

DISCLOSED !!!

WEEKLY PRIZED SCIENCE HUB CHALLENGE (Part 2) ANSWERS

Since young, Rayne has a big interest in automotive. He loves collecting various types of car miniatures, starting from racing cars, luxury cars, ambulances, and even military tanks.

To satisfy his interest, his parents brought him to visit their relative who works in an automobile service centre.

While walking around the place, Rayne found a lot of unused bald tyres in one corner.

Motivated by his curiosity, he asked an uncle, "Why were those tyres dumped?"

The uncle explained, "The bald tyres are not safe to be used. Hence, they must be changed regularly with new grooved tyres."

- (a) From scientific views, explain why the grooved tyres are safer to be used compared to the bald tyres (despite of the fact that both tyres are made of the same materials, have the same mass, and have the same volume of air).

ANSWER

During **wet weather**, the **grooved tyre** is preferably used than the bald tyre.

The reason is because **the ridges provide gaps for the water to escape**. Hence, it **increases the surface area of tyre** in contact with the road and **reduces the tyre lubrication**, preventing the car to slip.

Bald Tyre



Grooved Tyre

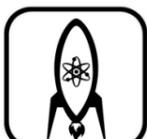


COMMON MISTAKE

The friction between bald tyre and the road is lesser than the one between grooved tyre and the road, causing the car with bald tyres easily slip.

→ During dry weather, the friction between bald tyre and the road is similar to the one between grooved tyre and the road (given the fact that both tyres are made of the same material, have the same mass, and have the same volume of air). The friction experienced by both bald and grooved tyres differs only during wet weather.

Please take note that friction is not determined by the surface area of tyre in contact with the road. Instead, it is determined by the mass and the material of tyres.

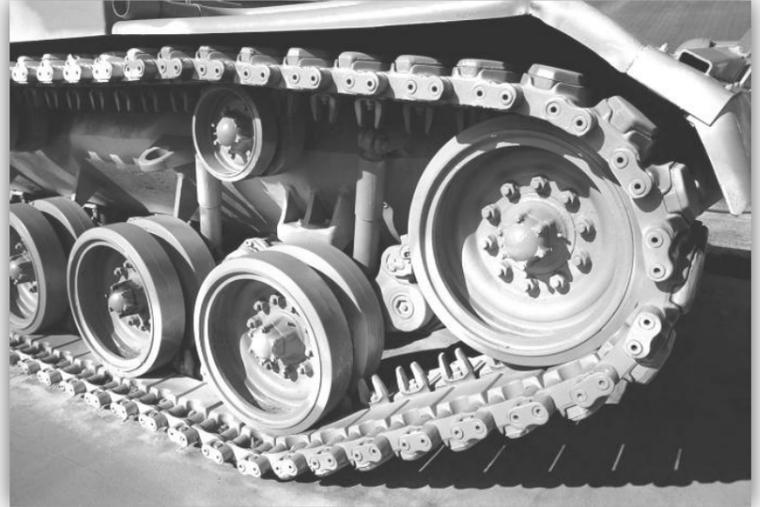


- (b) While looking around the factory, Rayne was reminded of how the tyres of military tank are designed differently from the ones of racing cars. The tyres are bundled by sheets of metal. Based on your knowledge about material, explain why metal is used.

ANSWER

The sheet of metal is **strong**, hence it helps the tyres **to withstand the heavy body of military tank and to distribute the weight evenly over a larger surface area in contact with the road.** Hence, the tyres **will not sink** when the tank is passing through muddy areas.

Besides, the metal is **hard**, hence it can **withstand scratches** from the stones **in rough terrain areas.**



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