an object on different planets.

**Weight of the
Same Object on
Different Planets**

Planet	Weight (N)
Earth	100.0
Mercury	37.8
Venus	90.7
Mars	37.7
Jupiter	236.4
Saturn	106.4
Uranus	88.9
Neptune	112.5

A different object has a weight of 200 N on Earth. On which planet would the weight of the same object be approximately 200 N?

- A. Venus
- B. Mars
- C. Saturn
- D. Neptune

**NECAP 2015 RELEASED ITEMS
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ESS2 (5-8) POC-8 Explain temporal or positional relationships between or among the Earth, Sun, and Moon (e.g., night/day, seasons, year, tides) OR how gravitational force affects objects in the solar system (e.g., moons, tides, orbits, satellites).

- 7 Why do most locations on Earth experience day and night?
- A. Earth travels around the Sun.
 - B. Earth rotates on its axis.
 - C. The Moon has a gravitational pull on Earth.
 - D. The Moon travels between Earth and the Sun.

**NECAP 2015 RELEASED ITEMS
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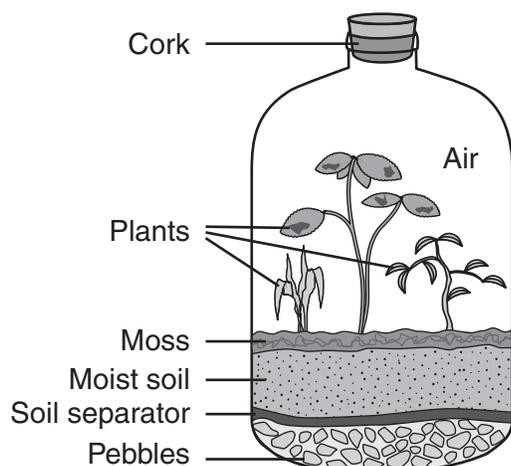
LS1 (5-8) POC-3 Compare and contrast sexual reproduction with asexual reproduction.

- 8 New sea stars can grow from pieces of a sea star that is torn apart. How are sea stars produced this way different from sea stars produced by sexual reproduction?
- A. New sea stars grown from pieces cannot reproduce.
 - B. New sea stars grown from pieces are genetically identical.
 - C. New sea stars grown from pieces are genetically different.
 - D. New sea stars grown from pieces can regrow new organs but not new arms.

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LS2 (5-8) SAE-7 Given an ecosystem, trace how matter cycles among and between organisms and the physical environment (includes water, oxygen, food web, decomposition, recycling but not carbon cycle or nitrogen cycle).

- 9 A student built the terrarium shown below to model the water cycle.



What role in the water cycle do the plants in the terrarium play?

- A. The plants use up water in the air and then use the water to dissolve the soil.
- B. The plants make water in their leaves and then precipitate the water onto the moss.
- C. The plants transport water from the moss and then help the soil retain the water.
- D. The plants take in water from the soil and then release the water from their leaves.

**NECAP 2015 RELEASED ITEMS
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LS4 (5-8) INQ-10 Use data and observations to support the concept that environmental or biological factors affect human body systems (biotic & abiotic).

- 10 Over the past several decades, the ozone layer over Australia has been thinning, causing increased levels of UV radiation to reach Earth's surface.

What is the **most likely** health consequence of increased radiation?

- A. People in Australia need more vitamin D in their diets.
- B. People in Australia have an increased risk of skin cancer.
- C. People in Australia have an increased sensitivity to cold.
- D. People in Australia are more resistant to respiratory diseases.

**NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE**

Broad Area of Inquiry:	Conducting Investigations
Inquiry Construct 8:	Use accepted methods for organizing, representing, and manipulating data.

- ① Copy **Data Table 1** from page 5 of your Inquiry Booklet in the space below. **Be sure to double-check that you have copied the data table and then calculate the averages, rounding to the nearest tenth.**

Scoring Guide

Score	Description
2	The response demonstrates a general understanding of how to use accepted methods for organizing, representing, and manipulating data. The response includes a data table and calculated averages, rounded to the nearest tenth.
1	The response demonstrates a limited understanding of how to use accepted methods for organizing, representing, and manipulating data. The overall response is limited.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response

A general understanding can be exemplified by the following sample response:

**Data Table 1:
Effect of Surface Type on Amount of Force of Friction
Needed to Pull a Wooden Block**

Surface	Trial 1 Force (N)	Trial 2 Force (N)	Trial 3 Force (N)	Average Force (N)
Wax Paper				
Sandpaper				
Paper Towel				

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 2

- ① Copy **Data Table 1** from page 5 of your Inquiry Booklet in the space below. **Be sure to double-check that you have copied the data table and then calculate the averages, rounding to the nearest tenth.**

Wooden Block On Surfaces Investigation

Surface	Trial 1	Trial 2	Trial 3	Average
Wax Paper	0.4 Newtons	0.45 Newtons	0.4 Newtons	0.4 Newtons
Sand-Paper	0.8 Newtons	0.85 Newtons	0.85 Newtons	0.8 Newtons
Paper-towel	1.15 Newtons	1.05 Newtons	1.1 Newtons	1.1 Newtons

The response demonstrates a general understanding of how to use accepted methods for organizing, representing, and manipulating data. The response includes a data table with a title, appropriate labels, units, and correctly calculated averages, rounded to the nearest tenth.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 1

- 1 Copy **Data Table 1** from page 5 of your Inquiry Booklet in the space below. Be sure to double-check that you have copied the data table and then calculate the averages, rounding to the nearest tenth.

	trial 1	trial 2	trial 3	Average
wax paper	0.50N	0.55N	0.50N	0.51N
Paper towel	1.10N	1.10N	1.20N	1.13N
Sand paper	1.35N	1.45N	1.40N	1.40N

The response demonstrates a limited understanding of how to use accepted methods for organizing, representing, and manipulating data. The response includes a data table with mostly appropriate labels, units, and correctly calculated averages. However, there is no title for the data table and no label for surface types, and the averages are rounded to the nearest hundredth, not tenth.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 0

- ① Copy **Data Table 1** from page 5 of your Inquiry Booklet in the space below. **Be sure to double-check that you have copied the data table and then calculate the averages, rounding to the nearest tenth.**

WAX paper - 50

SAND paper - 101

PAPER towel - 100

The response is incorrect or irrelevant to the skill or concept being measured. The response is not in the form of a data table.

**NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE**

Broad Area of Inquiry: Inquiry Construct 8:	Conducting Investigations Use accepted methods for organizing, representing, and manipulating data.
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- 2 Use the information in Data Table 1 to create a bar graph of the **average** force of friction needed to pull the wooden block across the three different surfaces.

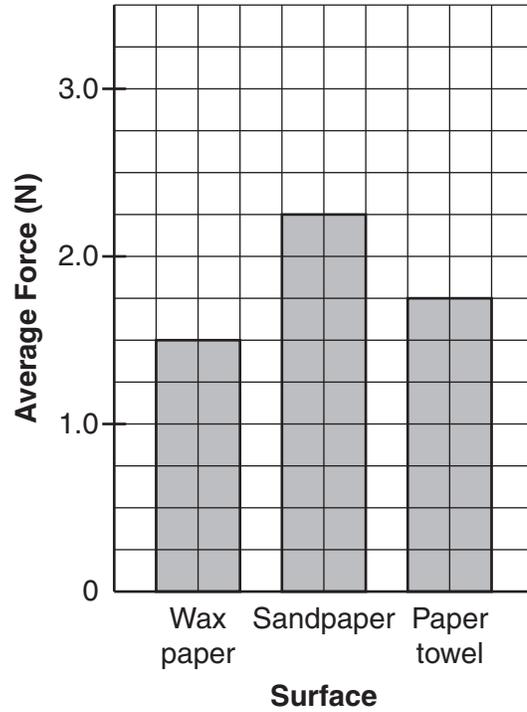
Scoring Guide

Score	Description
3	The response demonstrates a thorough understanding of how to use accepted methods for organizing, representing, and manipulating data. The response includes a bar graph of the average force of friction needed to pull the wooden block across the three different surfaces that has an appropriate title, axes labels, and scale for the range of data plotted.
2	The response demonstrates a general understanding of how to use accepted methods for organizing, representing, and manipulating data. The overall response is general.
1	The response demonstrates a limited understanding of how to use accepted methods for organizing, representing, and manipulating data. The overall response is limited.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

A thorough understanding can be exemplified by the following sample response:

**Effect of Surface Type on the Force
Needed to Pull a Wooden Block**



Student data may vary.

