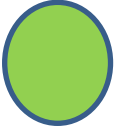

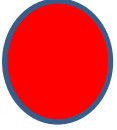


Target – **Conceptualise** friction

-  I can define friction. I can recognise what is and is not an example of friction. I can give my own examples of friction.
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-  I can recognise what is and is not an example of friction.

Friction is –

- a **force**
- **between two objects**
- which **resists movement**
- often changes energy to **heat**

*Your teacher will now show you some **demonstrations** which will let you see some of the **features** of friction and **where it occurs***

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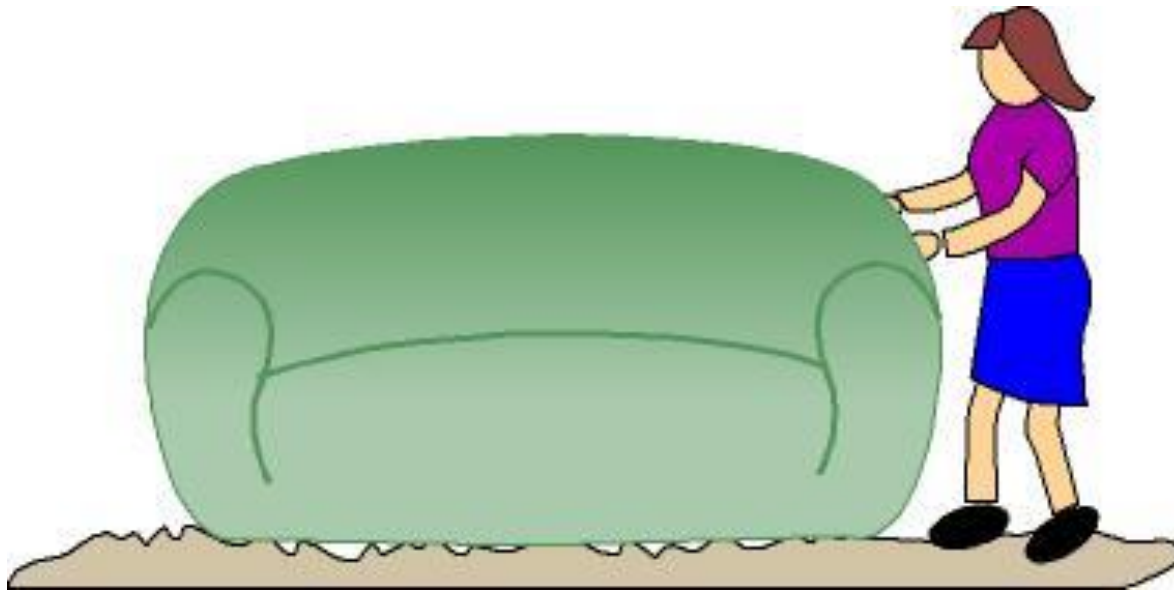
*Helpful or problem?
Big or small?*



