Acceleration due to Collision

Apparatus

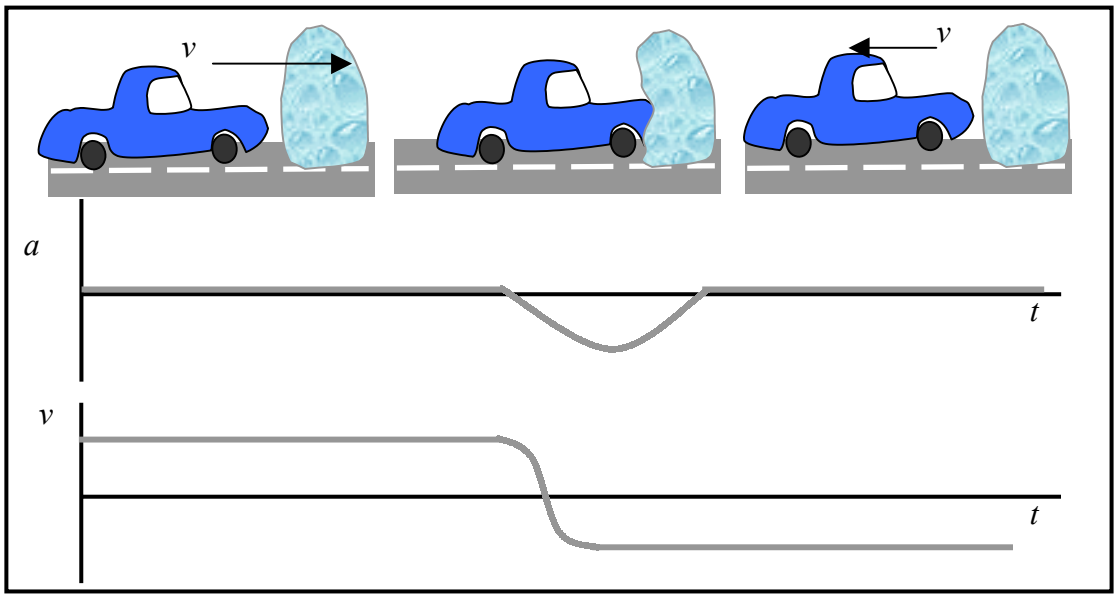
toy car, sponge

Action

The students roll the toy car at the sponge (not too quickly), and observe how it is slowed and then bounces back. They describe the collision in terms of velocity and acceleration and sketch the acceleration as a function of time. Note they should define a positive direction, for convenience this can be towards the sponge.

The Physics

The toy car initially has a positive velocity. It's velocity decreases as it is slowed down by the impact with the sponge. The velocity decreases to zero as the car comes to a halt. As the car begins to bounce back the velocity increases in magnitude, but is negative because the car is now moving in the negative direction. The change in velocity is always negative throughout the collision, hence the acceleration is always negative.



Accompanying sheet

Acceleration due to Collision

Define a positive direction.
Send the toy car into the sponge, so that it bounces back.

Describe what happens in terms of the velocity and acceleration of the car.

Sketch the acceleration of the car as a function of time.