NDE Grade 8 Form A

Start of Block: Default Question Block

Q1 **Grade 8 Form A**
Task #1 Fossil Discovery

Q2 Timing
First Click (1)
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Q3 State Student ID

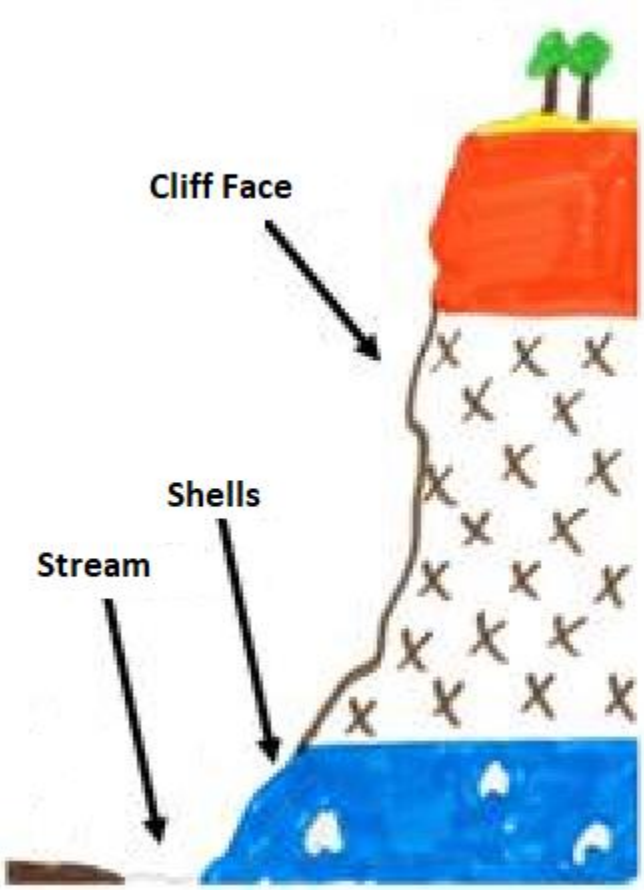
_____

Q4 Use the information provided in any part of this task to answer the questions.

Q5 Shortly after a field trip to Ashfall Fossil Beds State Historical Park, a student finds a rock with shells embedded in it while hiking near a stream. After looking around, the student notices a layer of rock in the cliff with more shells embedded. The student sketches the rock layers seen in the cliff.