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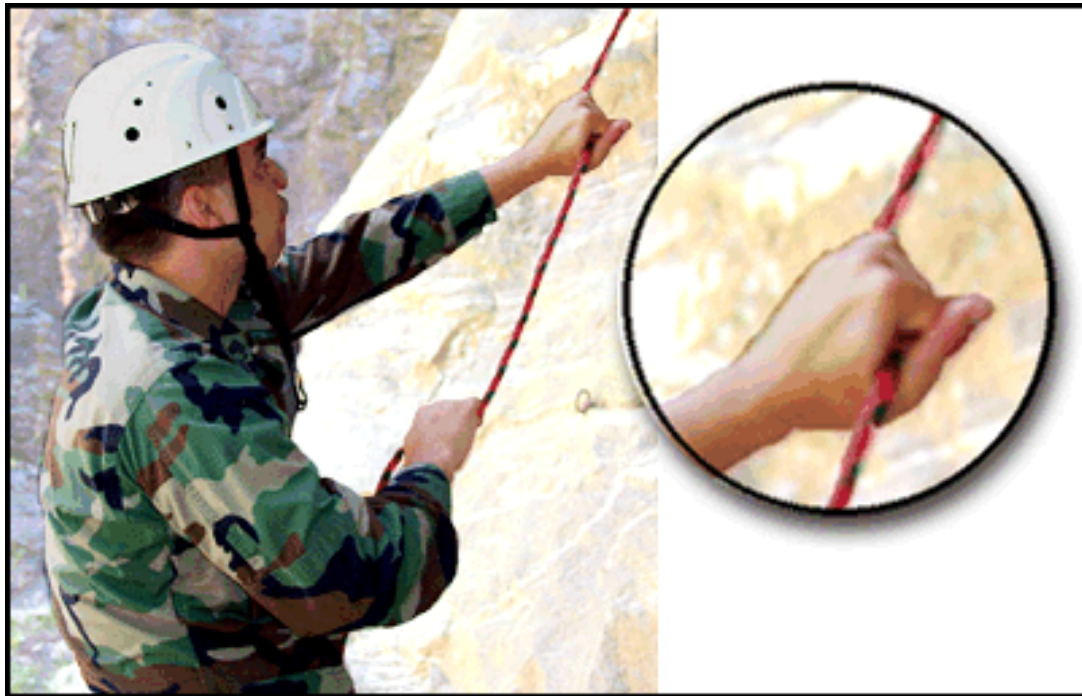
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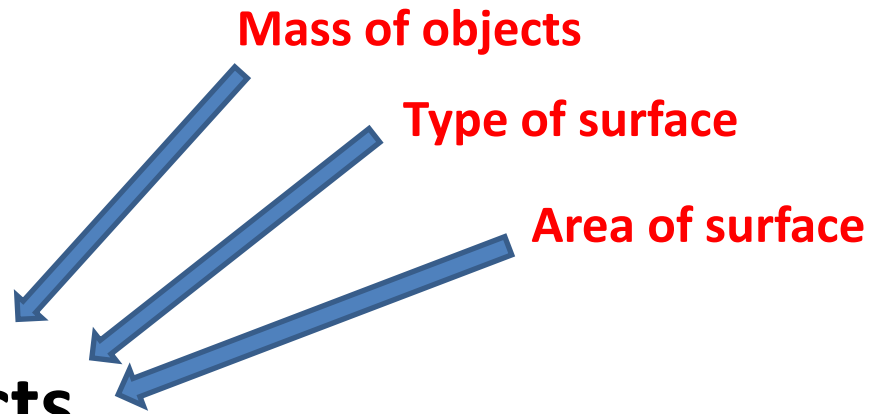
*Helpful or problem?
Large or small?*



Target – **Compare** friction forces

What affects the size of the friction force?

- **a force**
- **between two objects**
- **which resists movement**
- **often changes energy to heat**



Your group will be given **one factor** to investigate.

You need to –

- **Design** your experiment
- **Carry out your** experiment
- Draw a **conclusion** from your experiment.

Report back to the class on

- Our **aim**
- Our **method**
- How we made sure the experiment was **fair**
- How we made sure the results were **reliable**
- What we **concluded**



