



Coherence and Alignment Among Science Curriculum, Instruction, and Assessment (CASCIA) Project

Grade 8 Unit 1: Forces and Energy

Task 2 Prompt 4 Scored and Annotated Anchor Set

July 2024

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CASCIA Grade 8 EOU Assessment 1 Task 2: Barriers on the Highway

Prompt 4 Score Point 4

Prompt 4 Rubric

Prompt	Score Point 0	Score Point 1	Score Point 2	Score Point 3	Score Point 4
Prompt 4	No aspect of the response is correct	Response includes one (1) of the four (4) aspects	Response includes two (2) of the four (4) aspects	Response includes three (3) of the four (4) aspects	Response includes the following aspects: Part A - Identifies the guard rail Part B - Compares the impact velocity of a vehicle when stopped by each barrier type - Explains the relationship between velocity and KE - Explains the relationship of KE to the forces involved in the collision as related to Newton's third law

Score Point 4 (4/4 aspects met)

- Part A
 - Identifies the guard rail.
- Part B
 - Compares the impact velocity of a vehicle when stopped by each barrier type.
 - Explains the relationship between velocity and KE.
 - Explains the relationship of KE to the forces involved in the collision as related to Newton's third law.

Part A.

The barrier type that would result in stopping a moving vehicle and result in the least damage to the vehicle is the Guard Rail.

Part B.

Explain why this barrier type will be better at reducing damage and injury than the other barrier type. Reference the information in Table 2, the relationships among kinetic energy, mass, and velocity, and Newton's third law of motion to support your response.

This barrier type will be better at reducing damage and injury because it will decelerate the car. This will lower the velocity resulting in the kinetic energy lowering. The Jersey barrier on the other hand will be a much worse option, for it will decelerate the car immediately. This is bad as Newton's third law states that there is always an equal and opposite force; so when the car stops the barrier would also apply a strong force back to the vehicle.

CASCIA Grade 8 EOU Assessment 1 Task 2: Barriers on the Highway

Prompt 4 Score Point 3

Prompt 4 Rubric

Prompt	Score Point 0	Score Point 1	Score Point 2	Score Point 3	Score Point 4
Prompt 4	No aspect of the response is correct	Response includes one (1) of the four (4) aspects	Response includes two (2) of the four (4) aspects	Response includes three (3) of the four (4) aspects	Response includes the following aspects: Part A - Identifies the guard rail Part B - Compares the impact velocity of a vehicle when stopped by each barrier type - Explains the relationship between velocity and KE - Explains the relationship of KE to the forces involved in the collision as related to Newton's third law

Score Point 3 (3/4 aspects met)

- Part A
 - Identifies the guard rail.
- Part B
 - Compares the impact velocity of a vehicle when stopped by each barrier type.

NOTE: The student answer includes an implicit comparison without mentioning Jersey barrier.

- Explains the relationship between velocity/speed and KE.
- Does **NOT** explain the relationship of KE to the forces involved in the collision as related to Newton's third law.

Part A.

The barrier type that would result in stopping a moving vehicle and result in the least damage to the vehicle is the Guard Rail.

Part B.

Explain why this barrier type will be better at reducing damage and injury than the other barrier type. Reference the information in Table 2, the relationships among kinetic energy, mass, and velocity, and Newton's third law of motion to support your response.

This barrier type will be better at reducing damage and injury because it will slow down the vehicle and there will be less momentum impacts on the guard rail and the vehicle, when it slows down the loss (KE) there will be so the impact wouldn't be that hard.

CASCIA Grade 8 EOU Assessment 1 Task 2: Barriers on the Highway

Prompt 4 Score Point 2

Prompt 4 Rubric

Prompt	Score Point 0	Score Point 1	Score Point 2	Score Point 3	Score Point 4
Prompt 4	No aspect of the response is correct	Response includes one (1) of the four (4) aspects	Response includes two (2) of the four (4) aspects	Response includes three (3) of the four (4) aspects	Response includes the following aspects: Part A - Identifies the guard rail Part B - Compares the impact velocity of a vehicle when stopped by each barrier type - Explains the relationship between velocity and KE - Explains the relationship of KE to the forces involved in the collision as related to Newton's third law

Score Point 2 (2/4 aspects met)

- Part A
 - Identifies the guard rail.
- Part B
 - Compares the impact velocity of a vehicle when stopped by each barrier type.

