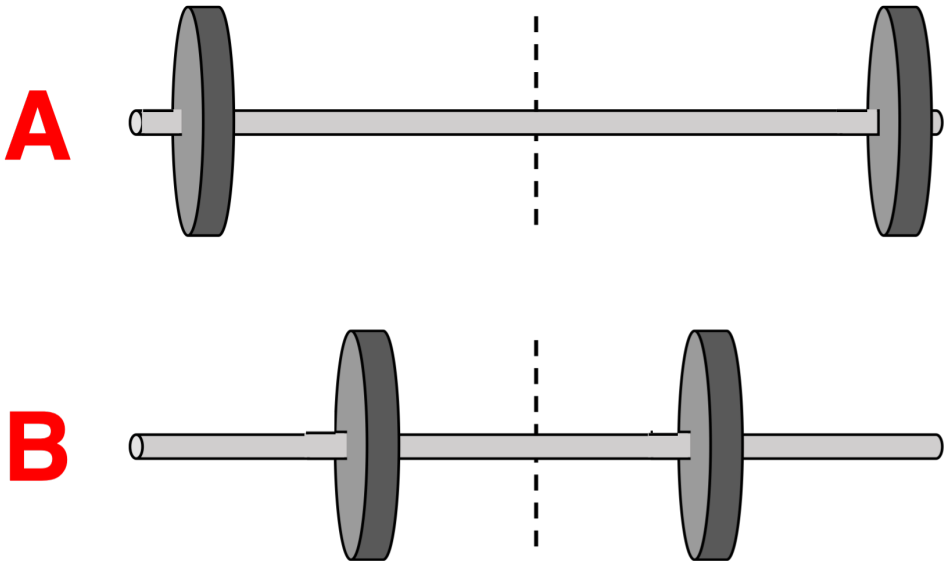
Rotational inertia

Activity 1: Location, Location, Location

Question Group 1

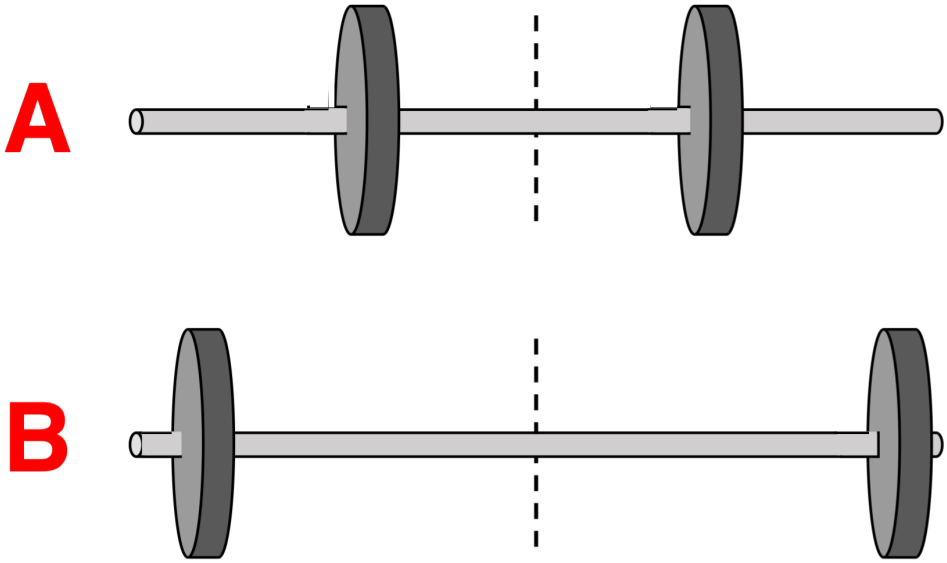
Questions 1

Two identical solid disks are arranged along a solid bar at different locations. For which arrangement – A or B – is the rotational inertia (**I**) about the vertical axis the greatest?