- includes titles, labels, keys, or symbols as needed
- includes a scale appropriate for the range of data to be plotted

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 3

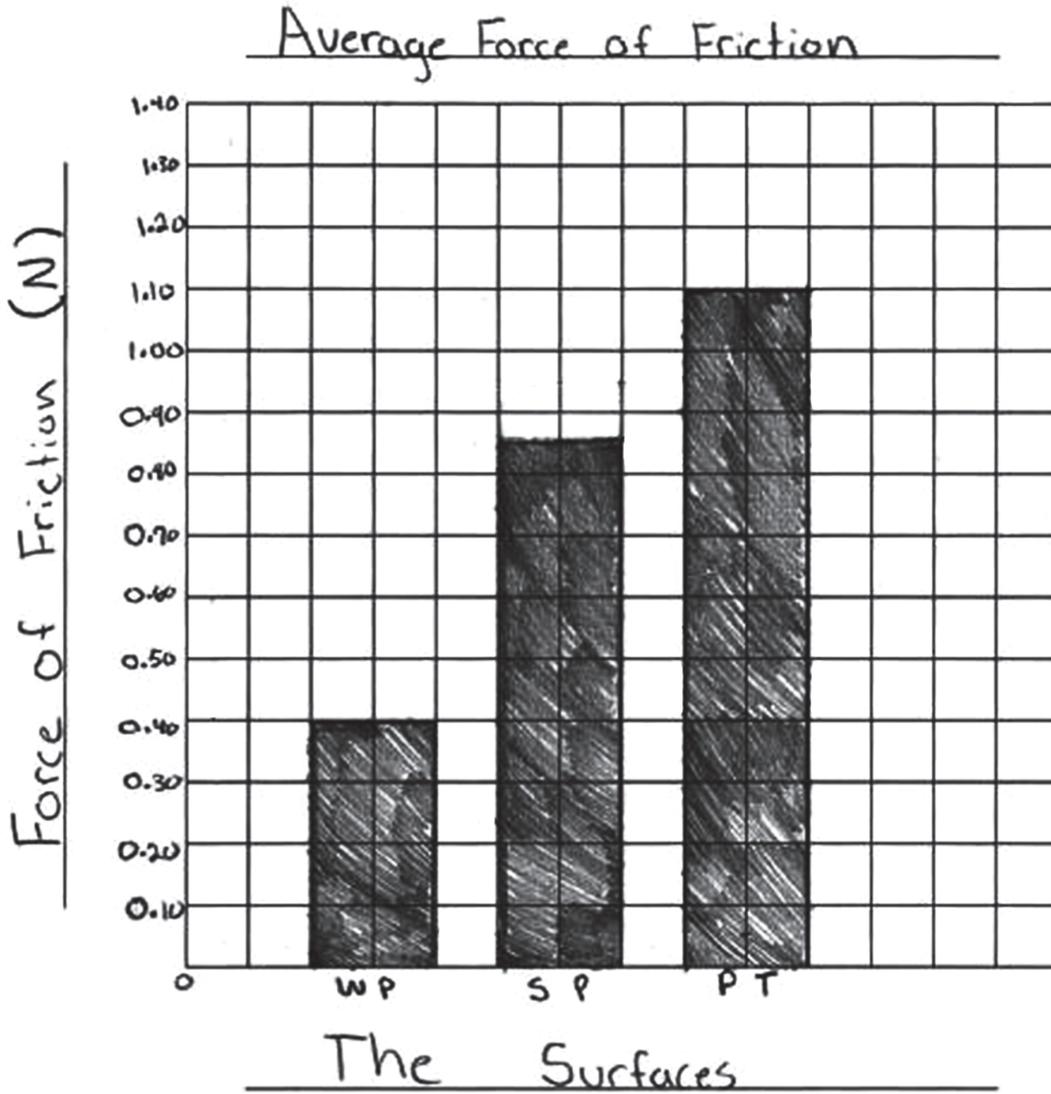
- 1 Copy Data Table 1 from page 5 of your Inquiry Booklet in the space below. Be sure to double-check that you have copied the data table and then calculate the averages, rounding to the nearest tenth.

	Trial 1	Trial 2	Trial 3	Average
Wax Paper	0.40	0.35	0.45	0.40
Sand paper	0.75	0.85	0.95	0.85
Paper towel	1.15	1.10	1.05	1.10

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 3 (CONTINUED)

- 2 Use the information in Data Table 1 to create a bar graph of the **average** force of friction needed to pull the wooden block across the three different surfaces.



Key: wp = wax paper
sp = sand paper
pt = Paper Towel

The response demonstrates a thorough understanding of how to use accepted methods for organizing, representing, and manipulating data. The bar graph has an appropriate title, axes labels, units, and scale for the range of data plotted.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 2

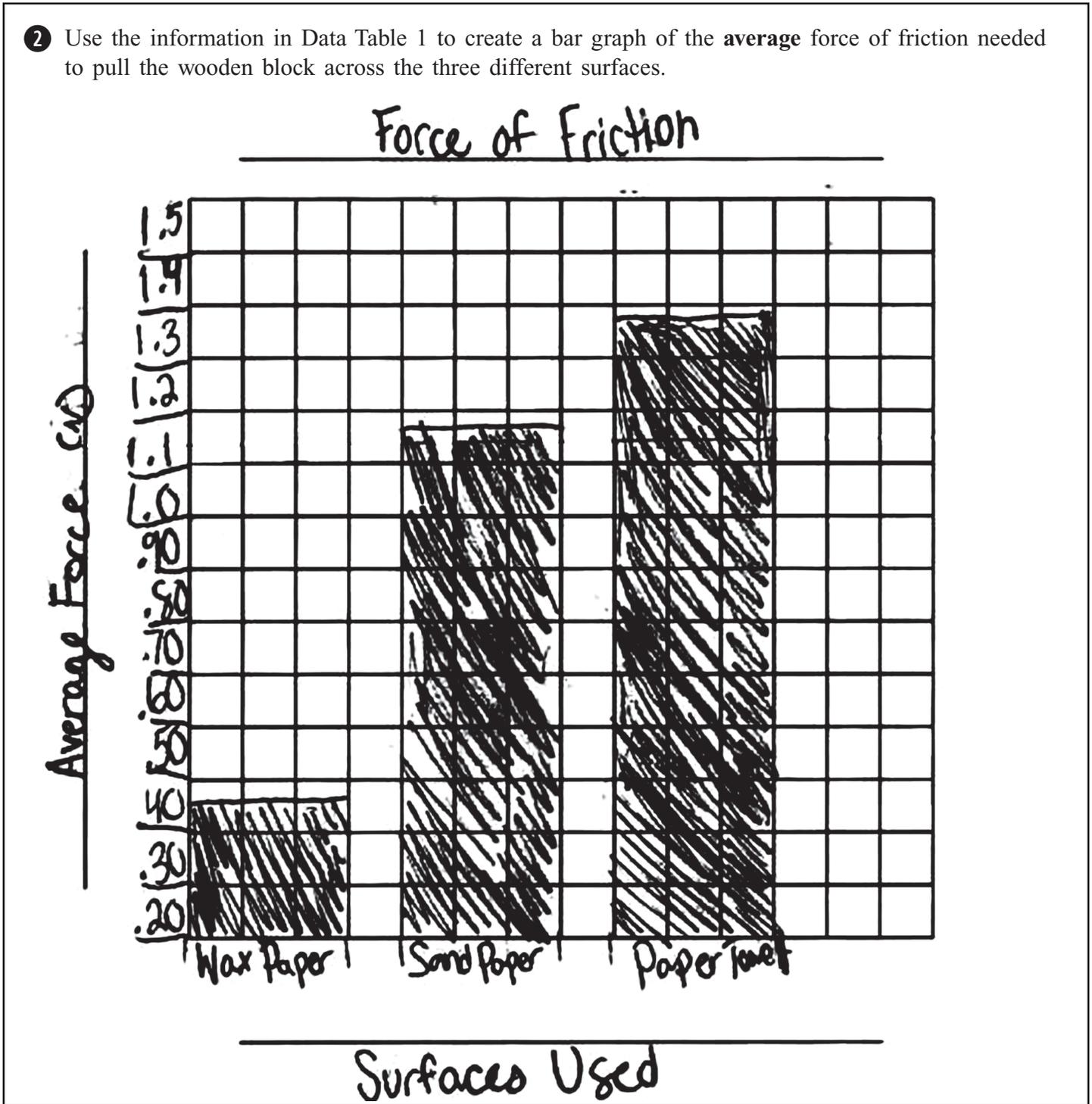
- ① Copy **Data Table 1** from page 5 of your Inquiry Booklet in the space below. Be sure to double-check that you have copied the data table and then calculate the averages, rounding to the nearest tenth.

