

62.4: An Example

✓ Example 62.4.1

As an example, let's imagine that a spacecraft is launched at high speed relative to the nearest star, Alpha Centauri (which is about 4 light-years away). The ship travels at 80% of the speed of light during the trip. From Earth, we see that the whole trip takes 5 years. We also see the astronaut's clocks running more slowly than ours by a factor of $\gamma = 2.78$, so that when the astronauts arrive, they are only 1.8 years older.

What do the astronauts see from their point of view on the spacecraft? Their clocks run at what seems a normal rate for them, but they see that the distance to Alpha Centauri has been length-contracted by a factor of $\gamma = 2.78$. They're traveling at a speed of $0.80c$, but they only have to travel a distance of $(4 \text{ light-years}) / \gamma = 1.44 \text{ light-years}$. When they arrive at Alpha Centauri, they're older by $(1.44 \text{ light-years}) / 0.80c = 1.8 \text{ years}$.

In summary, observers on Earth see the astronaut's clocks moving more slowly, but the astronauts have to travel the full 4 light-years. The astronauts see their clocks moving at normal speed, but the distance they have to travel is shorter. All observers agree that the astronauts are only 1.8 years older when they arrive.

62.4: An Example is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by LibreTexts.