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

Grade 8 Unit 1: Forces and Energy

Task 2 Prompt 2 Scored and Annotated Anchor Set

July 2024

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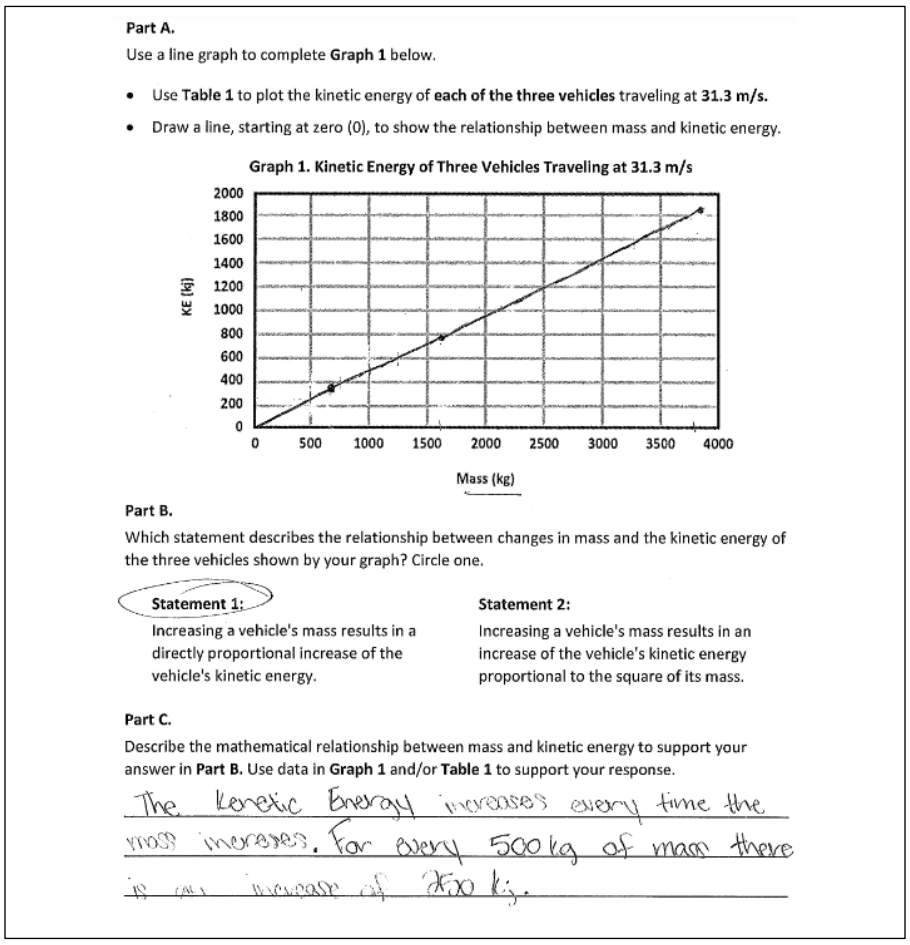
CASCIA Grade 8 EOU Assessment 1 Task 2: Barriers on the Highway
Prompt 2 Score Point 3

Prompt 2 Rubric

Prompt	Score Point 0	Score Point 1	Score Point 2	Score Point 3	Score Point 4
Prompt 2.	No aspect of the response is correct	Response includes **one (1)** of the **three (3)** aspects	Response includes **two (2)** of the **three (3)** aspects	The graph includes the following aspects: **Part A** • Accurate plotting of the kinetic energy for each of the three vehicles traveling at 31.3 m/s, including a line showing the correct linear relationship between mass and kinetic energy that starts at "0" **Part B** • Selects "**Statement 1**" **Part C** • Describes the direct relationship between mass and kinetic energy, indicating that as mass increases so does kinetic energy	NA

Score Point 3 (3/3 aspects met)

- Part A
  - Plots the kinetic energy vs. mass for each of the three vehicles traveling at 31.3 m/s, including a line showing the correct linear relationship between mass and kinetic energy that starts at "0."
- Part B
  - Selects "Statement 1."
- Part C
  - Describes the direct relationship between mass and kinetic energy, indicating that as mass increases, so does kinetic energy.