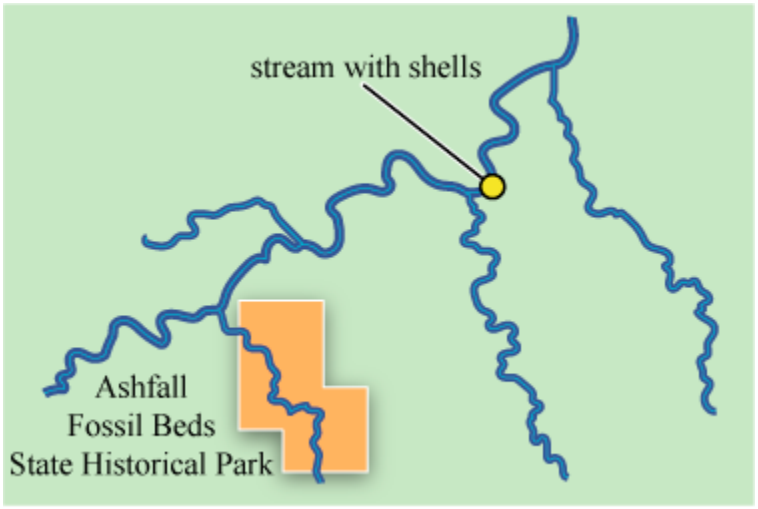
Q6

Q7



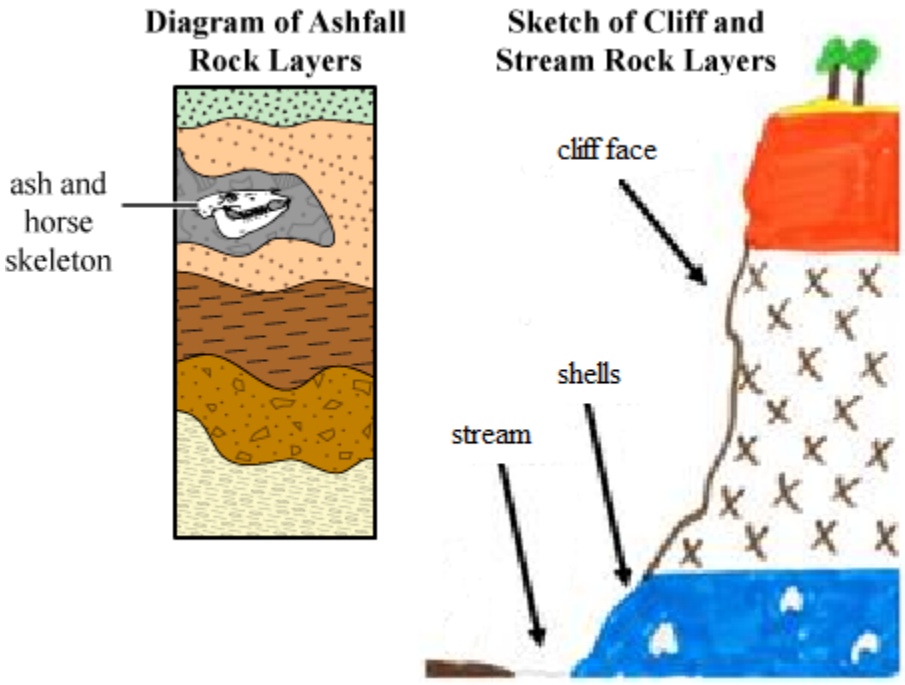
Q8 At Ashfall Fossil Beds State Historical Park, the student saw fossilized skeletons of horses and other mammals. The student wonders which is older: the rock with the shell or the fossil horse skeleton.

Q9



Q10 The student compares their sketch of the cliff with the shell layer to a diagram of rock layers at Ashfall Fossil Beds State Historical Park.

Q11



Q12 **Question 1**

This question has two parts. Answer part A, then answer part B.

Part A

Make a claim about the age of the rock with shells compared to the age of the fossil horse skeleton.

- A) The rock with shells is likely older than the fossil horse skeleton. (1)
- B) The rock with shells is likely younger than the fossil horse skeleton. (2)

Q13 **Part B**

What evidence from the rock layers supports the claim in part A?

- A) The rock layers are in the same order in both locations. (1)
- B) The volcanic ash layer is not seen in the cliff near the stream. (2)
- C) The shells are in a lower rock layer than the fossil horse skeleton. (3)
- D) The shells are in a younger rock layer than the fossil horse skeleton. (4)
- E) The shells were exposed by a stream, while the fossil horse skeleton was not. (5)

Q14 **Question 2**

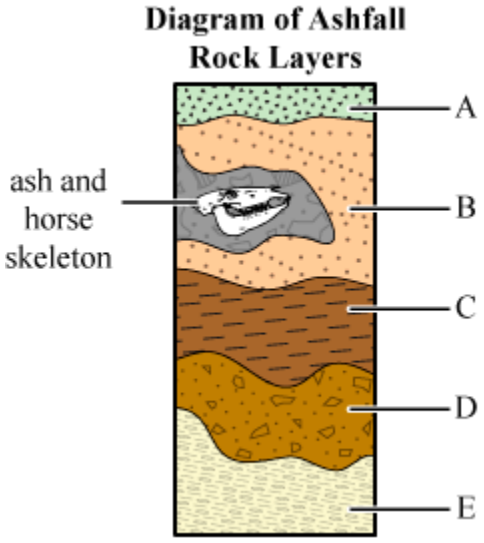
What evidence would support a claim that the shell in the rock is a fossil?

- A) It looked very old. (1)
- B) It was easily broken. (2)
- C) It was found inside a rock. (3)
- D) It was found near a stream. (4)
- E) It was found in the oldest rock layer. (5)
- F) It was found in the youngest rock layer. (6)

Q15 **Question 3**

Use the diagram of rock layers at Ashfall Fossil Beds State Historical Park to predict which layer might contain fossil shells like the one found near the stream.

