2009 Science 8ᵗʰ Grade Performance Event Sample

> **Item #1**
>
> **GLE(s): IN.1.A.8a**
>
> **Process Standard 1.1**

1. Write a reasonable hypothesis for the experiment that Carlos and Kim conducted.

_____

_____

Key Element:
_____

- If the type of surface gets rougher, then the car will not travel as far.
- If the amount of friction increases, then the car will not travel as far.
- If there is less friction, then the car will travel further

   OR

- Any reasonable hypothesis based on the testable question that predicts an effect, or the lack of effect, of the independent variable on the dependent variable.

Exemplary responses take these appropriate forms:

- If (independent variable) (description of change in independent variable), the (dependent variable) (description of event).
- As the (independent variable) (description of changes), the (dependent variable) (description of observed changes in dependent variable).
- The (qualitative/quantitative change in independent variable) of (independent variable), the (quantitative change in dependent variable).

NOTE: The "if, then" format does <u>not</u> have to be used in the student response in order for the student to earn full credit.

> **Score Points:**
> **1 point**   1 key element
> **0 points**   0 key elements

Item #2

GLE(s):   IN.1.A.8b

Process Standard(s) 1.3

2. What is the independent variable in this experiment?

_____

What is the dependent variable in this experiment?

_____

Key Elements:

_____
(Independent Variable) type of surface OR amount of friction

_____
(Dependent Variable) distance traveled

_____

Score Points:
2 Points   2 key elements
1 Point   1 key element
0 Points   0 key elements

Carlos and Kim recorded the data from their experiment in the data table below:

Table 1

| Surface of the Ramp | Distance Car Traveled (cm) | | | | | Average Distance (cm) |
| | Trials | | | | | |
	1	2	3	4	5	
Sand paper	45	50	47	51	47	
Waxed paper	92	98	94	95	96	95
Paint	80	82	80	84	79	81

3. Calculate the <u>average</u> that belongs in the empty box and record it in Table 1.

Key Element:
_____
48 (centimeters/cm)
_____

NOTE: Student may write response below table and still receive credit.

Score Points:
1 point   1 key element
0 points   0 key elements

Item #4

GLE(s)   IN.1.A.8b

Process Standards(s)   1.7

4. Explain why conducting five trials instead of one will help Carlos and Kim reach a more reliable conclusion.

Key Element:

One of the following:
.
- Unusual data (outliers) affects results less when averaged with more consistent data.

- Data from multiple trials can be compared to ensure the validity of the investigation (results from trials should be similar but not necessarily identical; i.e., a pattern is evident).

- Multiple trials produce more valid results/accurate results.

- Other valid response explaining the importance/advantage of conducting multiple trials/reproducing results.

Score Points:
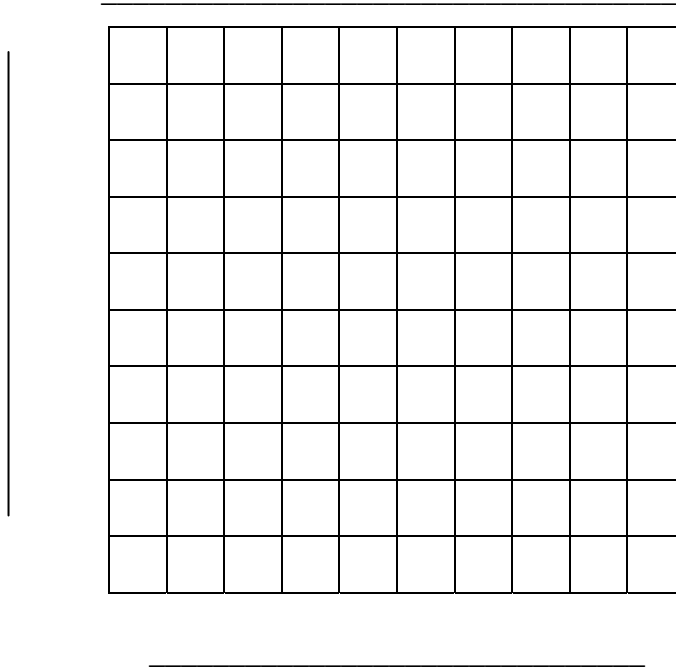**1 Point**   1 key element
0 Points   0 key elements

5. Use the data from Table 1 to construct a <u>bar</u> graph on the grid below. Graph only the <u>averages</u> of the distance measurements.

   Be sure to provide:
   - an appropriate title
   - a label for each axis with appropriate units
   - an appropriate number scale and category labels
   - correctly plotted data

Key Elements:

Appropriate title: a statement of the relationship between the independent variable (type of surface OR amount of friction) and the dependent variable (distance traveled) or a statement of what is being tested

_____

Both axes correctly labeled, with units (centimeters for distance traveled

_____

Appropriate number scale(s) written along axis/axes: numbers on the gridlines, numbers that allow all data to be plotted, consistently scaled, point of intersection must be zero

AND

Appropriate category labels written along axis below bars.

