

Student Handout: Newton's Second Law: Force, Velocity and Acceleration

#19

The goals of this activity are to understand how the motion shown in the drawings relates to velocity, whether or not the velocity is changing (acceleration) and what forces are causing the acceleration.

Procedure: Action Force

Look at the six cartoons on this page. There are three cartoons that show different ways that a girl can throw a ball, and three cartoons that show different motions of a car. For each cartoon, answer the following on a separate sheet of paper:

- What type of motion does each cartoon represent?
- As time passes, does the velocity increase, decrease or stay the same in each cartoon?
- As time passes, is the ball or car accelerating, decelerating or is the acceleration equal to zero?
- What forces are acting in each cartoon and what is the effect of these forces?

Example answers for Cartoon 1:

- Girl is dropping a ball straight down.
- Velocity is increasing
- Ball is accelerating
- Gravity is acting on the ball to speed up its fall.

Cartoons



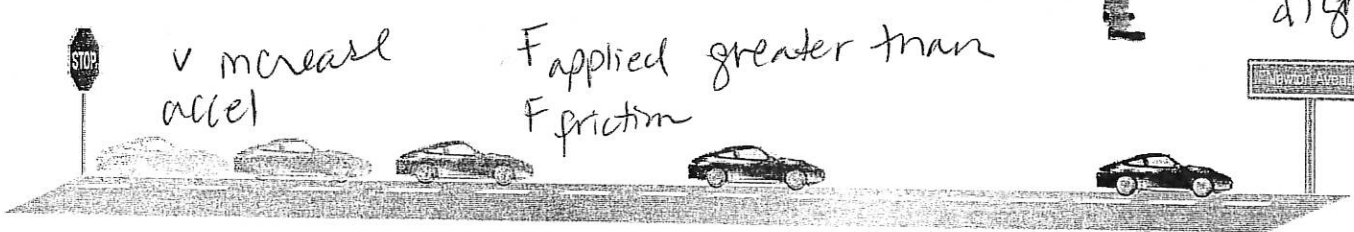
- Drop
- V increase
- accel
- gravity



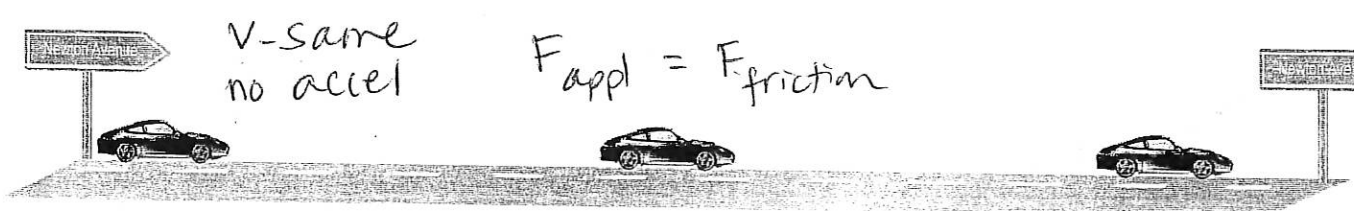
- Throw up
 - decrease
 - decel
 - gravity
- Applied by hand



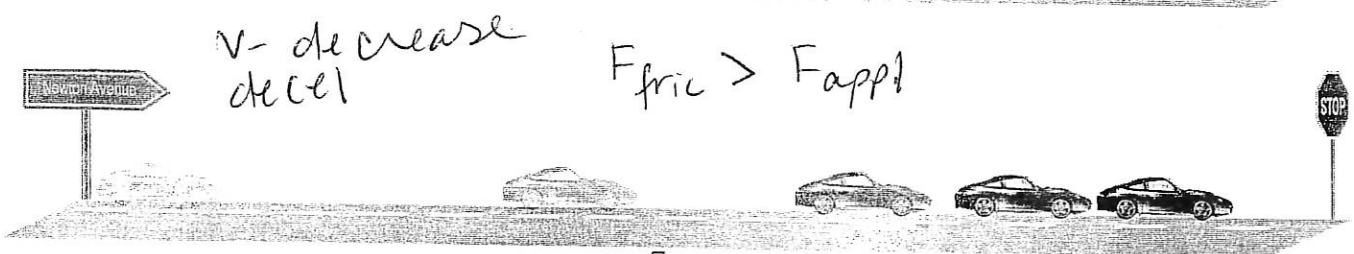
- Throw horizon
 - horiz. - same
 - vert - accel
 - gravity
- Applied



- v increase
accel
- $F_{\text{applied}} > F_{\text{friction}}$



- v - same
no accel
- $F_{\text{applied}} = F_{\text{friction}}$

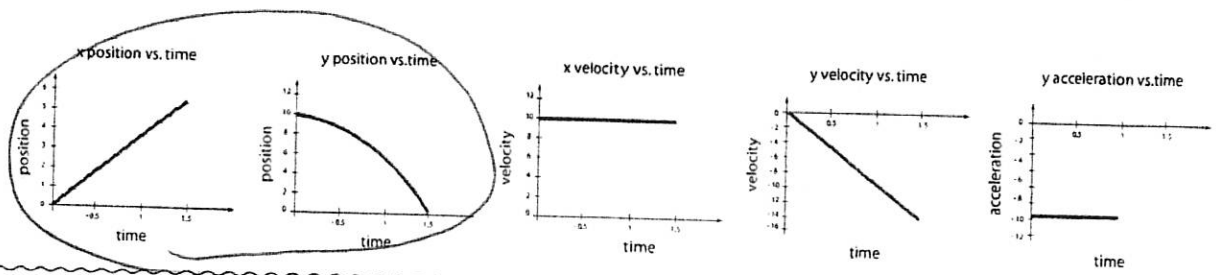


- v - decrease
decel
- $F_{\text{fric}} > F_{\text{applied}}$

Write your answer in the gray box below with the cartoon number that corresponds to the correct set of graphs. [Note: you may want to place the two pages together to help you do the comparison.]

