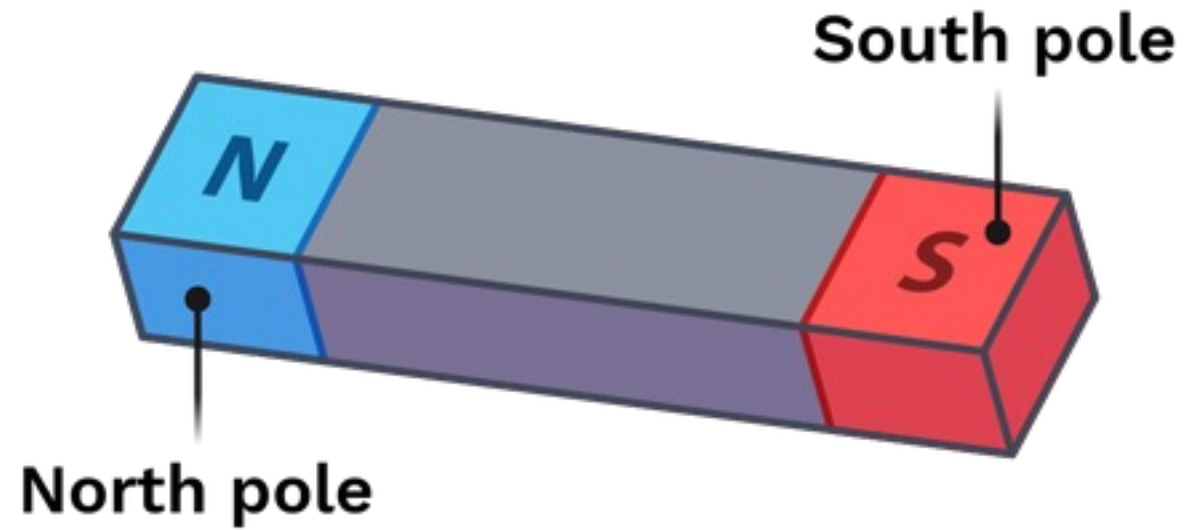
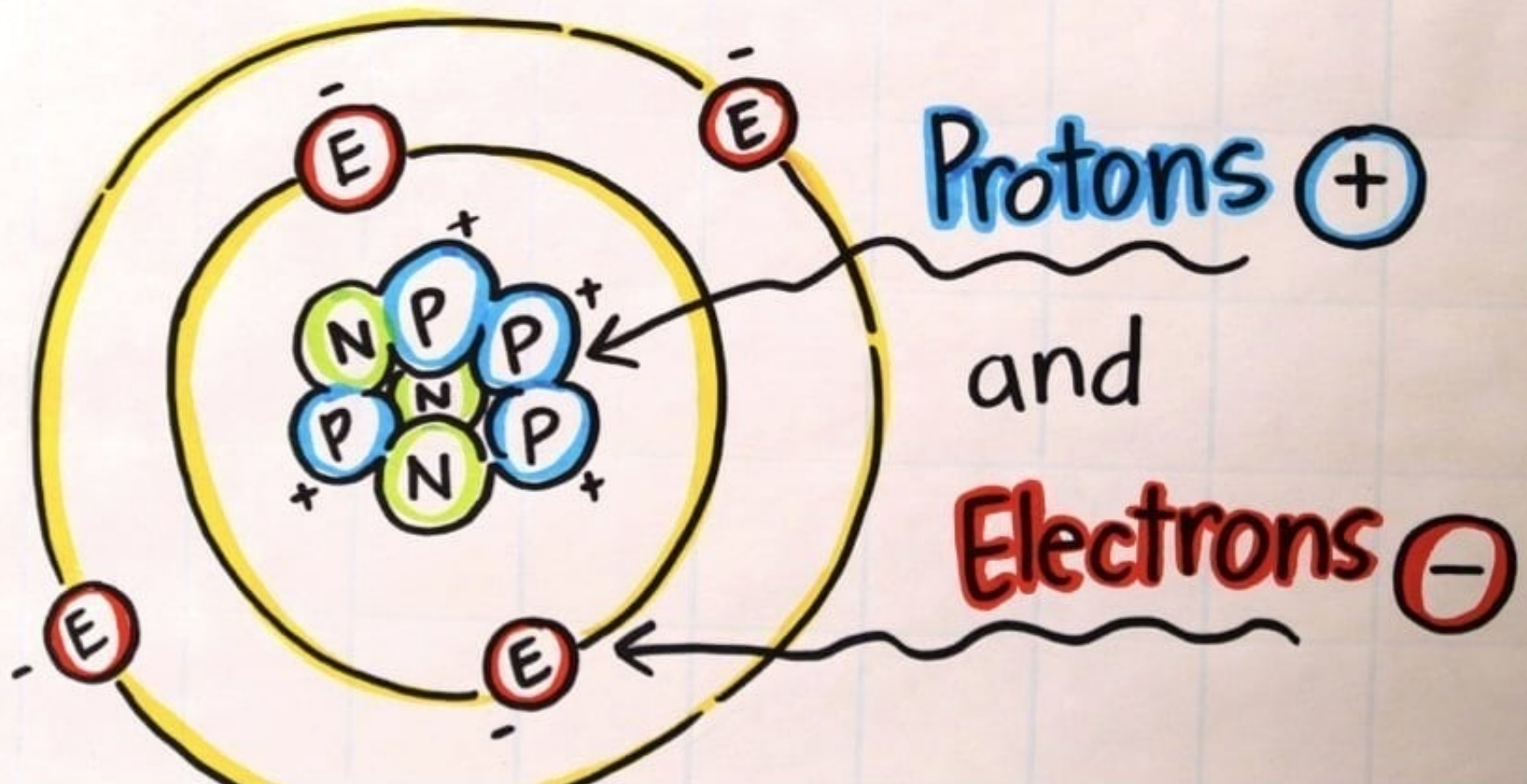


