



## Material

| Item-no. | Qty. | Description                          |
|----------|------|--------------------------------------|
| DS600-00 | 1    | Lab table "NTL", mobile              |
| DS600-10 | 1    | Assembly for lab table "NTL"         |
| DS500-1G | 4    | Screw clamp, jaw width approx. 50 mm |
| DS600-6G | 1    | Board holders, pair, magnetic        |
| DS102-2G | 2    | Clamp saddle                         |
| DS101-75 | 1    | Stand rail, universal, L=750 mm      |
| DS103-7G | 2    | Sliding saddle, H=70 mm              |
| DM800-1M | 1    | Maxwell's Wheel                      |
| DM800-1S | 1    | Support rods, pair                   |

### Purpose

To demonstrate the conversion of energy – conversion of potential into kinetic energy.

### Preparation

Fix the table setup with the four screw clamps to the lab table.



Afterwards mount the board holders to the rails of the assembly.

Now you can mount the two clamp saddles to the upper end of the board holders as shown on the images.

Afterwards you can mount the 750 mm stand rail at those clamp saddles.



Fix the two 70 mm sliding saddles in the centre of the stand rail.

Cut off a 150 cm piece of the cord.

Both handles are threaded onto the cord with the holes on the fixing screws.



The ends of the cord are tied to the two holes in the axis of the Maxwell wheel.

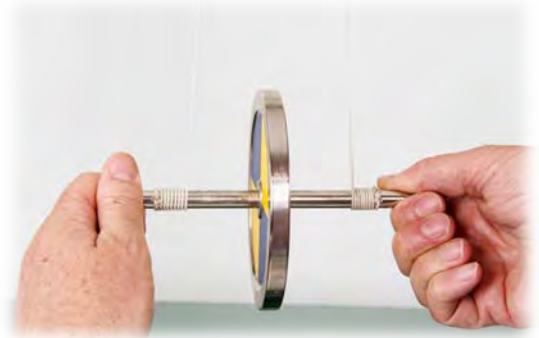


Now fix the Maxwell wheel with the help of the holders to the sliding saddles.

Adjust the cord is in the handles so that the axis of the wheel hangs horizontally.

### Experiment

The Maxwell wheel is carefully wound up from its resting position. The cord must wrap around the axis in one layer.



The wheel has potential energy at the top.

Release the wheel now.

### Result

The Maxwell wheel rotates slowly as it descends; the potential energy is converted into kinetic energy.

The kinetic energy is mainly rotational energy because of the large moment of inertia and the slow downward movement.

When the line is completely unwound, the wheel continues to turn (flywheel) and winds up again while the kinetic energy reduces.

Since it almost reaches the starting height again, the kinetic energy at the (lowest) reversal point corresponds to the potential energy at the starting point.

The losses arise due to the friction that occurs - the total energy is retained.



### Note

If you would just drop the wheel - without prior cord winding - the energy would not be converted back into potential energy.

A yo-yo works according to this principle of energy conservation.

By moving the yo-yo against the direction of movement of the wheel the line is completely rewound.

### Experiment with data recording

Move the stand rail down by lowering the clamp saddles and fix the clamp saddles in that position.

A distance sensor is placed on the floor just below the Maxwell wheel and connected to the measuring system.

When setting up check whether the sensor actually detects the wheel and not an edge of the surroundings.



Before starting the measurement the wheel should be held from behind or from above so that the sensor does not detect the movement of the hand.

