# Model 1
# Beam balance (lever)

Date

Name

Class

The students are supported in individual tasks by the provision of construction instructions (see appendix) for the construction and solution of the tasks. For tasks where appropriate, this is indicated at the beginning of the answer sheet. indicated at the beginning of the answer sheet.

Students receive a copy of the measuring scales to cut out.

## THEMATIC TASK

The beam balance can be calibrated using any "standard weight." The markings on the scale should be divided into appropriately selected divisions.

1. The distance between the divisions must be uniform, as the counterweight is moved linearly in line with the increase in weight in the weighing pan. The distance between two 10 g markings should be approximately 5 cm.

2. The maximum weight that can be weighed with the balance is slightly more than 35 g. The maximum weight that the balance can determine depends on the length of the balance beam and the load capacity of the weighing pan. Theoretically, it corresponds to the greatest displacement of the counterweight before it exceeds the scale.

3. When the balance is in equilibrium, i.e., the balance beam is exactly horizontal and the pointer of the balance points to the tip of the red angle stone, the torque on the right and left sides of the axis is equal.

When in equilibrium, the torques on both sides of the lever are equal. This corresponds to the formula:

$$F_{links} * d_{links} = F_{rechts} * d_{rechts}$$

Where F is the force (weight) and d is the distance to the axis of rotation.

## EXPERIMENTAL TASK

1. The measuring range of the scale can be doubled by doubling the length of the right side of the balance beam shown in the picture or halving the length of the left side. Finally, the movable counterweight on the right side of the balance beam can be doubled.

2. A more accurate resolution of the scale can be achieved by reducing the size of the counterweight or by extending the left side of the balance beam. To maintain the measuring range, the right side of the balance beam must be extended accordingly.

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## APPENDICES

Model 1:
· Building instructions for beam balance
· Sheet with blank scales to cut out