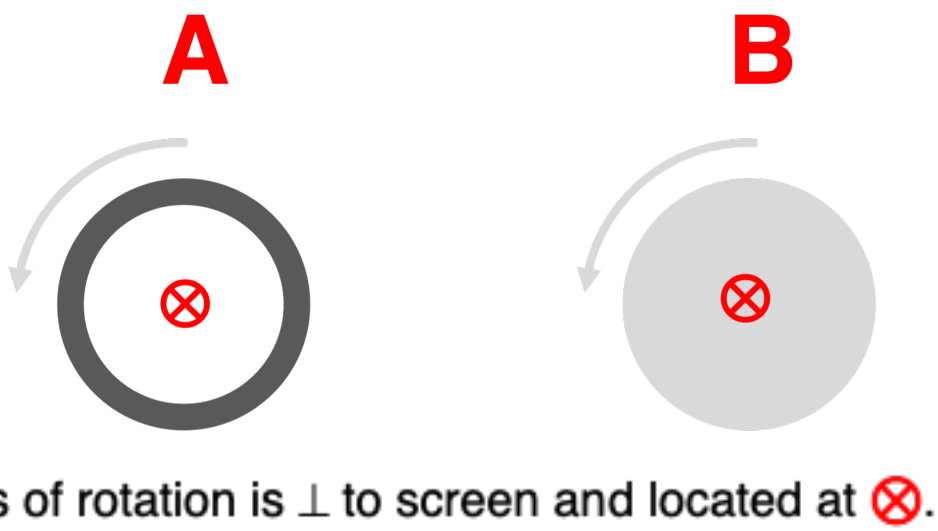


Questions 2

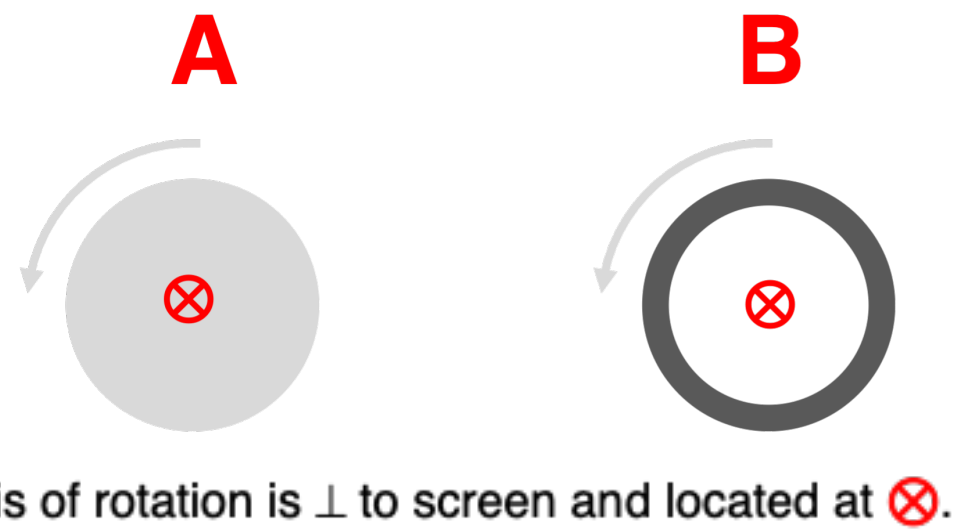
Two identical solid disks are arranged along a solid bar at different locations. For which arrangement – A or B – is the rotational inertia (**I**) about the vertical axis the greatest?



Question Group 2
Questions 3
A ring (A) and a solid disk (B) have the same mass. That mass is concentrated along the rim of the ring and distributed uniformly about the disk. For which object – A or B – is the rotational inertia (**I**) about the axis the greatest?

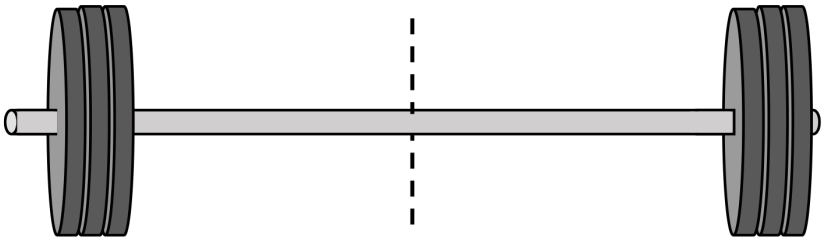


Questions 4
A solid disk (A) and a ring (B) have the same mass. That mass is distributed uniformly about the disk and concentrated along the rim of the ring. For which object – A or B – is the rotational inertia (**I**) about the axis the greatest?

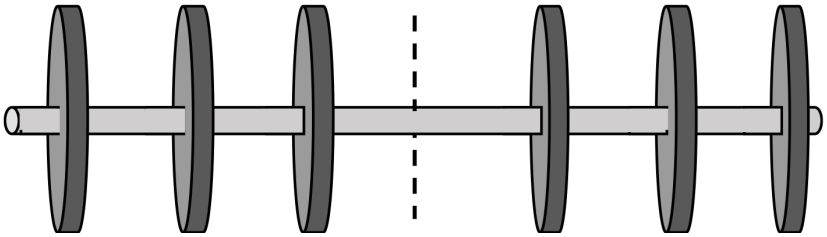


Question Group 3
Questions 5
Six identical solid disks are arranged along a solid bar at different locations. For which arrangement – A or B – is the rotational inertia (**I**) about the vertical axis the greatest?

