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

Grade 8 Unit 1: Forces and Energy

Task 2 Prompt 3 Scored and Annotated Anchor Set

July 2024

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CASCIA Grade 8 EOU Assessment 1 Task 2: Barriers on the Highway
Prompt 3 Score Point 4

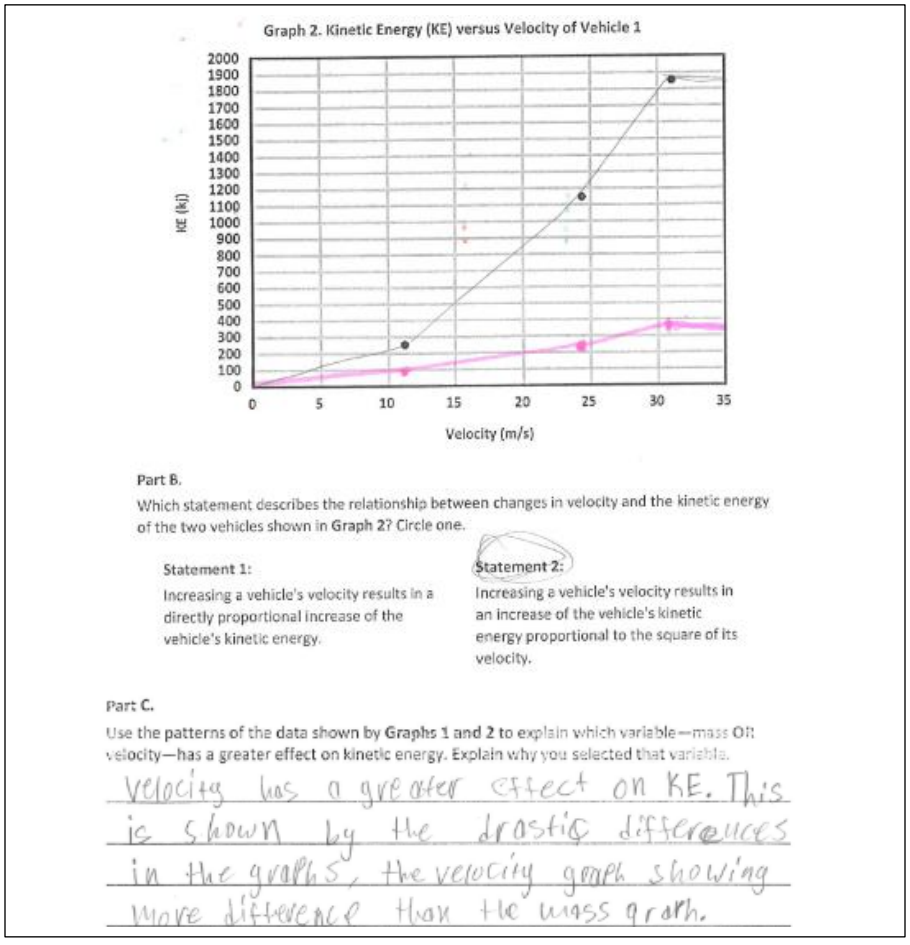
Prompt 3 Rubric

Prompt	Score Point 0	Score Point 1	Score Point 2	Score Point 3	Score Point 4
Prompt 3	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** • Accurate plotting of the KE for Vehicle 3 traveling at **three (3)** different speeds **Part B** • Selects **"Statement 2"** **Part C** • Describes the relationship between mass and kinetic energy **AND** between velocity and kinetic energy using patterns of data shown by each graph • Explains that an increase in velocity results in a greater relative rate of change in kinetic energy than an increase in mass based on the analysis of the data in the graphs

Score Point 4 (4/4 aspects met)

- Part A
  - Plots KE for Vehicle 3 traveling at three (3) different speeds.

  NOTE: The lines are not necessary.
- Part B
  - Selects "Statement 2."
- Part C
  - Describes the relationships between mass and kinetic energy AND between velocity and kinetic energy using patterns of data shown by each graph.
  - Explains or states that an increase in velocity results in a greater relative rate of change in kinetic energy than an increase in mass based on the data analysis in the graphs.



