Acceleration (SwiftStudy Printable)

Key Formulas

$$a = \frac{\Delta v}{\Delta t}$$

a	average acceleration	m/s^2
Δv	change in velocity	m/s
Δt	elapsed time	s

$$a = \frac{v_f - v_i}{\Delta t}$$

a	average acceleration	m/s^2
v_f	final velocity	m/s
v_i	initial velocity	m/s
Δt	elapsed time	s

Tips to Remember

- Use the second formula when you have the beginning and ending velocity. Use the first formula (with the Δv) when you care how much the velocity **changes**, but you don't know the starting or ending velocities. (e.g., "How much faster is the ball going after three seconds?")
- Watch for cases where v_i or v_f is implicity given to be zero. For example, "comes to a stop" indicates that v_f is zero. Similarly, "a ball is dropped" (rather than thrown) usually indicates that v_i is zero.
- Objects whose velocity is decreasing have negative acceleration. Therefore, words such as "a car skids, decelerating at 6 m/s^2" often mean that the acceleration is actually -6 m/s^2. Just don't assume that negative acceleration **always** means that something is slowing down. Changing from -5 m/s to -10 m/s is a negative acceleration since the velocity is decreasing (getting more negative), but the object is moving faster, not slower.
- Some texts will use the units m/s/s for acceleration instead of m/s^2, since the acceleration unit comes from velocity units (m/s) divided by time units (s). While most physics texts use m/s^2, math texts often use m/s/s.