A

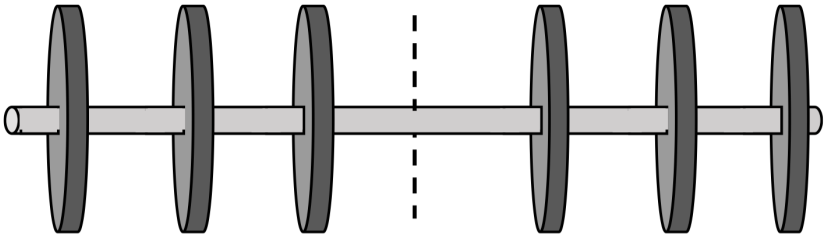


B

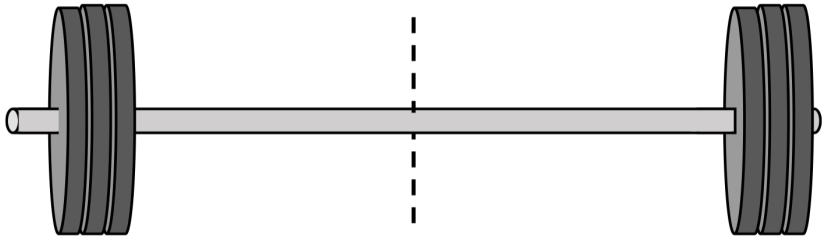


Questions 6
Six identical solid disks are arranged along a solid bar at different locations. For which arrangement – A or B – is the rotational inertia (**I**) about the vertical axis the greatest?

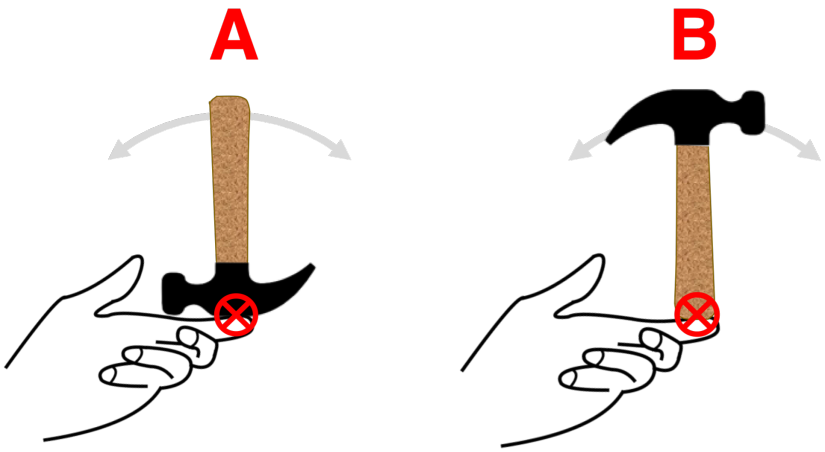
A



B

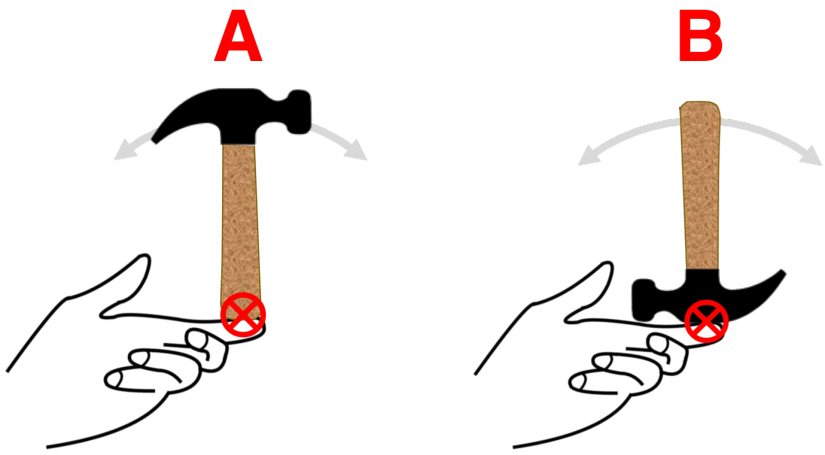


Question Group 4
Questions 7
A hammer is balanced on a finger with two different arrangements. For which arrangement – A or B – is the rotational inertia (**I**) about the axis the greatest?