Trial #	Wax Paper	Sand Paper	Paper Towel
1	0.45N	1.25N	1.35N
2	0.35N	1.15N	1.25N
3	0.55N	1.10N	1.50N
AVG.	0.45N	1.17N	1.37N

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 2 (CONTINUED)

- 2 Use the information in Data Table 1 to create a bar graph of the **average** force of friction needed to pull the wooden block across the three different surfaces.



The response demonstrates a general understanding of how to use accepted methods for organizing, representing, and manipulating data. The data points are plotted correctly, there are titles, labels and units, but the vertical axis does not begin at 0 and the scaling numbers are not aligned to the grid.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 1

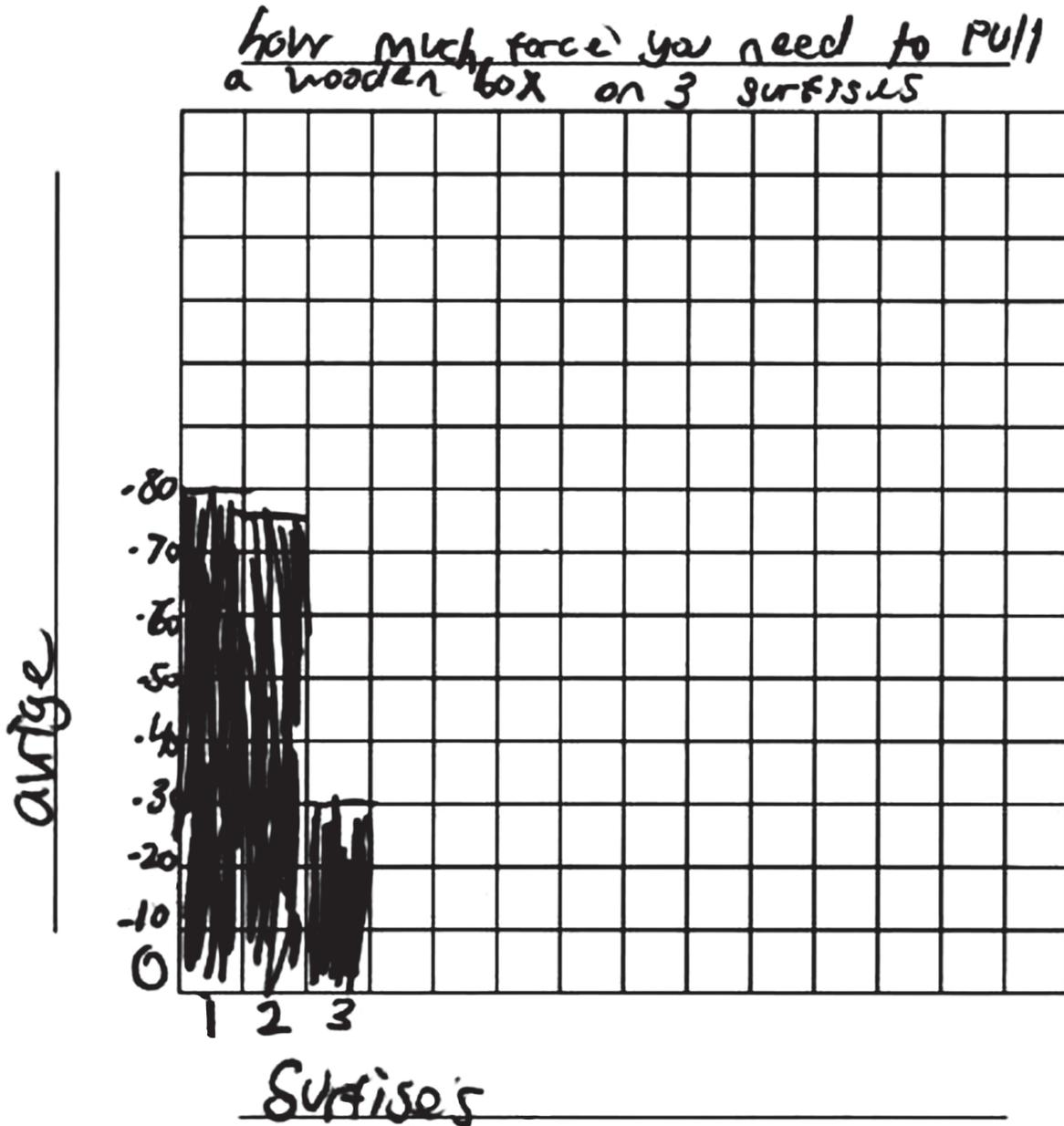
- 1 Copy **Data Table 1** from page 5 of your Inquiry Booklet in the space below. Be sure to double-check that you have copied the data table and then calculate the averages, rounding to the nearest tenth.

trial	1	2	3	average
Sand Paper	.80	.80	.80	.80
Paper towels	.75	.75	.75	.75
wax paper	.30	.25	.56	.30

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 1 (CONTINUED)

- 2 Use the information in Data Table 1 to create a bar graph of the **average** force of friction needed to pull the wooden block across the three different surfaces.



The response demonstrates a limited understanding of how to use accepted methods for organizing, representing, and manipulating data. The data points are plotted correctly and the scale is acceptable, but the graph is a histogram instead of a bar graph, and there are no units and unclear surface labels.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 0

