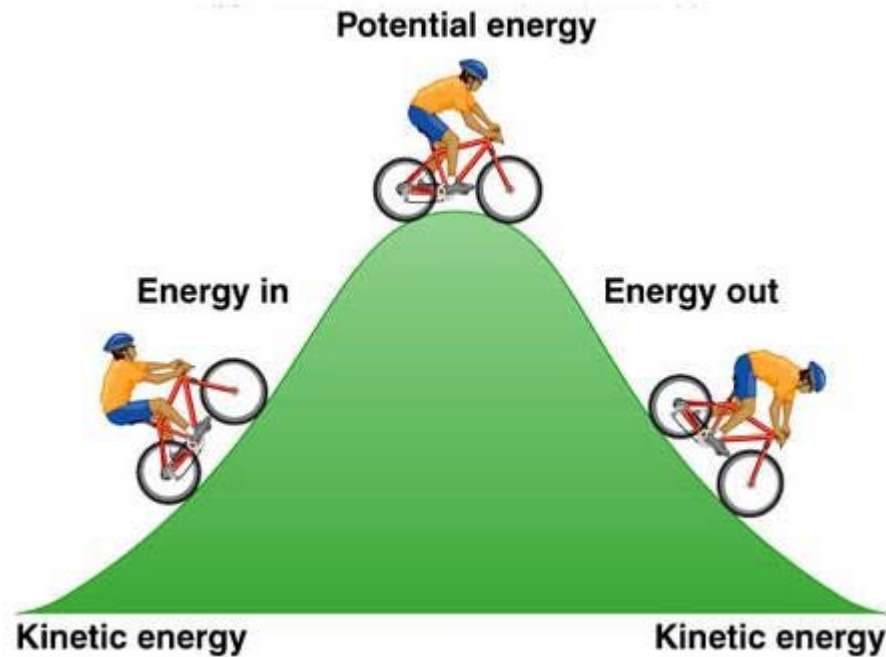


# Law of Conservation of Energy



## Outcome:

S2-3-09 Investigate the conservation of energy in a motor vehicle collision.

# The law of Conservation of Energy:

The Law of Conservation of Energy states that:

- **ENERGY CANNOT** be **LOST** or **CREATED**, but can only be **TRANSFORMED** or converted into different **FORMS OF ENERGY**.

In a car crash, in addition to **CONVERTING** energy from one form to another, energy is also **TRANSFERRED**:

- From the **CAR** to the **PAVEMENT**.
- Through the **BODY** of the car.
- Through the **PASSENGERS** in the car.



# The law of Conservation of Energy:

In a car collision, huge amounts of kinetic energy are converted and transferred to other systems. Energy can be converted to several different types of energy, such as;

1. **KINETIC** energy
  - The energy of **MOTION** (e.g., wheels turning)
2. **POTENTIAL** energy:
  - the energy of **POSITION** with respect to the surface of the **EARTH** (e.g., an object falling from two stories up will not reach as great a final velocity and kinetic energy as an object that falls from 16 floors up)
3. **HEAT** energy:
  - The energy of **MOLECULES** in **MOTION** (e.g., smoke rising from an engine)
4. **SOUND** energy:
  - The **DISTURBANCE** of **MOLECULES** (e.g., a loud crashing sound)

# Friction

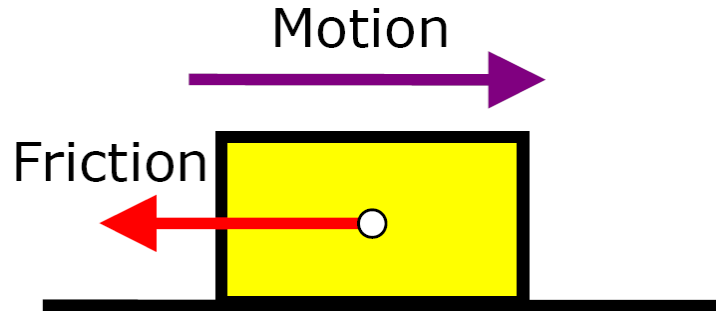


## Outcome:

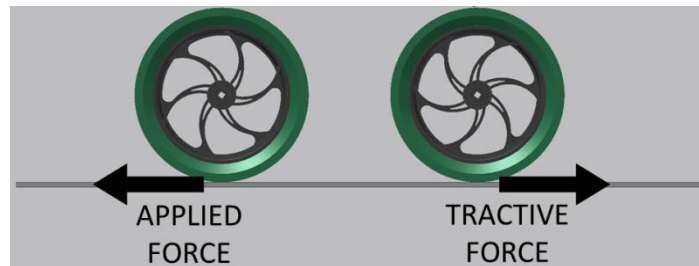
S2-3-10 Investigate the conditions that illustrate the effects of friction on motion

# The Effects of Friction...

**FRICTION** is a force that **OPPOSES** motion.



In terms of tires and the road, friction is the force that opposes the **ACTION** force of the **TIRE** pushing on the **GROUND**. The **REACTION** force – the **GROUND** pushing back on the **TIRE** – is only as large as the force of friction between the tire and the road.



It is this force of **FRICTION** that **CONTROLS** the motion of the car. It is used to start the car moving, to slow it down and stop it and to make it turn.

# The Effects of Friction...

Conditions that can affect friction and the motion of cars on the roads

## 1. ROAD CONDITIONS:

- ICY, WET, and SNOW-COVERED roads can all reduce friction.
- GRAVEL and DIRT may INCREASE friction unless it is very LOOSE.  
(Then the stones and particles of dirt act like BALL BEARINGS and reduce friction.)



# The Effects of Friction...

Conditions that can affect friction and the motion of cars on the roads

## 2. TYPE OF VEHICLE:

- Some cars are equipped with **FOUR-WHEEL DRIVE** and are made for all conditions.
- Some cars have more **MASS** which increases the force of friction between the tires and the road.
- Some cars have the **ENGINE** over the **DRIVE WHEELS**. This also increases the force of friction.



# The Effects of Friction...

## 3. TYPE OF TIRE:

- Snow tires with their **DEEP TREAD** can get a good grip on the road.
- **STUDDED** tires and special tires made of **SOFT RUBBER** for ice add traction for more friction.
- Racing tires are **SMOOTH** but are made of **SOFT** rubber.
- Race car drivers “**SMOKE**” their tires to **HEAT** them up which makes them more “**STICKY**”. This increases the force of friction.
- **AQUATREAD** tires channel **WATER** out from under the tire to reduce **HYDROPLANING** and increase friction





# The Effects of Friction...

## 4. TIRE INFLATION:

- Driving on OVER-INFLATED tires can also REDUCE friction.