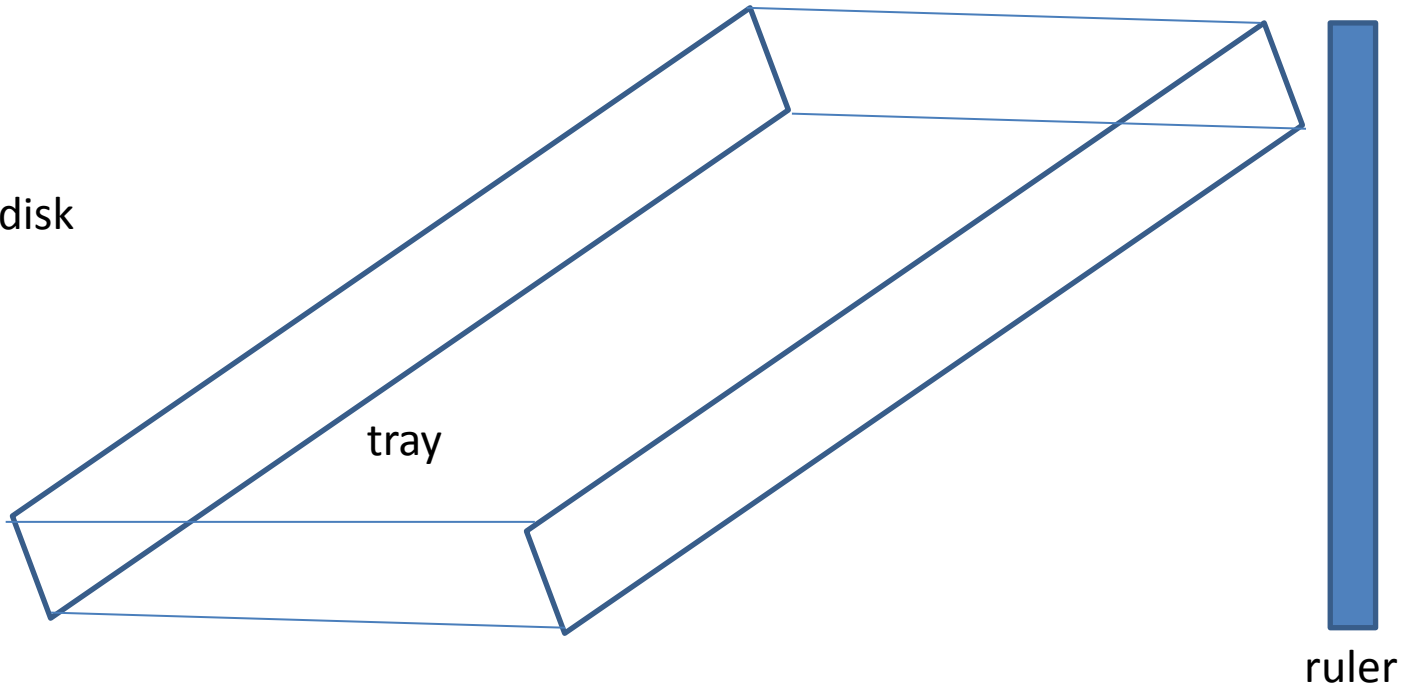
100g masses



Sandpaper disk



Blutack



Aim – to find out **how smoothness of surface** affects the **force of friction**