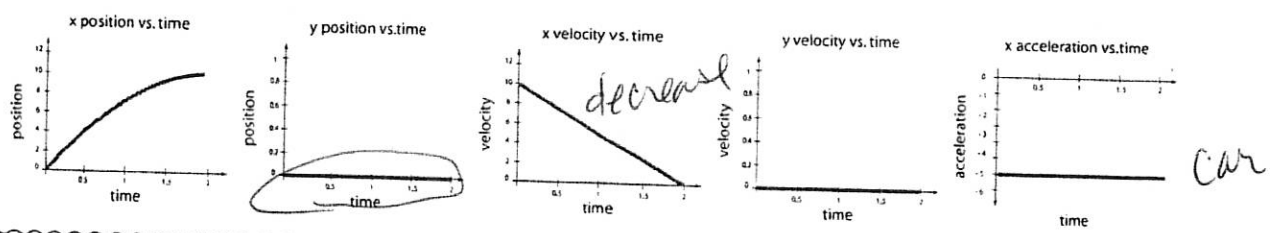
A

3



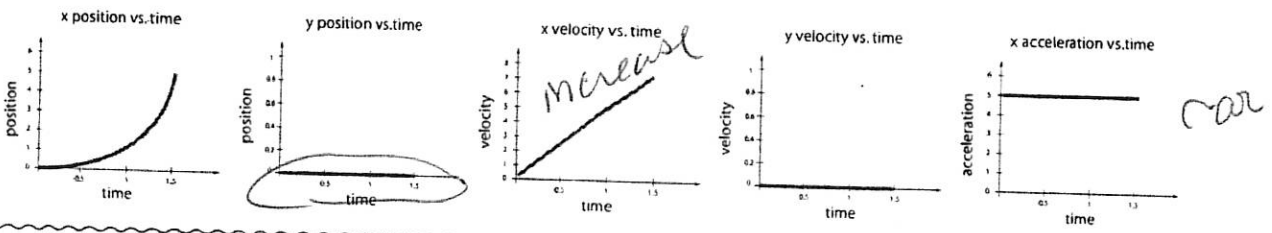
B

6



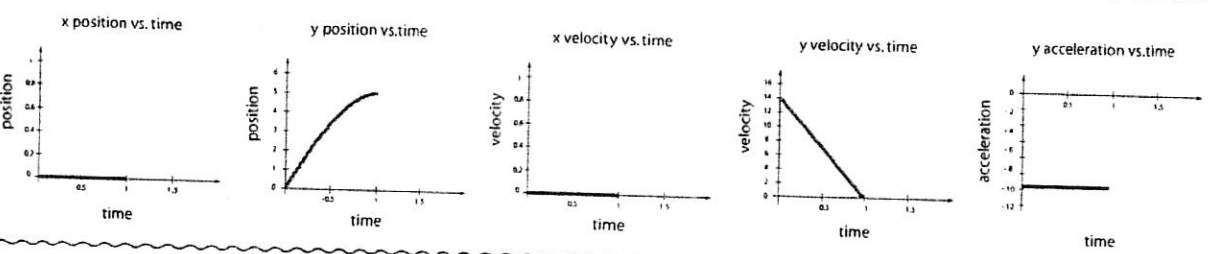
C

4



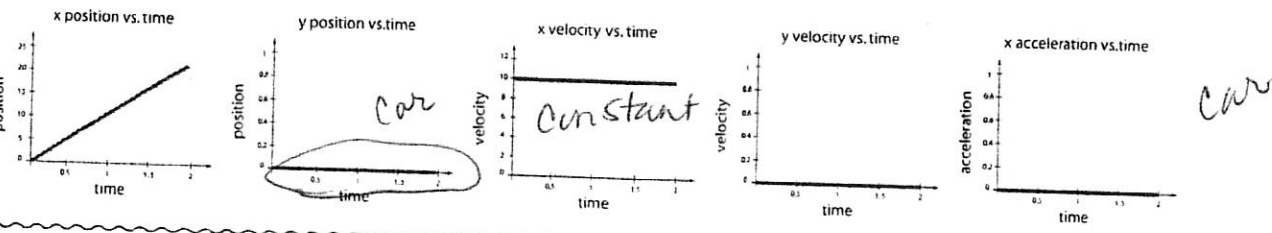
D

2



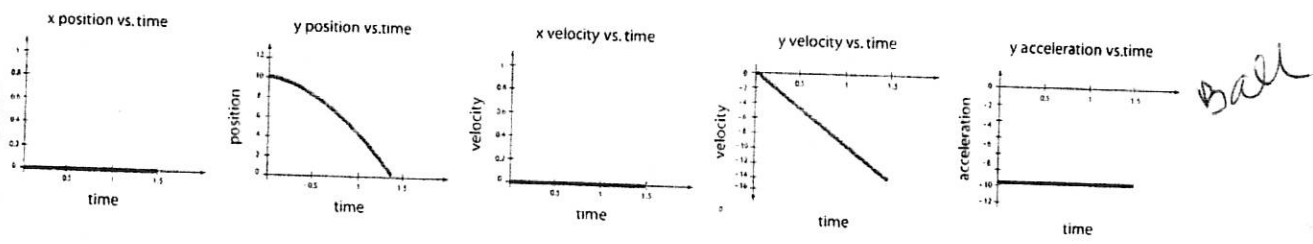
E

5



F

1



Name: _____

Date: _____

Period: _____