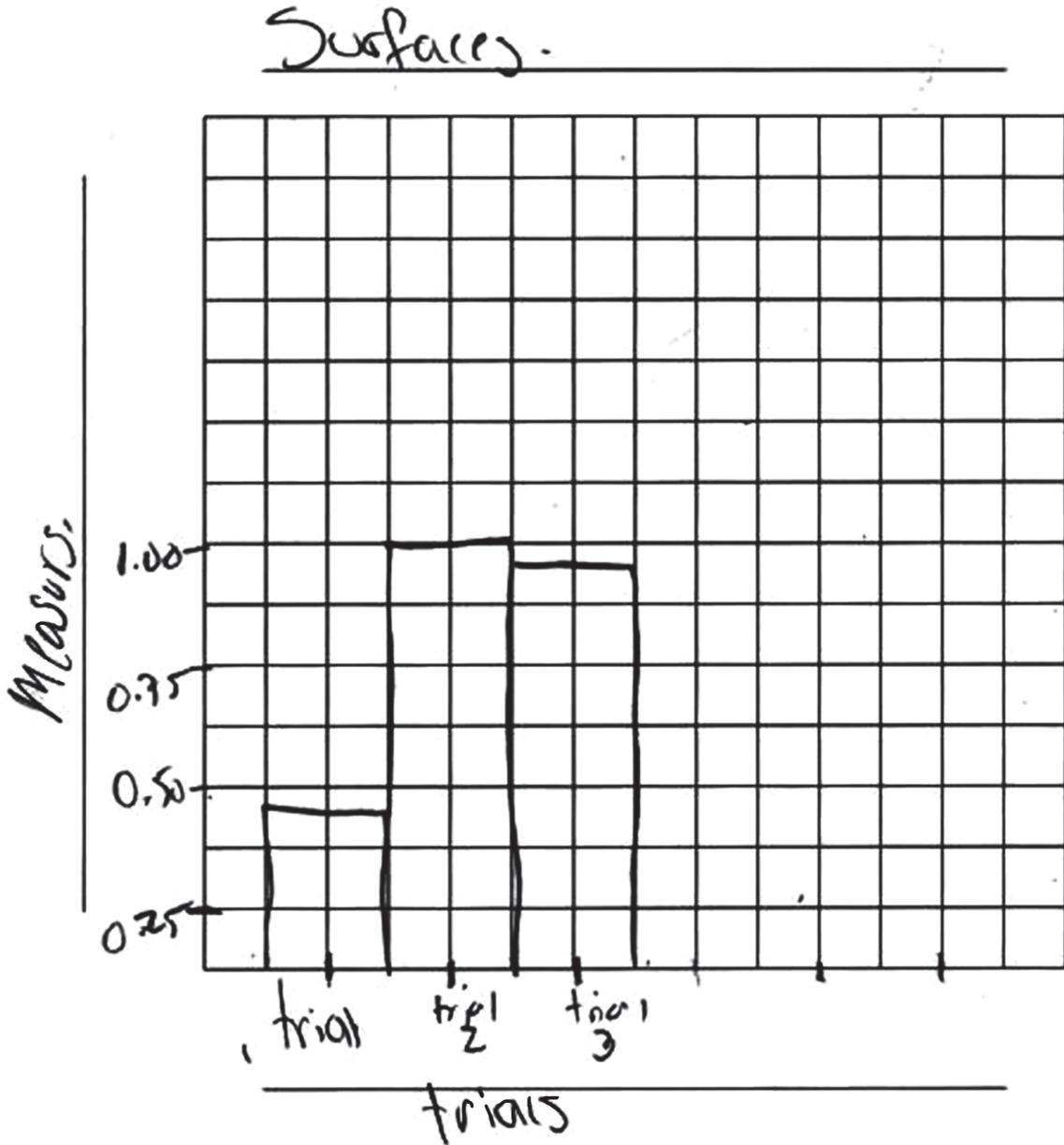
- 1 Copy Data Table 1 from page 5 of your Inquiry Booklet in the space below. Be sure to double-check that you have copied the data table and then calculate the averages, rounding to the nearest tenth.

Trial 1	Rounding nearest tenths
0.45	50
Trial 2	
1.00	1.00
Trial 3	
0.95	1.00

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 0 (CONTINUED)

- 2 Use the information in Data Table 1 to create a bar graph of the **average** force of friction needed to pull the wooden block across the three different surfaces.



The response is incorrect or irrelevant to the skill or concept being measured.

**NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE**

Broad Area of Inquiry: Inquiry Construct 2:	Formulating Questions & Hypothesizing Construct coherent argument in support of a question, hypothesis, prediction.
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- 3 a. Is your prediction supported by the evidence from your investigation?
- b. Explain why the evidence supports or does not support your prediction. Be sure to include specific pieces of evidence in your answer.

Scoring Guide

Score	Description
2	The response demonstrates a general understanding of how to construct a coherent argument in support of a question, hypothesis, or prediction. The response explains why the evidence supports or does not support the prediction and includes specific pieces of evidence in the answer.
1	The response demonstrates a limited understanding of how to construct a coherent argument in support of a question, hypothesis, or prediction. The overall response is limited.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response

A general understanding can be exemplified by the following sample response:

- a. The evidence (supported) (did not support) my prediction.
- b. Rougher surfaces required more force to pull the wooden block across it. For example, it required x Newtons of force to move the block across the sandpaper and only y Newtons of force to move the block across the paper towel.

Student data may vary.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 2

The texture of the surface determines the amount of force needed to slide an object across it because the object may need more force over one surface than another

- 3 a. Is your prediction supported by the evidence from your investigation?
b. Explain why the evidence supports or does not support your prediction. Be sure to include specific pieces of evidence in your answer.

a. Yes. Through the evidence my group has gathered, it is clear that it is supported.

b. The evidence supports my prediction because in my prediction, I stated that indeed the surface's texture does determine the amount of force needed to slide an object across it.

The response demonstrates a general understanding of how to construct a coherent argument in support of a prediction. The response explains why the evidence supports the prediction and includes specific pieces of evidence in the answer.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 1

if the surface is smooth it will weigh less

- 3 a. Is your prediction supported by the evidence from your investigation?
b. Explain why the evidence supports or does not support your prediction. Be sure to include specific pieces of evidence in your answer.

and because you had to pull it on a surface
to question a answer it

The response demonstrates a limited understanding of how to construct a coherent argument in support of a prediction. The response explains why the evidence supports the prediction, but only vaguely references pieces of evidence.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 0

Sometimes a hard surface can make stuff go slow or make it stop and the smooth surface makes it go faster because of the softness.

- 3 a. Is your prediction supported by the evidence from your investigation?
b. Explain why the evidence supports or does not support your prediction. Be sure to include specific pieces of evidence in your answer.

A.) yes it supports my prediction.
B.) it supports my prediction because on the rough places the wood block went slow and on the wax paper it went fast.

The response does not provide an explanation or evidence to support the claim that the prediction was supported.

**NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE**

Broad Area of Inquiry: Inquiry Construct 13:	Developing and Evaluating Explanations Communicate how scientific knowledge applies to explain results, propose further investigations, or construct and analyze alternative explanations.
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- 4 Identify what can be done to make your results more accurate. Explain why this change would make your results more accurate.

Scoring Guide

Score	Description
2	The response demonstrates a general understanding of communicating how scientific knowledge applies to explain results, propose further investigations, or construct and analyze alternative explanations. Response identifies what can be done to make the results more accurate and explains why this change would make the results more accurate.
1	The response demonstrates a limited understanding of communicating how scientific knowledge applies to explain results, propose further investigations, or construct and analyze alternative explanations. The overall response is limited.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response

A general understanding can be exemplified by the following sample response:

In order to produce more accurate data, we could use a more accurate spring scale. Accept any of the following additional correct responses:

- Conduct more trials to make sure our results are consistent (repeatable, comparable).
- Have the same person pull the block each time to standardize our procedure.
- Calibrate the scale each time to make sure we are recording the accurate force of friction.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 2

- 4 Identify what can be done to make your results more accurate. Explain why this change would make your results more accurate.

We could've had one person pull the spring scale everytime. Then we would've had one exact force pulling everytime instead of 3 different forces

The response demonstrates a general understanding of communicating how scientific knowledge applies to explain results, propose further investigations, or construct and analyze alternative explanations. The response identifies that having one person performing the trials would make the results more accurate and explains why this change would make the results more accurate.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 1

- 4 Identify what can be done to make your results more accurate. Explain why this change would make your results more accurate.

I think we could have had the same person pull the block. It would probably be more accurate.

The response demonstrates a limited understanding of communicating how scientific knowledge applies to explain results, propose further investigations, or construct and analyze alternative explanations. The response identifies that having one person performing the trials would make the results more accurate, but does not provide a sufficient explanation.

SCORE POINT 0

- 4 Identify what can be done to make your results more accurate. Explain why this change would make your results more accurate.

What can make my results more accurate is make the decimals whole numbers (rounding).

The response is incorrect or irrelevant to the skill or concept being measured.

**NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE**

Broad Area of Inquiry:	Conducting Investigations
Inquiry Construct 8:	Use accepted methods for organizing, representing, and manipulating data.

- 5 Use the data from Data Table 2 on page 6 to draw a graph that shows the relationship between mass (g) and **average** force of friction (N).

