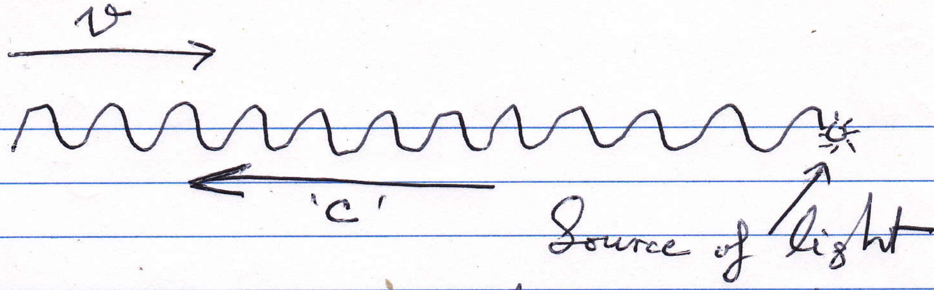

We assume the velocity of the source of light and that of the medium of space to be zero

The relative velocity is $c + v$ in the case above.

f_0 = frequency of light from the source

λ_0 = wavelength of light from the source.

$$c = f_0 \lambda_0$$
$$c + v = f \lambda_0$$

} the object moving toward the source encounters more crests of the wave

$$\frac{c+v}{c} = \frac{f \lambda_0}{f_0 \lambda_0} = \frac{f}{f_0}$$

or, $$1 + \frac{v}{c} = \frac{f}{f_0}$$

or, $$\frac{v}{c} = \frac{f}{f_0} - 1 = \frac{f - f_0}{f_0} = \frac{\Delta f}{f_0}$$

Then, $$v = \frac{\Delta f}{f_0} \cdot c$$

or, $$\boxed{v = \Delta f \cdot \lambda_0}$$

Velocity of an object in space relative to another object is equal to the product of frequency shift and original wave-length of light

Thus, velocity will also depend on the wave length of light.