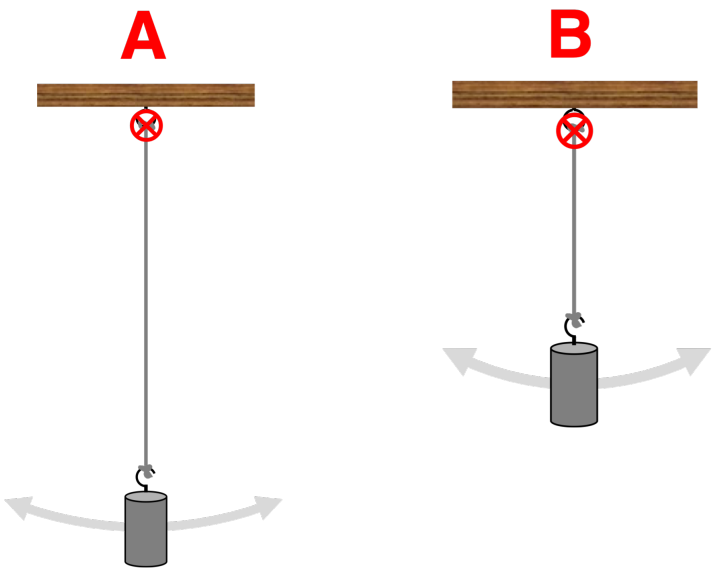
Axis of rotation is ⊥ to screen and located at ⊗.

Questions 8
A hammer is balanced on a finger with two different arrangements. For which arrangement – A or B – is the rotational inertia (**I**) about the axis the greatest?



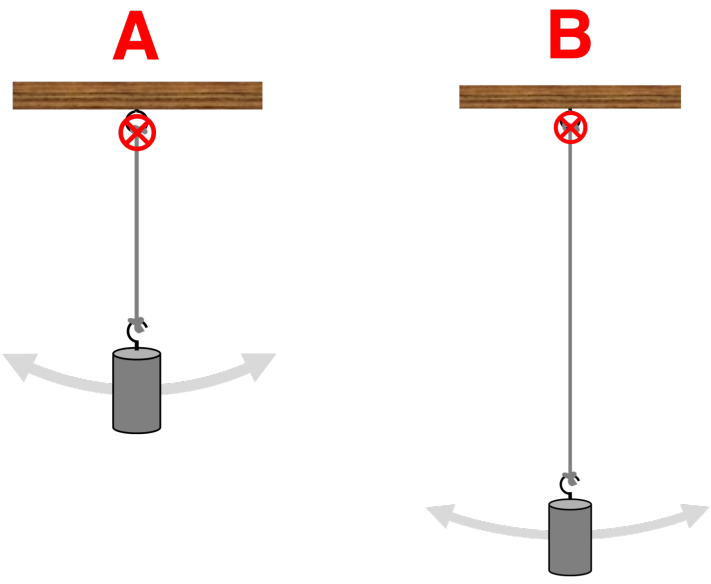
Axis of rotation is ⊥ to screen and located at ⊗.

Question Group 5
Questions 9
Two different pendula are made using identical masses and strings of different lengths. For which pendulum – A or B – is the rotational inertia (**I**) about the axis the greatest?



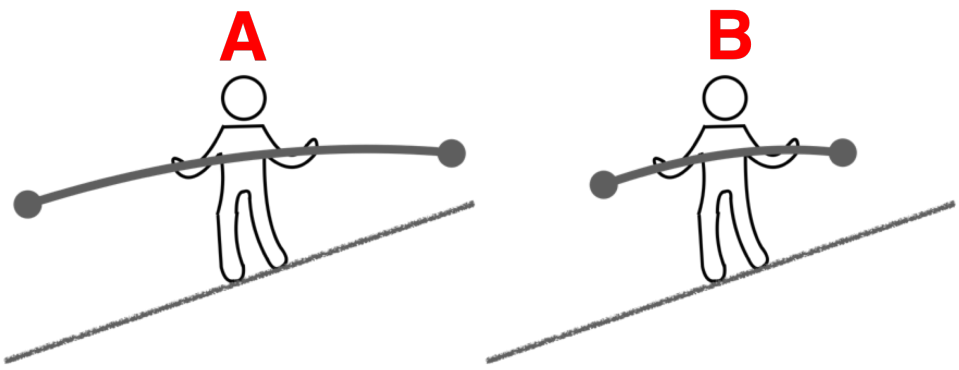
Axis of rotation is ⊥ to screen and located at ⊗.

