



Motion? No motion? ... or it depends?

For many years, British driver Lewis Hamilton and German Sebastian Vettel have shared the limelight at Formula 1 Grands Prix.



Document: View of Sebastian Vettel's cockpit



This photograph is a screen capture of a video made by an onboard camera inside Sebastian Vettel's car. The halo displaying speed values, gear ratios and engine rpm information, as well as gas pedal and brake pedal use, is an overlay offered by TV channels to help them follow the Grand Prix.

Questions

1. Give the example of a stationary object and a moving object for a spectator sitting in the grandstand at a Formula 1 Grand Prix.
2. Give the example of a stationary object and a moving object for Lewis Hamilton during a Formula 1 Grand Prix.

A frame of reference is the “location” from which a motion is studied. It's a reference solid, to which we associate a space coordinates system and a clock.

3. Indicate in which frame of reference the value of the speed indicated by the speedometer of Sebastian Vettel's car in document 1 was measured.
4. Is there a frame of reference in which Sebastian Vettel's car has zero speed? If so, which one?
5. Is there a frame of reference in which Sebastian Vettel's car has a different speed? If so, give an example.
6. Is a spectator sitting in the stand motionless? Justify your answer.