Part A.

Use a line graph to complete **Graph 1** below.

- Use **Table 1** to plot the kinetic energy of **each of the three vehicles** traveling at **31.3 m/s.**
- Draw a line, starting at zero (0), to show the relationship between mass and kinetic energy.

Graph 1. Kinetic Energy of Three Vehicles Traveling at 31.3 m/s

Part B.

Which statement describes the relationship between changes in mass and the kinetic energy of the three vehicles shown by your graph? Circle one.

Statement 1:
Increasing a vehicle's mass results in a directly proportional increase of the vehicle's kinetic energy.

Statement 2:
Increasing a vehicle's mass results in an increase of the vehicle's kinetic energy proportional to the square of its mass.

Part C.

Describe the mathematical relationship between mass and kinetic energy to support your answer in **Part B.** Use data in **Graph 1** and/or **Table 1** to support your response.

The Kinetic Energy increases every time the mass increases. For every 500 kg of mass there is an increase of 250 kJ.

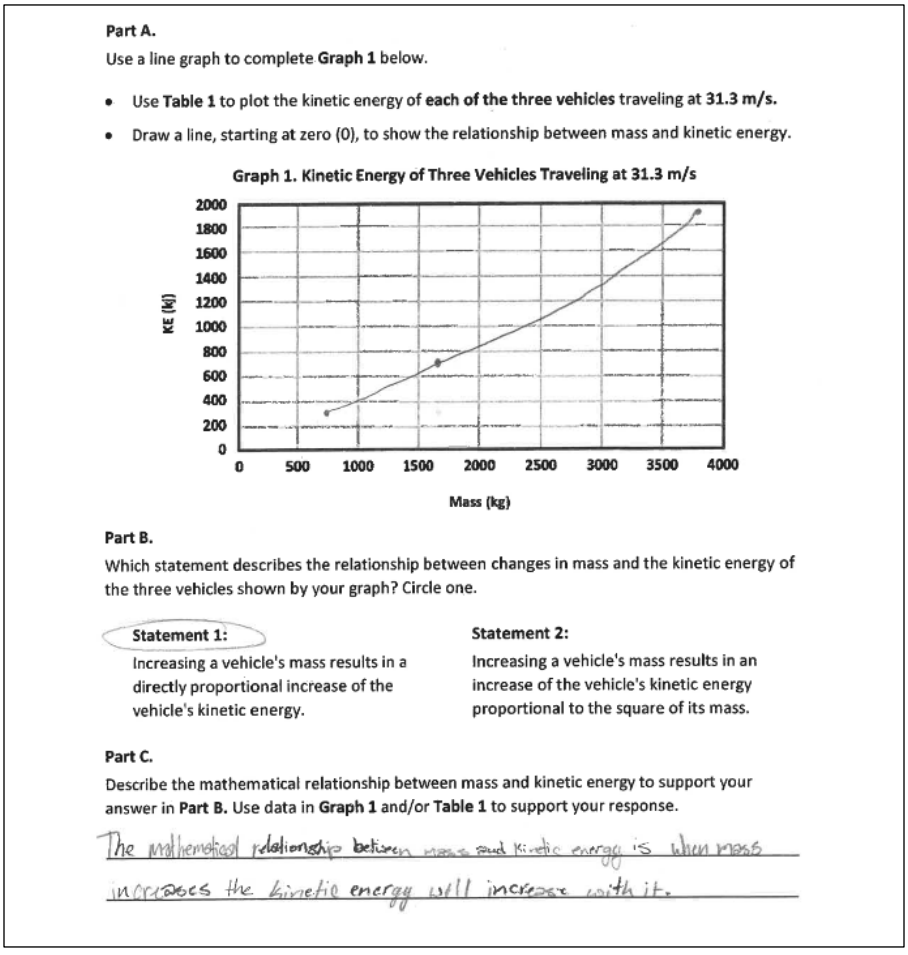
CASCIA Grade 8 EOU Assessment 1 Task 2: Barriers on the Highway
Prompt 2 Score Point 2