Questions 10
Two different pendula are made using identical masses and strings of different lengths. For which pendulum – A or B – is the rotational inertia (**I**) about the axis the greatest?

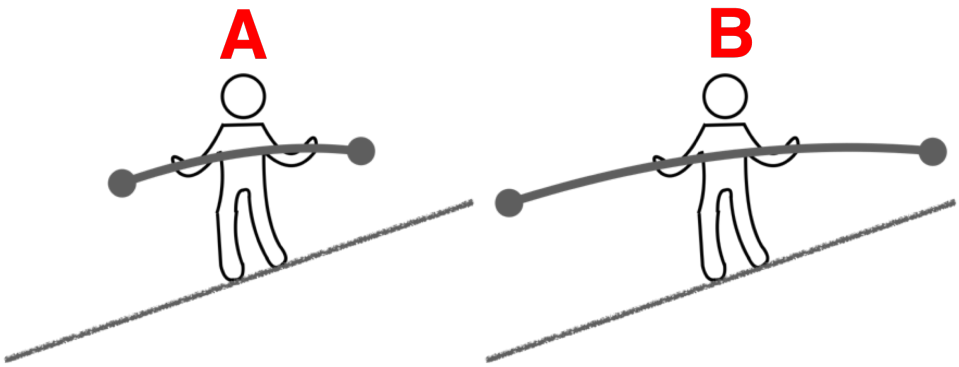


Axis of rotation is ⊥ to screen and located at ⊗.

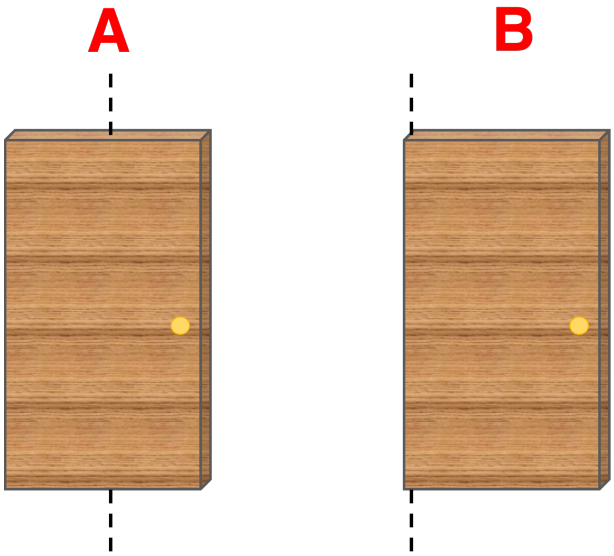
Question Group 6
Questions 11
A tightrope walker is experimenting with two different balancing poles. The two poles have the same mass but pole A is longer than pole B. For which pole – A or B – is the rotational inertia (**I**) the greatest? The axis of rotation is the tightrope.



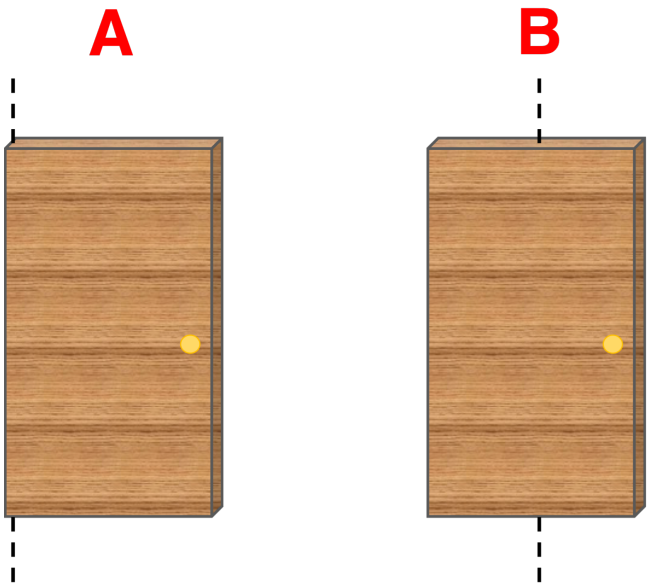
Questions 12
A tightrope walker is experimenting with two different balancing poles. The two poles have the same mass but pole A is shorter than pole B. For which pole – A or B – is the rotational inertia (**I**) the greatest? The axis of rotation is the tightrope.



