

Balancing Act:Grade: 9th – 10thhttps://phet.colorado.edu/sims/html/balancing-act/latest/balancing-act_en.html**Brief Notes:**

For rotating an object, not only force but distance of the force from rotation point also matters. For rotational equilibrium, total torque about rotation point must be zero. This means, about rotation point, total left-side torque should be equal to total right-side torque.

Torque is given as: $\tau = F \cdot r$ F - Force, r - Distance of force from rotation point

Explore:**Intro:**

Remove support of rod. Does the rod rotate? Can you identify rotation point?

Keep one fire extinguisher on rod, at a point. Does the rod rotate? If yes, why? Notice direction of rotation (Clockwise/Anti-clockwise) also.

Keep it at different positions and observe change in rotation speed of the rod.

Keep another fire extinguisher on other side. Try to balance rod. Notice positions of fire extinguishers when rod becomes horizontal.

(Click on Rulers to check position)

Calculate the left-side and right-side torque. What is the relation between values of torques when rod is horizontal?

Disturb one of the extinguishers a little from its position. What happens to movement of the rod? Explain reason to support your observation.

Now, keep both fire extinguishers on same side of the rod at different positions. And keep dustbin on other side. Try to balance the rod. What are the values of total left-side torque and right-side torque under balanced condition?

Balance Lab:

Click on Rulers. Remove support. Balance rod for different objects and people. Check the values of torques under balanced condition.

Place mystery object A at 1 m position on rod. Balance rod by using 20 kg boy. How can you find mass of mystery object A? Have you ever thought of how does seesaw scale at grocery shop works?



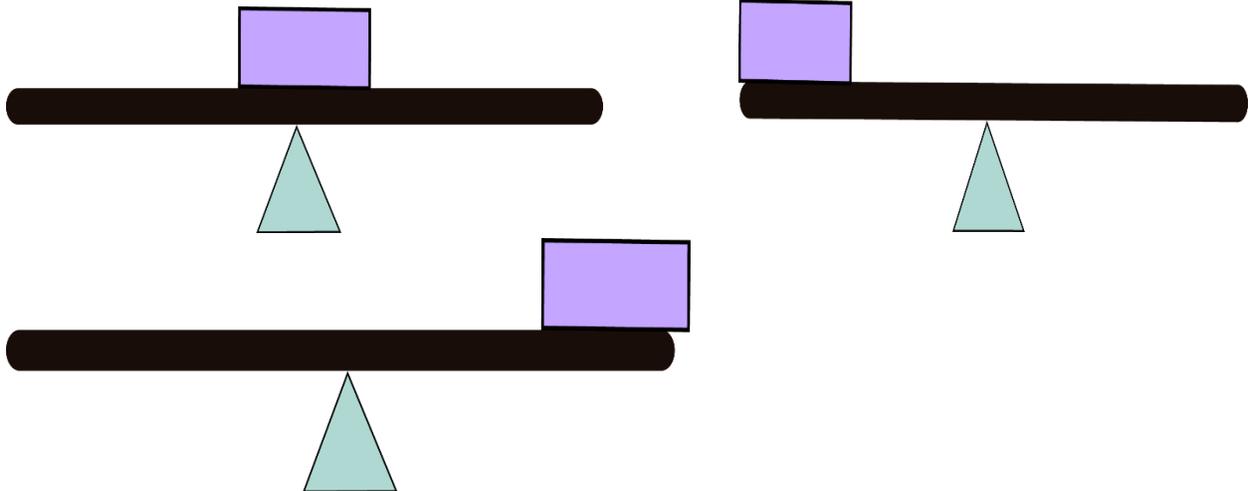
Find out masses of other mystery objects.

Game:

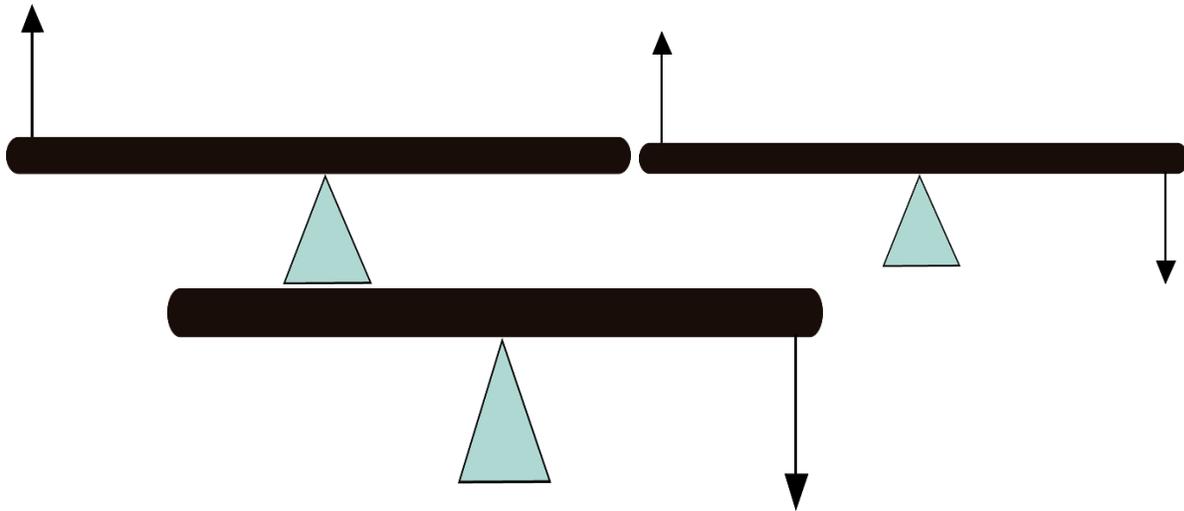
Play game to test your understanding of rotational motion.

Think:

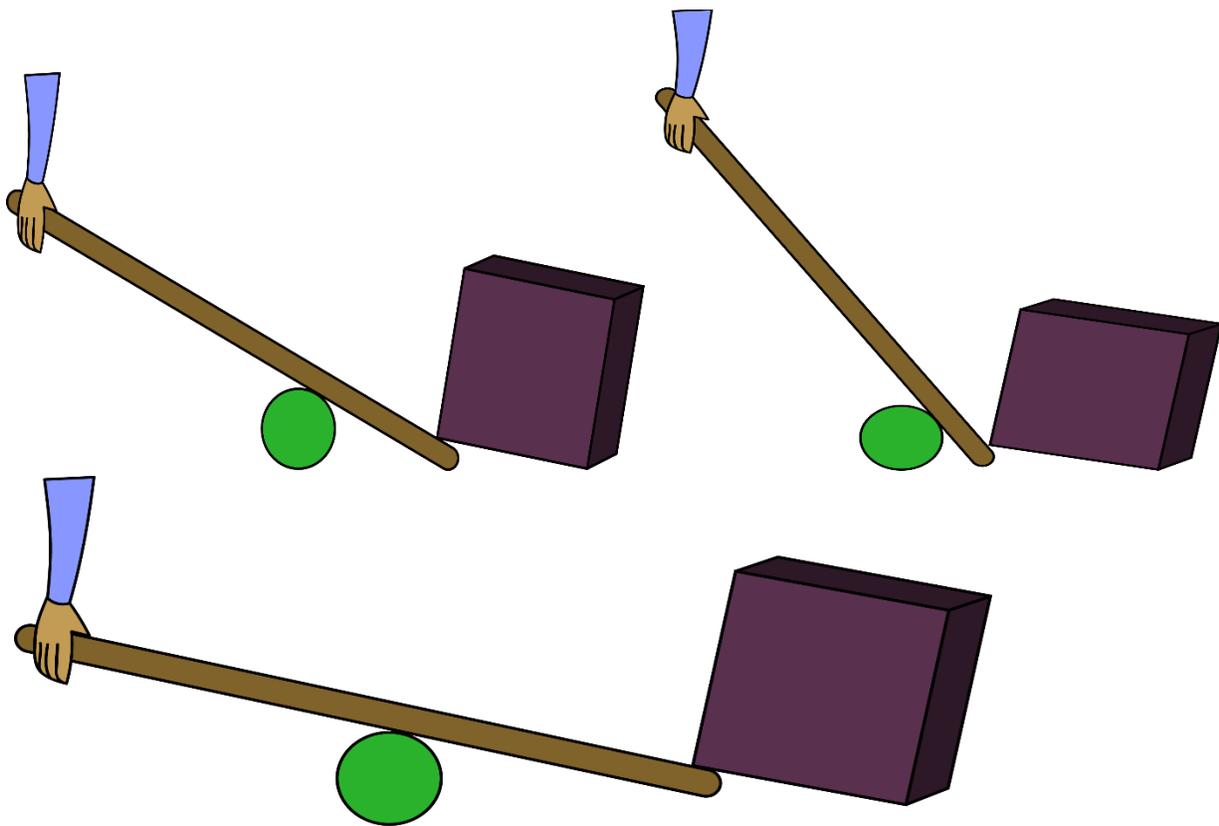
Three bricks, each of mass 1 kg, are kept on a scale. In which of the following case(s), rod will turn over? Explain your reason.



Explain difference in the following cases.



In which case, you can easily lift up weight? And why?



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