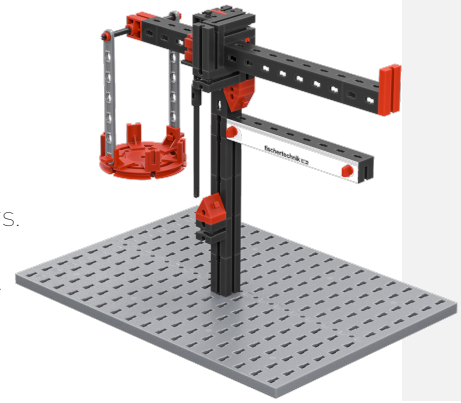
Model 1
Beam balance (lever)

To determine the weight of an object, we need to know the ratio of its weight to a fixed reference or unit value. This can be achieved by balancing two movable levers. The reference weight is then determined is then determined using a suitable scale.



Date

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Class

· How the beam balance works:

The beam balance is based on the principle of the lever. If the weight in the left weighing pan, the center of gravity shifts, causing the balance to be disturbed.

· Compensation by shifting the weight:

To restore the balance, the movable weight (consisting of four black base blocks) on the right side of the balance beam must be moved further outwards.

· Pointer as a control instrument:

The pointer (a black axis) indicates whether the scale is in balance. Balance is achieved when the pointer points exactly to the tip of the red angle block.

CONSTRUCTION TASK

Build the beam balance shown in Fig. 1 and cut out the template for the scale along the given lines.

1. Attaching the scale:

Place the scale on the black angle bracket. Secure it with two S-latches so that it is stable and does not slip. The scale should be clearly visible and correctly aligned.

2. Marking the zero position:

- Make sure that the weighing pan is empty.
- Balance the scale by moving the counterweight.
- Observe where the tip of the red angle bracket points on the scale under the weight.
- Mark this position with a fine line and write a "0" next to it to indicate the zero position.

3. Checking the zero setting:

Carefully move the scale and check whether it returns exactly to the zero position after you release it.

THEMATIC TASK

The scale is now ready for use and can be calibrated.

1. Weigh the weighing pan with standard weights:

Use basic building blocks as unit weights, for example (BS30 = approx. 5 g or BS 15 = approx. 2.5 g). Weigh down the left weighing pan and move the counterweight on the right side of the beam until the pointer points exactly to the lower red angle stone.

2. Set markings:

Mark the position of the red angle stone on the scale for different weight values (e.g., 5 g, 10 g, 15 g, ...).

3. Checking:

Test the calibration with known weights and check the distances and positions of the marks.

Date _____

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Class _____

1. How far apart are two 10 g markings on the scale?

_____

2. What is the maximum weight you can determine with the scale?

_____

3. When the scale is in equilibrium, which physical quantities are equal? equal?

_____

EXPERIMENTAL TASK

1. How can you modify the scale so that the measuring range doubles? Name at least two possibilities.

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2. You want a more accurate resolution for the scale. How can you achieve this achieve this? (There are several ways to do this.)

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