# Magnets



Atoms  $\dashrightarrow$  have



Protons (+)

and

Electrons (-)

Atoms





## Types of Magnet

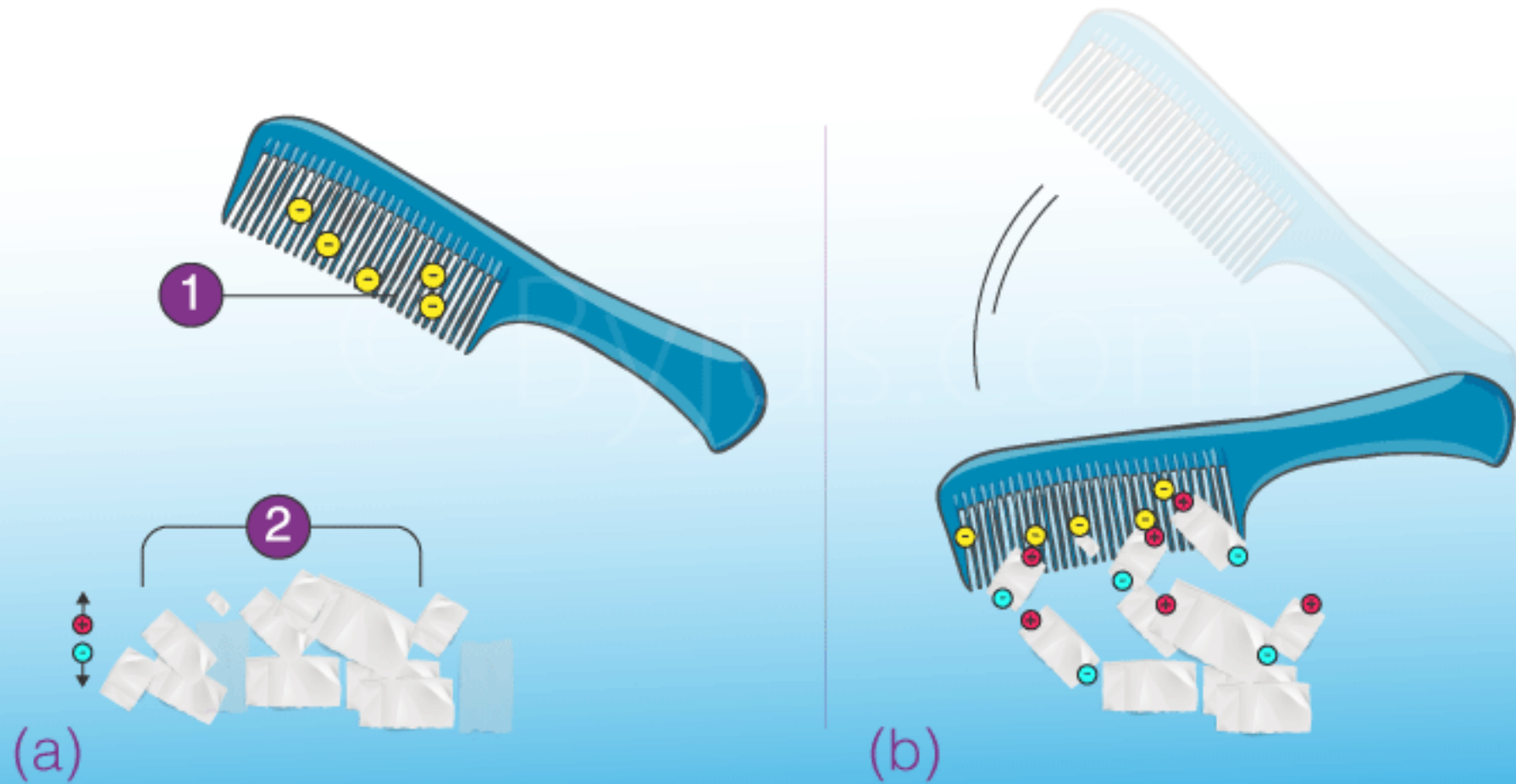
```
graph TD; A[Types of Magnet] --> B[Temporary Magnets]; A --> C[Permanent Magnets]; A --> D[Electromagnets];
```

