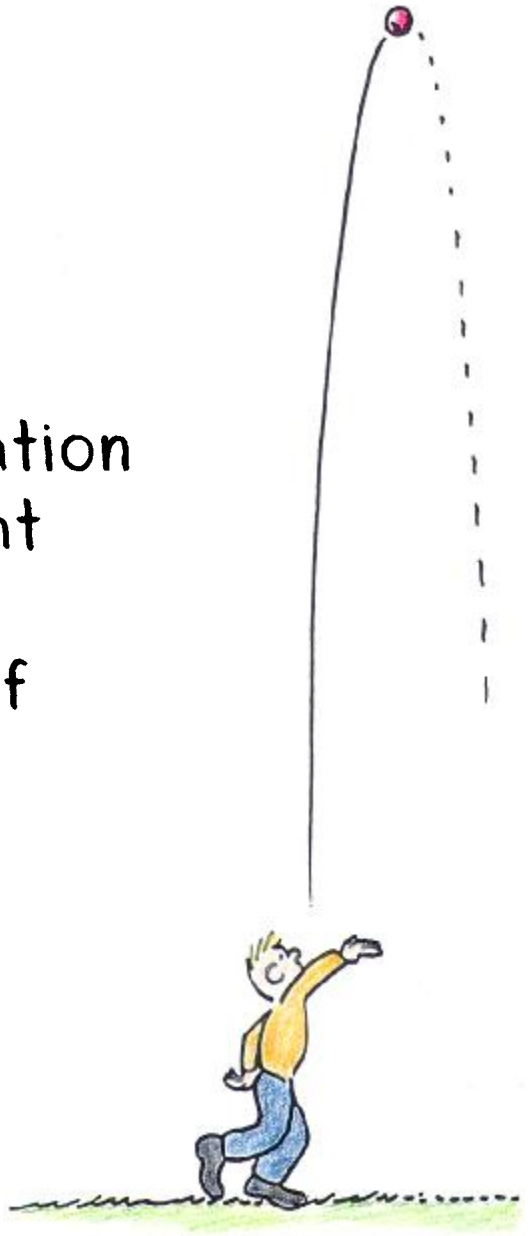
NEXT-TIME QUESTION

CONCEPTUAL Physics

What will be the acceleration of a rock thrown straight upward at the moment it reaches the tippity-top of its trajectory?



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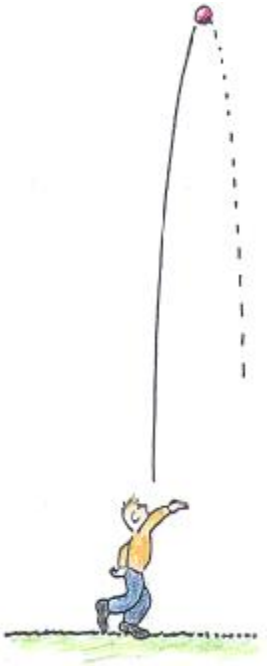

Answer:

Although its speed and velocity at the top will both instantaneously be zero, its acceleration will be g, or 9.8 m/s^2. Remember, acceleration is not speed or velocity—it is the rate at which velocity changes. A moment before or after the rock reaches the top, it is moving, which is evidence that its velocity is changing at every instant. The rock undergoes a change as it passes through the zero value of velocity just as it undergoes the same rate of change passing through any other value of velocity. Or look at it via Newton's 2nd law. At the top or anywhere in its path, the rock has both weight and mass, and

$$a = \frac{F}{m} = \frac{mg}{m} = g .$$