

Vocabulary: Special Relativity

- Aether – according to 19th century physicists, a mysterious substance that fills space and supports the motion of *electromagnetic waves*.
 - Aether does not exist.
- Electromagnetic wave – a wave that consists of oscillating perpendicular electric and magnetic fields.
 - In a vacuum, electromagnetic waves travel at the speed of light.
 - Electromagnetic waves vary in their frequency.
 - From highest to lowest frequency, the *electromagnetic spectrum* includes gamma rays, X-rays, ultraviolet rays, visible light, infrared radiation, microwaves, and radio waves.
- Frame of reference – the background or an object that is assumed to be stationary when measuring motion.
 - The frame of reference may also refer to the coordinate system used to measure motion.
- Inertial frame of reference – a frame of reference that is moving at a constant velocity relative to other inertial frames of reference.
 - Although it is often used as a frame of reference, Earth is not an inertial frame of reference because it is constantly accelerating due to its rotation.
 - Inertial frames of reference are also called *inertial reference frames*.
- Length contraction – the apparent shortening of moving objects as measured by a stationary observer.
- Principle of relativity – the law that states that all physical laws are the same in any inertial frame of reference.
 - According to the principle of relativity, all inertial frames of reference are equally valid.
 - The principle of relativity is also known as *Galilean relativity*.
- Special relativity – a theory that assumes the speed of light in a vacuum is constant in all reference frames, and that all inertial reference frames are equally valid.
 - According to the theory of special relativity, a moving object will contract and increase in mass as measured by a stationary observer. In addition, stationary observers will see moving clocks run more slowly than stationary clocks.
- Time dilation – the slowing of time on moving objects as measured by a stationary observer.