Temporary Magnets

Permanent Magnets

Electromagnets





1 Charged comb | 2 Pieces of paper

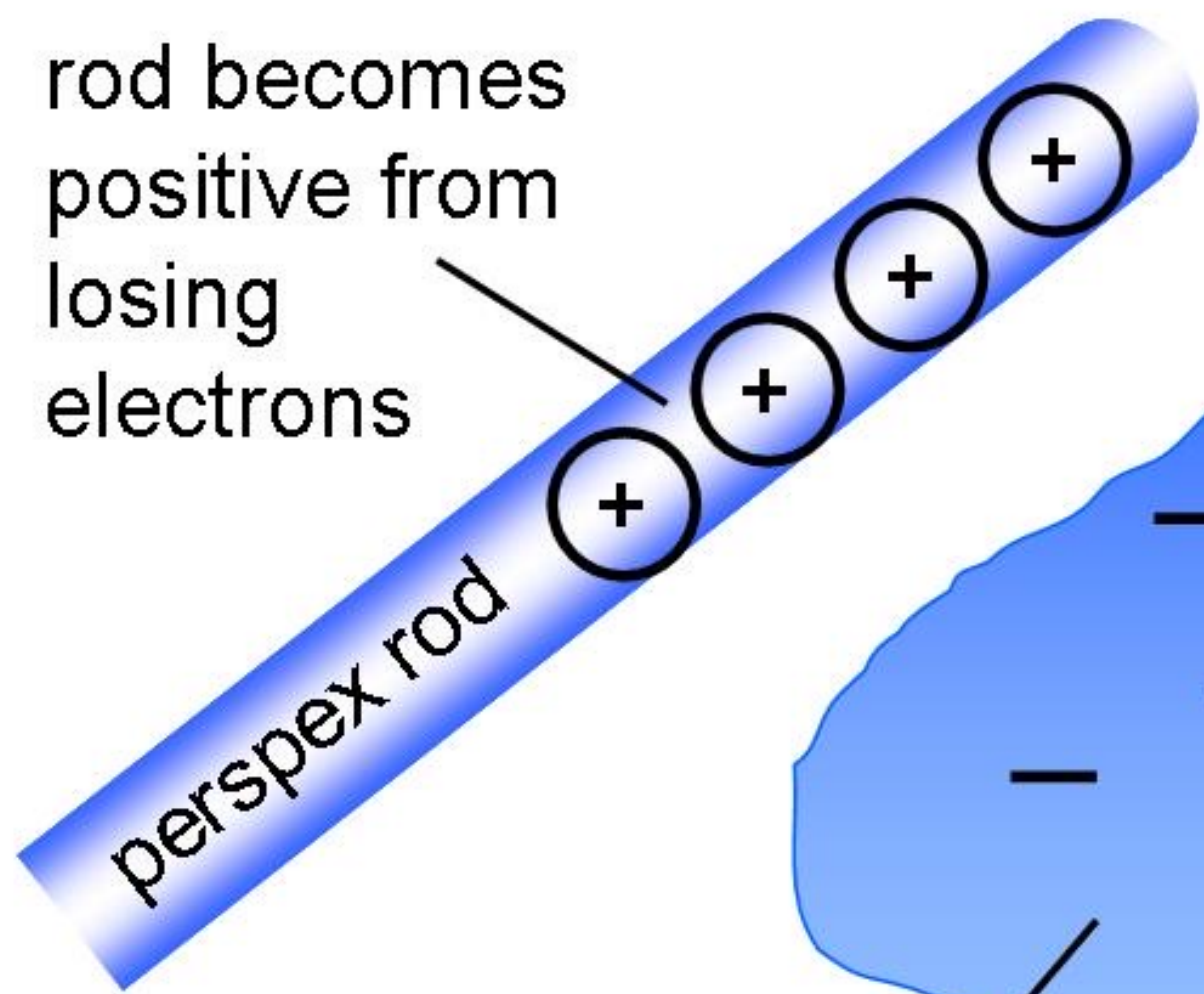
(b) The comb attracting small pieces of paper with static electricity.



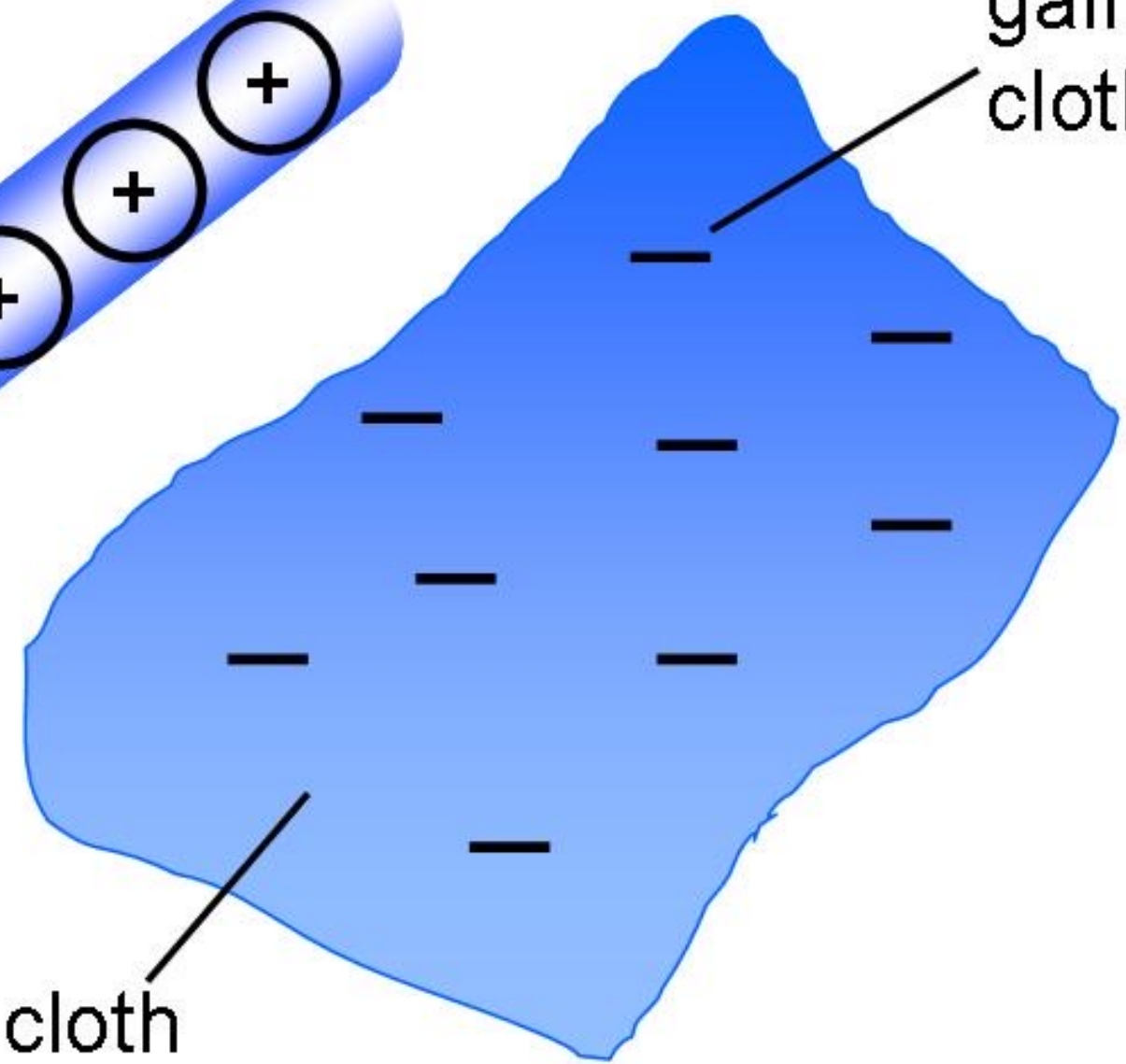
## Easy Static Electricity Science Experiments







