

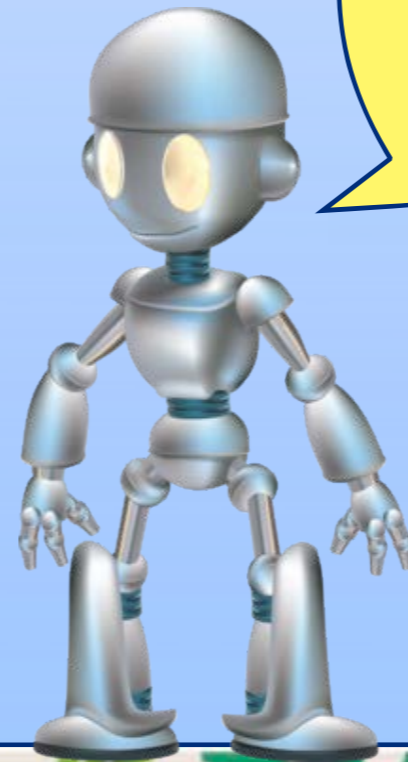
Forces In Action

Learning Objective:

To recognise that gears allow a smaller force to have a greater effect.

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Gears (sometimes called **cogwheels**) are wheels that have 'teeth'. Two or more gears working together are called a **transmission**. When the teeth of two gears mesh together, force can be transmitted from one gear to the other.

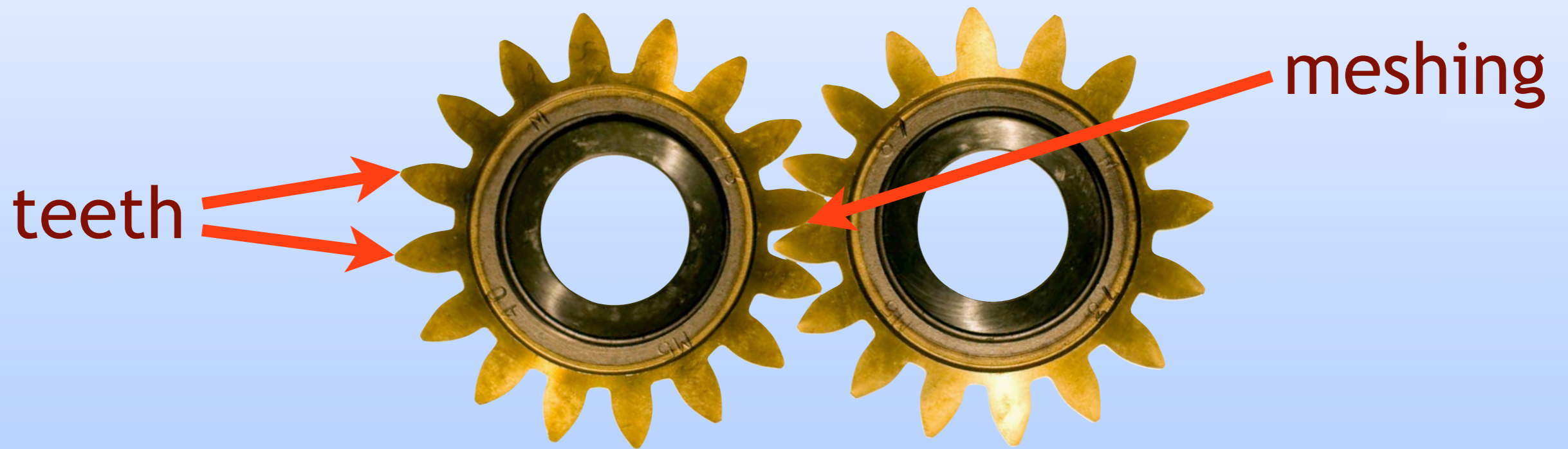


Let's take a closer look at the different parts of a transmission and how they work together...

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Gears are attached to an **axle** which allows them to rotate around a fixed point. In a **transmission**, the **teeth** of two or more gears mesh together.

