

NAME _____

DATE _____

Scenario

Angela is standing on a very low-friction skateboard while Blake pushes her away from the motion detector, which is set to record velocity as a function of time. In Trial 1, Blake pushes softly. In Trial 2, Blake pushes harder, and in Trial 3, Blake pushes Angela the hardest.

Analyze Data

PART A: Use the data provided by the motion detector to find a pattern between the change in Angela's motion and the interaction with Blake. Fill in the blanks.

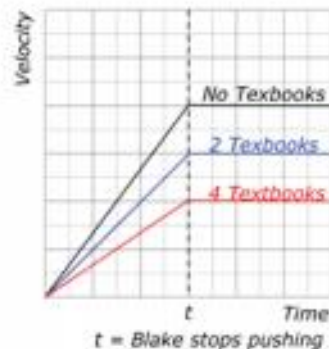
When Blake pushes harder, the slope of the velocity vs. time line **increases**.

Since the slope **represents the acceleration**, the acceleration is **larger**.

When Blake stops pushing, the slope of the velocity vs. time line becomes **zero**. Since the slope is now **zero**, this means that the acceleration is also **zero**.

**Using Representations**

PART B: The students then repeat the experiment, this time with Angela holding two textbooks and then four textbooks. Sketch a diagram of the velocity vs. time for Angela with two and then four textbooks. Blake pushes with the same force every time. The velocity of Angela without textbooks is already sketched.

**Argumentation**

PART C: The following statement is written to describe what will happen after the first 5 seconds when Blake is no longer pushing. Cross out any incorrect statements and explain why they are incorrect. (Use the checklist to help you check your own writing! After you have written your answer, make sure that you can check off the statements in the list, or revise your answer!)

~~"After Blake stops pushing, Angela will travel at a constant speed for a few seconds before she runs out of force. Then she will decelerate and stop."~~

Assuming that friction can be neglected, Angela will continue at a constant speed after Blake stops pushing. Her velocity will not change until another force is exerted on her like friction, air resistance, or a wall.

Checklist:

- I answered the question directly.
- I stated a law of physics that is always true.
- I connected the law or laws of physics to the specific circumstances of the situation.
- I used physics vocabulary (force, mass, acceleration, velocity, constant, changing).