Q16



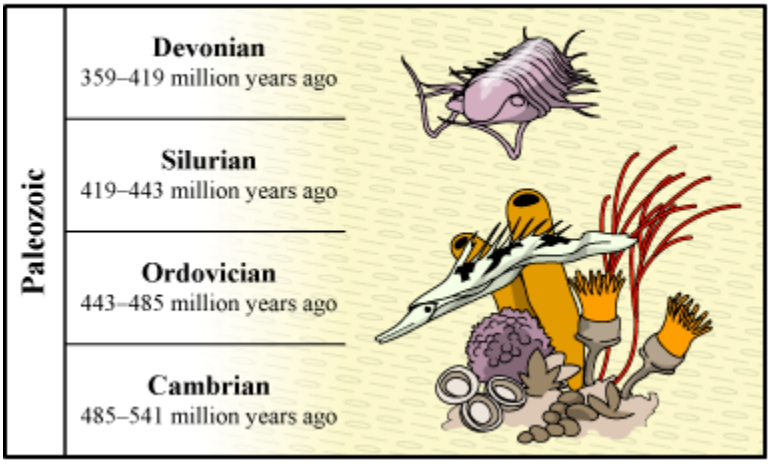
Q17 Which layer is MOST LIKELY to have fossil shells like the ones near the stream?

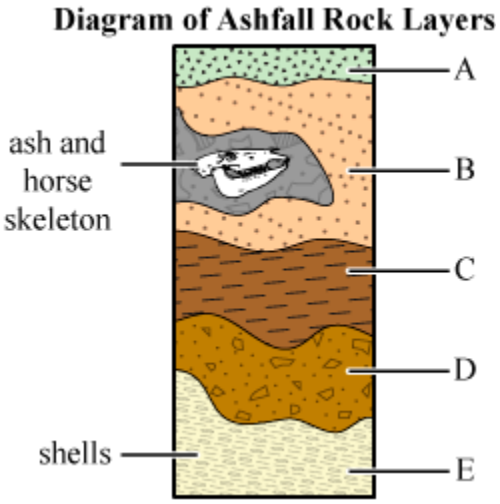
- A (1)
- B (2)
- C (3)
- D (4)
- E (5)

Q18 **Question 4**

This question has two parts. Answer part A, then answer part B. The diagram shows other fossils found in the shell layer.

Q19





Q20 **Part A**

Make a claim about the local environment when the shell layer formed.

- A) The environment was marine and similar to layer B. (1)
- B) The environment was similar to the environment today. (2)
- C) The environment was marine and different from layer B. (3)
- D) The environment was the same as the environment in layer B. (4)

Q21 **Part B**

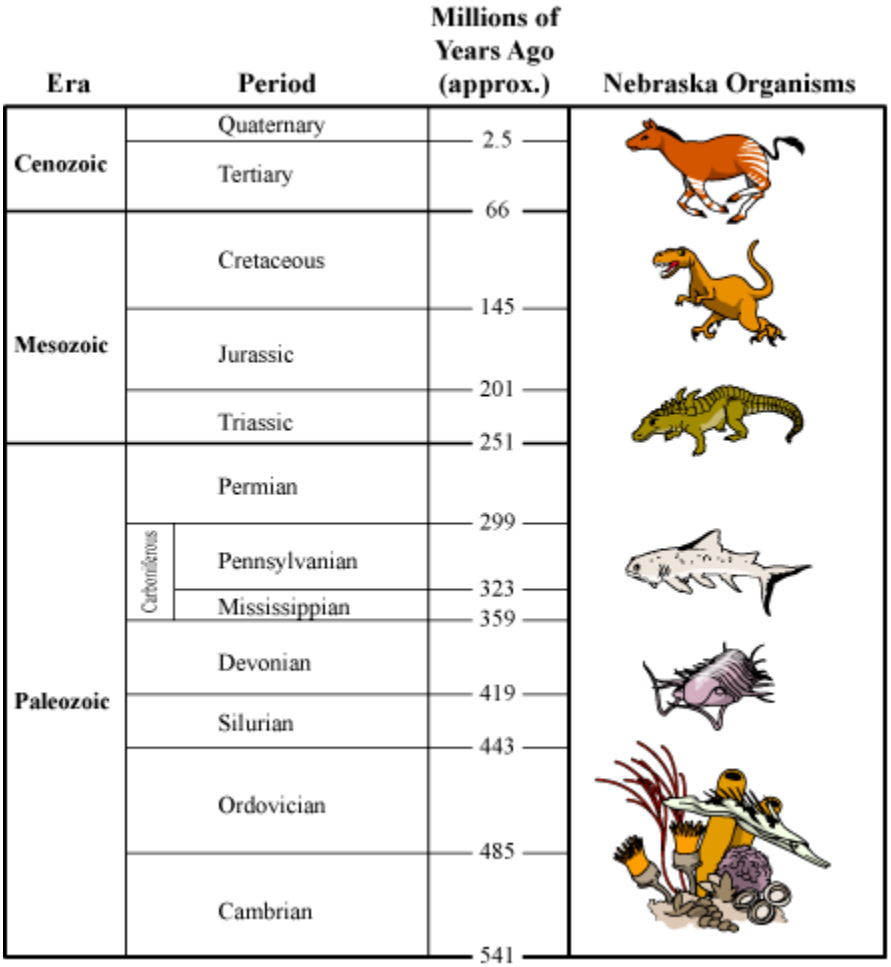
What evidence supports the claim made in part A?