Prompt 2 Rubric

Prompt	Score Point 0	Score Point 1	Score Point 2	Score Point 3	Score Point 4
Prompt 2.	No aspect of the response is correct	Response includes **one (1)** of the **three (3)** aspects	Response includes **two (2)** of the **three (3)** aspects	The graph includes the following aspects: **Part A** • Accurate plotting of the kinetic energy for each of the three vehicles traveling at 31.3 m/s, including a line showing the correct linear relationship between mass and kinetic energy that starts at "0" **Part B** • Selects "**Statement 1**" **Part C** • Describes the direct relationship between mass and kinetic energy, indicating that as mass increases so does kinetic energy	NA

Score Point 2 (2/3 aspects met)

- Part A
  - Does **NOT** correctly plot the kinetic energy vs. mass for each of the three vehicles traveling at 31.3 m/s, including a line showing the correct linear relationship between mass and kinetic energy that starts at "0" (i.e., The student's plot does not start at zero.).
- Part B
  - Selects "Statement 1."
- Part C
  - Describes the direct relationship between mass and kinetic energy, indicating that as mass increases, so does kinetic energy.



Part A.

Use a line graph to complete **Graph 1** below.

- Use **Table 1** to plot the kinetic energy of **each of the three vehicles** traveling at **31.3 m/s.**
- Draw a line, starting at zero (0), to show the relationship between mass and kinetic energy.

Graph 1. Kinetic Energy of Three Vehicles Traveling at 31.3 m/s

Part B.

Which statement describes the relationship between changes in mass and the kinetic energy of the three vehicles shown by your graph? Circle one.

Statement 1:
Increasing a vehicle's mass results in a directly proportional increase of the vehicle's kinetic energy.

Statement 2:
Increasing a vehicle's mass results in an increase of the vehicle's kinetic energy proportional to the square of its mass.

Part C.

Describe the mathematical relationship between mass and kinetic energy to support your answer in **Part B.** Use data in **Graph 1** and/or **Table 1** to support your response.

The mathematical relationship between mass and kinetic energy is when mass increases the kinetic energy will increase with it.