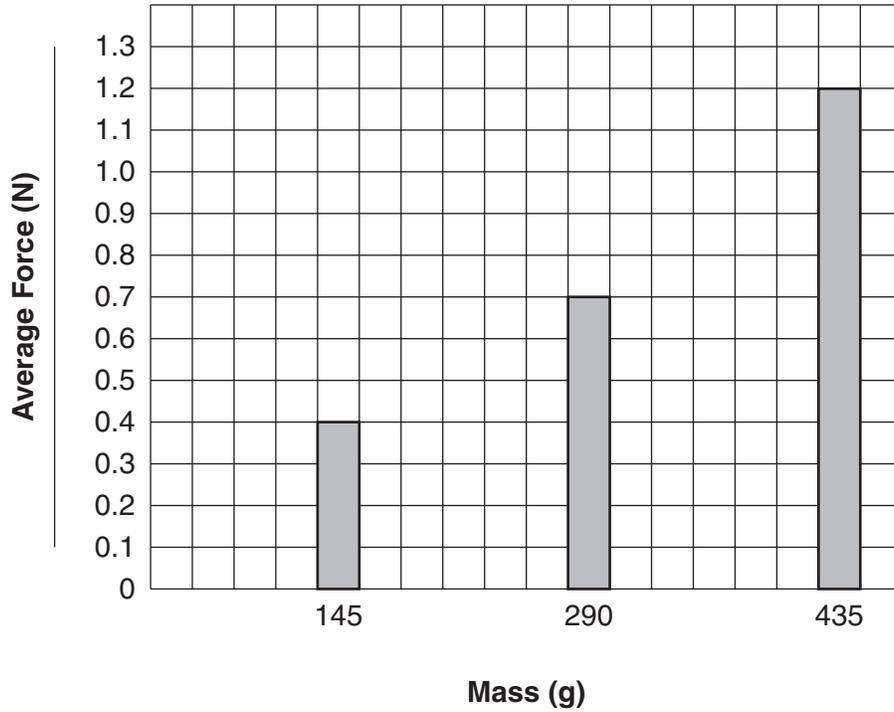
Scoring Guide

Score	Description
3	The response demonstrates a thorough understanding of how to use accepted methods for organizing, representing, and manipulating data. The response includes a graph of the relationship between mass (g) and average force of friction (N). Graph has appropriate title, axes labels, and scale for the range of data plotted.
2	The response demonstrates a general understanding of how to use accepted methods for organizing, representing, and manipulating data. The overall response is general.
1	The response demonstrates a limited understanding of how to use accepted methods for organizing, representing, and manipulating data. The overall response is limited.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

A thorough understanding can be exemplified by the following sample response:

Effect of Mass on Force of Friction

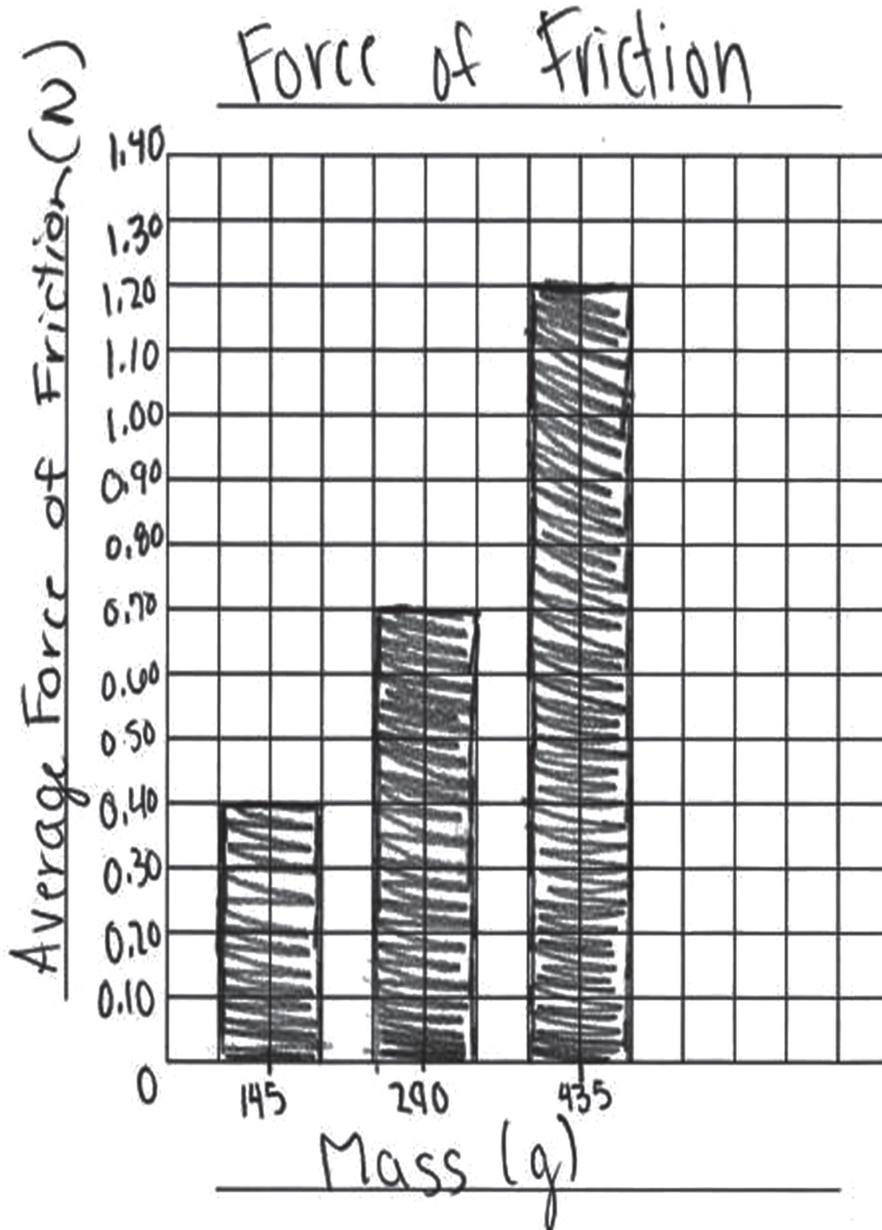


- Graph includes titles, labels, keys, or symbols as needed.
- Response selects a scale appropriate for the range of data to be plotted.
- A line graph is also acceptable.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 3A

- 5 Use the data from Data Table 2 on page 6 to draw a graph that shows the relationship between mass (g) and **average** force of friction (N).

