Name: _____ Date: _____

How Car Wheels Take a Turn Without Skidding

Circle group

A car goes around a corner. Its wheels do not all go the same distance. Think of a bend in a road. The wheel on the outside has a longer path. The wheel on the inside has a shorter path. If both wheels had to spin at the same speed, one would skid or drag.

Engineers solved this with a set of gears called a differential. It sits between the two driving wheels, in the middle of an axle. The engine sends power to the differential. The differential splits the power between the wheels.

The split does not have to be even. On a straight road, both wheels turn at the same rate. In a curve, the small gears inside turn so the outer wheel spins faster. The inner wheel spins slower. Both wheels still get power. Both still grip the road.

Without it, a car would be hard to steer. The tires would wear out fast. You cannot see a differential from the driver's seat. But it works each time you turn a corner. Many cars and trucks have one.

Questions

1. Which wheel goes a longer way in a curve?

_____

_____

2. What is the set of gears called that splits the engine's power?

_____

_____

3. Where is a differential usually found?

_____

_____

4. What do the two wheels do on a straight road?

_____

_____

5. Why would a car skid in a turn without a differential?

_____

_____

6. Why can you not see a differential from the driver's seat?

_____

_____

Words to know

differential: a set of gears that lets wheels turn at different speeds
axle: the rod that a pair of wheels turns on
skid: to slide sideways out of control
engineer: a person who designs machines and structures

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

How Car Wheels Take a Turn Without Skidding

Triangle group

When a car goes around a corner, its wheels do not all travel the same distance. Picture a curve like a bend in a road. The wheel on the outside of the bend has to cover a longer path than the wheel on the inside. If both wheels were forced to spin at exactly the same speed, one of them would have to skid or drag.

Engineers solved this puzzle with a set of gears called a differential. It sits between the two driving wheels, usually in the middle of an axle. The engine sends its turning power into the differential, and the differential splits that power between the two wheels.

The clever part is that the split does not have to be even. On a straight road, both wheels turn at the same rate. In a curve, the small gears inside the differential rotate in a way that lets the outer wheel spin faster and the inner wheel spin slower. Both wheels still get power, and both keep gripping the road.

Without this machine, a car would be hard to steer, and the tires would wear out quickly. You cannot see a differential from the driver's seat, yet it works every time you turn a corner. Many trucks and cars use one, and so do some small vehicles.

Questions

1. Which wheel travels a longer path in a curve?

_____

_____

2. What is the set of gears called that splits the engine's power?

_____

_____

3. Where is a differential usually found?

_____

_____

4. What happens to the two wheels on a straight road?

_____

_____

5. Why would a car skid in a turn without a differential?

_____

_____

6. Why does the passage say you cannot see a differential from the driver's seat?

_____

_____

Words to know

differential: a set of gears that lets wheels turn at different speeds
axle: the rod that a pair of wheels turns on
skid: to slide sideways out of control
engineer: a person who designs machines and structures
rotate: to turn around a center point

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

How Car Wheels Take a Turn Without Skidding

Square group

When a car rounds a corner, its wheels do not all travel the same distance. Picture a curve like a bend in a road. The wheel on the outside of the bend must cover a longer path than the wheel on the inside. If both wheels were forced to spin at exactly the same speed, one of them would inevitably skid or drag.

Engineers solved this puzzle with a set of gears called a differential. It sits between the two driving wheels, usually in the middle of an axle. The engine sends its turning power into the differential, and the differential divides that power between the two wheels.

The ingenious part is that the division does not have to be equal. On a straight road, both wheels turn at the same rate. Around a curve, the small gears inside the differential rotate in a way that allows the outer wheel to spin faster and the inner wheel to spin slower. Both wheels continue to receive power, and both keep gripping the road.

Without this machine, a car would be difficult to steer, and its tires would wear out quickly. You cannot see a differential from the driver's seat, yet it quietly works every time you turn a corner. Many trucks and cars use one, and so do some small vehicles.

Questions

1. Which wheel travels the longer path around a curve?

_____

_____

2. What is the set of gears called that divides the engine's power?

_____

_____

3. Where is a differential usually located?

_____

_____

4. What do the two wheels do on a straight road?

_____

_____

5. Why would a car skid in a turn if it lacked a differential?

_____

_____

6. Why does the passage say you cannot see a differential from the driver's seat?

_____

_____

Words to know

differential: a set of gears that lets wheels turn at different speeds
axle: the rod that a pair of wheels turns on
skid: to slide sideways out of control
engineer: a person who designs machines and structures
rotate: to turn around a center point

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

For the teacher: How Car Wheels Take a Turn Without Skidding

Each student sheet carries a shape, not a level. The same topic and facts, written three ways.

Circle: How Car Wheels Take a Turn Without Skidding

Easier · 181 words · Flesch-Kincaid grade 2.5

1. The wheel on the outside of the bend.
2. A differential.
3. In the middle of an axle between the two driving wheels.
4. They turn at the same rate.
5. Both wheels would have to spin at the same speed even though they go different distances.
6. It is hidden under the car on the axle.

Triangle: How Car Wheels Take a Turn Without Skidding

This passage · 219 words · Flesch-Kincaid grade 6

1. The wheel on the outside of the bend.
2. A differential.
3. In the middle of an axle between the two driving wheels.
4. They turn at the same rate.
5. Both wheels would be forced to spin at the same speed even though they travel different distances.
6. It is hidden underneath the car on the axle.

Square: How Car Wheels Take a Turn Without Skidding

Harder · 220 words · Flesch-Kincaid grade 6.9

1. The wheel on the outside of the bend.
2. A differential.
3. In the middle of an axle between the two driving wheels.
4. They turn at the same rate.
5. Both wheels would be forced to spin at the same speed even though they travel different distances.
6. It is hidden beneath the car on the axle.