Beam balance (Item No.: P1253600)

Curricular Relevance

Area of Expertise: Physik
Education Level: Klasse 7-10
Topic: Mechanik
Subtopic: Kräfte, einfache Maschinen
Experiment: Balkenwaage

Difficulty	Preparation Time	Execution Time	Recommended Group Size
Easy	10 Minutes	10 Minutes	1 Student

Additional Requirements:

- Set of precision weights, 1 g...50 g 44017-00
- Various objects

Experiment Variations:

Keywords:

Principle and equipment

Principle

Demonstrate that the mass of bodies can be determined with a beam balance.

Equipment

Position No.	Material	Order No.	Quantity
1	Demo Physics board with stand	02150-00	1
2	Rod on fixing magnet	02151-02	1
3	Scale for demonstration board	02153-00	1
4	Weight holder for slotted weights	02204-00	2
5	Slotted weight, silver bronze, 10 g	02205-02	2
6	Slotted weight, black, 50 g	02206-01	2
7	Slotted weight, silver bronze, 50 g	02206-02	2
8	Balance pan, plastic	03951-00	2
9	Lever	03960-00	1
10	Pointer for demonstration lever	03963-00	1
11	Marker, black	46402-01	1
Additional material:			
12	Set of precision weights, 1 ... 50 g	44017-00	
13	Various objects		

Robert-Bosch-Breite 10
D - 37079 Göttingen
Tel: +49 551 604 - 0
Fax: +49 551 604 - 107
info@phywe.de
www.phywe.com

Set-up and procedure

Set-up

- With the aid of the scale, draw a vertical line on the demonstration board.
- Place the axle on fixing magnet onto the board in such a manner that the upper end of the line is covered and the axle lies directly on the line.
- Slip the lever onto the axle (the upper hole in the middle of the lever, so that the lever is in stable equilibrium) and attach the pointer (Fig. 1).
- Load the two weight holders with the same number of slotted weights (e.g. each with 1 x 10 g and 12 x 50 g). Hang them on the #10 index marks at the right and at the left ends.

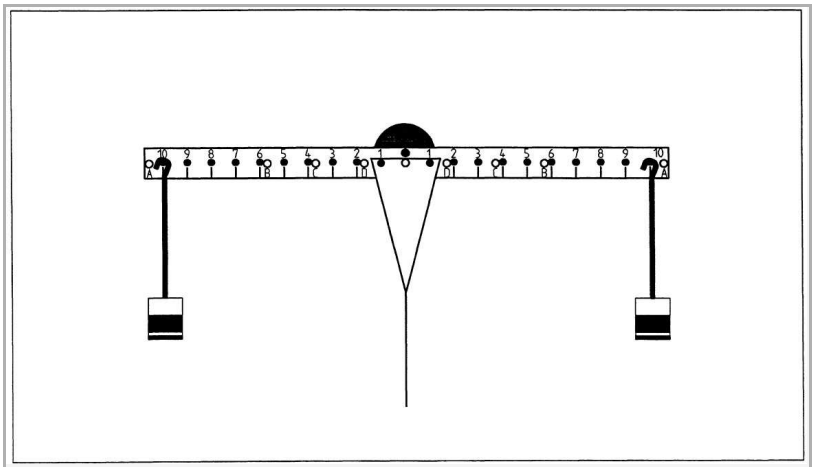

Fig. 1

Procedure

- Hang one of the two weight holders on any arbitrary mark, and observe the lever. Determine where the second weight holder must be hung in order for the lever to again be horizontal.
- Record your observations under (1).
- Rehang the weight holders on the two #10 index marks. Remove one 10 g slotted weight, replace it, note your observation under (2).
- Remove the weight holders and hang the balance pans onto the lever. Pull the lever toward the end of the axle so that the balance pans are not in contact with the demonstration board (Fig. 2).
- Place various objects whose mass is unknown onto one of the balance pans; load the other balance pan with weights from the set of weights such that the balance is in equilibrium.
- Note the mass of the objects under (3).

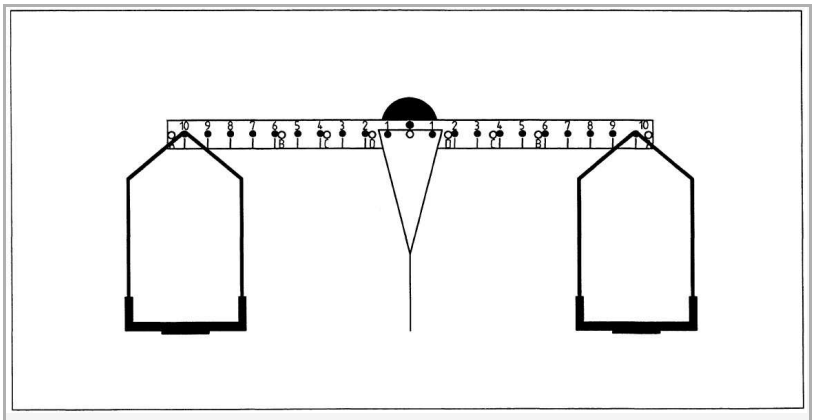

Fig. 2

Observation and evaluation

Observation

The lever is in equilibrium when the same bodies are hung at equal distances from the fulcrum.

The lever is in equilibrium when the bodies which are hung at equal distances from the fulcrum have the same mass.

Table 1

Body	Mass in g
Helical spring $3N/m$	15
Movable pulley, $d = 65mm$	12
Rod for pulley	15
Shaft	40

Evaluation