



The Michelson–Morley Experiment

Checklist statement

✓

I can describe the principle of the Michelson–Morley interferometer.

I can outline how the experiment was used to attempt to detect absolute motion.

I can explain the significance of the failure to detect absolute motion.

I can explain how the Michelson–Morley experiment supports the invariance of the speed of light.

Einstein's Theory of Special Relativity

Checklist statement

✓

I can define what is meant by an inertial frame of reference.

I can state the two postulates of Einstein's theory of special relativity.

I can explain that the laws of physics have the same form in all inertial frames of reference.

I can explain that the speed of light in free space is invariant.

Time Dilation

Checklist statement

✓

I can define proper time.

I can explain time dilation as a consequence of special relativity.

I can apply $t = \frac{t_0}{\sqrt{1 - \frac{v^2}{c^2}}}$, define all terms and know their standard units.

I can describe evidence for time dilation using muon decay.

Length Contraction

Checklist statement ✓

I can explain length contraction for an object moving at speed v .

I can apply $l = l_0 \sqrt{1 - \frac{v^2}{c^2}}$, define all terms and know their standard units.

Mass and Energy

Checklist statement ✓

I can explain the equivalence of mass and energy.

I can apply $E = mc^2$, define all terms and know their standard units.

I can apply $E = \frac{mc^2}{\sqrt{1 - \frac{v^2}{c^2}}}$, define all terms and know their standard units.

I can interpret graphs showing how mass and kinetic energy vary with speed.

I can describe Bertozzi's experiment as evidence for the variation of kinetic energy with speed.