- A) Environments change over time. (1)
- B) Environments remain the same over time. (2)
- C) Shells are found in Nebraska's streams today. (3)
- D) The shell layer contains many marine organisms. (4)

Q22 Use the information in any part of this task to answer the questions.

The diagram shows the geologic timescale and some common Nebraska organisms at those time periods.

Q23



Q24 **Question 5**

Based on the diagram, which statement BEST describes the environmental changes that occurred in Nebraska?

A) Nebraska changed from warm to cold. (1)

B) Nebraska changed from cold to warm. (2)

C) Nebraska changed from ocean to swamp to prairie. (3)

D) Nebraska changed from prairie to swamp to ocean. (4)

Q25 **Question 6**

This question has two parts. Answer part A, then answer part B. Part A

Scientists at Ashfall Fossil Beds State Historical Park estimate that the horse skeleton fossils were formed about 11 million years ago.

Make a claim about the age of the shells found by the student.

- A) The shells are younger than 11 million years. (1)
- B) The shells are between 11 million and 200 million years old. (2)
- C) The shells are between 200 million and 541 million years old. (3)
- D) The shells are older than 541 million years. (4)

Q26 **Part B**

What evidence about the age of the shells supports the claim made in part A?

- A) The shells are marine in origin. (1)
- B) The shells are in the bottom rock layer. (2)
- C) The shells are similar in age to the horse skeleton fossils. (3)
- D) The shells are found in Nebraska's streams today. (4)

Q27 **Student Feedback**

Q28

Feedback Question #1

How interesting was the task you just completed?

1 star is not interesting and 5 stars is very interesting.

(1)

Q29 **Feedback Question #2**
How difficult was the task as a whole?
1 star is not difficult and 5 stars is very difficult.
(1)

Q30
Feedback Question #3

Please rate the difficulty **to understand how to respond to each question.**

1 star is not difficult and 5 stars is very difficult.
Question 1 (1)
Question 2 (2)
Question 3 (3)
Question 4 (4)
Question 5 (5)
Question 6 (6)

Page Break

Q31 **Grade 8 Form A**
Task #2 Sculpture Setup

Q32 Timing
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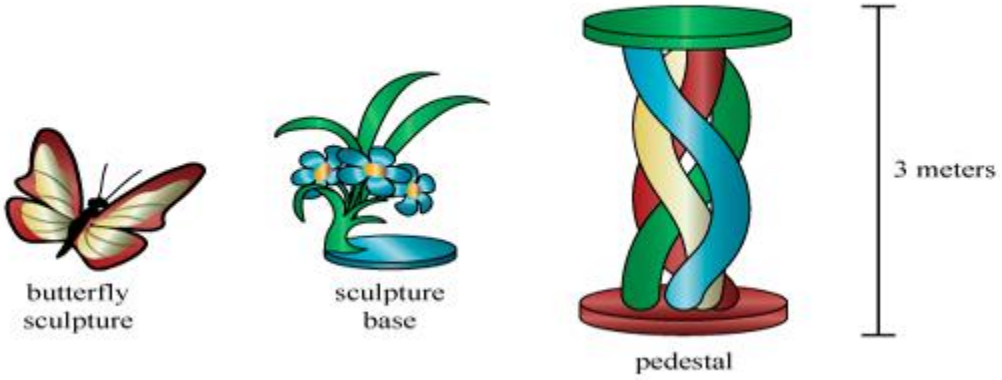
Q33 Use the information provided in any part of this task to answer the questions.

Q34 A two-part sculpture of a butterfly was donated to a school and needs to be placed onto a pedestal. Students will program a robot to place the sculpture into the pedestal safely without breaking the sculpture or the pedestal.

