

Extended Response

1.2 The Scientific Methods 71.

You wish to perform an experiment on the stopping distance of your new car. Create a specific experiment to measure the distance. Be sure to specifically state how you will set up and take data during your experiment.

- a. Drive the car at exactly 50 mph and then press harder on the accelerator pedal until the velocity reaches the speed 60 mph and record the distance this takes.
- b. Drive the car at exactly 50 mph and then apply the brakes until it stops and record the distance this takes.
- c. Drive the car at exactly 50 mph and then apply the brakes until it stops and record the time it takes.
- d. Drive the car at exactly 50 mph and then apply the accelerator until it reaches the speed of 60 mph and record the time it takes.

72.

You wish to make a model showing how traffic flows around your city or local area. Describe the steps you would take to construct your model as well as some hypotheses that your model could test and the model's limitations in terms of what could not be tested.

- a. Testable hypotheses like the gravitational pull on each vehicle while in motion and the average speed of vehicles is 40 mph
- b. Non-testable hypotheses like the average number of vehicles passing is 935 per day and carbon emission from each of the moving vehicle
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73.

What would play the most important role in leading to an experiment in the scientific world becoming a scientific law?

- a. Further testing would need to show it is a universally followed rule.

- b. The observation would have to be described in a published scientific article.
- c. The experiment would have to be repeated once or twice.
- d. The observer would need to be a well-known scientist whose authority was accepted.

1.3 The Language of Physics: Physical Quantities and Units 74.

Tectonic plates are large segments of the Earth's crust that move slowly. Suppose that one such plate has an average speed of 4.0 cm/year . What distance does it move in 1.0 s at this speed? What is its speed in kilometers per million years? Report all of your answers using scientific notation.

- a. $1.3 \times 10^{-9} \text{ m}$; $4.0 \times 10^1 \text{ km/million years}$
- b. $1.3 \times 10^{-6} \text{ m}$; $4.0 \times 10^1 \text{ km/million years}$
- c. $1.3 \times 10^{-9} \text{ m}$; $4.0 \times 10^{-11} \text{ km/million years}$
- d. $1.3 \times 10^{-6} \text{ m}$; $4.0 \times 10^{-11} \text{ km/million years}$

75.

At $x = 3$, a function $f(x)$ has a positive value, with a positive slope that is decreasing in magnitude with increasing x . Which option could correspond to $f(x)$?

- a. $y = 13x$
- b. $y = x^2$
- c. $y = 2\log(x)$
- d. $y = \frac{3}{x}$