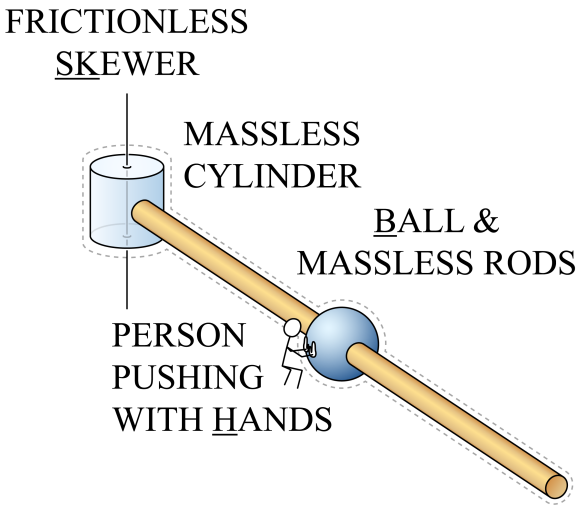
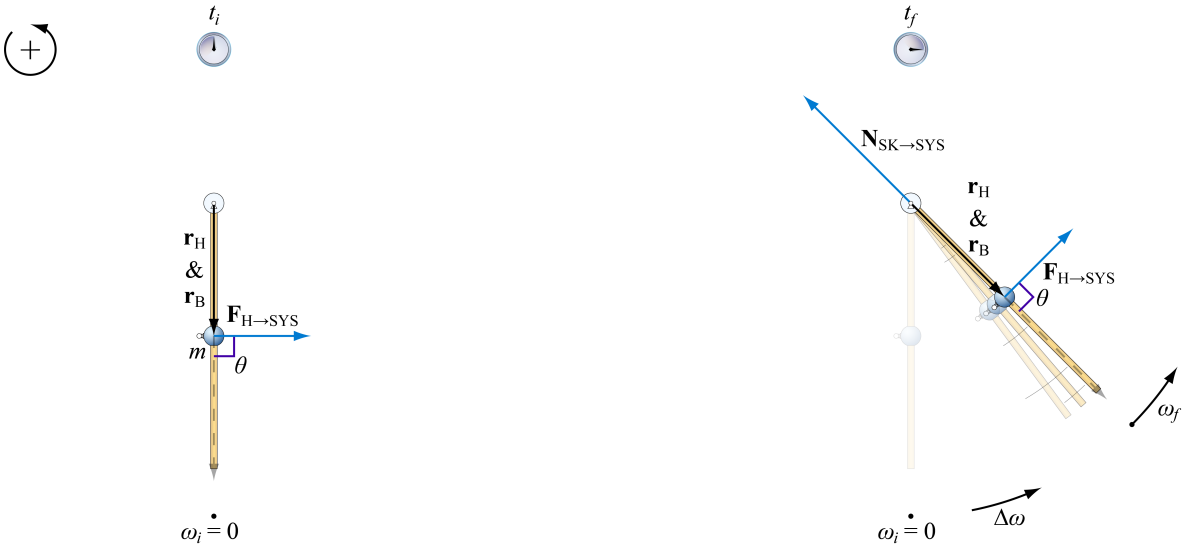
Torque and rotational inertia

What affects the amount of angular acceleration I give a rigid object?