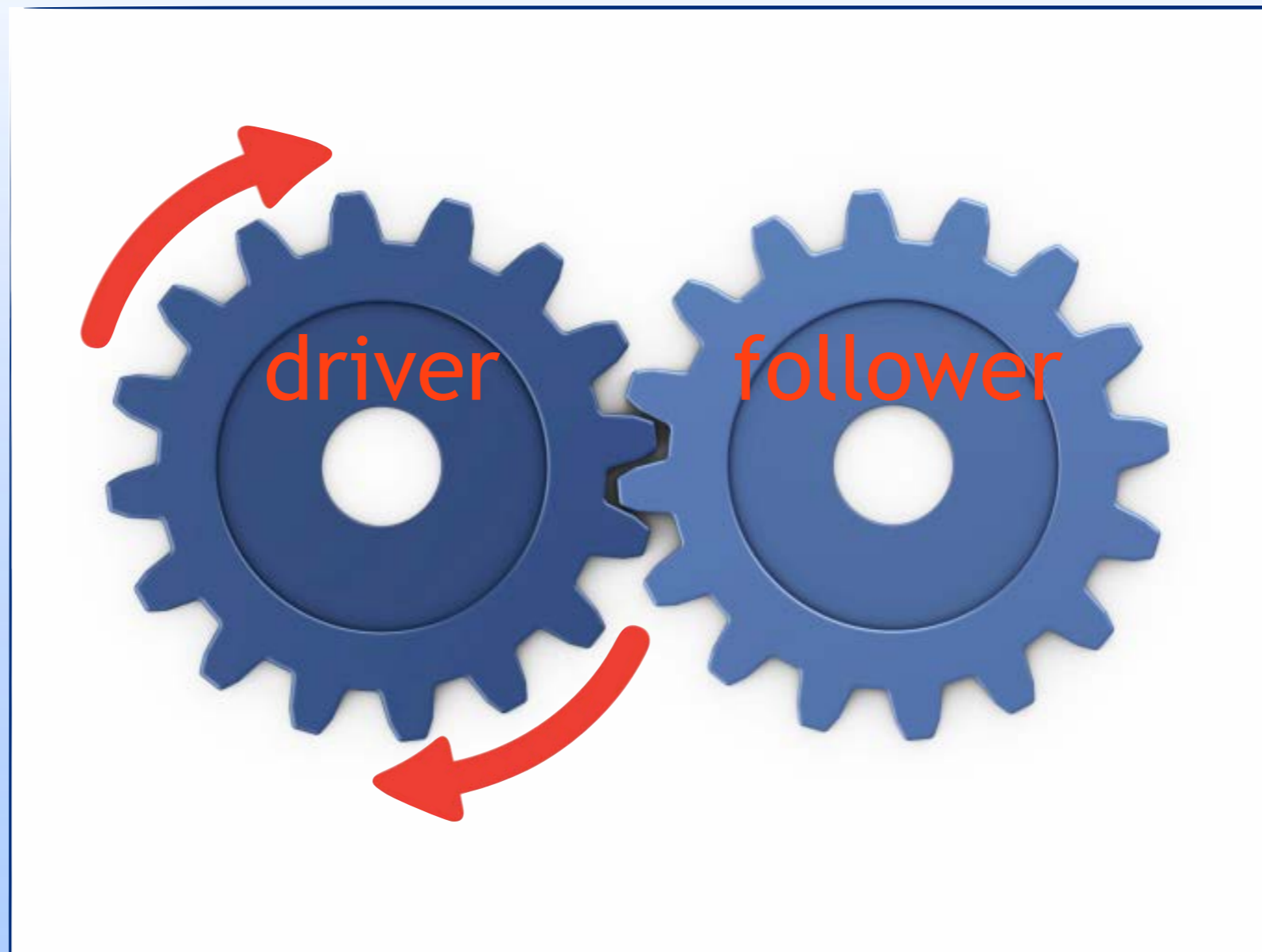


In a transmission, the gear that provides the power (usually attached to a motor which turns it) is called the **driver gear**. When the driver gear turns, force is transmitted from it, making the other gears in the transmission (called **follower gears**) turn too.

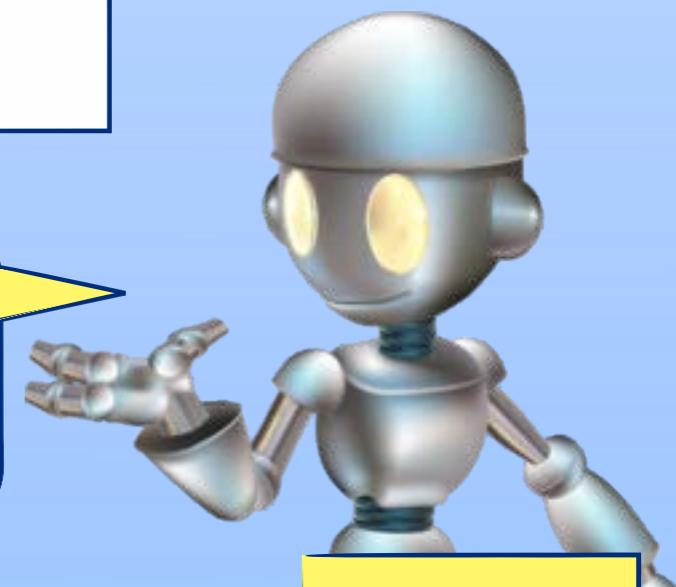
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Pairs of meshing gears turn in opposite directions.



