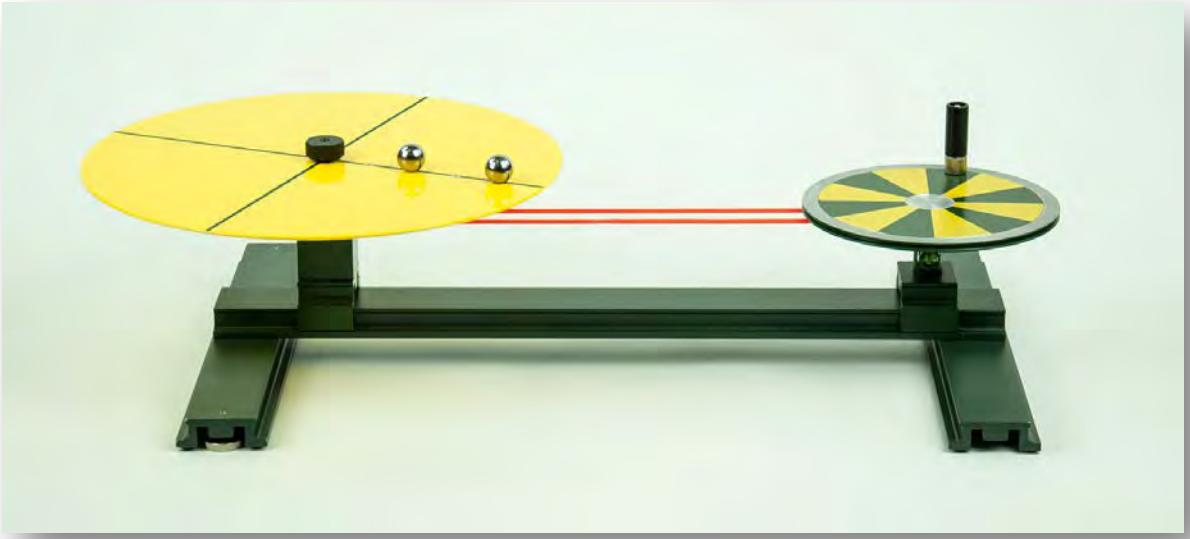
CENTRIFUGAL FORCE

MED 09.02



Material

Item-no.	Qty.	Description
DS101-1G	1	Support base, large, L=500 mm
DS103-3G	1	Sliding saddle, H=34 mm
DS402-3B	1	Pivot bearing with transverse hole,
DS402-3S	1	Drive pulley demo, with ball bearing
DS402-2N	1	Crank pin, L=50 mm
DS401-1A	1	Drive belts, set of 2
DM357-3K	1	Rotating disk, "demo"
DM357-3H	1	Support rod for rotating disk demo
DM340-2S	1	Steel balls ¾" (19 mm), set of 2

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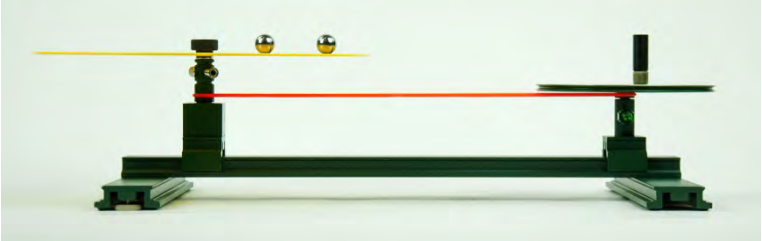
Purpose
To demonstrate the centrifugal force and its dependence on the distance r from the axis of rotation and on the angular velocity or speed / rotational frequency.

Preparation
Mount the pivot bearing and the sliding saddle on the support base as shown on the image; afterwards screw the crank pin on the drive pulley.

Now insert the drive pulley into the sliding saddle.

Fix the support rod to the rotating disk and mount both parts in the pivot bearing.

As shown on the image below taut the long drive belt between the sliding saddle and the pivot bearing.



Experiment
Place the steel balls in the 2nd and 4th hole of the rotating disk.
Set the rotating disk slowly into motion by turning the crank and slowly increase the rotational speed.

Observe which of the two steel balls is thrown out of the circular path first.

Now place the steel balls in different holes and repeat the experiment.
Observe the behaviour of the steel balls and their dependence on the distance r and the angular velocity.

For the last part of the experiment place one of the steel balls in the groove of the support rod to determine the centrifugal force in the centre.

Conclusion
The steel ball that is further away from the centre falls easier off the rotating disk.
The radius of the circular path of this ball is bigger.

Note
A stationary observer (observing the disk from the outside) can determine that the force that holds the ball in the circular path is no longer sufficient with a larger radius or higher speed and the ball then maintains its direction.
For the co-rotating observer a force is shown radially outwards, an "escape away from the center".