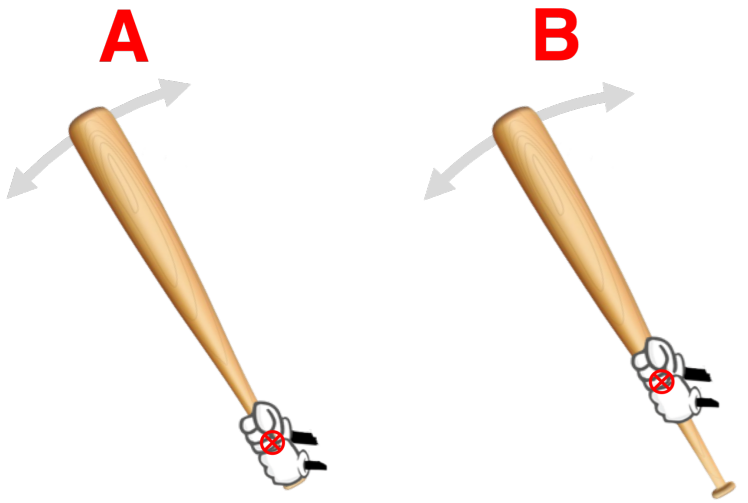
Activity 2: A Change of Axis
Question Group 7
Questions 13
Consider the same door being rotated about two different axes – one aligned with its center (A) and one aligned with its edge (B). For which case – A or B – is the rotational inertia (**I**) the greatest?



Questions 14
Consider the same door being rotated about two different axes – one aligned with its edge (A) and one aligned with its center (B). For which case – A or B – is the rotational inertia (**I**) the greatest?

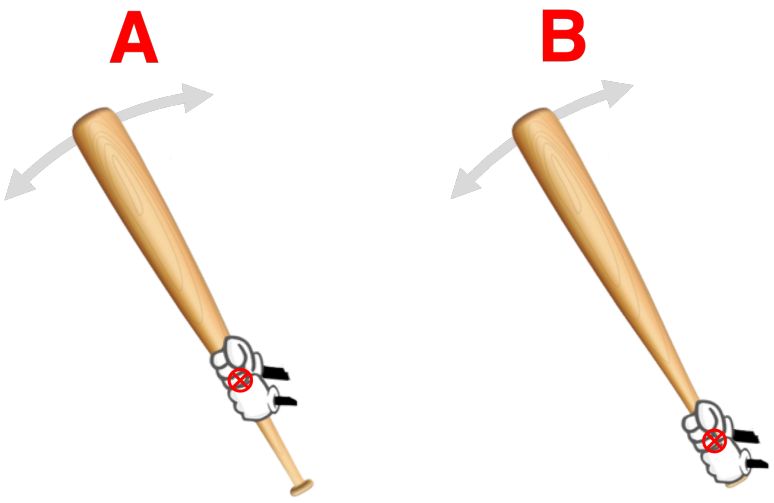


Question Group 8
Questions 15
A baseball bat is being rotated about two different axes – one located near the knob of the bat (A) and one located several inches up from the knob of the bat (B). For which case – A or B – is the rotational inertia (**I**) the greatest?



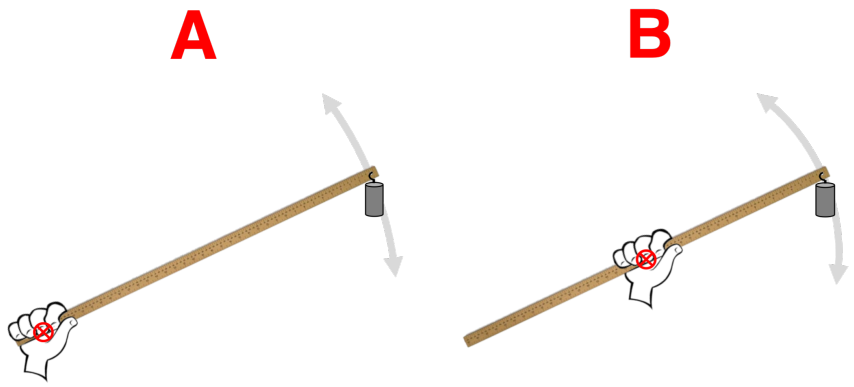
Axis of rotation is ⊥ to screen and located at ⊗.

Questions 16
A baseball bat is being rotated about two different axes – one located several inches up from the knob of the bat (A) and one located near the knob of the bat (B). For which case – A or B – is the rotational inertia (**I**) the greatest?



