

Lab: The affect different material surfaces swapped over a lab bench surface have on the coefficient of friction.

Testable Question:

How does the type of material that the object is made of affects Coefficient of friction?

Independent (Manipulated) Variable:

Different surfaces of an object

Dependent (Responding) Variable:

Coefficient of friction

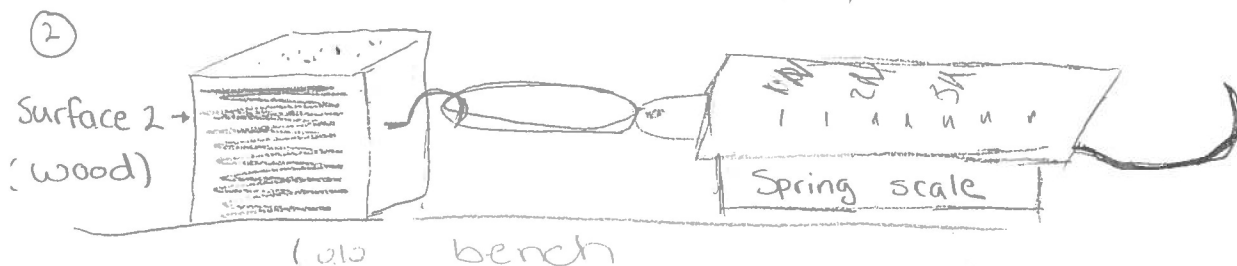
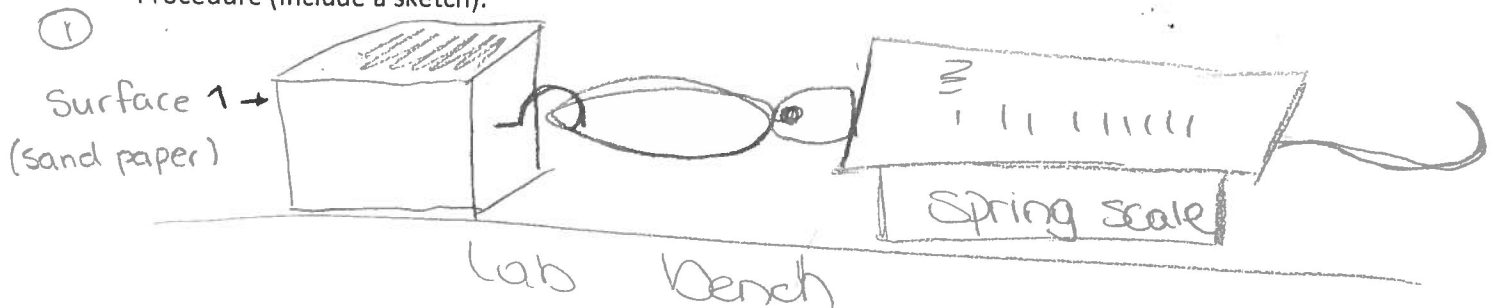
Controlled Variables:

- mass of object
- Velocity of object
- type of floor surface (lab bench surface)
- Same person

Expected Results:

- Smooth surfaces will have less coefficient of friction than rough surfaces.

Procedure (Include a sketch):



Etc....

Observations (a table is the clearest way to present):

The average kinetic Friction of three different surfaces

Object Surfaces	Kinetic Friction			
	Trial 1	Trial 2	Trial 3	Average F_k
Sand paper Surface	0.2 N	0.2 N	0.18 N	$\frac{0.2+0.2+0.18}{3}$ = 0.19 N
Wood Surface	0.15 N	0.17 N	0.10 N	$\frac{0.15+0.17+0.10}{3}$ = 0.14 N
Vinyl Surface	0.4	0.5 N	0.38 N	$\frac{0.4+0.5+0.38}{3}$ = 0.43

Calculations:

$$m = 98g = 0.098 \text{ kg}$$

$$F_N = mg$$

$$= (0.098 \text{ kg}) (9.8 \text{ m/s}^2)$$

$$= 0.9604$$

Sand Paper Surface	Wood Surface	Vinyl Surface
$\mu_k = \frac{F_k}{F_N}$	$\mu_k = \frac{F_k}{F_N}$	$\mu_k = \frac{F_k}{F_N}$
$= \frac{0.19 \text{ N}}{0.9604 \text{ N}}$	$= \frac{0.14 \text{ N}}{0.9604 \text{ N}}$	$= \frac{0.43 \text{ N}}{0.9604 \text{ N}}$
$= 0.1978$	$= 0.1458$	$= 0.4477$
$= 0.20$	$= 0.15$	$= 0.45$

Conclusions:

∴ rough surfaces like the Sand paper had a higher coefficient of friction than smooth surfaces like wood. Vinyl surface feels like it's smooth, but it had a higher coefficient of friction than the other two surfaces, because it's sticky and it will stick to the lab bench surface.