❁Bismillaahirrohmaanirrohiim❁

Doing an Experiment

Anya had an assignment from her science teacher about a 'force'. She already learned that a force can be a pull or a push. Her teacher asked her to measure the distance of a toy car if it's being pushed in different track surfaces, on the floor, carpet, and pavement.

To make a fair science experiment, the only variable she changed is the surface track. For the other variable, she made them similar. She used the same toy car. She also tried to push using her hand force as equal as possible.

This is the result of the experiment she did.

The surface	The distance
the floor	30 cm
the carpet	24 cm
the pavement	18 cm

The next day, she discussed her experiment result in her class with her teacher and friends.

Teacher : So, on which surface does the car move with the longest distance?

Students : On the floor.

Teacher : And how about the shortest distance?

Students : On the pavement.

Teacher : Now, who can tell me why the result is different? Anya, please.

Anya : Because the floor is smooth, so the car can move further. But the pavement has rough surface so the car moved slower.

Teacher : Ok, good. Now my question is, when you push a toy car on any surface, do you think the car will eventually stop?

Students : Yes.

Teacher : Do you know why?

Students : (confused)

Teacher : You already know that there are two kinds of force, right?

Anya : Yes. Push and pull.

Teacher : There is one more kind of force. That's called 'FRICTION'. This force works in the opposite direction of the object that is moving across it. The floor, the carpet and the pavement have this force.

Friction is what happens when any two things rub against each other. When the car tires rub the floor, carpet or pavement, it created 'friction' that slow down the car movement.

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NOTES :

- ✓ **When you kick a ball or push a toy car, it gradually slows down and stops. The force that makes the ball or the toy car slow down is friction.**
- ✓ **Friction are affected by two things:**
  - ✓ **The nature of both surfaces.**
  - ✓ **The weight which both surfaces are pressed together.**
- ✓ **Friction occurs between two surfaces that are touching, such as the surface of the ball and the ground or the surface of the toy car tires and the floor.**
- ✓ **Friction is a force that opposes motion/movement. So,**
  - ✓ **The rougher the surfaces of the things that rub each other, the higher the friction is.**
  - ✓ **The smoother the surfaces of the things that rub each other, *the lower* the friction is.**

Do it at home with your parents.

Which things have more friction?

Take one chair and try to push it for at least 1 metre on different surfaces:

- on the carpet
- on the floor

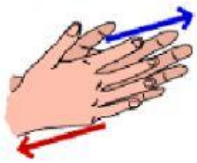
Which surface has more friction? _____

Which surface has less friction? _____

FRICTION IS EVERYWHERE

Friction is what happens when any two things rub against each other. It can happen between **solids, liquids and gases**.

The examples **for solids friction:** Your two hands are rubbing together, or your skis are rubbing on the snow.



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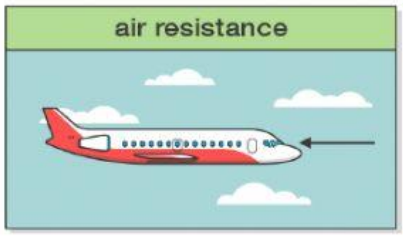
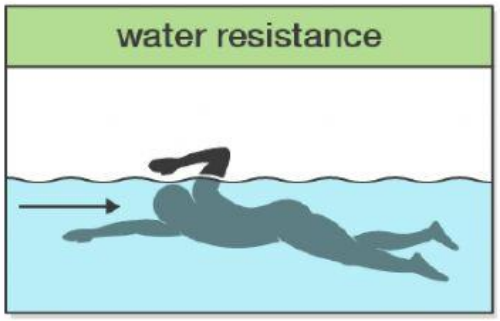
The examples **for gases or is called Air resistance:** ***Air resistance*** is a type of *friction* between air and another material.

For example, when an aeroplane flies **t**hrough the air, air particles hit the aeroplane making it more difficult for it to move through the air another example is the air slowing down your car or someone do skydiving.



The examples **for liquids or is called water resistence**: the friction occurs when something moves through the water so its surface rub against the water.
e.g when the water slowing down a boat, someone swimming or fish swim in the water.



Frictional forces

Beside 'a push' and 'a pull', there is one more force you've learned. It's FRICTION.

Whenever an object moves against another object, it feels **frictional** forces. These forces act in the opposite direction to the movement. Friction makes it harder for things to move.

Useful frictional forces

- Friction can be useful:
  - friction between our shoes and the floor stop us from slipping
  - friction between tires and the road stop cars from skidding
  - friction between the brakes and wheel help bikes and cars slow down
- Frictional forces are much smaller on smooth surfaces than on rough surfaces, which is why we slide on ice. Friction may not be useful when you slide on ice. However, if you want to

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stop sliding or turning your slide, friction is useful. Without friction, you won't be able to stop sliding or turning your slide.

- Friction can produce heat to keep warm such as when we rub our palm together in cold weather.

Not useful frictional forces

- Friction can also be not useful. If you don't lubricate your bike regularly with oil, the friction in the chain and axles increases. Your bike will be noisy and difficult to pedal.
- While flying in the sky, the friction between the air and clouds with the plane is not useful because it slows down the movement of the plane.
- Friction can causes wear and tear. For example when we use our shoes for a long time our soles in the shoes will be more thin or worn out that because there is friction of shoes and road that we pass by.
- Friction can produce heat that is not useful. For example the moving parts of machines can become too hot and damage the machine.

Useful and Not Useful Friction

- Frictions are not useful when you want to move something because frictions can slow down the movement. However, frictions are useful when you want to stop something from moving or turn the direction of something.

Answer the question below.

Rooney wanted to make a track for his toy car. His father bought his a piece of wood for him. Rooney, then, cut the piece of wood. However, when he pushed his toy car on the track, it didn't run too far because the surface is rough. Tell me things he can do to make his car move farther on the track he made?

_____

_____

❁Alhamdulillaahirobbilaalamiin❁

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