rod becomes positive from losing electrons



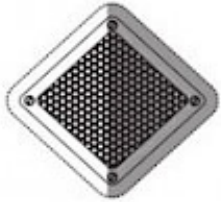
dry cloth

electrons gained by the cloth

## Permanent Magnet



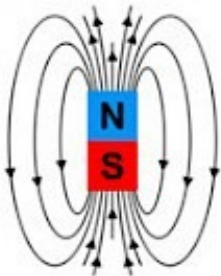
Permanently Magnetised



Made of Hard  
Magnetic Materials



Magnetism doesn't  
vary in strength



Magnets' poles  
cannot be altered

## Electromagnet

Temporarily Magnetised

Made of Soft  
Magnetic Materials

Magnetism can be varied in  
strength according to needs

Magnets' poles can  
be modified



# Concept Map

Magnetism

Classification of Magnets

- Natural Magnets
- Artificial Magnets
  - Temporary
  - Permanent

Properties of Magnets

- Attractive
- Repulsive
- Directive

Magnetic Materials

- Diamagnetic
- Paramagnetic
- Ferromagnetic

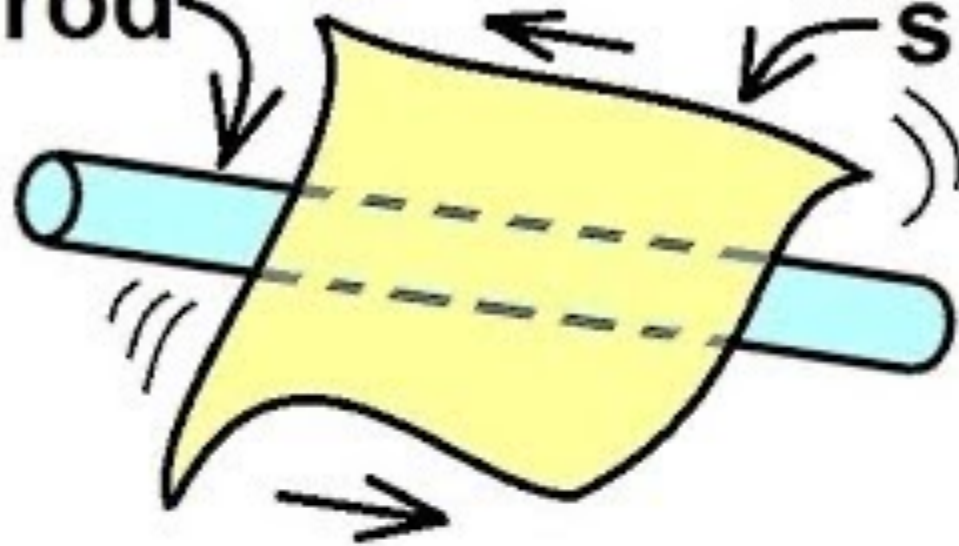
Uses

- Dynamo
- Hard disk
- Maglev train

## Charging with a Silk Cloth

glass rod

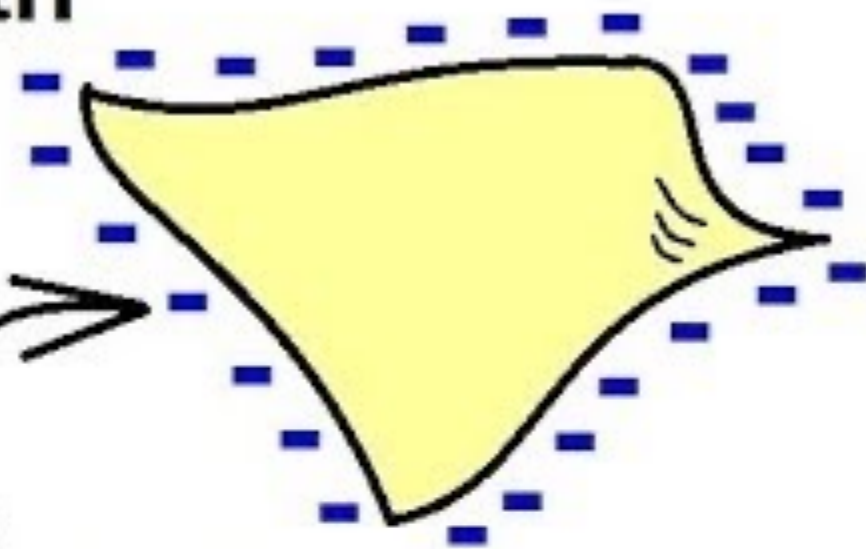
silk cloth



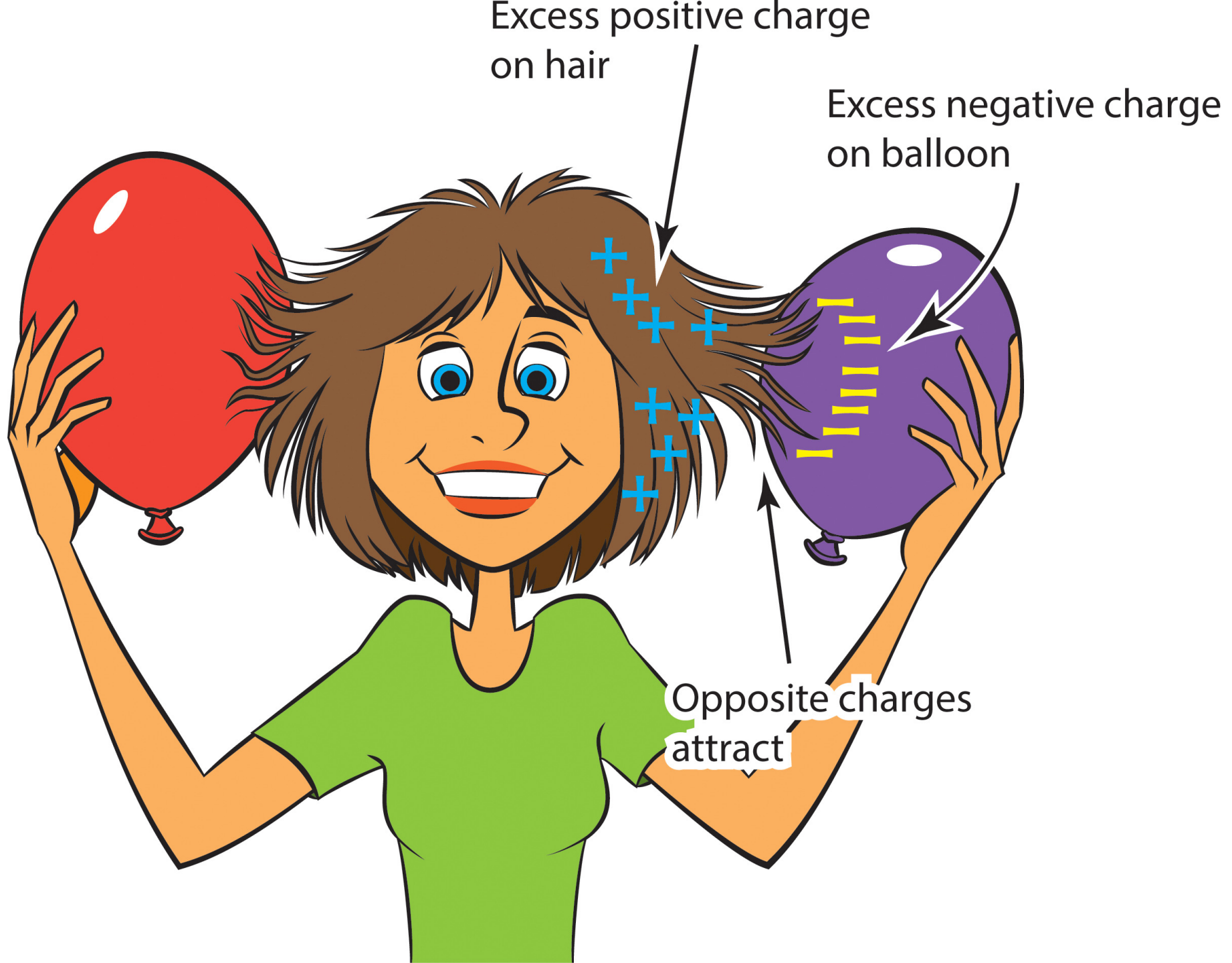
When rubbing the glass rod the rod will become **positively** charged



The silk cloth when placed in contact with the rod will attract the **negative** charges ( $e^-$ ) more strongly.







Discharge within cloud  
between negative base  
and positive top  
(Intra-cloud)

