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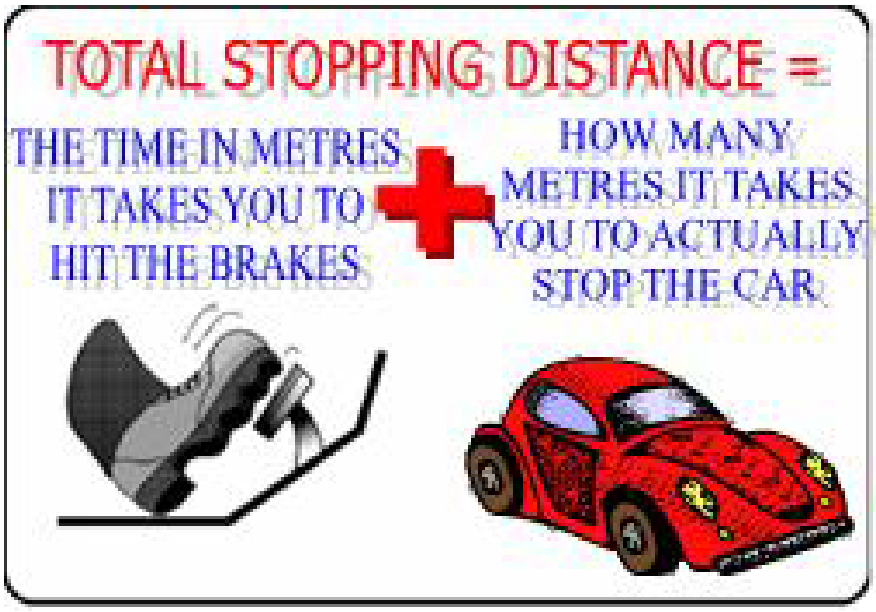
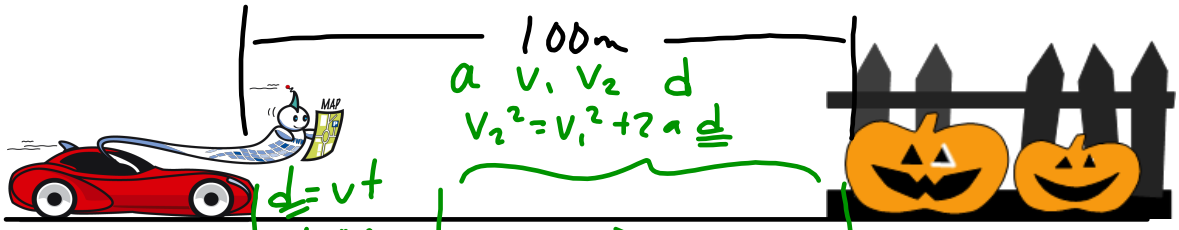
Stopping Distances
Sim Objective: Learn that stopping distances can vary depending on frictional forces, speed of an object and mass.
You are presented with a road on which there is a shopping trolley.
Select a vehicle by clicking on the car or lorry.
Then, select a surface on which they can stop safely at the stop sign, without skidding and hitting the trolley.
Begin
SMART Technologies Inc.
Supporting Education

Reaction Time Activity

focused/distracted

ttp://www.schooltube.com/video/4386d84344d2a7345c5e/ATT-The-Last-Text-Documentary


TOTAL STOPPING DISTANCE =
THE TIME IN METRES IT TAKES YOU TO HIT THE BRAKES
+
HOW MANY METRES IT TAKES YOU TO ACTUALLY STOP THE CAR