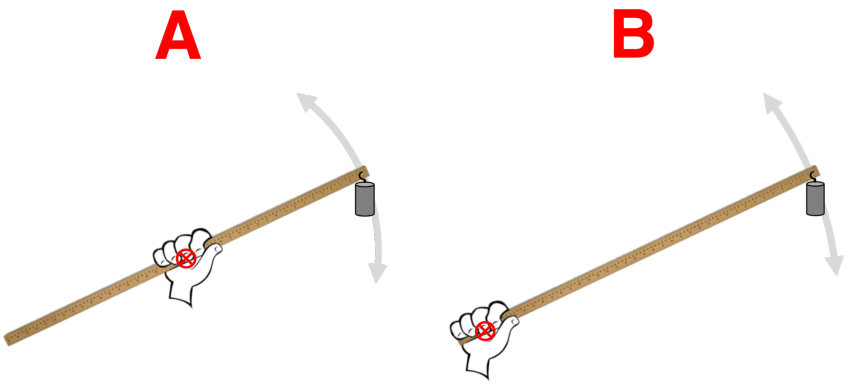
Axis of rotation is ⊥ to screen and located at ⊗.

Question Group 9
Questions 17
A 1-kg mass is secured to the end of a 1-meter stick. The meter stick is then rotated about two different axes – one located on the opposite end of the meter stick (A) and one located at its exact center (B). For which case – A or B – is the rotational inertia (**I**) the greatest?



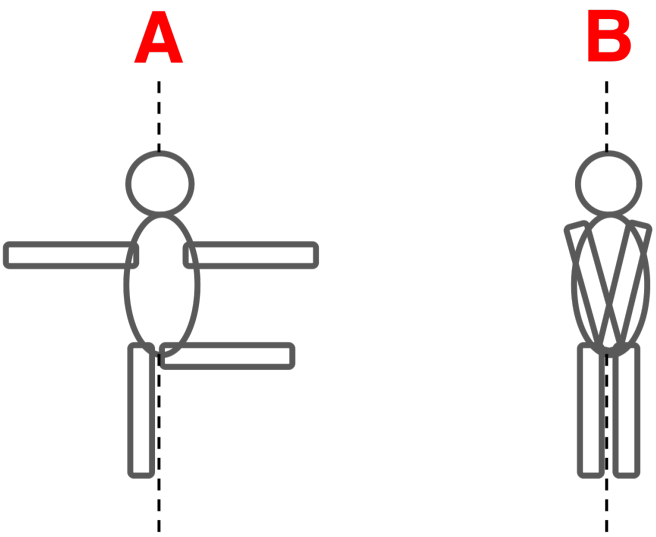
Axis of rotation is ⊥ to screen and located at ⊗.

Questions 18
A 1-kg mass is secured to the end of a 1-meter stick. The meter stick is then rotated about two different axes – one located at its exact center (A) and one located on the opposite end of the meter stick (B). For which case – A or B – is the rotational inertia (**I**) the greatest?

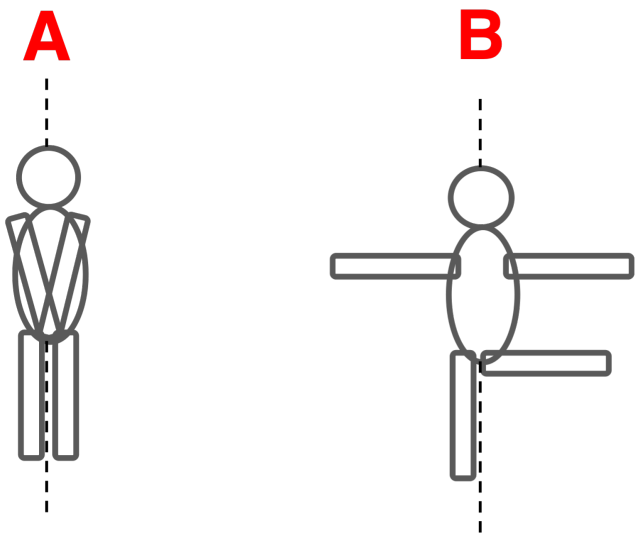


Axis of rotation is ⊥ to screen and located at ⊗.

