Chapter 5 of MHR (Page 152)

Isaac Newton

(1642-1727)

Inertia and Newton's First Law

NEWTON'S FIRST LAW — THE LAW OF INERTIA

An object at rest or in uniform motion will remain at rest or in uniform motion unless acted on by an external force.

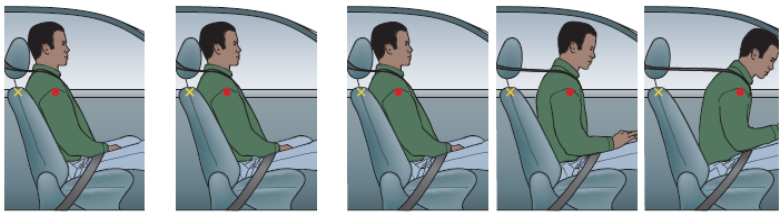
A few demos:

Read MHR: Pg 154 - 155

INERTIAL AND NON-INERTIAL FRAMES OF REFERENCE

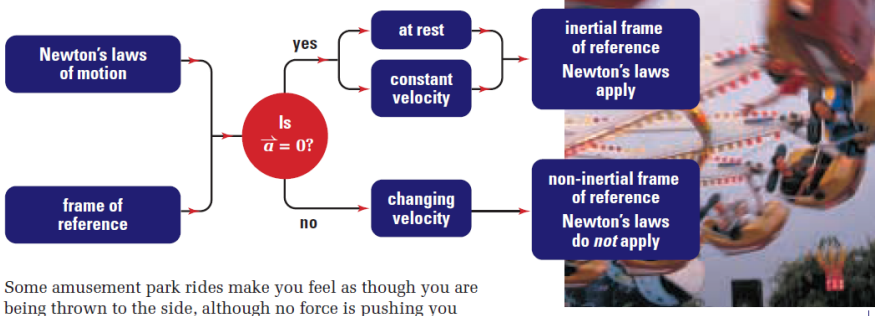
An inertial frame of reference is one in which Newton's laws of motion are valid. Inertial frames of reference are at rest or in uniform motion, but they are not accelerating.

A non-inertial frame of reference is one in which Newton's laws of motion are not valid. Accelerating frames of reference are always non-inertial. (rotating frames of reference are accelerating)



Relative to inside the car, what force caused the passenger to accelerate forward?

Concept Organizer



Some amusement park rides make you feel as though you are being thrown to the side, although no force is pushing you outward from the centre. Your frame of reference is moving rapidly along a curved path and therefore it is accelerating. You are in a non-inertial frame of reference, so it seems as though your motion is not following Newton's laws of motion.

Close read MHR Pg. 156 - 157, conceptual problems on page 158.

* Newton's Laws of motion do not apply at the atomic level.

5.3 Reaction Forces and Newton's Third Law

NEWTON'S THIRD LAW

For every action force on object B due to object A, there is a reaction force, equal in magnitude but opposite in direction, due to object B acting back on object A.

$$\vec{F}_{\text{A on B}} = -\vec{F}_{\text{B on A}}$$

A few qualitative examples.

Close read MHR Pg. 177 - 179.

Attachments

forces-and-motion-basics_all.jar

forces-1d_all.jar