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

Prompt 3 Rubric

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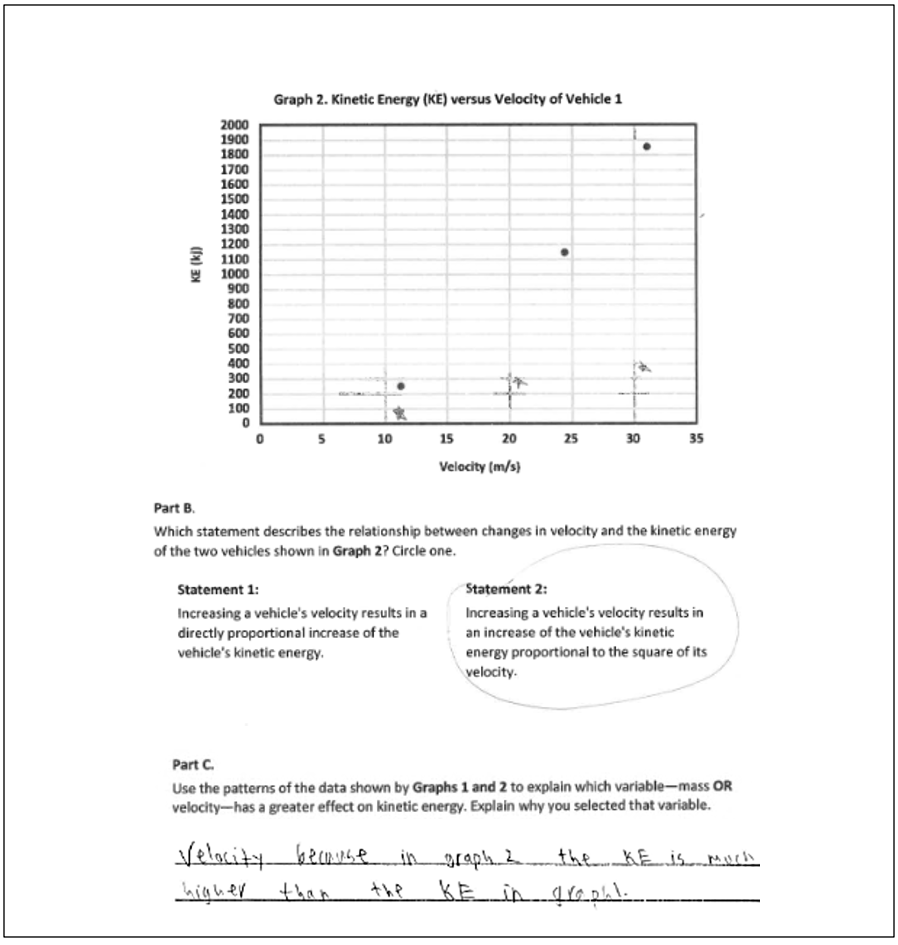
Score Point 3 (3/4 aspects met)

- Part A
  - Plots KE for Vehicle 3 traveling at three (3) different speeds.
- Part B
  - Selects "Statement 2."
- Part C
  - Does **NOT** describe the relationships between mass and kinetic energy AND between velocity and kinetic energy using patterns of data shown by each graph.
  - Explains or states that an increase in velocity results in a greater relative rate of change in kinetic energy than an increase in mass (i.e., ". . . higher than the KE in graph 1.").



Graph 2. Kinetic Energy (KE) versus Velocity of Vehicle 1

Part B.

Which statement describes the relationship between changes in velocity and the kinetic energy of the two vehicles shown in **Graph 2**? Circle one.

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

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

Part C.

Use the patterns of the data shown by **Graphs 1 and 2** to explain which variable—mass **OR** velocity—has a greater effect on kinetic energy. Explain why you selected that variable.

Velocity because in graph 2 the KE is much higher than the KE in graph 1.

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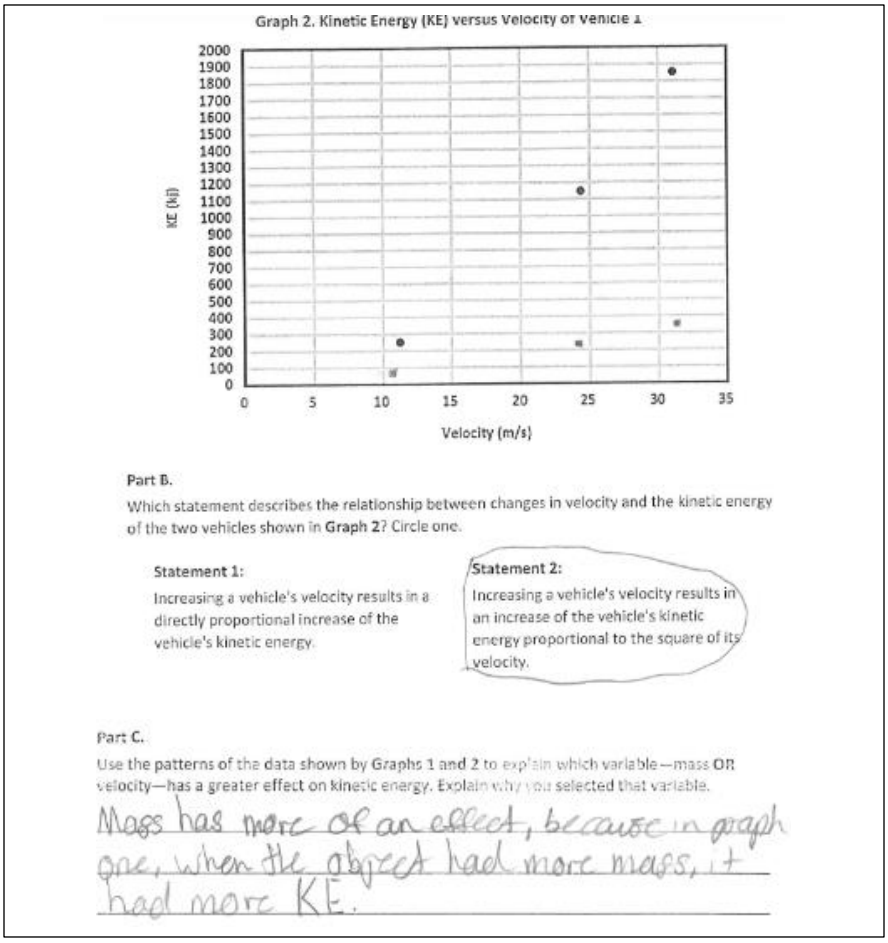
Score Point 2 (2/4 aspects met)