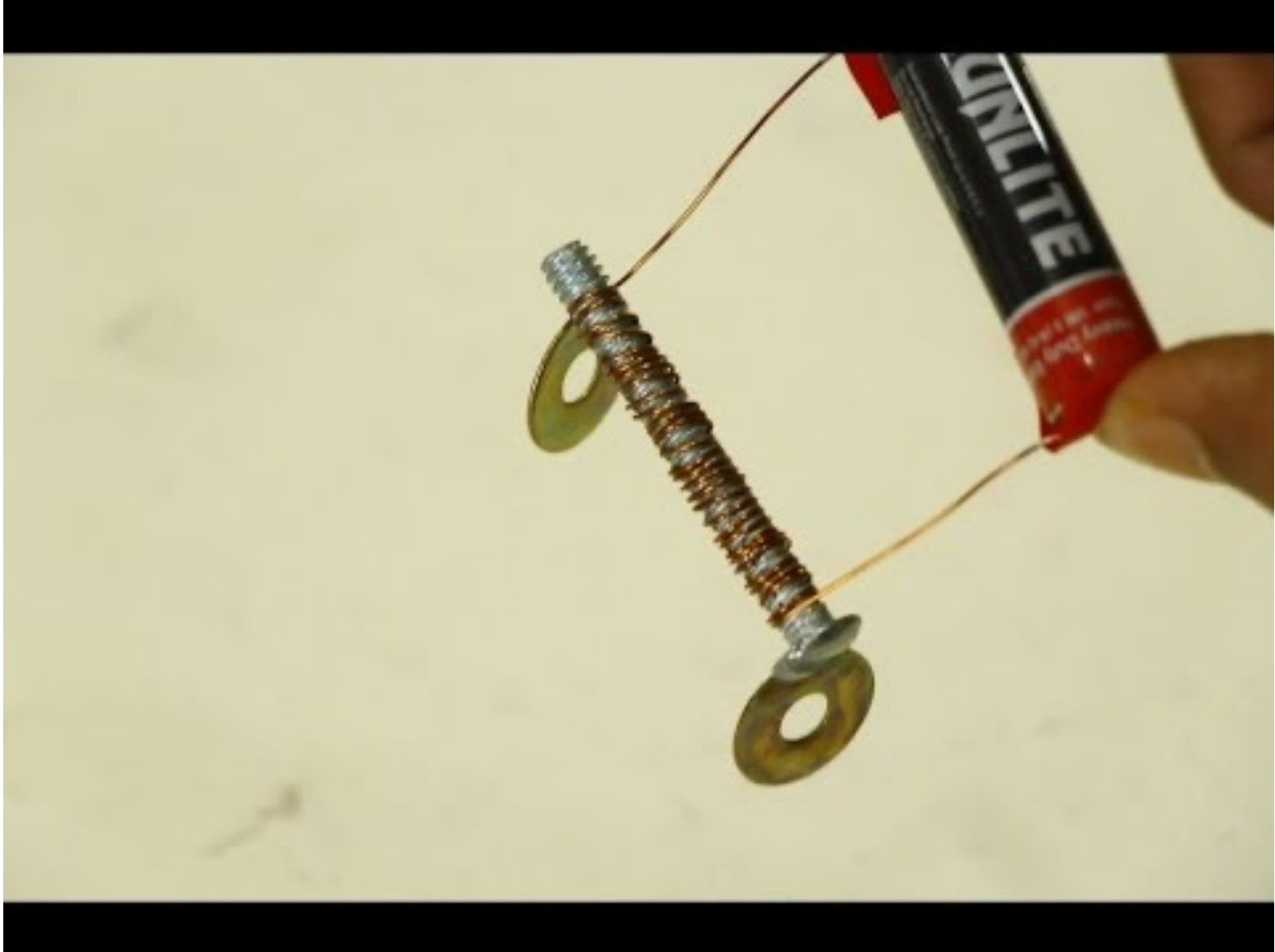


Discharge between the  
negative and positive  
areas of two clouds  
(Inter-cloud)



Discharge between the  
negative base of a cloud and the  
positive ground below it  
(cloud-to-ground)









# STATIC ELECTRICITY IN WINTER

**COLD AIR HOLDS LESS MOISTURE  
MAKING IT DRIER IN THE WINTER**

**DRY AIR MEANS LESS WATER VAPOR  
TO CONDUCT CHARGE AWAY FROM YOU**

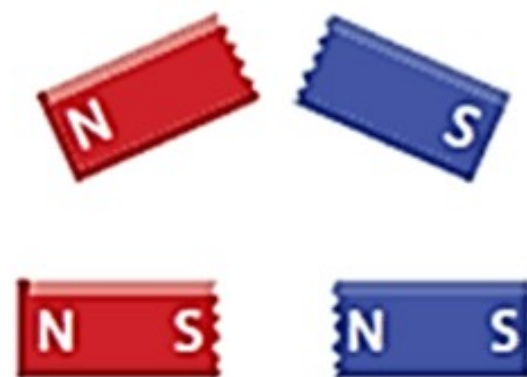
**THE LOWER THE HUMIDITY THE HIGHER  
THE VOLTAGE OF STATIC DISCHARGE**



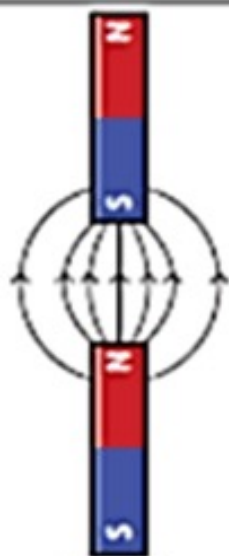
Magnets attract objects made of iron, nickel and cobalt.



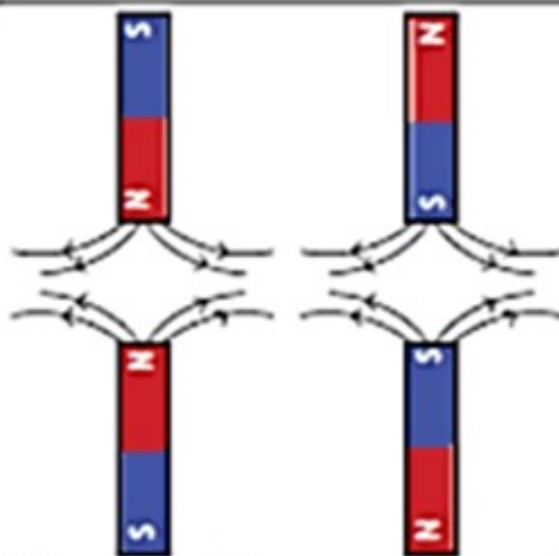
Magnets have two poles, the north pole (N) and the south pole (S).