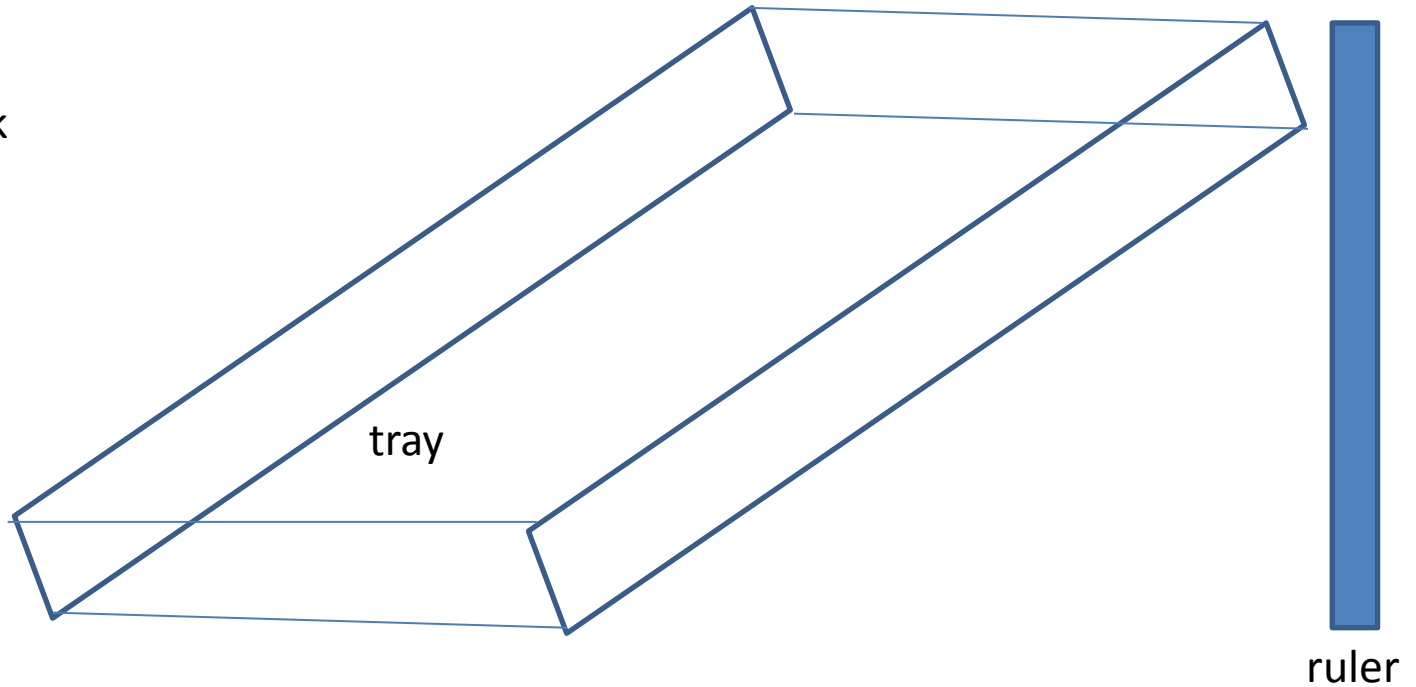
Carry out races to investigate the problem.



