Acceleration

Chapter 5.1c

Acceleration: The rate at which velocity changes.

Speeding up $\rightarrow$ positive acceleration

Slowing down $\rightarrow$ negative acceleration (deceleration)

Calculating Acceleration

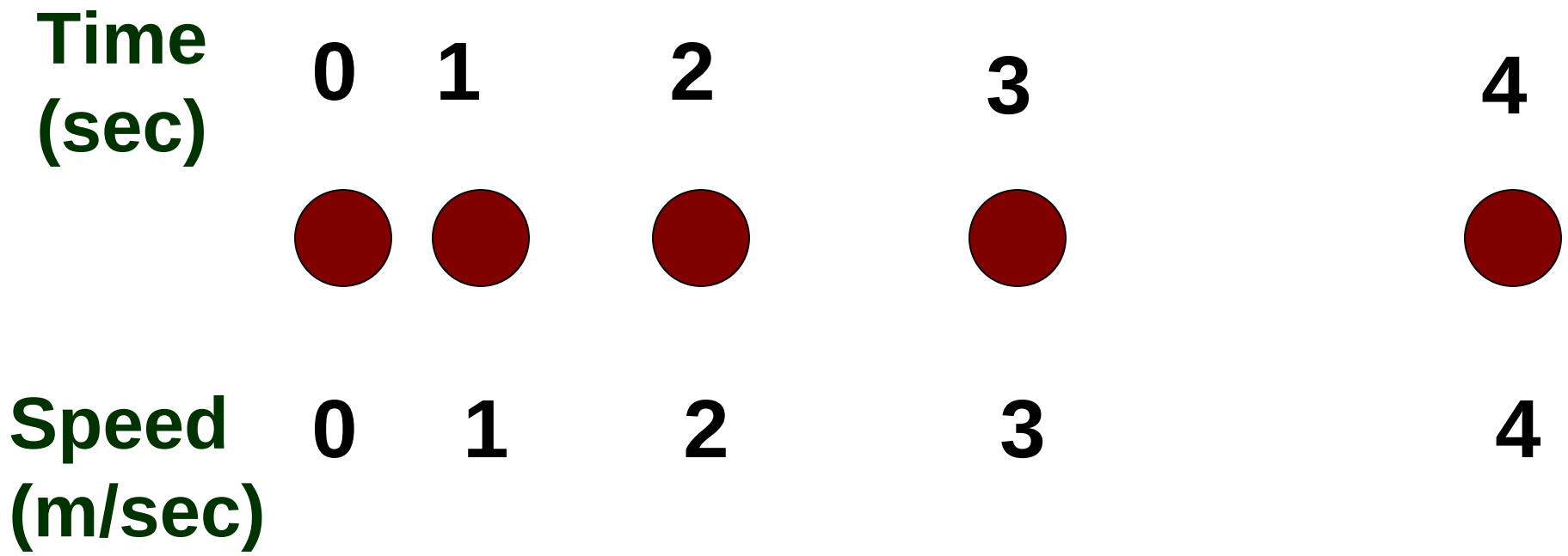
$$\text{Acceleration} = \frac{\Delta \text{Velocity}}{\Delta \text{Time}}$$

$$= \frac{(\text{Velocity}_{\text{final}} - \text{Velocity}_{\text{initial}})}{(\text{Time}_{\text{final}} - \text{Time}_{\text{initial}})}$$

What is the school bus's acceleration if it takes 10 seconds to reach a speed of 50 m/sec from a stop?

$$\text{Acceleration} = \frac{(\text{Velocity}_{\text{final}} - \text{Velocity}_{\text{initial}})}{(\text{Time}_{\text{final}} - \text{Time}_{\text{initial}})}$$

$$= \frac{50\frac{\text{m}}{\text{sec}} - 0\frac{\text{m}}{\text{sec}}}{10\text{sec} - 0\,\text{sec}} = \frac{50\frac{\text{m}}{\text{sec}}}{10\text{sec}} = \boxed{5\frac{\text{m}}{\text{sec}^2}}$$



$$\text{Acceleration} = \frac{(\text{Velocity}_{\text{final}} - \text{Velocity}_{\text{initial}})}{(\text{Time}_{\text{final}} - \text{Time}_{\text{initial}})}$$

$$= \frac{4\frac{\text{m}}{\text{sec}} - 0\frac{\text{m}}{\text{sec}}}{4\text{sec} - 0\,\text{sec}} = \frac{4\frac{\text{m}}{\text{sec}}}{4\text{sec}} = 1\frac{\text{m}}{\text{sec} \bullet \text{sec}}$$