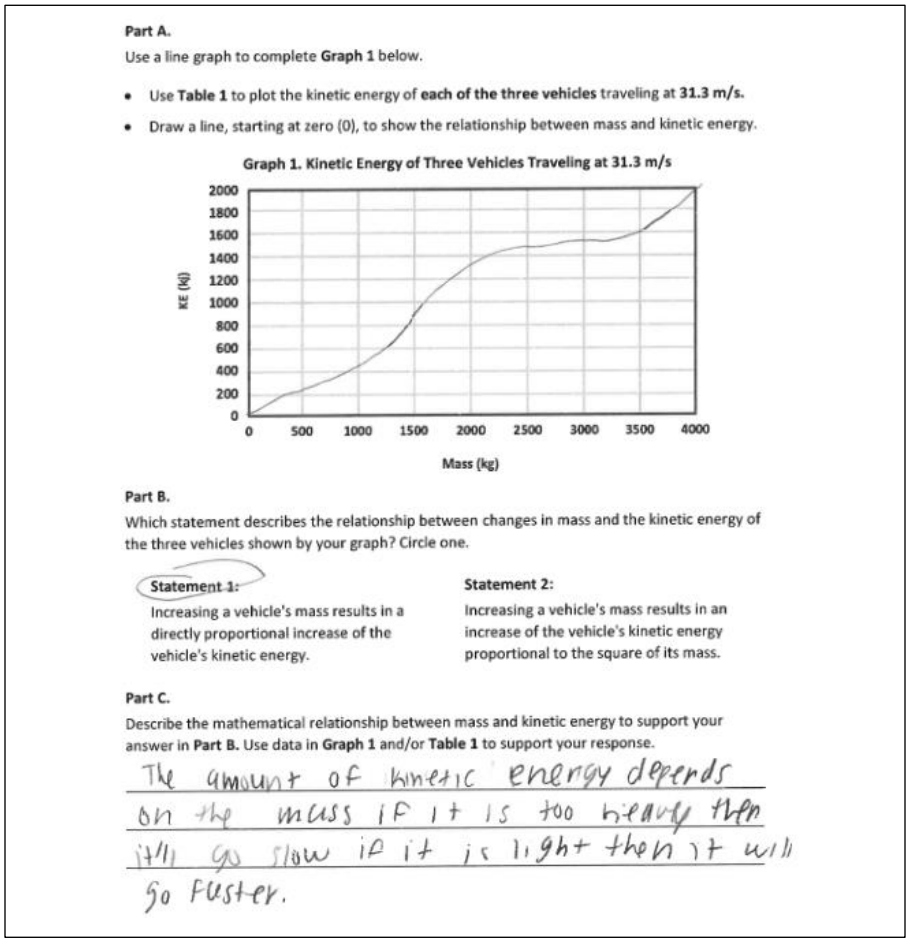
CASCIA Grade 8 EOU Assessment 1 Task 2: Barriers on the Highway
Prompt 2 Score Point 1

Prompt 2 Rubric

Prompt	Score Point 0	Score Point 1	Score Point 2	Score Point 3	Score Point 4
Prompt 2.	No aspect of the response is correct	Response includes **one (1)** of the **three (3)** aspects	Response includes **two (2)** of the **three (3)** aspects	The graph includes the following aspects: **Part A** • Accurate plotting of the kinetic energy for each of the three vehicles traveling at 31.3 m/s, including a line showing the correct linear relationship between mass and kinetic energy that starts at "0" **Part B** • Selects "**Statement 1**" **Part C** • Describes the direct relationship between mass and kinetic energy, indicating that as mass increases so does kinetic energy	NA

Score Point 1 (1/3 aspects met)

- Part A
  - Does **NOT** correctly plot the kinetic energy vs. mass for each of the three vehicles traveling at 31.3 m/s, including a line showing the correct linear relationship between mass and kinetic energy that starts at "0."
- Part B
  - Selects "Statement 1."
- Part C
  - Does **NOT** describe the direct relationship between mass and kinetic energy, indicating that as mass increases, so does kinetic energy.



Part A.

Use a line graph to complete **Graph 1** below.

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Graph 1. Kinetic Energy of Three Vehicles Traveling at 31.3 m/s

Part B.

Which statement describes the relationship between changes in mass and the kinetic energy of the three vehicles shown by your graph? Circle one.

Statement 1:
Increasing a vehicle's mass results in a directly proportional increase of the vehicle's kinetic energy.

Statement 2:
Increasing a vehicle's mass results in an increase of the vehicle's kinetic energy proportional to the square of its mass.

Part C.

Describe the mathematical relationship between mass and kinetic energy to support your answer in **Part B.** Use data in **Graph 1** and/or **Table 1** to support your response.

The amount of kinetic energy depends on the mass if it is too heavy then it'll go slow if it is light then it will go faster.