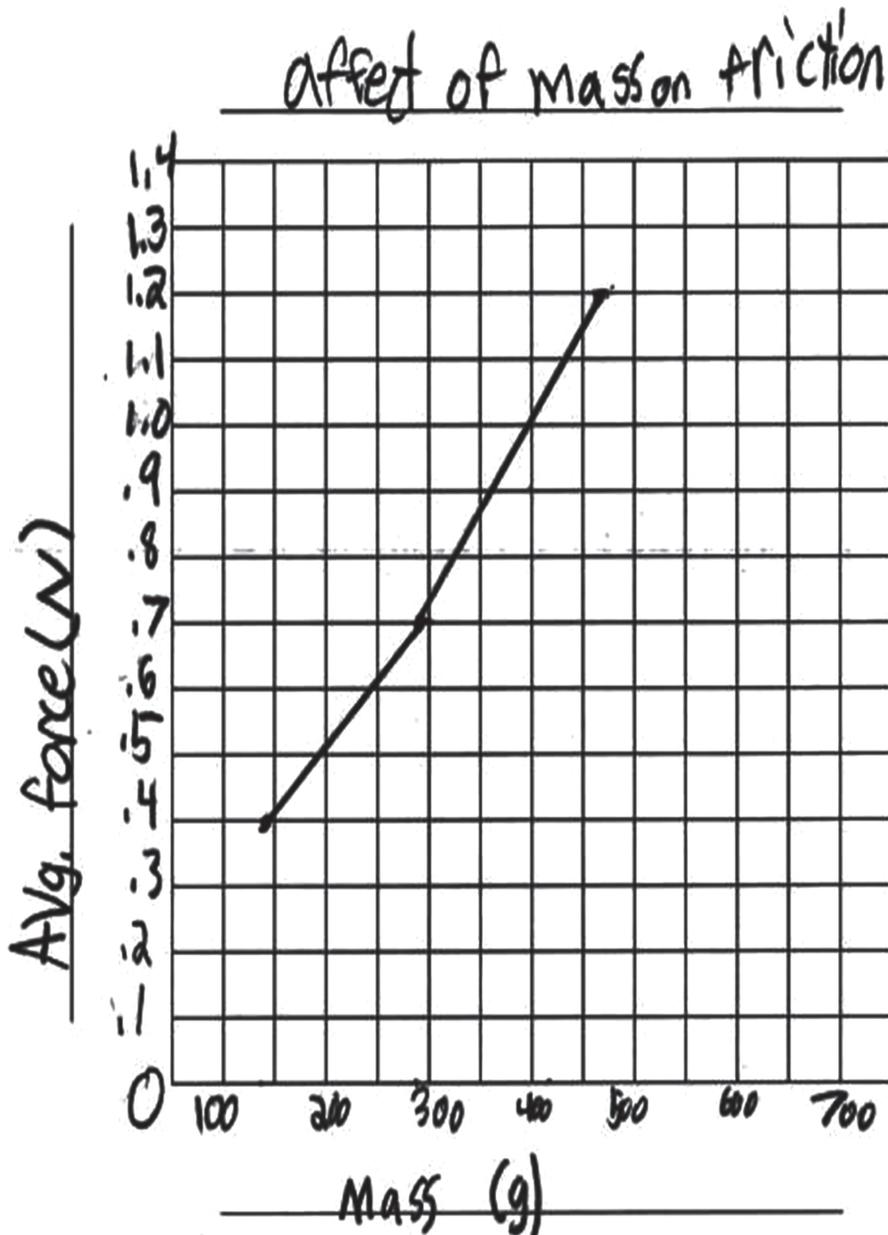


The response demonstrates a thorough understanding of how to use accepted methods for organizing, representing, and manipulating data. The response includes a graph of the relationship between mass (g) and average force of friction (N). The graph has appropriate title, axes labels, units, and scale for the range of data plotted. A bar graph is an acceptable representation.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 3B

- 5 Use the data from Data Table 2 on page 6 to draw a graph that shows the relationship between mass (g) and average force of friction (N).

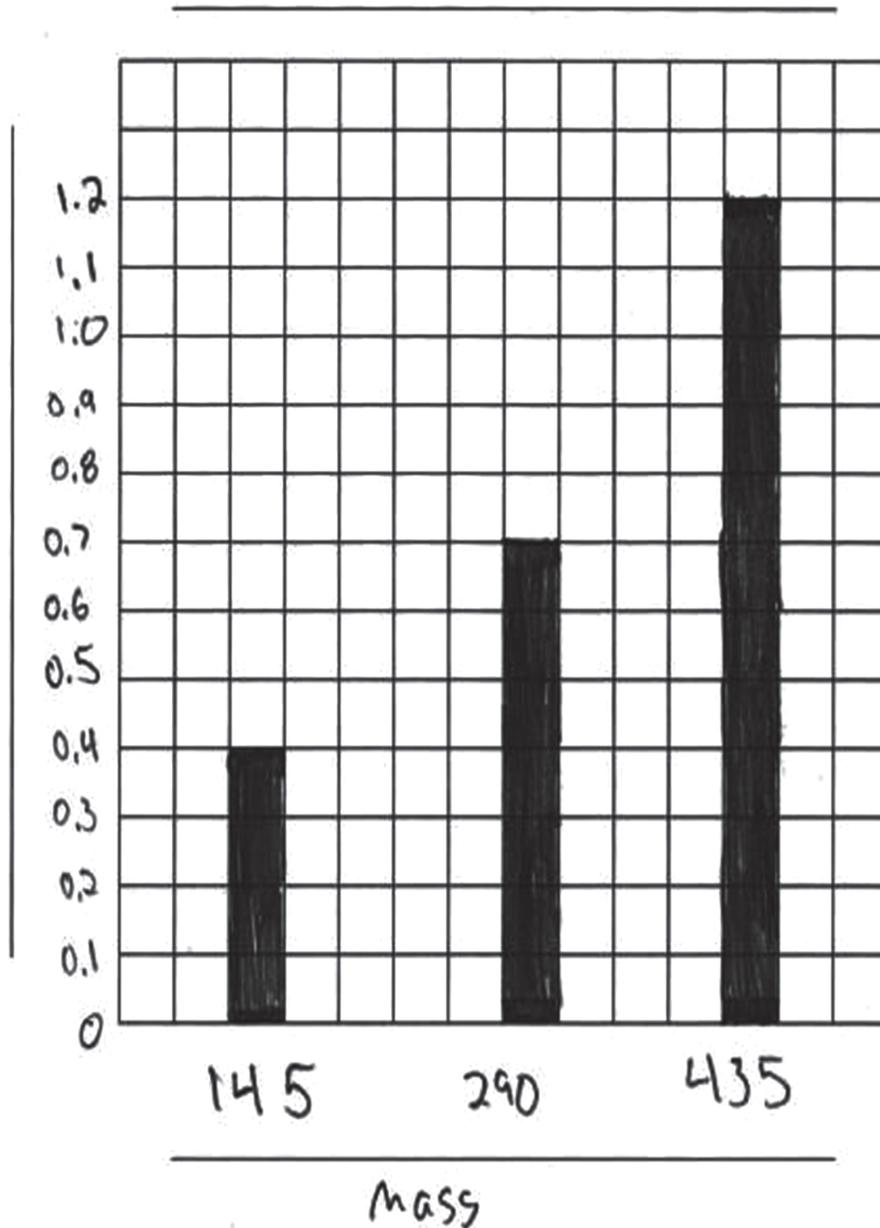


The response demonstrates a thorough understanding of how to use accepted methods for organizing, representing, and manipulating data. The response includes a graph of the relationship between mass (g) and average force of friction (N). The graph has appropriate title, axes labels, units, and scale for the range of data plotted. A line graph is an acceptable representation.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 2

- 5 Use the data from Data Table 2 on page 6 to draw a graph that shows the relationship between mass (g) and **average** force of friction (N).

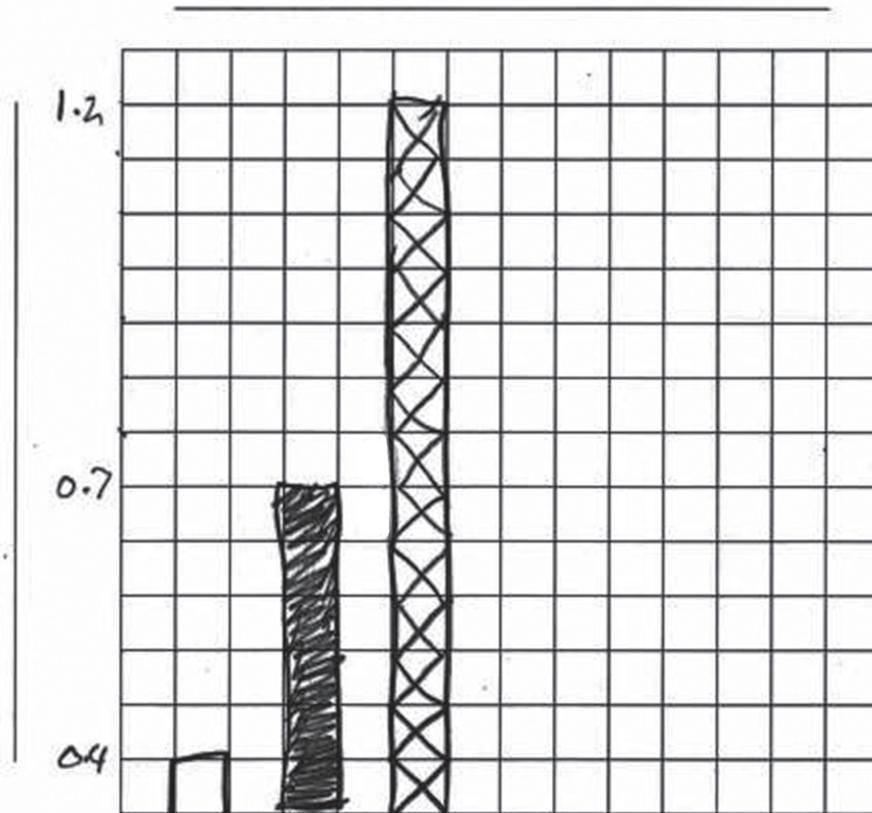


The response demonstrates a general understanding of how to use accepted methods for organizing, representing, and manipulating data. The data are plotted correctly, but the graph is missing a title, y-axis label and units.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 1

- 5 Use the data from Data Table 2 on page 6 to draw a graph that shows the relationship between mass (g) and **average** force of friction (N).



