Flipping Physics Lecture Notes:
A Basic Acceleration Example Problem and Understanding Acceleration Direction

Example Problem: Mr.p is riding his bike at -14.3 km/hr when he begins pedaling the bike to cause a constant acceleration. If, after 6.4 seconds, the bike is moving at -23.7 km/hr, what was the acceleration of the bike?

Knowns: $v_i = -14.3 \dfrac{km}{hr} \times \dfrac{1hr}{3600s} \times \dfrac{1000m}{1km} = -3.97\overline{2}\dfrac{m}{s}$; $v_f = -23.7\dfrac{km}{hr} \times \dfrac{1hr}{3600s} \times \dfrac{1000m}{1km} = -6.58\overline{3}\dfrac{m}{s}$;

$\Delta t = 6.4s$; $a = ?$

$$a = \frac{\Delta v}{\Delta t} = \frac{v_f - v_i}{\Delta t} = \frac{-6.58\overline{3} - (-3.97\overline{2})}{6.4} = -0.407986\,\overline{1} \approx \boxed{-0.41\frac{m}{s^2}}$$

Common Question: If the bike is "speeding up" how can the acceleration be negative?

If an object is "speeding up" that means the magnitude of the velocity is increasing. That means that the acceleration and the velocity will be in the same direction. In other words, if the velocity is negative and the object is speeding up, then the acceleration will also be negative. People are usually used to having positive velocities and therefore a negative acceleration would be opposite the velocity and the object would be slowing down.