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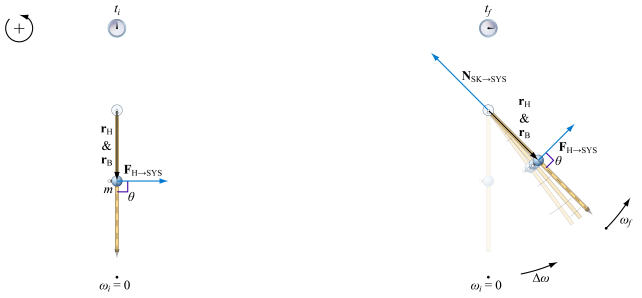
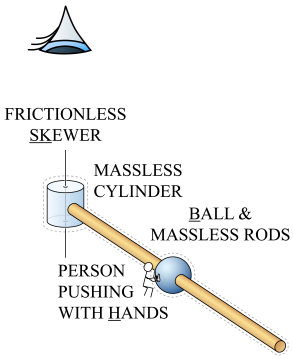
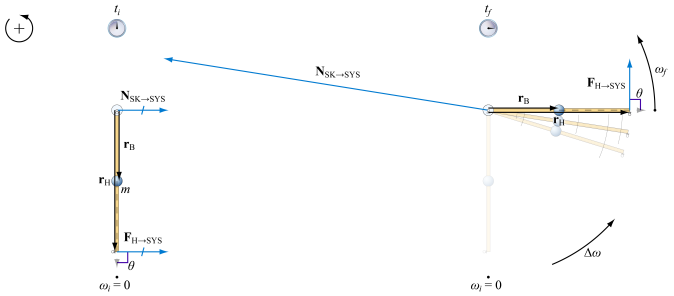
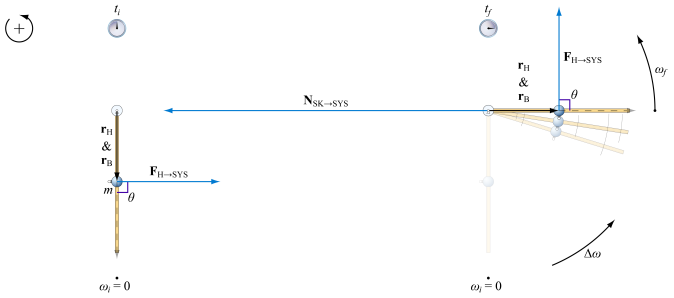




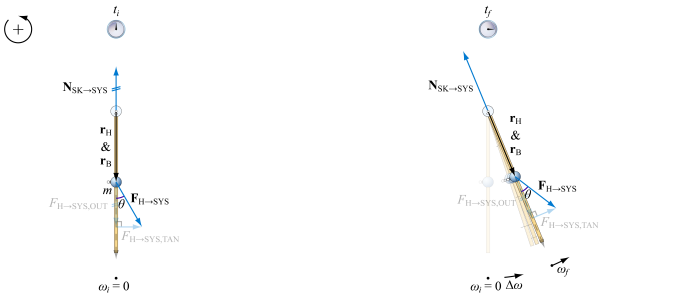
What can I do to give a rigid object a greater angular acceleration?



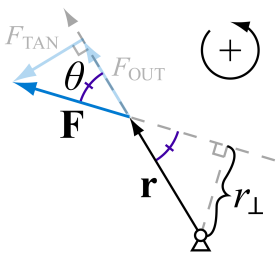
$$\uparrow r \Rightarrow \uparrow \alpha$$



