



Material

Item-no.	Qty.	Description
DM503-2A	1	Vacuum pump, electric 12, two stages
C1520-1M	1	Vacuum hose, plastics, D=6 mm, L=100 cm
DM560-1F	1	Free fall tube

Purpose

To demonstrate that the free fall speed of a body in a Vacuum is not depending on its mass

The friction force is greater on the feather and has a much stronger effect, primarily because of the smaller mass. In addition, the frictional force is speed-dependent which leads to a uniform falling movement instead of an evenly accelerated one.

Preparation

Place the rubber part of the hose for 30 seconds in hot water, thus this part will become more elastic.

Place the rubber part of the hose carefully on the tap on the free fall tube.

Afterwards connect the free fall tube with the vacuum pump through the hose.



Experiment 1

Turn on the vacuum pump so that the air gets sucked out of the free fall tube. After the free fall tube is evacuated close the tap and remove the hose from the pump.

There are two bodies of different mass in the free fall tube. Bring the free fall tube into vertical position and turn it by 180 ° as fast as possible.

Observe the two bodies in the free fall tube.

Result

The bodies reach the bottom of the free fall tube nearly at the same moment.

Experiment 2

Open the tap and let the air flow back into the free fall tube. Again bring the free fall tube in vertical position, turn it as fast as possible by 180 ° and observe the two bodies in the free fall tube.

Result

Due to the air resistance the two bodies fall at different speed.

Note

If the experiment is performed several times it could become electrostatically charged through the friction of your hand or the feather. This could result in the feather sticking on the wall of the free fall tube. In such a case let the air flow into the free fall tube and wait for some time until the experiment is repeated.