- Part A
  - Plots KE for Vehicle 3 traveling at three (3) different speeds.
- Part B
  - Selects "Statement 2."
- Part C
  - Does **NOT** describe the relationships between mass and kinetic energy AND between velocity and kinetic energy using patterns of data shown by each graph.
  - Does **NOT** explain or state that an increase in velocity results in a greater relative rate of change in kinetic energy than an increase in mass.



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

Prompt 3 Rubric

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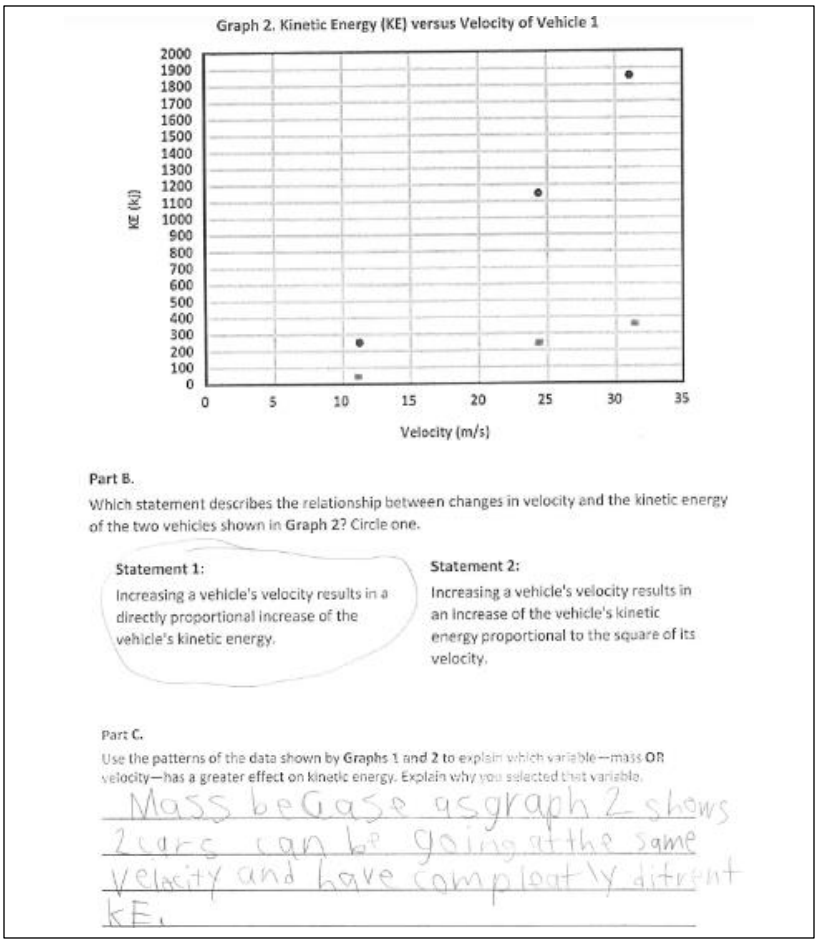
Score Point 1 (1/4 aspects met)

- Part A
  - Plots KE for Vehicle 3 traveling at three (3) different speeds.
- Part B
  - Does **NOT** select "Statement 2."
- Part C
  - Does **NOT** describe the relationships between mass and kinetic energy AND between velocity and kinetic energy using patterns of data shown by each graph (i.e., The student incorrectly interprets the data represented in graphs 1 and 2 in comparing the relationships.).
  - Does **NOT** explain or state that an increase in velocity results in a greater relative rate of change in kinetic energy than an increase in mass.



CASCIA Grade 8 EOU Assessment 1 Task 2: Barriers on the Highway
Prompt 3 Score Point 0

Prompt 3 Rubric

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Score Point 0 (0/4 aspects met)

- Part A
  - Does **NOT** plot KE for Vehicle 3 traveling at three (3) different speeds.
- Part B
  - Does **NOT** select "Statement 2."
- Part C
  - Does **NOT** describe the relationships between mass and kinetic energy AND between velocity and kinetic energy using patterns of data shown by each graph.
  - Does **NOT** explain or state that an increase in velocity results in a greater relative rate of change in kinetic energy than an increase in mass.