$a = -8.3\ m/s^2$

$V_1 = \frac{60}{3.6}\ km/h$

$V_1 = 16.7\ m/s$

drivers reaction time = 0.8 s

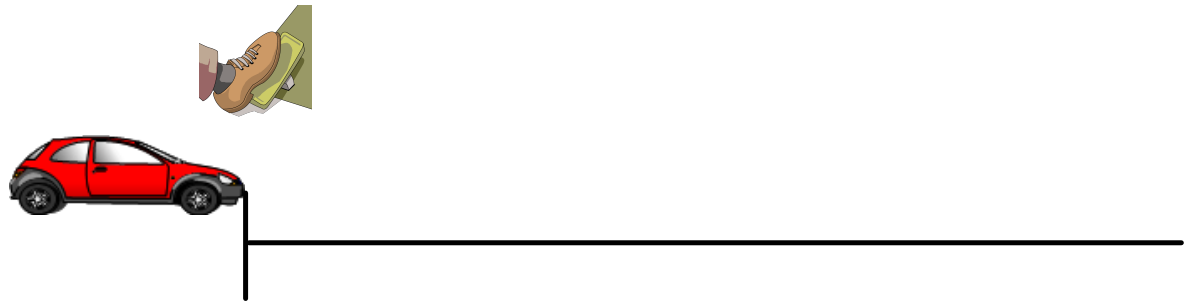
$\vec{a}$

(UM) $d = vt \rightarrow (16.7)(0.8)$

$d = 13.36\ m$

$d = 30.16\ m$

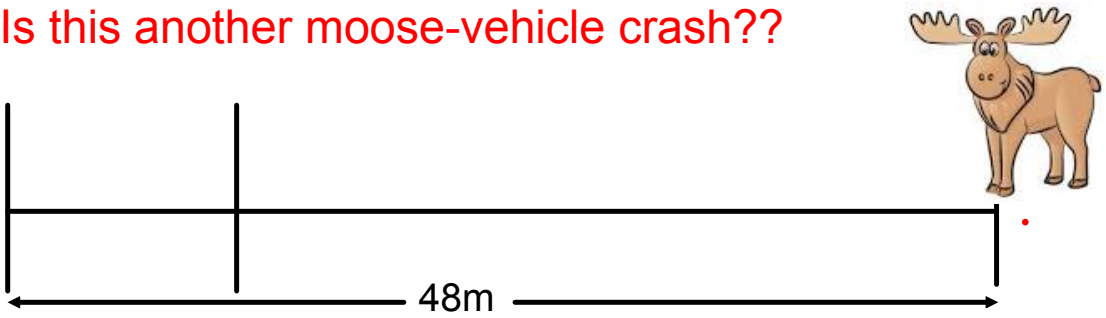
$d = 16.8\ m$



Ford Focus: stopping distance of 52.7m when travelling at 112 km/h.

What is the driver's reaction time if it actually takes 60m to come to a stop?

Is this another moose-vehicle crash??



v_1=110km/h

$t_{reaction}$ = 0.68s

a = -8.9m/s^2

1. What is the stopping distance of a Toyota Celica ($a = -9.2\ m/s^2$) from 97 km/h where the driver has a reaction time of 0.55 s?

2. An automobile is travelling at 25 m/s on a country road when the driver suddenly notices a cow in the road 30 m ahead. The driver attempts to brake the automobile but the distance is too short. With what velocity would the car hit the cow if the car decelerated at $7.84\ m/s^2$ and the driver's reaction time was 0.75 s?

60

$v_1 = 10$

$v_2 = -20$

$a = -9.8$

$d = ?$

$t = ?$

$v_2^2 = v_1^2 + 2ad$

$-20^2 = 10^2 + 2(-9.8)d$

$400 = 100 - 19.6d$

$\frac{300}{-19.6} = \frac{-19.6d}{-19.6}$

$-15.3\text{m} = d$

$v_2 = v_1 + at$

$-20 = 10 + (-9.8)t$

$\frac{-20-10}{-9.8} = \frac{-9.8t}{-9.8}$

$3.1\text{s} = t$

63.

$a = -20 \frac{km/h}{s} \Rightarrow -5.5 \frac{m/s}{s}$ $V_2^2 = V_1^2 + 2ad$

d

$V_1 = 50 km/h \Rightarrow 13.88 m/s$

$V_2 = 5 m/s$ ✓

$5^2 = 13.88^2 + 2(-5.5)d$

$25 = 192.93 + (-11)d$

$\frac{25 - 192.93}{-11}$ $d = 15m$