Q35

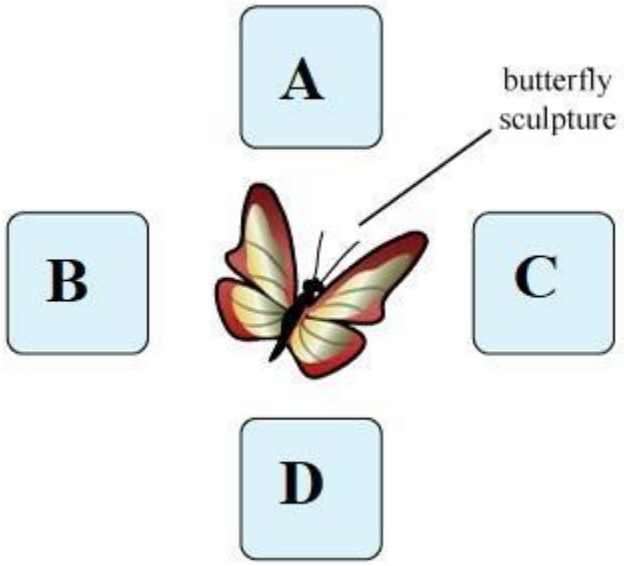


Q36 · The sculpture base has a mass of 40 kilograms. · The butterfly sculpture has a mass of 10 kilograms. · The robot applies an unbalanced force of 1000 newtons. · The pedestal is 3 meters tall. · The safe acceleration rate for the sculpture is 2 meters per second squared.

Q37 **Question 1**

The students think about how forces will affect the motion of the sculpture. Move one force arrow into each box to show how forces cause the sculpture to be lifted upward.

Q38



Q39

A	B	C	D
_____ Small Up (1)	_____ Small Up (1)	_____ Small Up (1)	_____ Small Up (1)
_____ Large Up (2)	_____ Large Up (2)	_____ Large Up (2)	_____ Large Up (2)
_____ Small Left (3)	_____ Small Left (3)	_____ Small Left (3)	_____ Small Left (3)
_____ Large Left (4)	_____ Large Left (4)	_____ Large Left (4)	_____ Large Left (4)
_____ Small Right (5)	_____ Small Right (5)	_____ Small Right (5)	_____ Small Right (5)

_____ Large Right (6)	_____ Large Right (6)	_____ Large Right (6)	_____ Large Right (6)
_____ Small Down (7)	_____ Small Down (7)	_____ Small Down (7)	_____ Small Down (7)
_____ Large Down (8)	_____ Large Down (8)	_____ Large Down (8)	_____ Large Down (8)

Q40 **Question 2**

This question has two parts. First answer Part A, then Part B.

To program the robot, students do an investigation to determine how much applied force is needed to lift objects with different masses. The students lift the objects with a spring scale and record the results in the data table.

Q41

Q42

Mass of Objects (kilograms)	Applied Force (newtons)
1	10
2	20
3	30
4	40

Part A

Which relationship do the students find between the mass of an object and the applied force?

- A) The object's mass is 10 times the applied force. (1)
- B) The mass of the objects causes the applied force to increase. (2)
- C) The less the applied force, the greater the mass of the objects. (3)
- D) The greater the mass of an object, the greater the applied force. (4)

Q43 **Part B**

Calculate the minimum applied force needed (in newtons) to lift the sculpture base and the butterfly together onto the pedestal. Enter your answer in the box.

_____

Q44 **Question 3**

Students do another investigation to determine the relationship between acceleration and force. They lift a 10-kilogram object repeatedly with increasing unbalanced forces. They measure the resulting accelerations and record the results in the data table.

Mass of Object (kilograms)	**Unbalanced Force (newtons)**	**Acceleration of Object (meters per second squared)**
10	10	1
10	50	5
10	100	10
10	150	

15

Which relationship do the students find between acceleration and force?

- A) As the unbalanced force increases, the mass of the object stays the same. (1)
- B) As the unbalanced force increases, the acceleration of the object increases. (2)
- C) As the acceleration of the object increases, the unbalanced force decreases. (3)
- D) As the acceleration of the object increases, the mass of the object stays the same. (4)

Q45 **Question 4** This question has two parts. First answer Part A, then Part B. Part A Use patterns in the data as evidence to make a scientific claim about the relationship between the unbalanced force applied to an object, the mass of the object, and the change in motion.