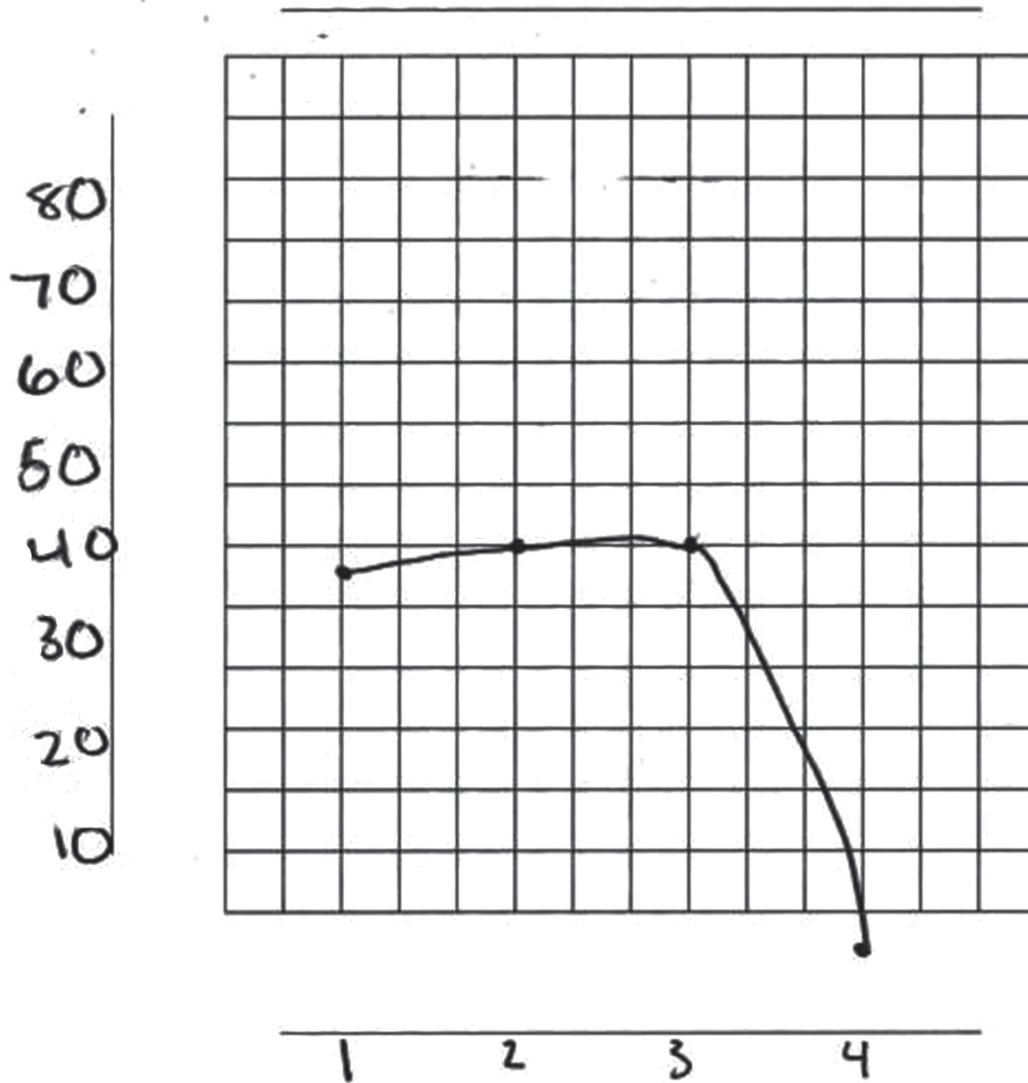
145 = □
290 = ■
435 = ▩

The response demonstrates a limited understanding of how to use accepted methods for organizing, representing, and manipulating data. The data are plotted correctly, but the y-axis has an inconsistent scale, the axes are not labeled, and there is no title.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 0

- 5 Use the data from Data Table 2 on page 6 to draw a graph that shows the relationship between mass (g) and **average** force of friction (N).



The response is totally incorrect.

**NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE**

Broad Area of Inquiry: Inquiry Construct 4:	Planning and Critiquing of Investigations Identify information/evidence that needs to be collected in order to answer the question, hypothesis, prediction.
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- 6 Identify which variable—surface type, mass, or surface area—had the greatest effect on the force of friction needed to pull the wooden blocks. Use evidence from Data Tables 1, 2, and 3 to explain your answer.

Scoring Guide

Score	Description
2	The response demonstrates a general understanding of how to identify information/evidence that needs to be collected in order to answer the question, hypothesis, or prediction. Response identifies which variable had the greatest effect on the force of friction needed to pull the wooden blocks, using evidence from Data Tables 1, 2, and 3 to explain the answer.
1	The response demonstrates a limited understanding of how to identify information/evidence that needs to be collected in order to answer the question, hypothesis, or prediction. The overall response is limited.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response

A general understanding can be exemplified by the following sample response:

Mass and surface type are the variables that affected the force of friction. When mass increased from 145 g to 435 g, the amount of force needed to pull the block increased from 0.38 N to 1.17 N. Rougher surfaces required more force to pull the wooden block across them. The smooth wax paper needed only x N of force to pull the block, while the rougher sandpaper needed y N of force. Surface area had no effect on the amount of force needed to pull the blocks.

Student data may vary.

Only one variable is necessary.

Accept either mass or surface type if evidence is used to explain the answer.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 2

- 1 Copy **Data Table 1** from page 5 of your Inquiry Booklet in the space below. Be sure to double-check that you have copied the data table and then calculate the averages, rounding to the nearest tenth.

Force based on Texture

	wax paper	Paper Towel	Sand paper	Average
Force 1	.55 N	1.25 N	1.25 N	$\bar{.516}$ N
Force 2	.45 N	1.49 N	1 N	$\bar{1.336}$ N
Force 3	.55 N	1.27 N	1.15 N	$\bar{1.13}$ N

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 2 (CONTINUED)

- 6 Identify which variable—surface type, mass, or surface area—had the greatest effect on the force of friction needed to pull the wooden blocks. Use evidence from Data Tables 1, 2, and 3 to explain your answer.

The surface type had the greatest effect. I can tell, because there is such a large difference between sand paper and wax paper

The response demonstrates a general understanding of how to identify information/evidence that needs to be collected in order to answer the question. The response uses data from the tables to support mass as being a variable with the greatest impact on the force of friction.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 1

- 1 Copy **Data Table 1** from page 5 of your Inquiry Booklet in the space below. Be sure to double-check that you have copied the data table and then calculate the averages, rounding to the nearest tenth.

Friction Data table

Trials	Sand Paper	Wax Paper	Paper towel
1	1.2 newtons	.25 newtons	1.25 newtons
2	1.25 newtons	.55 newtons	1.2 newtons
3	1.05 newtons	.50 newtons	1.1 newtons
4	1.15 newtons	.50 newtons	1.25 newtons
5	1.15 newtons	.45 newtons	1.2 newtons
6	1.1 newtons	.50 newtons	1.05 newtons
Average	1.15 newtons	.46 newtons	1.2 newtons

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 1 (CONTINUED)

- 6 Identify which variable—surface type, mass, or surface area—had the greatest effect on the force of friction needed to pull the wooden blocks. Use evidence from Data Tables 1, 2, and 3 to explain your answer.

Surface type effected the amount of force of friction needed to pull the wooden blocks because it changed the numbers more than any other variables

The response demonstrates a limited understanding of how to identify information/evidence that needs to be collected in order to answer the question. Surface type is an accepted answer, but the explanation that “it changed the numbers more” is not very specific.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 0A

- 1 Copy **Data Table 1** from page 5 of your Inquiry Booklet in the space below. Be sure to double-check that you have copied the data table and then calculate the averages, rounding to the nearest tenth.

