

How could you  
walk on a wall,  
like this?

Discuss the  
forces at work  
in this  
photograph.



By the end of this lesson I will be able to:

**All:** identify drag forces and friction  
(developing)

**Most:** describe the effect of drag forces  
and friction (secure)

**All:** explain why drag forces and friction slow  
things down (extending)

**I will be working scientifically to:**

- make a prediction you will
- record measurements
- describe what your results show.

Rub your hands together for a minute.  
How does that feel?

What causes the heat?

There is resistance to the rubbing motion.  
The name of this resistant force is Friction

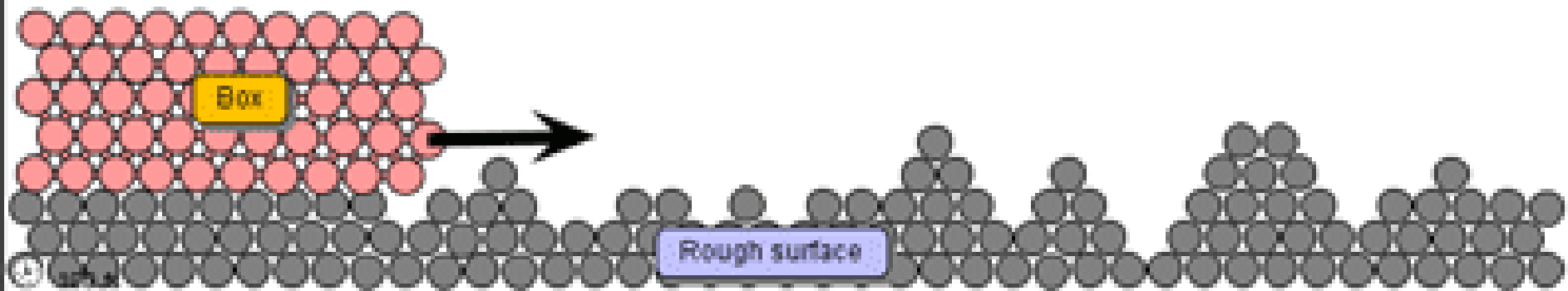
Friction:

- Produce heat
- Wear things away
- Slow things down
- Make a noise



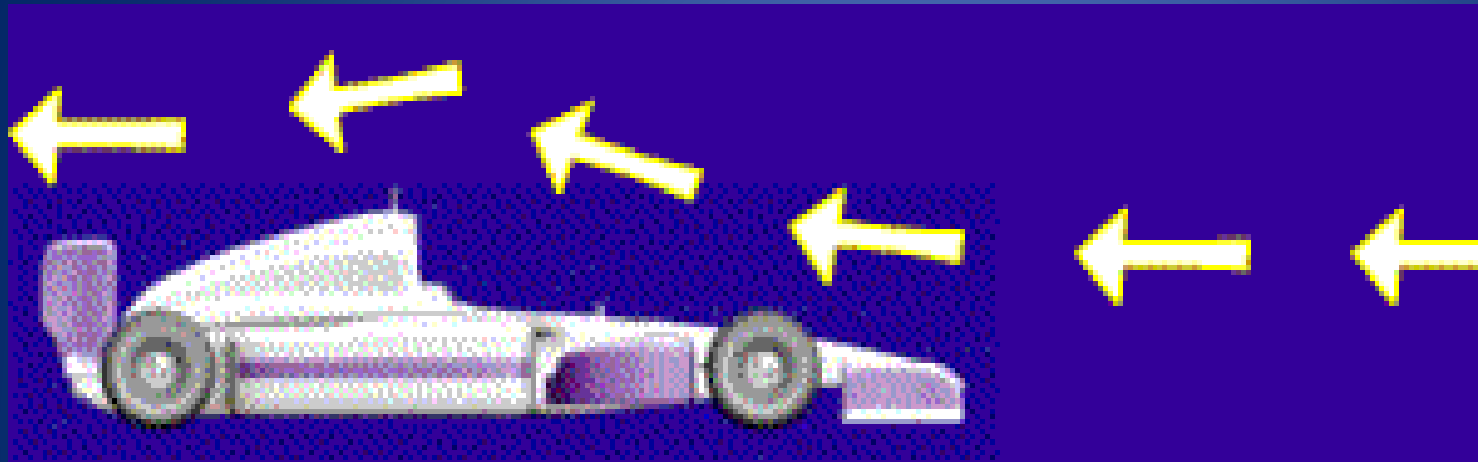
- Friction always tries to slow moving objects down. It **opposes motion**.
- It is a force between 2 touching objects.

A microscopic model of friction





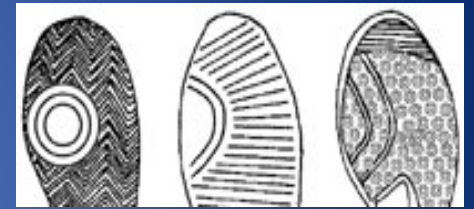
# Drag





# Method

1. Take off your shoe
2. Draw a diagram of the tread. E.g.



3. Pull your shoe across the floor, how hard is it do this out of 10? Add to your table! Try with your P.E. shoe or your pencil case. Add that to your table too!



# Investigating friction

## Safety

- Be careful not to break the 2m rule if moving around.

## During the practical

1. Complete a table sheet each.
2. Tidy up your area before sitting down.
3. Complete the questions after the table.

## Questions after the practical in your books

1. Why do footballers have studs on their shoes? Explain the difference in terms of friction.
  2. Why does a car stop when you apply the brakes?
  3. Why is it harder to travel through water than through air?
- ★ Suggest why the hinges on a door need to be lubricated.

# Questions after the practical in your books (stuck use page 116 of the textbook)

1. Think about what you've just discovered about surfaces:
    - A. What features do the soles of shoes have that make them good for sports?
  2. Why does a car stop when you apply the brakes?
  3. Why is it harder to travel through water than through air?
  - Suggest why the hinges on a door need to be lubricated.
- 
- Football and running shoes may have a big tread (very rough surface) to increase the friction and grip.
  - Ballet shoes are the opposite low tread (smooth) to decrease friction

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  - Suggest why the hinges on a door need to be lubricated.

- Cars rely on friction at the brakes and tyres in order to stop. And friction between the road and the tyres. When you break the friction increases to slow the car.



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- Suggest why the hinges on a door need to be lubricated.

- When objects travel through air or water, effort is required to push the air and water particles out of the way. This slows down the object.

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  2. Why does a car stop when you apply the brakes?
  3. Why is it harder to travel through water than through air?
- Suggest why the hinges on a door need to be lubricated.

- You need to lubricate hinges to reduce the friction to make it easier for the door to open.

# You should be able to:

**All:** identify drag forces and friction (developing)

**Most:** describe the effect of drag forces and friction (secure)

**All:** explain why drag forces and friction slow things down (extending)



# How do these things effect friction and drag?

- rough surfaces
- moving slow
- smooth surfaces
- moving in liquid
- streamlined shape
- lubrication
- non-streamlined shape
- small tread
- moving fast
- large tread

## Increase

rough surfaces  
moving in liquid  
non-streamlined shape  
moving fast  
large tread

## Reduce

moving slow  
smooth surfaces  
streamlined shape  
lubrication  
small tread