



## 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.

☐