Surface	Trial 1	Trial 2	Trial 3	Average
Sand paper	1.5 newtons	1.1 Newtons	1.05 newtons	1.2 Newtons
wax paper	35 newtons	.25 Newtons	3 newtons	.3 Newtons
Paper towel	1 Newtons	.9 newtons	.8 newtons	.9 Newtons

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 0A (CONTINUED)

- 6 Identify which variable—surface type, mass, or surface area—had the greatest effect on the force of friction needed to pull the wooden blocks. Use evidence from Data Tables 1, 2, and 3 to explain your answer.

The surface area because that's the one that
changes every time.

The response is incorrect or irrelevant to the skill or concept being measured.

NECAP 2015 RELEASED INQUIRY TASK
 GRADE 8 SCIENCE

SCORE POINT 0B

- 1 Copy Data Table 1 from page 5 of your Inquiry Booklet in the space below. Be sure to double-check that you have copied the data table and then calculate the averages, rounding to the nearest tenth.

Surface texture	amount of force (N)			how the texture affects the amount of force to move an object
	Trial 1	Trial 2	Trial 3	Averages
Wax paper	0.75N	0.75N	0.8N	0.77N
Sand paper	1.25N	1.25N	1.2N	1.23N
paper towel	1.75N	1.75N	1.8N	1.77

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 0B (CONTINUED)

- 6 Identify which variable—surface type, mass, or surface area—had the greatest effect on the force of friction needed to pull the wooden blocks. Use evidence from Data Tables 1, 2, and 3 to explain your answer.

The Surface type had the greatest affect on the wooden block² because the adverage for Side 3 at 98.3cm and 0.4N was the largest ammount in Surface area.

The response is incorrect or irrelevant to the skill or concept being measured.

**NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE**

Broad Area of Inquiry: Inquiry Construct 1:	Formulating Questions and Hypothesizing Analyze information from observations, research, or experimental data for the purpose of formulating a question, hypothesis, or prediction.
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- 7 Predict which playing piece, the curling stone or the shuffleboard disk, requires more force to travel a distance of 10 m on the wooden floor. Use evidence from Data Tables 2 and 3 and information from the story to explain your answer.

Scoring Guide

Score	Description
2	The response demonstrates a general understanding of how to analyze information from observations, research, or experimental data for the purpose of formulating a question, hypothesis, or prediction. Response includes a prediction identifying which object, the curling stone or the shuffleboard disk, would require more force to travel a distance of 10 m on the wooden floor, using evidence from Data Tables 2 and 3 and information from the story to explain the answer.
1	The response demonstrates a limited understanding of how to analyze information from observations, research, or experimental data for the purpose of formulating a question, hypothesis, or prediction. The overall response is limited.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response

A general understanding can be exemplified by the following sample response:

The curling stone, which has more mass than the shuffleboard disk, is more affected by the force of friction. In the investigation, when the mass increased from 145 g to 290 g, the amount of force needed to pull the block increased from 0.38 N to 0.68 N.

The surface area difference between the curling stone and shuffleboard disk in contact with the wooden floor does not affect the force of friction.

A general response must include qualitative or quantitative data from Data Tables 2 or 3, or information from the story.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 2A

- 7 Predict which playing piece, the curling stone or the shuffleboard disk, requires more force to travel a distance of 10 m on the wooden floor. Use evidence from Data Tables 2 and 3 and information from the story to explain your answer.

It is clear that the curling stone will require more force. Table two showed that the more mass, the more force. The curling stone has a mass of 17-20 kg. The shuffle board piece only has a mass of 0.45 kg.

The response demonstrates a general understanding of how to analyze information from observations, research, or experimental data for the purpose of formulating a prediction. The response includes a prediction identifying the curling stone would require more force to travel a distance of 10 m on the wooden floor, and uses qualitative evidence from the task to explain the answer.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 2B

- 7 Predict which playing piece, the curling stone or the shuffleboard disk, requires more force to travel a distance of 10 m on the wooden floor. Use evidence from Data Tables 2 and 3 and information from the story to explain your answer.

The curling stone will take more force to travel 10m on a wooden floor. The curling stone will take more force because it is overall heavier, as I learned in Table 2 the mass has an effect on the force of friction, greater the mass greater the force needed. Although the diameter of the two pieces does not play a roll in the force needed because as I learned in Table 3 surface area does not act as a variable

The response demonstrates a general understanding of how to analyze information from observations, research, or experimental data for the purpose of formulating a prediction. The response includes a prediction identifying the curling stone would require more force to travel a distance of 10 m on the wooden floor, and uses quantitative evidence from the task to explain the answer.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 1

- 7 Predict which playing piece, the curling stone or the shuffleboard disk, requires more force to travel a distance of 10 m on the wooden floor. Use evidence from Data Tables 2 and 3 and information from the story to explain your answer.

Curling stone because it is heavier and it would need more force for it to go where you want it.

The response demonstrates a limited understanding of how to analyze information from observations, research, or experimental data for the purpose of formulating a prediction. The response makes a reasonable prediction with some reasoning, but does not use specific evidence from the task.

SCORE POINT 0

- 7 Predict which playing piece, the curling stone or the shuffleboard disk, requires more force to travel a distance of 10 m on the wooden floor. Use evidence from Data Tables 2 and 3 and information from the story to explain your answer.

I think that the shuffleboard disk will need more force to push it because the ice for curling makes it slide really far with a slight push.

The response is incorrect or irrelevant to the skill or concept being measured.

**NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE**

Broad Area of Inquiry: Inquiry Construct 13:	Developing and Evaluating Explanations Communicate how scientific knowledge applies to explain results, propose further investigations, or construct and analyze alternative explanations.
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- 8 Describe how the coach could make the sled more difficult to push. Use **one** piece of evidence from the investigations to support your answer.

Scoring Guide

Score	Description
2	The response demonstrates a general understanding of communicating how scientific knowledge applies to explain results, propose further investigations, or construct and analyze alternative explanations. Response describes how the coach could make the sled more difficult to push, using one piece of evidence from the investigations to support the answer.
1	The response demonstrates a limited understanding of communicating how scientific knowledge applies to explain results, propose further investigations, or construct and analyze alternative explanations. The overall response is limited.
0	The response is incorrect or irrelevant to the skill or concept being measured.
Blank	No response

A general understanding can be exemplified by the following sample response:

The coach could make the force of friction greater by adding more mass or placing the sled on a rougher surface. Increasing the force of friction between the sled and the ground would require the players to have to push harder on it to make it move. Evidence from the investigation includes the x N of force required to pull the blocks on the rougher paper towel compared to the y N of force required to pull the blocks on the smoother wax paper. More force was also required to pull the blocks when more blocks were added to the stack.

A correct response includes either adding mass or placing the sled on a rougher surface.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 2

- 8 Describe how the coach could make the sled more difficult to push. Use **one** piece of evidence from the investigations to support your answer.

The coach could make the sled more difficult to push by adding more mass to it. In data table 2 it shows that when the mass is 145 grams you need a force of .4 N but when the mass is 435 grams you need to apply a force of 1.2 N.

The response demonstrates a general understanding of communicating how scientific knowledge applies to propose further investigations. The response describes how the coach could make the sled more difficult to push by adding mass, and uses evidence from the investigations to support the answer.

SCORE POINT 1

- 8 Describe how the coach could make the sled more difficult to push. Use **one** piece of evidence from the investigations to support your answer.

The coach could make the sled more difficult to push if he adds more people to the sled or just add more weight.

The response demonstrates a limited understanding of communicating how scientific knowledge applies to propose further investigations. The response describes how to make the sled more difficult to push, but does not include evidence from the investigations.

NECAP 2015 RELEASED INQUIRY TASK
GRADE 8 SCIENCE

SCORE POINT 0

- 8 Describe how the coach could make the sled more difficult to push. Use **one** piece of evidence from the investigations to support your answer.

For the coach to make the sled more difficult to push, he could lean back. leaning forward would only make it easier because they aren't spread apart

Incorrect or irrelevant response.