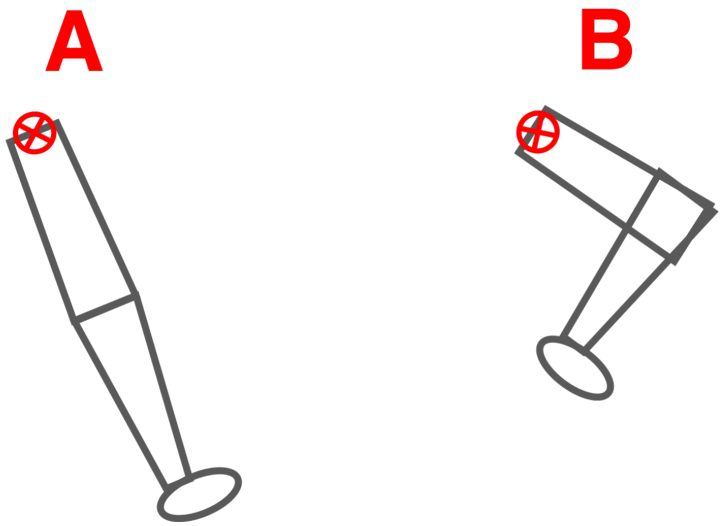
Activity 3: Contraption Analysis
Question Group 10
Questions 19
Each contraption below consist of three identical, connected parts. The configuration of the parts is different. For which contraption – A or B – is the rotational inertia (**I**) about the vertical axis the greatest?



Questions 20
Each contraption below consist of three identical, connected parts. The configuration of the parts is different. For which contraption – A or B – is the rotational inertia (**I**) about the vertical axis the greatest?

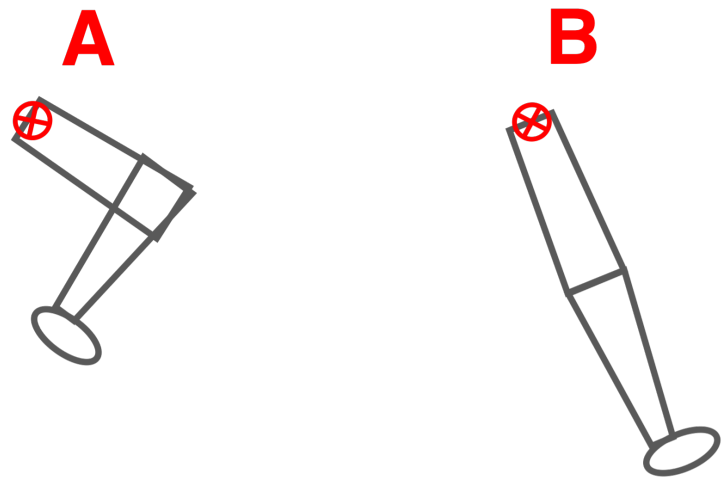


Question Group 11
Questions 21
Each contraption below consist of three identical, connected parts. The configuration of the parts is different. For which contraption – A or B – is the rotational inertia (**I**) about the axis the greatest?



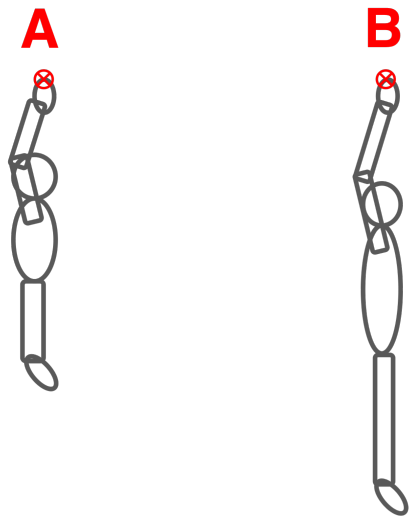
Axis of rotation is ⊥ to screen and located at ⊗.

Questions 22
Each contraption below consist of three identical, connected parts. The configuration of the parts is different. For which contraption – A or B – is the rotational inertia (**I**) about the axis the greatest?



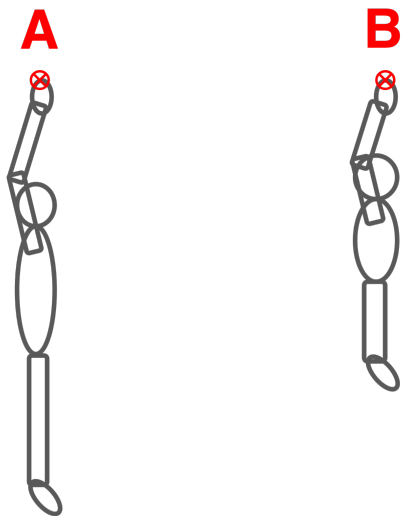
Axis of rotation is ⊥ to screen and located at ⊗.

Question Group 12
Questions 23
Each contraption below consist of seven identical, connected parts. The configuration of the parts is different. For which contraption – A or B – is the rotational inertia (**I**) about the axis the greatest?



Axis of rotation is ⊥ to screen and located at ⊗.

Questions 24
Each contraption below consist of seven identical, connected parts. The configuration of the parts is different. For which contraption – A or B – is the rotational inertia (**I**) about the axis the greatest?



Axis of rotation is ⊥ to screen and located at ⊗.