Mass of Objects

(kilograms)

Applied force

(newtons)

1

10

2

20

3

30

4

40

Mass of Object

(kilograms)

Unbalanced Force

(newtons)

Acceleration of Object

(meters per second squared)

10

10

1

10

50

5

10

100

10

10

150

15 Which conclusion can the students make from the patterns of data from their investigations?

- A) If mass increases from 1 kilogram to 4 kilograms, the motion stays the same. (1)
- B) If the force increases from 2 newtons to 8 newtons, the motions stays the same. (2)
- C) If the force increases by 10 newtons for each 1-kilogram increase in mass, then the change in motion will stay the same. (3)
- D) If the mass increases by 2 times, then the force must also increase by 2 times to keep the change in motion the same. (4)

Q46 **Part B**

Which mathematical formula BEST represents the data?

- A) $a = m / F$ (1)
- B) $F = ma$ (2)
- C) $m = Fa$ (3)
- D) $m = a / F$ (4)

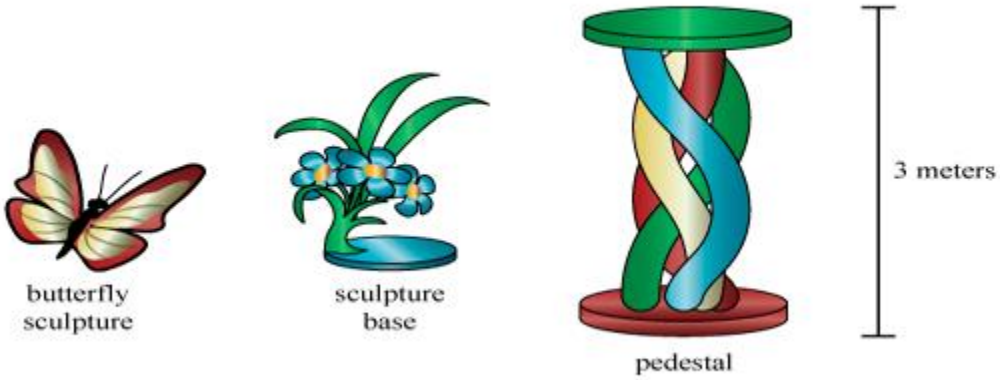
Page Break

Q47 Use the information provided in any part of this task to answer the questions.

Q48 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

Q49 A two-part sculpture of a butterfly was donated to a school and needs to be placed onto a pedestal. Students will program a robot to place the sculpture into the pedestal safely without breaking the sculpture or the pedestal.

Q50



Q51 · The sculpture base has a mass of 40 kilograms. · The butterfly sculpture has a mass of 10 kilograms. · The robot applies an unbalanced force of 1000 newtons. · The pedestal is 3 meters tall. · The safe acceleration rate for the sculpture is 2 meters per second squared.

Mass of Objects
(kilograms)Applied force

(newtons)110220330440 Mass of Object
(kilograms)Unbalanced Force
(newtons)Acceleration of Object
(meters per second squared)10101105051010010101501 5

Q52 **Question 5**

The students have two options to set up the sculpture. Assemble the 10-kilogram butterfly sculpture on the 40-kilogram sculpture base and move them together onto the pedestal. Move the 40-kilogram sculpture base onto the pedestal, then move the 10-kilogram butterfly sculpture onto the pedestal. Use the equation to determine the acceleration of the parts and the assembled sculpture when the robot moves them with an unbalanced force of 1,000 newtons.

F = ma

Enter the acceleration (in meters per second squared) of each part of the sculpture and the assembled sculpture into the boxes.

- Acceleration of the 40-kilogram butterfly sculpture: (1)

_____

- Acceleration of the 10-kilogram sculpture base: (2)

_____

- Acceleration of the 50-kilogram sculpture and sculpture base together: (3)

_____

Q53 **Question 6**

How could the sculpture be safely placed onto the pedestal using the robot? Make a claim for what is the best solution to the problem. Use the data and your calculations as evidence to support your claim.

_____

_____

_____

_____

Q54 **Student Feedback**

Q55
Feedback Question #1

How interesting was the task you just completed?

1 star is not interesting and 5 stars is very interesting.
(1)

Q56 **Feedback Question #2**
How difficult was the task as a whole?
1 star is not difficult and 5 stars is very difficult.
(1)

Q57
Feedback Question #3

Please rate the difficulty **to understand how to respond to each question.**

1 star is not difficult and 5 stars is very difficult.

Question 1 (1)	☆	☆	☆	☆	☆
Question 2 (2)	☆	☆	☆	☆	☆
Question 3 (3)	☆	☆	☆	☆	☆
Question 4 (4)	☆	☆	☆	☆	☆
Question 5 (5)	☆	☆	☆	☆	☆
Question 6 (6)	☆	☆	☆	☆	☆

End of Block: Default Question Block