100g masses

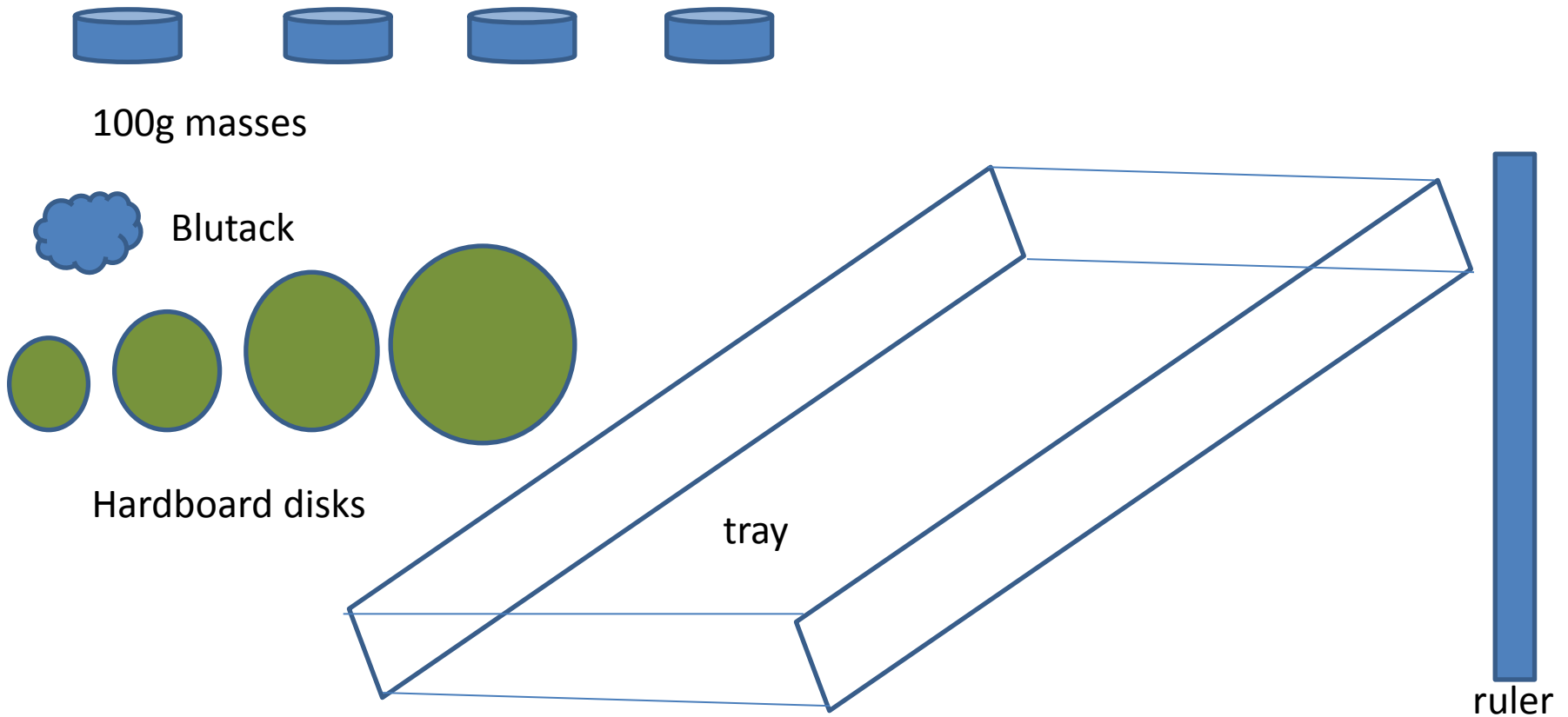


Blu tack



Aim – to find out how **the mass of the object** affects the **force of friction**

Carry out races to investigate the problem.



Aim – to find out how **surface area of the object** affects the **force of friction**

Carry out races to investigate the problem.

Reporting prompts

*We were **trying to find out** how affected*

*To **do this** we*

*The things we had to **keep the same** were*

*To make sure the results were **reliable** we*

***We found that** as the got **bigger**, the force of friction got*

Friction investigations

From our friction investigations we found that –


If the **mass increases**, the **friction force**


_____.

If the **area of the surfaces** in contact **increases**, the **friction force** _____.

To produce a **large** friction force, you should use a _____ surface.

Target – **Control** friction forces

 I can **give 2 reasons** why it is important to reduce friction. I can **list 3** ways in which friction can be reduced. I can **explain** how these work.

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 I can **list 3** ways in which friction can be reduced.

Sometimes you want to make friction forces **larger**, to **generate heat** or **get good grip**.

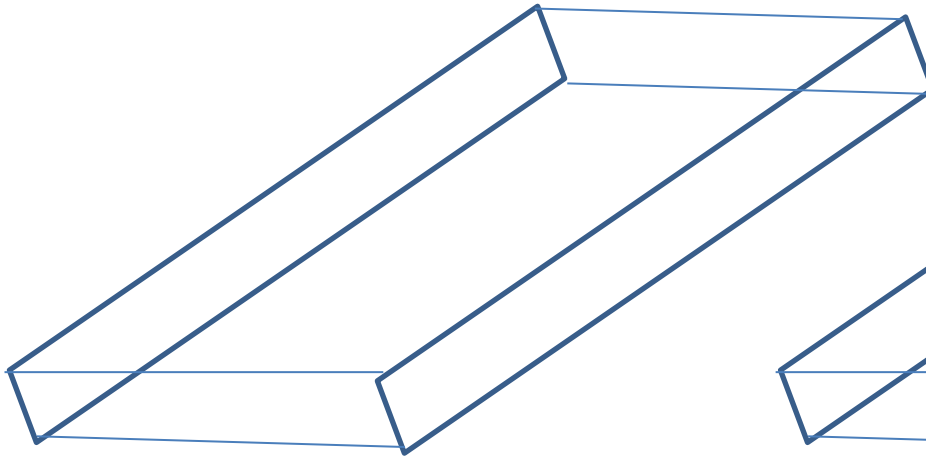
Sometimes you want to make friction forces **smaller** to let machines run **smoothly** or **reduce how much heat is produced**.