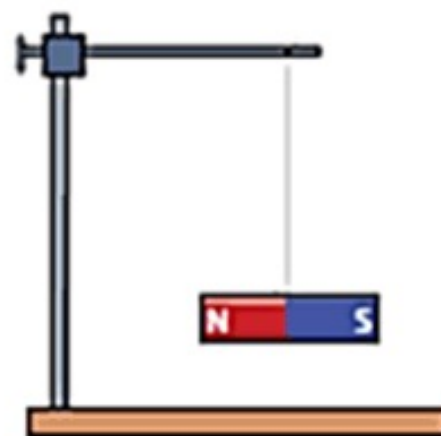
Poles always exist in pairs. They cannot be separated.



Opposite poles of two magnets attract each other.



Like poles of two magnets repel each other.



If a magnet is suspended freely by a thread, it aligns itself in the north-south direction.

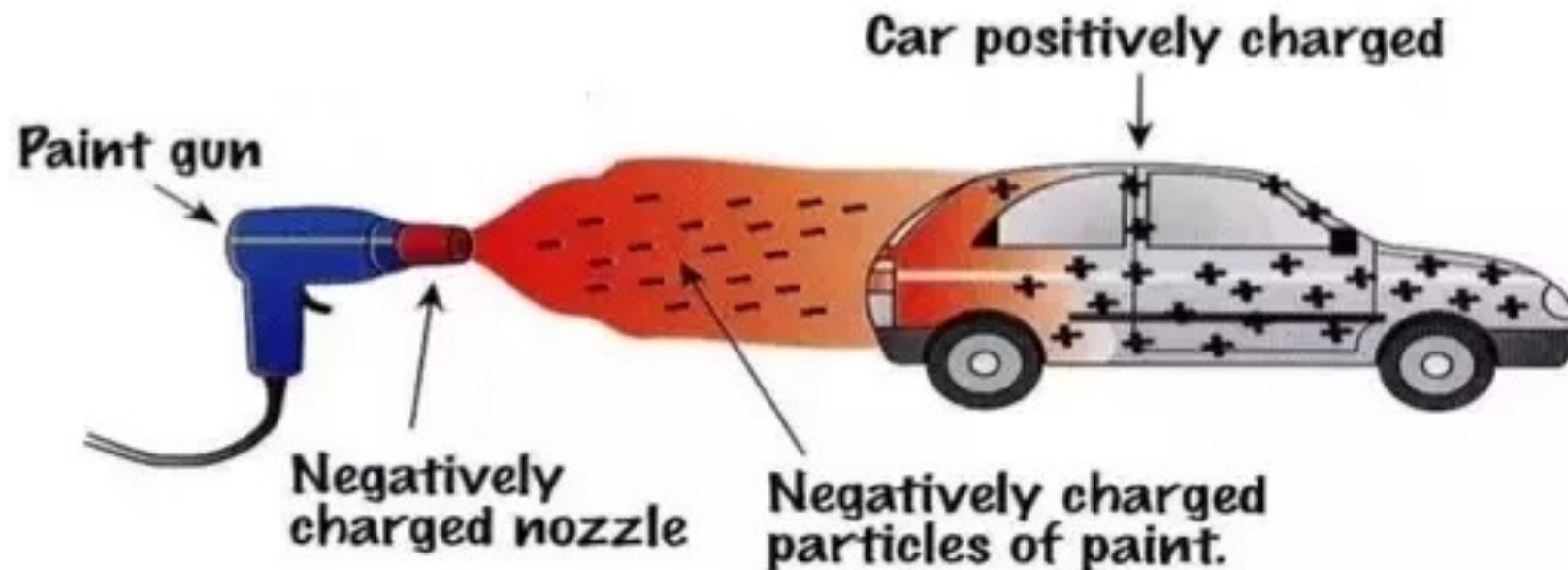


## Static Electricity : Useful Charging

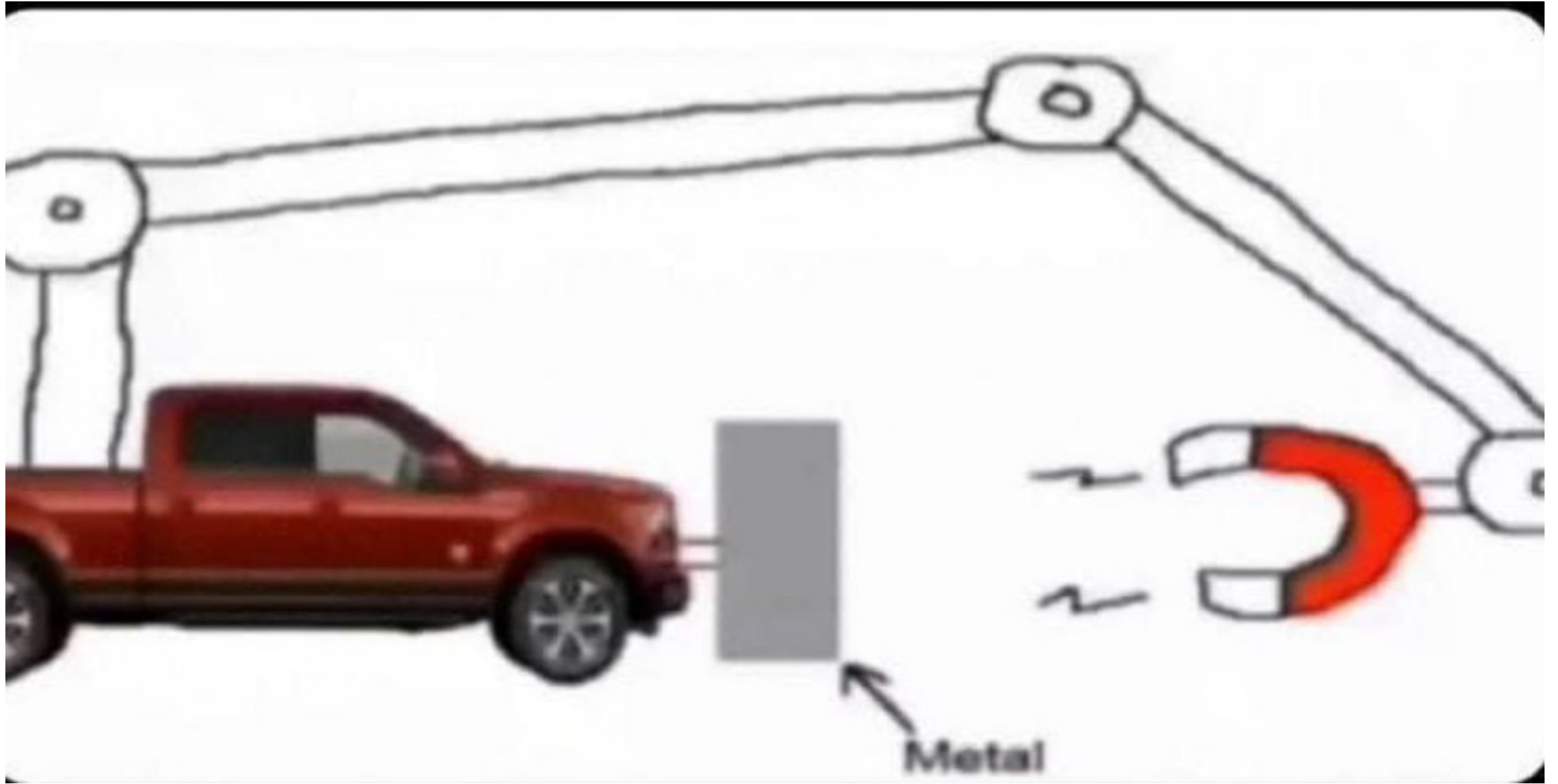
The paint is charged as it comes out of the nozzle.

The paint is attracted to the car.

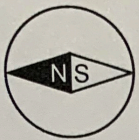
The car must be earthed or connected to a positive voltage.

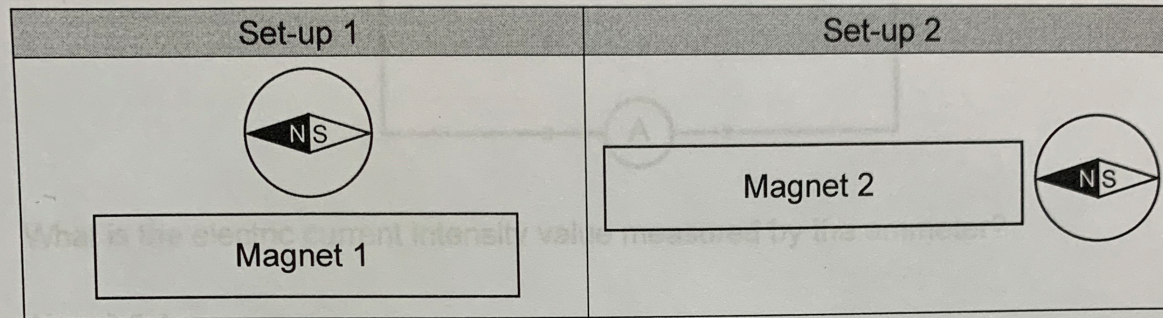






2. Two set-ups, each consisting of a compass placed near a bar magnet, are represented below.

The symbol  represents a compass.



Which of the following choices (A, B, C or D) correctly indicates the poles of the magnet in each set-up?

	Magnet 1	Magnet 2
A)	S N	N S
B)	S N	S N
C)	N S	N S
D)	N S	S N



7. A straw made of polypropylene (type of plastic) was rubbed with wool.

The triboelectric series (electrostatic list) below can be used to predict the charges on two objects after they are rubbed together.

TRIBOELECTRIC SERIES (ELECTROSTATIC LIST)

