Friction and Mass

**Aim:** To investigate how increasing mass affects the size of friction

**Hypothesis:**

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**Materials:**

• wooden block with hook

• spring balance or force sensor

• 200 g masses

**Method:**

**1** Place the wooden block on a bench top.

**2** Attach the spring balance to the block of wood as shown in Figure 7.2.12.



**3** Measure the size of the force needed to keep the block moving at a constant speed. This is equal to the force of friction. Record this in your results table.

**4** Repeat step 3 twice and record the results.

**5** Add a 200 g mass on top of the block of wood. Measure the friction between the block and the bench top three times and add these results to the table.

**6** Repeat the friction measurements for 400, 600, 800 and 1000 g (1 kg) masses on the block, recording three results for each test.

**Results:**

Table 1: Lino surface

|  |  |  |
| --- | --- | --- |
| Object moving | Friction force measured (N) | Average friction (N) |
| Trial 1 | Trial 2 | Trial 3 |
| Wooden block |  |  |  |  |
| Wooden block + 100g |  |  |  |  |
| Wooden block + 200g |  |  |  |  |
| Wooden block + 300g |  |  |  |  |
| Wooden block + 400g |  |  |  |  |
| Wooden block + 500g |  |  |  |  |

Table 2: Carpet surface

|  |  |  |
| --- | --- | --- |
| Object moving | Friction force measured (N) | Average friction (N) |
| Trial 1 | Trial 2 | Trial 3 |
| Wooden block |  |  |  |  |
| Wooden block + 100g |  |  |  |  |
| Wooden block + 200g |  |  |  |  |
| Wooden block + 300g |  |  |  |  |
| Wooden block + 400g |  |  |  |  |
| Wooden block + 500g |  |  |  |  |

Draw a line graph for the results: Mass (x axis), Average Friction (y axis)

**Discussion:**

1. State the following variables:
2. Controlled
3. Independent
4. Dependent
5. Describe what happened to the size of the force of friction as the mass on the wooden block increased.
6. Describe the difference in force needed to move the block on the carpet and then on the lino. Why do you think there was a difference?

**Conclusion:**