How can we control friction forces?

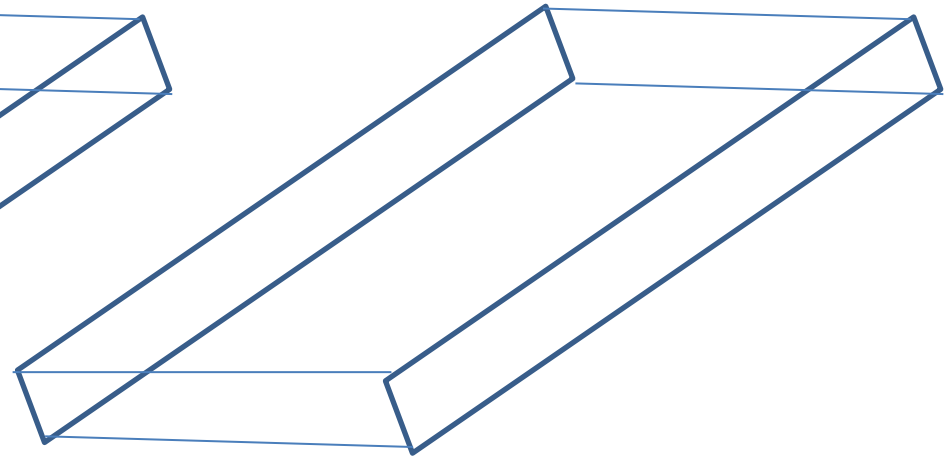


ruler

100g masses



Dry tray



Tray with
detergent

Aim – to find out how a **lubricant** affects the **force of friction**

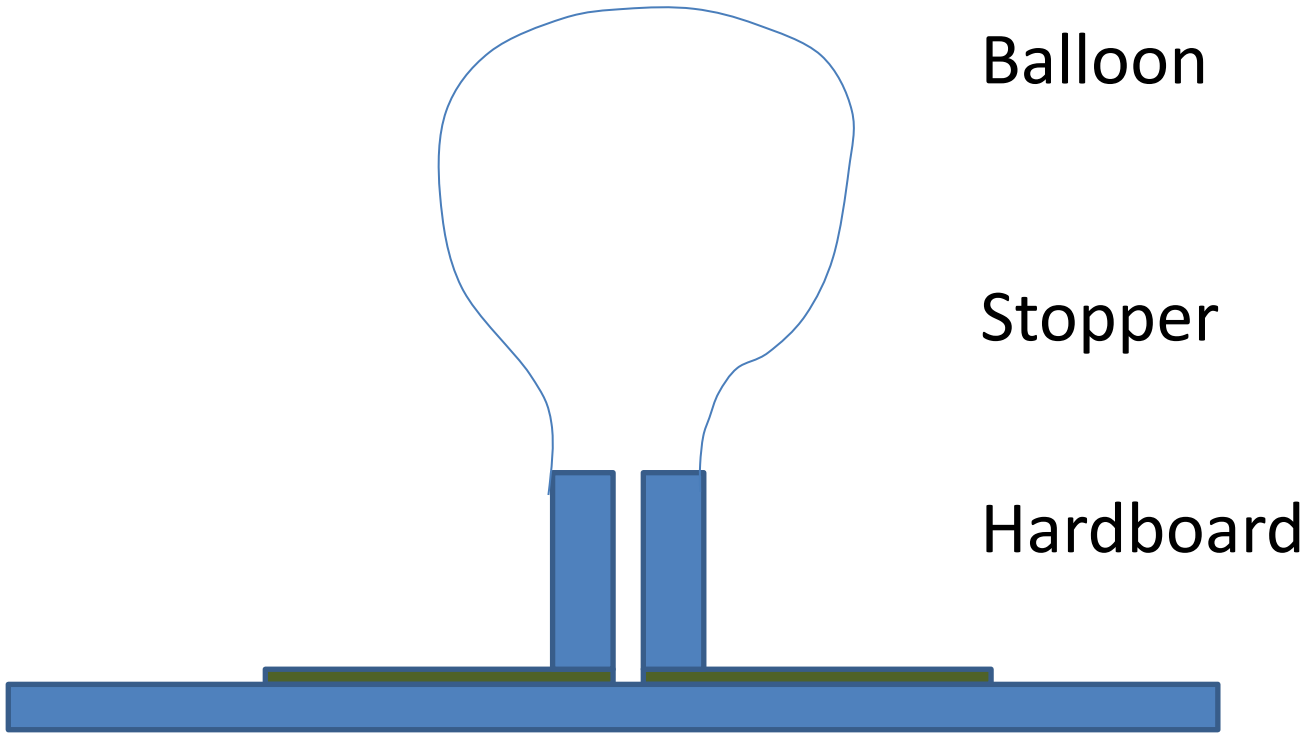
Carry out races to investigate the problem.



