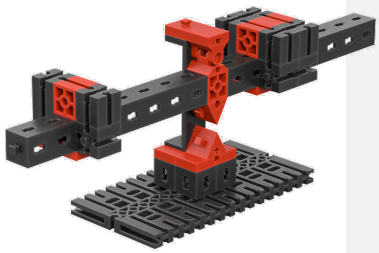
Model 13
Double-sided lever



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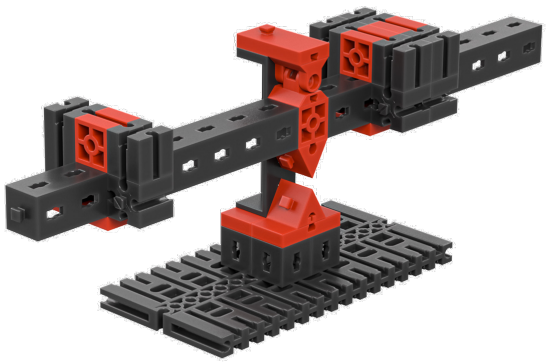
DESIGN TASK

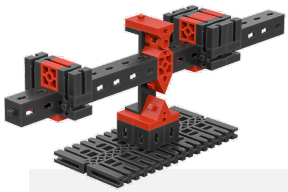
Construct the double-sided lever according to the building instructions.



THEMATIC TASK

Place weights of equal size on both sides of the double-sided lever. Position the weights at the outermost points on both sides and observe what happens. The lever should now be in equilibrium, i.e., exactly horizontal.

1. Move one weight toward the axis of rotation. What do you notice?



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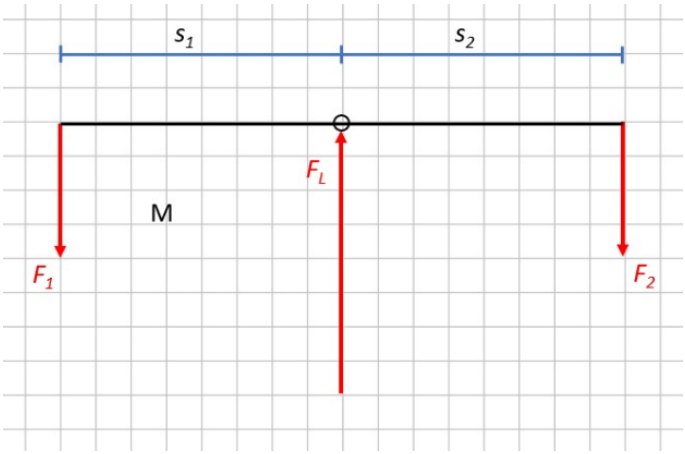
2. Can you balance the lever by doubling the weight on one side?

3. Make a guess as to how the distance s between the center of gravity of the weight and the axis of rotation behaves.



4. Calculate the moments around the axis of rotation resulting from the individual weights and add them together.

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When is the lever mathematically in equilibrium?

What would this mean for the lever length if the weight on one side were doubled?

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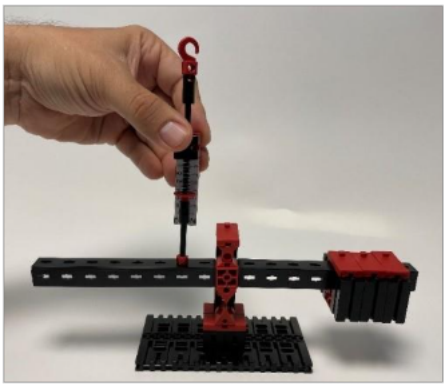
EXPERIMENTAL TASK



Hold the spring balance against the model so that it exerts a vertical compressive force on the left part of the lever arm. Hold it high enough so that the lever arm is exactly in the equilibrium position.

This will determine the weight of the counterweights.

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1. What can you say about the experimental setup?

2. What are the advantages of positioning the scale close to the axis of rotation? What are the disadvantages?

3. What are the advantages and disadvantages of measuring far away from the axis of rotation?

Tip: The lever must always be exactly the same on both sides during the experiments so that the dead weight of the two sides exactly cancels each other out.

For example, if you extend the lever on only one side, the corresponding weight of the extension is added to the actual test weight. The line of action of the weight force also moves away from the axis of rotation, and the resulting moment from this half of the lever becomes greater.