Impulse-Momentum for Rigid Bodies: Exercise 3
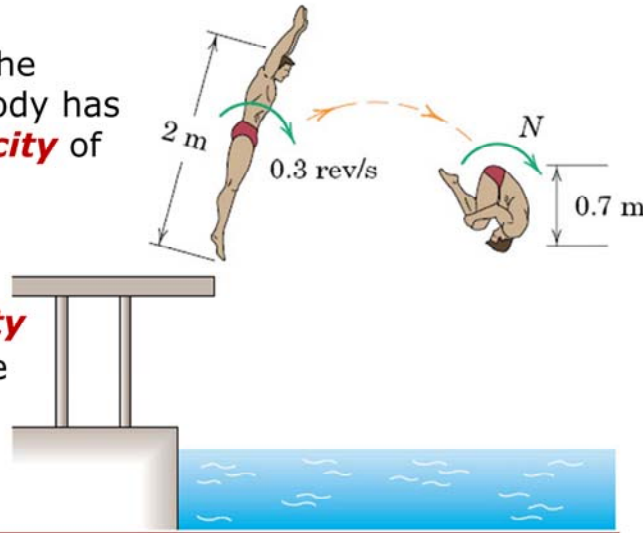
Fully extended the diver's **80-kg** body has a **angular velocity** of **0.3 rev/s**.

2 m

0.3 rev/s

N

0.7 m

Determine the **angular velocity** N later when the diver assumes a tuck position.

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6/190 Approximate the diver's body as a uniform slender bar in the first case and as a sphere in the second case. Conservation of angular momentum $H_1 = H_2$:

$$\tfrac{1}{12} m \ell^2 N_1 = \tfrac{2}{5} m r^2 N_2$$

$$\tfrac{1}{12}(2)^2 (0.3) = \tfrac{2}{5}\left(\tfrac{0.7}{2}\right)^2 N_2$$

$$\underline{N_2 = 2.04 \text{ rev/s}}$$