***Aim:*** *To be able to investigate what can affect the force of friction and to include scientific detail in your answers.*

**Investigating Friction: What factors can affect the amount of friction that an object experiences?**

**Task:** You will be using a box that can be filled with masses and dragging it over a variety of surfaces.

**Info:** Before we can get an object moving we need to over come the friction between itself and the surface that it is resting on. The amount of force needed to get the object moving is equal to the friction.

**Variables:**

**There are actually two investigations here. Can you identify the variables for each one?**

**Investigation 1** …………………………………………

Independent ……………………………………………

Dependent ………………………………………………

Control ……………………………………………………

**Investigation 2** …………………………………………

Independent ……………………………………………

Dependent ………………………………………………

Control …………………………………………………….

**Equipment:**

* Mass box
* Newton meter
* Masses
* Surfaces

**Method:**

**Investigation 1 – How does the mass affect friction**

1. Collect equipment.
2. Measure the mass of the mass box and record it in the results table.
3. Place the empty mass box on one type of surface and start to apply force to it in a directly horizontal direction. Record the force at which it starts to move and repeat this twice more.
4. Increase the mass by 100g and repeat for masses up to 500g.

**Investigation 2 – How does the surface affect friction.**

1. Collect equipment
2. Repeat investigation 1 except on a different surface. Repeat until all surfaces have been tested.

**Results:**

**Surface…………………………………………….**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Mass (g) | Friction (N) Test 1 | Friction (N) Test 2 | Friction (N) Test 3 | Friction (N) Av |
| Box ( g) |  |  |  |  |
| + 100g |  |  |  |  |
| + 200g |  |  |  |  |
| + 300g |  |  |  |  |
| + 400g |  |  |  |  |
| + 500g |  |  |  |  |

**Surface…………………………………………….**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Mass (g) | Friction (N) Test 1 | Friction (N) Test 2 | Friction (N) Test 3 | Friction (N) Av |
| Box ( g) |  |  |  |  |
| + 100g |  |  |  |  |
| + 200g |  |  |  |  |
| + 300g |  |  |  |  |
| + 400g |  |  |  |  |
| + 500g |  |  |  |  |

**Surface…………………………………………….**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Mass (g) | Friction (N) Test 1 | Friction (N) Test 2 | Friction (N) Test 3 | Friction (N) Av |
| Box ( g) |  |  |  |  |
| + 100g |  |  |  |  |
| + 200g |  |  |  |  |
| + 300g |  |  |  |  |
| + 400g |  |  |  |  |
| + 500g |  |  |  |  |

**Graph:**  Plot all 3 surfaces on the same graph. Use different colours for each plot.



**Analysis and Conclusion:**

1. How did your investigation go? Were there any difficulties?

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1. How did you ensure that your investigation was both accurate and reliable?

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1. Is there a pattern to your results? Can you explain them?

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1. If you were to repeat the investigation how would you improve it?

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1. What can you conclude from your investigation?

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* Have you included everything that a graph should have?
* Have you included scientific detail in your answers?

**FRICTION! - Bumpy surfaces rubbing and sticking to other surfaces!**

