

## Stopping Einstein's train and re-teaching time dilation

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### Abstract

*Are you a physics teacher? So read this article carefully. Sorry, there has been wrong teaching for over a hundred years. The cause of time dilation is not the invariance of the speed of light. The cause is another. It is necessary to change teaching. IF WE STUDY THE EINSTEIN TRAIN STOPPING AND STARTING THE MOVEMENT WE WILL UNDERSTAND THAT IT IS NOT THE LIGHT THAT SLOWS THE TIME ON THE WATCH.*

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To teach time dilation Einstein showed the example of a train.

For the observer inside the train traveling along with the beam of light from a lantern fixed to the train floor, the beam of light in vertical motion bounces off a fixed mirror on the roof of the car and is reflected back to the lantern also in a vertical line.

For the observer inside the train, it doesn't matter if the train is stopped or at very high speed: the beam of light will always travel the same distance from the lantern to the mirror and back to the lantern.

Einstein's explanation for teaching time dilation is given when the train is moving. He shows that when the train moves, the observer inside the train continues to see the same distance covered by the light beam from the lantern to the ceiling mirror and back to the lantern. This is true. Einstein continues to teach that the observer at rest outside the train sees the light from the lantern go up on a diagonal and after bouncing off the mirror go back on another diagonal to go back and reach a lantern that is already far away and thus the beam of light for the external observer and at rest it forms two hypotenuses one going up to the mirror and the other going down to the lantern. This is true. We agree that the observer at rest outside the train sees the light travel a far greater distance than the distance seen by the observer inside the train. With this demonstration Einstein teaches that time the observer's clock inside the train records less time than the observer's clock at rest outside the

train. This is true because the distances traveled by the light were different for the two observers.

Please reason now: does light because it has a constant speed and is the same for all observers, does it have any power to act on observers' clocks? I repeat the question: does light have any power or force to act on observers' clocks? Answer me please.

Of course not, light is only used for the mathematical calculation of time  $t$ , but it does not act on the clock turns, no, no, no.

So why, when comparing the observer's clock inside the train with the observer's clock at rest outside the train, are the two clocks out of date? Why is the observer's clock inside the train delayed and the observer's clock resting outside the train is in advance? We understand that it is not the invariance of light that affects the turns of the clocks. So what is the cause that causes the watches to become out of sync?

**TO UNDERSTAND WE HAVE TO STOP THE EINSTEIN RELATIVITY TRAIN AND CHANGE THE TEACHING OF TIME DILATATION**

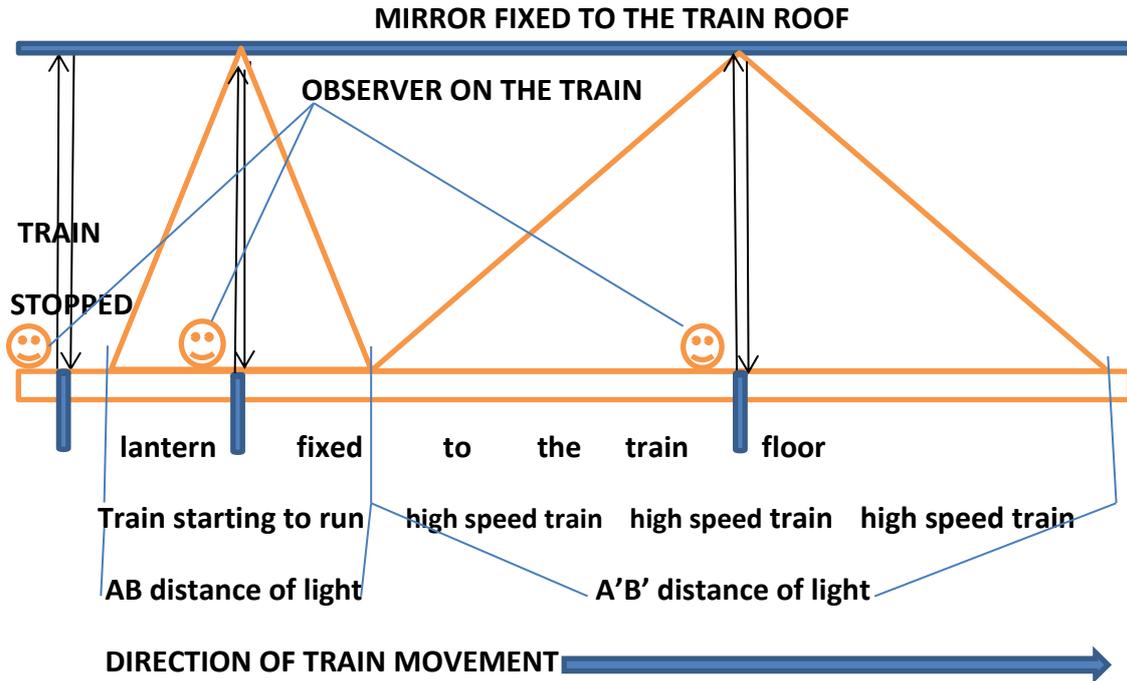
Pay attention now please: At the beginning, if the train is stopped the distance covered by the beam of light seen by the observer inside the train is the same distance seen by an observer standing at rest outside the train. With the train stopped, the observer's clock inside the train and the observer's clock outside the train are set and synchronized there isn't time dilation. Remember when the train was stopped the distance traveled by light to the observers inside the train and outside was the same. When the train moved, the speed of light did not change, but the distance traveled by it increased for the outside observer, so it is the movement of the train that causes time dilation. When the train starts to move, the observer's clock inside the train starts to slow down. Increasing the speed of the train will further delay the clock compared to the watch of the observer outside the train. Why does time dilation in watches occur if the invariance of light is not the physical cause of the phenomenon? The cause is the movement of the train or the speed of the train. Higher train speed means greater clock delay on the train. However, something else occurs. The train's speed produces kinetic energy. Kinetic energy produces INERTIA (It was Einstein who taught that energy has inertia like matter has).

According to Newton's first law, "inertia is the opposition or resistance that matter makes to change its state of rest or movement".

The greater or lesser inertia in the clocks due to their movements hinders or facilitates their turns more or less. Inertia is the cause of time dilation in watches; not the light. Sorry friends.

To better understand the text, see the illustration on the next page.

## Stopping Einstein's train and re-teaching time dilation



OBSERVER AT REST OFF THE TRAIN. He sees the train stopped first and then moving

To calculate the time dilation use the Lorentz equation shown here. The movement of the train or any other vehicle is the "v" square. But you know, what dilates time on clocks is Newton's inertia.

$$\Delta t = \frac{\Delta t_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

observer's watch on the train affected by high inertia      observer's watch at rest

train speed square

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More:... Gravitational field also affects the clock due to the inertia caused by the weight and affects the clock by registering the time dilation. But the observation is only on the spot.