CASCIA Grade 8 EOU Assessment 1 Task 2: Barriers on the Highway
Prompt 2 Score Point 0

Prompt 2 Rubric

Prompt	Score Point 0	Score Point 1	Score Point 2	Score Point 3	Score Point 4
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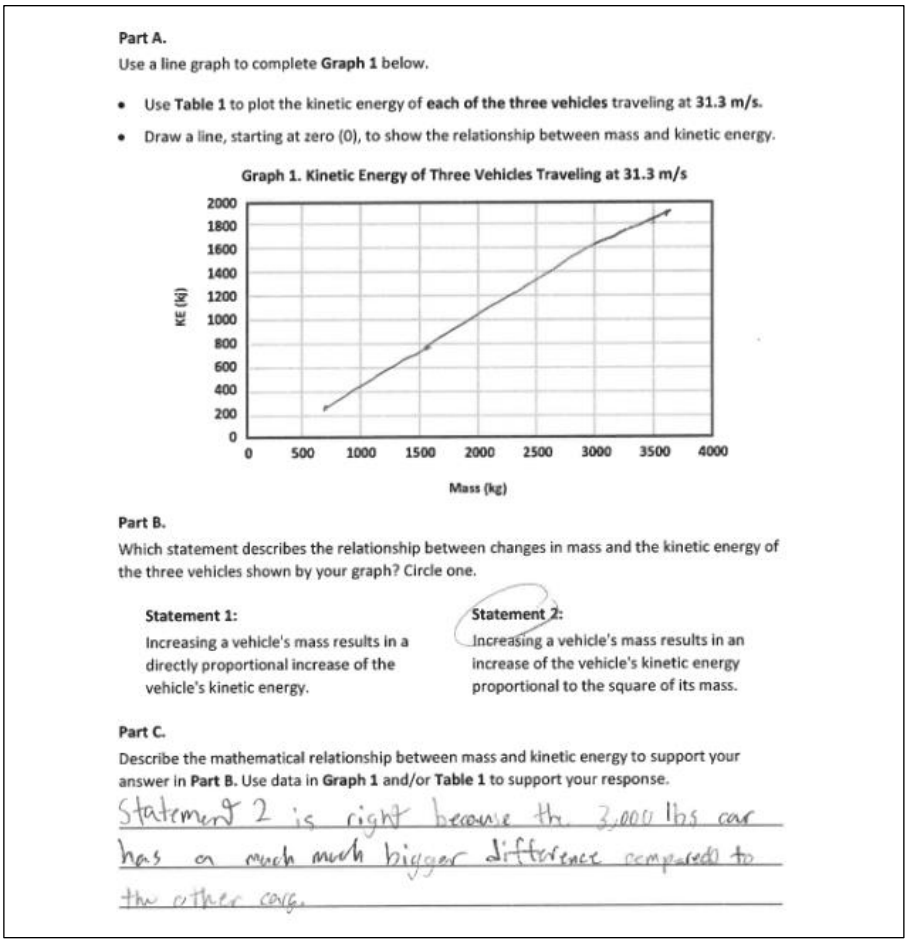
Score Point 0 (0/3 aspects met)

- Part A
  - Does **NOT** correctly plot the kinetic energy vs. mass for each of the three vehicles traveling at 31.3 m/s, including a line showing the correct linear relationship between mass and kinetic energy that starts at "0".
- Part B
  - Does **NOT** select "Statement 1."
- Part C
  - Does **NOT** describe the direct relationship between mass and kinetic energy, indicating that as mass increases, so does kinetic energy.



Part A.

Use a line graph to complete **Graph 1** below.

- Use **Table 1** to plot the kinetic energy of **each of the three vehicles** traveling at **31.3 m/s.**
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Graph 1. Kinetic Energy of Three Vehicles Traveling at 31.3 m/s

Part B.

Which statement describes the relationship between changes in mass and the kinetic energy of the three vehicles shown by your graph? Circle one.

Statement 1:
Increasing a vehicle's mass results in a directly proportional increase of the vehicle's kinetic energy.

Statement 2:
Increasing a vehicle's mass results in an increase of the vehicle's kinetic energy proportional to the square of its mass.

Part C.

Describe the mathematical relationship between mass and kinetic energy to support your answer in **Part B.** Use data in **Graph 1** and/or **Table 1** to support your response.

Statement 2 is right because the 3,000 lbs car has a much much bigger difference compared to the other cars.