



Science Toolkit: Grade 5 Objective 1.C.1.a

Student Handout: Science: Grade 5 Objective 1.C.1.a

Standard 1.0 Skills and Processes

Topic C. Communicating Scientific Information

Indicator 1. Recognize that clear communication is an essential part of doing science because it enables scientists to inform others about their work, expose their ideas to criticism by other scientists, and stay informed about scientific discoveries around the world.

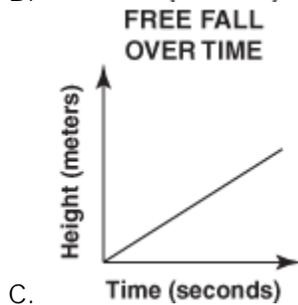
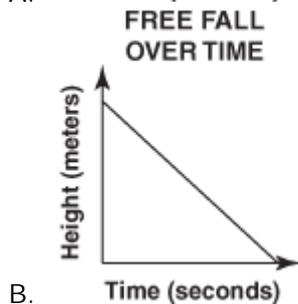
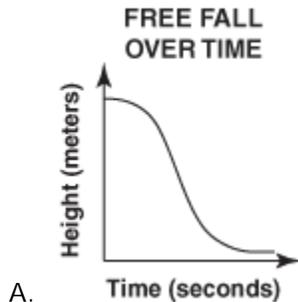
Objective a. Make use of and analyze models, such as tables and graphs to summarize and interpret data.

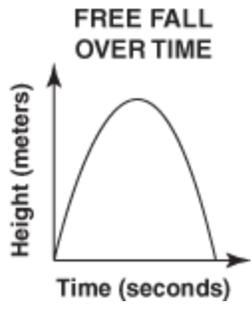
Selected Response (SR) Item

Question

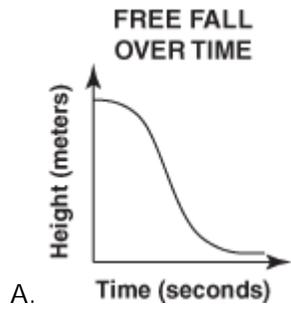
Read the passage '[Free Fall](#)' to answer the following.

Which graph best shows the motion of a car in a free-fall ride as the car drops?





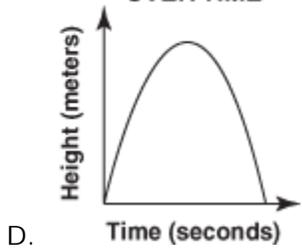
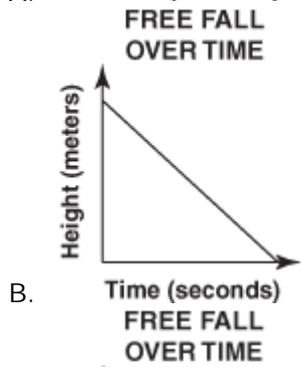
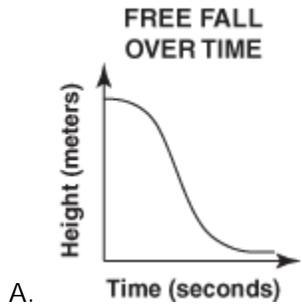
Correct Answer



Question

Read the passage '[Free Fall](#)' to answer the following.

Which graph best shows the motion of a car in a free-fall ride as the car drops?



Free Fall

Galileo first introduced the concept of free fall. His classic experiments led to the finding that all objects free fall at the same rate, regardless of their mass. According to legend, Galileo dropped balls of different mass from the Leaning Tower of Pisa to help support his ideas.

A freely falling body is an object that is moving under the influence of gravity only. These objects have a downward acceleration toward the center of the earth. Newton later took Galileo's ideas about mechanics and formalized them into his laws of motion.

Free-fall rides are really made up of three distinct parts: the ride to the top, the momentary suspension, and the downward plunge. In the first part of the ride, force is applied to the car to lift it to the top of the free-fall tower. The amount of force that must be applied depends on the mass of the car and its passengers. The force is applied by motors, and there is a built-in safety allowance for variations in the mass of the riders.

After a brief period in which the riders are suspended in the air, the car suddenly drops and begins to accelerate toward the ground under the influence of the earth's gravity. The plunge seems dramatic. Just as Galileo and Newton explain in their theories of free fall, the least massive and most massive riders fall to the earth with the same rate of acceleration. If the riders were allowed to hit the earth at that speed, coming to a sudden stop at the end of the ride, there would certainly be serious injuries. Ride designers account for this by building an exit track. The car is attached to this track, which gradually curves toward the ground. A stretch of straight track allows the car to slow down and brake, producing a controlled stop at the bottom, that keeps passengers from getting injured.

Amusement Park Physics: Free Fall

"Free Fall" from *Amusement Park Physics* at www.learner.org, Annenberg Media, ©1997.