The surfaces rubbing between the block and board create friction

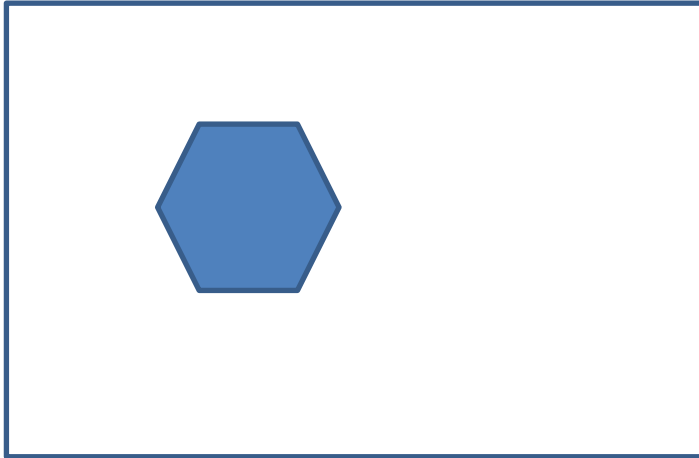


A lubricant is a slippery surface in a layer *between* the two surfaces. This reduces how much they rub together, so lubricants reduce friction. If there is less friction, there will also be less heat generated.



Explain how a balloon puck works

Do rollers and wheels have a bearing on this?



Use the spring balance to find the force needed to pull the 1 kg mass across the tray **at a steady speed**.

Repeat, but with the 1kg mass on **rollers**.

Repeat, but with the 1kg mass on **wheels**.

Repeat in the tray full of polystyrene **beads**.



The surfaces rubbing between the block and board create friction



Putting the block on rollers, wheels or beads **stops as much of the surfaces coming into contact**. If less of the surfaces are in contact, there will be less friction.

Reducing friction

A slippery substance known as a _____ stops surfaces _____ together. This makes friction _____er.

A hovercraft puts a layer of _____ between two surfaces to make friction _____.

Wheels, roller and spheres make the surfaces in contact _____er, so friction is _____.

If friction is smaller, a machine will need _____ energy to keep it going. Reducing friction also reduces how much _____ is produced by machines.



The spray is an example of a _____

It is used to make friction _____



The ball bearings between the inner and outer rings reduce _____.

They will generate _____ heat as they move.



Gymnasts put chalk on their hands to _____ friction.

This gives them better _____.



Olympic snow boarders put wax on their boards. This is _____ friction to help them slide _____.