NOTE: The student answer includes an implicit comparison without mentioning Jersey barrier.

- Does **NOT** explain the relationship between velocity/speed and KE.
- Does **NOT** explain the relationship of KE to the forces involved in the collision as related to Newton's third law.

Part A.

The barrier type that would result in stopping a moving vehicle and result in the **least** damage to the vehicle is the Guard Rail.

Part B.

Explain why this barrier type will be better at reducing damage and injury than the other barrier type. Reference the information in **Table 2**, the relationships among kinetic energy, mass, and velocity, and Newton's third law of motion to support your response.

This barrier type will be better at reducing damage and injury because the Guard Rail slows the object and then stops while the other barrier doesn't. The barrier also supports the wadded post. The rail is built to reduce ~~and~~ damage and injury by stopping.

CASCIA Grade 8 EOU Assessment 1 Task 2: Barriers on the Highway

Prompt 4 Score Point 1

Prompt 4 Rubric

Prompt	Score Point 0	Score Point 1	Score Point 2	Score Point 3	Score Point 4
Prompt 4	No aspect of the response is correct	Response includes one (1) of the four (4) aspects	Response includes two (2) of the four (4) aspects	Response includes three (3) of the four (4) aspects	Response includes the following aspects: Part A - Identifies the guard rail Part B - Compares the impact velocity of a vehicle when stopped by each barrier type - Explains the relationship between velocity and KE - Explains the relationship of KE to the forces involved in the collision as related to Newton's third law

Score Point 1 (1/4 aspects met)

- Part A
 - Identifies the guard rail.
- Part B
 - Does **NOT** compare the impact velocity of a vehicle when stopped by each barrier type.
 - Does **NOT** explain the relationship between velocity/speed and KE.
 - Does **NOT** explain the relationship of KE to the forces involved in the collision as related to Newton's third law.

Part A.

The barrier type that would result in stopping a moving vehicle and result in the least damage to the vehicle is the guard rail.

Part B.

Explain why this barrier type will be better at reducing damage and injury than the other barrier type. Reference the information in Table 2, the relationships among kinetic energy, mass, and velocity, and Newton's third law of motion to support your response.

This barrier type will be better at reducing damage and injury because the guard rail when hit it will stop, the guard rail will have the newtons third law

CASCIA Grade 8 EOU Assessment 1 Task 2: Barriers on the Highway

Prompt 4 Score Point 0

Prompt 4 Rubric

Prompt	Score Point 0	Score Point 1	Score Point 2	Score Point 3	Score Point 4
Prompt 4	No aspect of the response is correct	Response includes one (1) of the four (4) aspects	Response includes two (2) of the four (4) aspects	Response includes three (3) of the four (4) aspects	Response includes the following aspects: Part A - Identifies the guard rail Part B - Compares the impact velocity of a vehicle when stopped by each barrier type - Explains the relationship between velocity and KE - Explains the relationship of KE to the forces involved in the collision as related to Newton's third law

Score Point 0 (0/4 aspects met)

- Part A
 - Does **NOT** identify the guard rail.
- Part B
 - Does **NOT** compare the impact velocity of a vehicle when stopped by each barrier type.
 - Does **NOT** explain the relationship between velocity/speed and KE.
 - Does **NOT** explain the relationship of KE to the forces involved in the collision as related to Newton's third law.

Part A.

The barrier type that would result in stopping a moving vehicle and result in the least damage to the vehicle is the Jersey barrier.

Part B.

Explain why this barrier type will be better at reducing damage and injury than the other barrier type. Reference the information in Table 2, the relationships among kinetic energy, mass, and velocity, and Newton's third law of motion to support your response.

This barrier type will be better at reducing damage and injury because The
Concrete barrier is made out of concrete
and it will stop a moving vehicle going
straight into it and it will keep the
driver and the passengers safe because
only the front of the will get damaged
but the people in the back will be
OK.