Acquires negative charges	Polypropylene
↑	Ebonite
	Rubber
	Paper
	Silk
	Wool
	Gives up negative charges

As the straw is brought close to an open book, a page moves up close to the straw.

Which of the following statements correctly explains why the page moves up close to the straw?

- A) The straw is positively charged and attracts the neutral paper.
- B) The straw is positively charged and attracts the negatively charged paper.
- C) The straw is negatively charged and attracts the neutral paper.
- D) The straw is negatively charged and attracts the negatively charged paper.

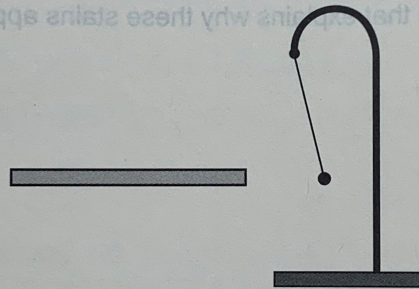


3. In a laboratory experiment, you rub a vinyl ruler with a piece of wool. These materials become charged according to the following triboelectric series (electrostatic list).

### TRIBOELECTRIC SERIES

Acquires negative charges	Ebonite
↑	Cotton
↑	Vinyl
↑	Silk
↑	Wool
↑	Glass
Gives up negative charges	Acetate

When you bring the ruler close to a suspended charged sphere, there is repulsion.



Which of the following choices (A, B, C or D) correctly indicates the charge on the ruler and the charge on the sphere?

	Charge on the ruler	Charge on the sphere
A)	+	+
B)	+	-
C)	-	+
D)	-	-