$$\uparrow F \Rightarrow \uparrow \alpha$$



$$\downarrow \perp \text{ity} \Rightarrow \downarrow \alpha$$



$$\tau_F := \pm r_\perp F$$
$$:= \pm (r \sin\theta) F$$

Torque and rotational inertia

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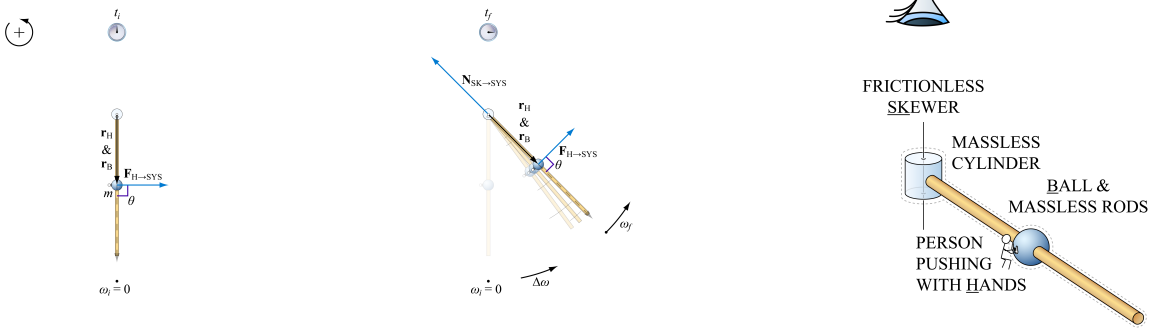
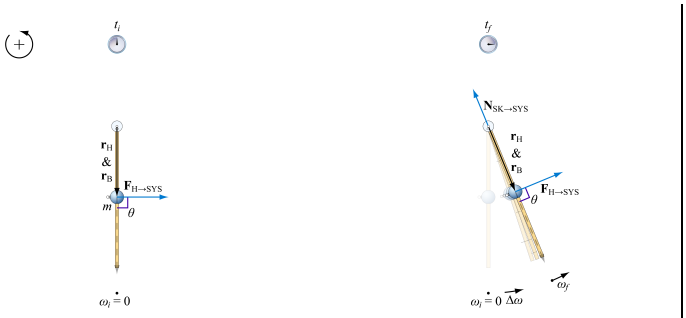
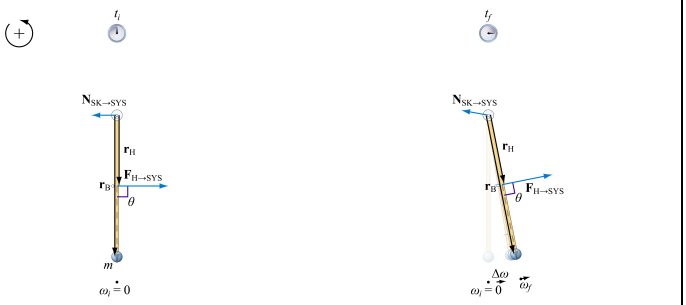


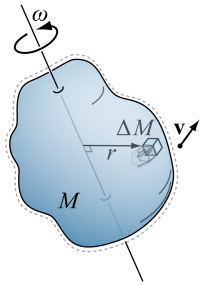
How can I change the properties of a rigid object
to make the object more difficult to angularly accelerate?



$$\uparrow M \Rightarrow \downarrow \alpha$$



$$\uparrow r \Rightarrow \downarrow \alpha$$



$$I_{\substack{\text{RIGID SET}\\ \text{OF}\\ \text{PARTICLES}}} := \sum_i \Delta M_i r_i^2$$

$$I_{\text{RIGID}} = I_1 + I_2 + \cdots$$

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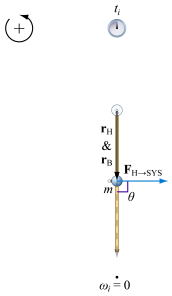

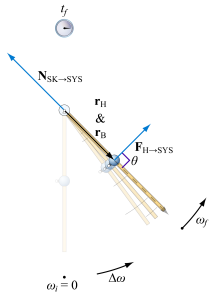

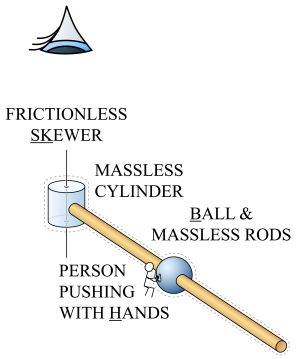

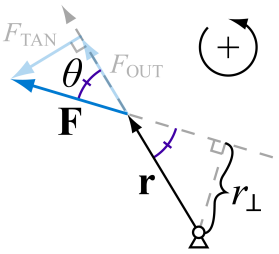

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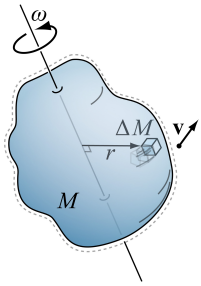

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$$\alpha = \frac{\Sigma\,\tau}{I}$$