_____

All data points correctly plotted AND, for bar graphs, all four bars correctly drawn (top line of each bar is well-defined)

_____

NOTE: If student only uses data points from the table to number their axes, they will lose both the scaling and the plotting points. (Rationale: the student in this case has basically made a bar graph without bars and simply connected the top of each bar with a line.)
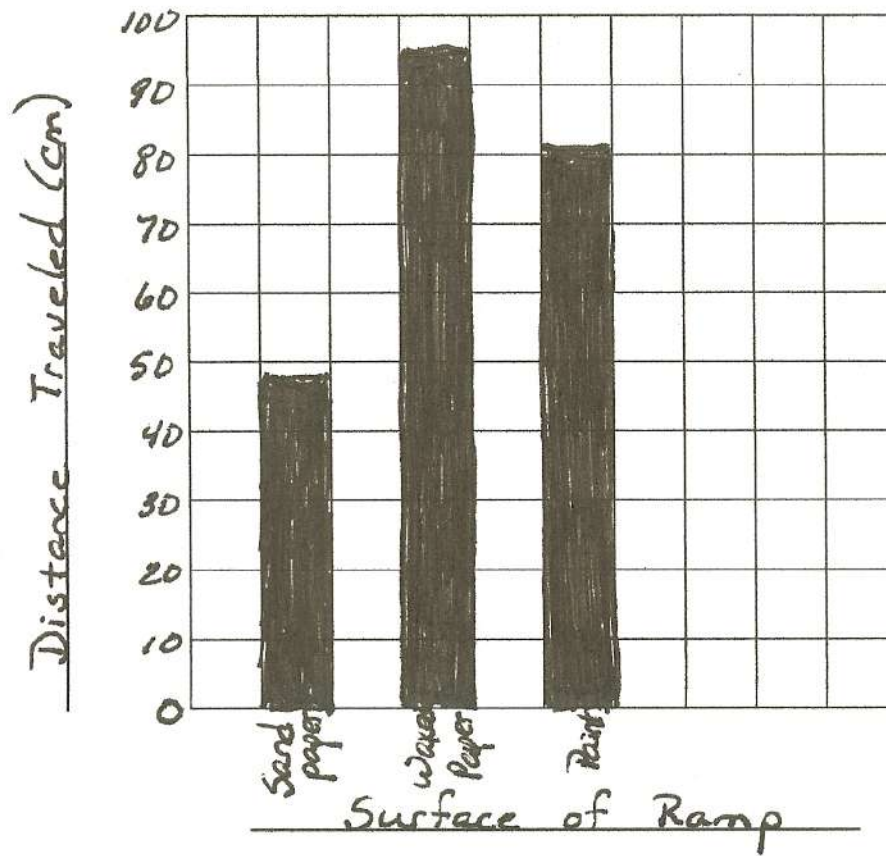
Exception to above note: If student only uses data points from the table but scales the axes correctly, student will receive credit for the scaling point.

NOTE: Student should not be penalized for compressing the interval between zero and the first non-zero number as long as they designate the compression with a broken axis and the rest of the scale intervals are consistent.

Score Points:	
4 points	four key elements
3 points	three key elements
2 points	two key elements
1 point	one key element
0 points	no key elements

Exemplary Response:

Effect of Friction on Distance Traveled

Y-axis: Distance Traveled (cm), marked 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100

X-axis: Surface of Ramp — Sand paper, Waxed Paper, Paint

6. Use the data from the data table and graph to write a conclusion for the experiment on friction.

_____

_____

_____

Key Element:
_____

Any valid conclusion consistent with the results in Table 1 (e.g., The more friction there was, the less distance the toy car traveled. The car traveled an average of 95 cm on the waxed paper but only 48 cm on the sandpaper.).

.
_____

Score Points:
1 Point   one key element
0 Points   no key elements

7. Identify two factors, other than those mentioned in the procedure, that should be held constant throughout the investigation.

    1._____

    2._____

Explain why these factors should be held constant.

Key Elements:

_____

Height of the ramp

_____

Measuring technique

_____

Method for releasing car

_____

Same car

_____

Other reasonable factor that could influence distance traveled

_____

AND

(why factors should be held constant)

All variables except the one being tested must be constant or the results will not be valid. (It will not be known which variable may have caused the results).

Any response indicating that if there were more than one variable, then they will not know what caused the effect.

_____

Score Points:	
3 points	two factors AND explanation
2 points	two factors OR one factor and explanation
1 point	one factor OR explanation
0 points	no key elements

Item #8

GLE(s):   **IN.1.A.8a**

Process Standard(s):   1.1

8. Carlos and Kim want to see if the mass of the car has an effect on the distance traveled.

Write a testable question for Carlos and Kim's new investigation.

_____

_____

_____

Key Elements:
_____

Any reasonable testable question about how the mass of the car may influence distance traveled that:
- Identifies what will be tested or measured
- Will generate quantifiable data
- Has a control or comparison inherent in the question

NOTE: The independent variable (IV; mass of car) and dependent variable (DV; distance traveled) must be identified in the question.

Examples Include:

- How does the mass of the car affect distance traveled?
- Will increasing the mass of the car change the distance traveled?
- Other testable question about the car's mass that may influence the distance traveled
_____

Score Points:
1 point   one key element
0 points   no key elements

9. Complete the table below to show the tools and metric units used in the new investigation.

	Tools	Metric Units
Mass of object		
Distance object traveled		

Key Elements:

_____

(mass of object) balance AND grams/g

_____

(distance traveled) meter stick AND centimeters/cm

_____

Score Points:
2 points   two key elements
1 point   one key element
0 points   no key elements