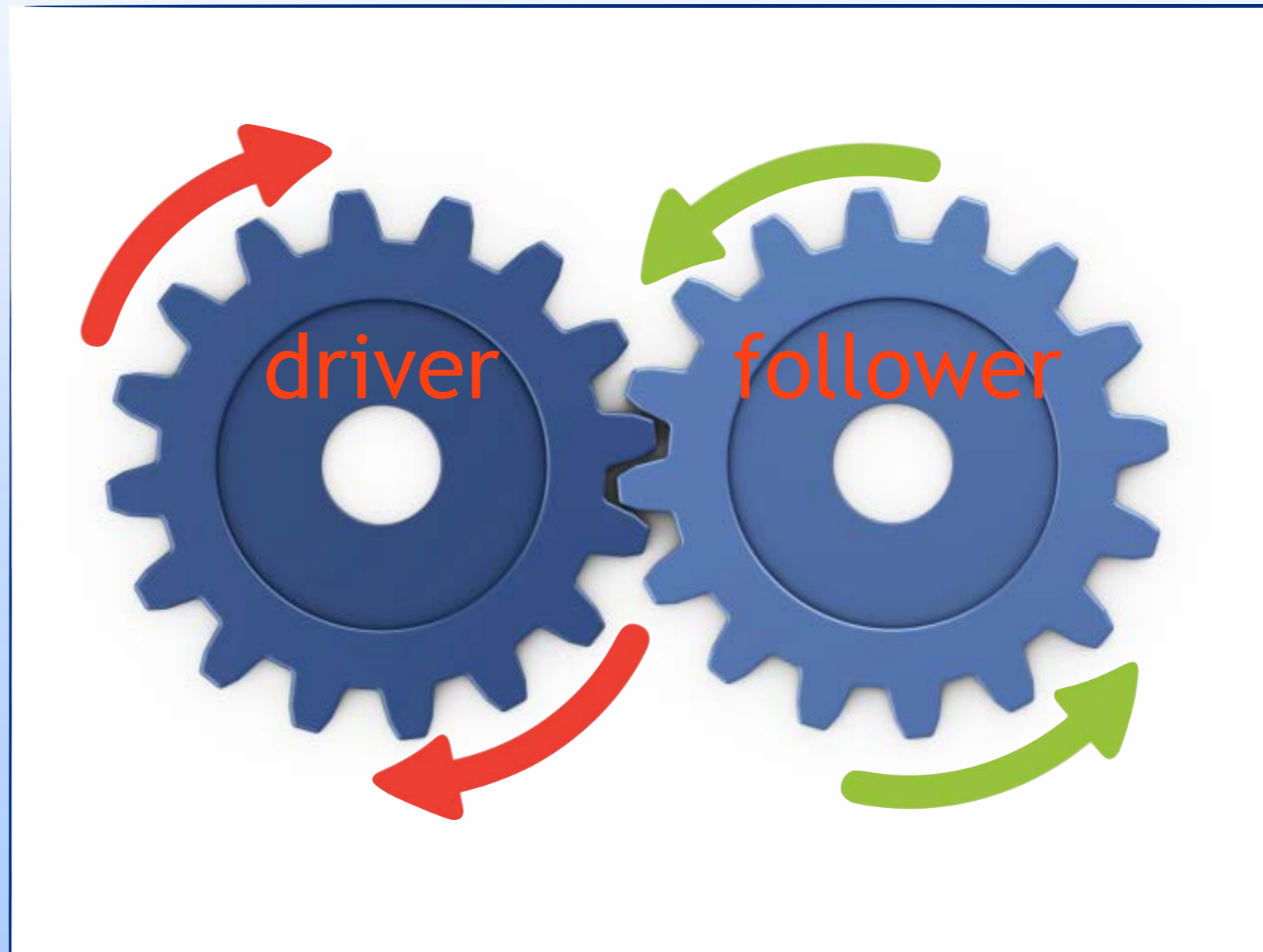
Which way will the **follower** gear turn? Clockwise or anticlockwise?



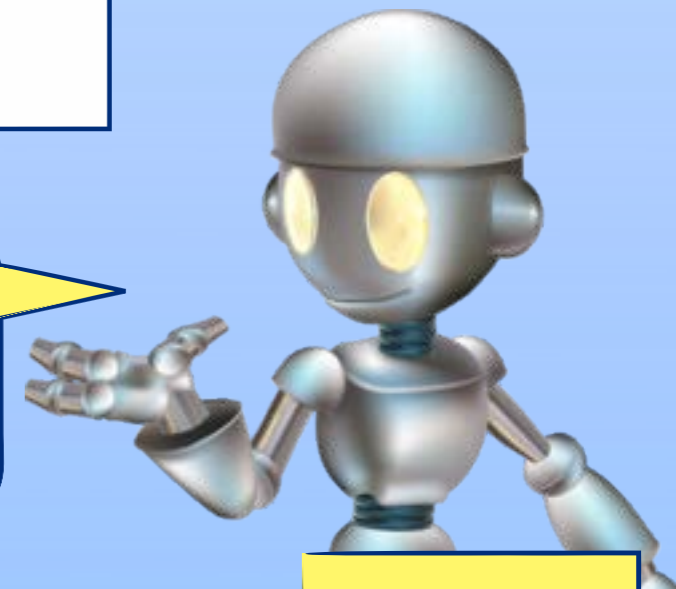
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The follower gear will turn anticlockwise.

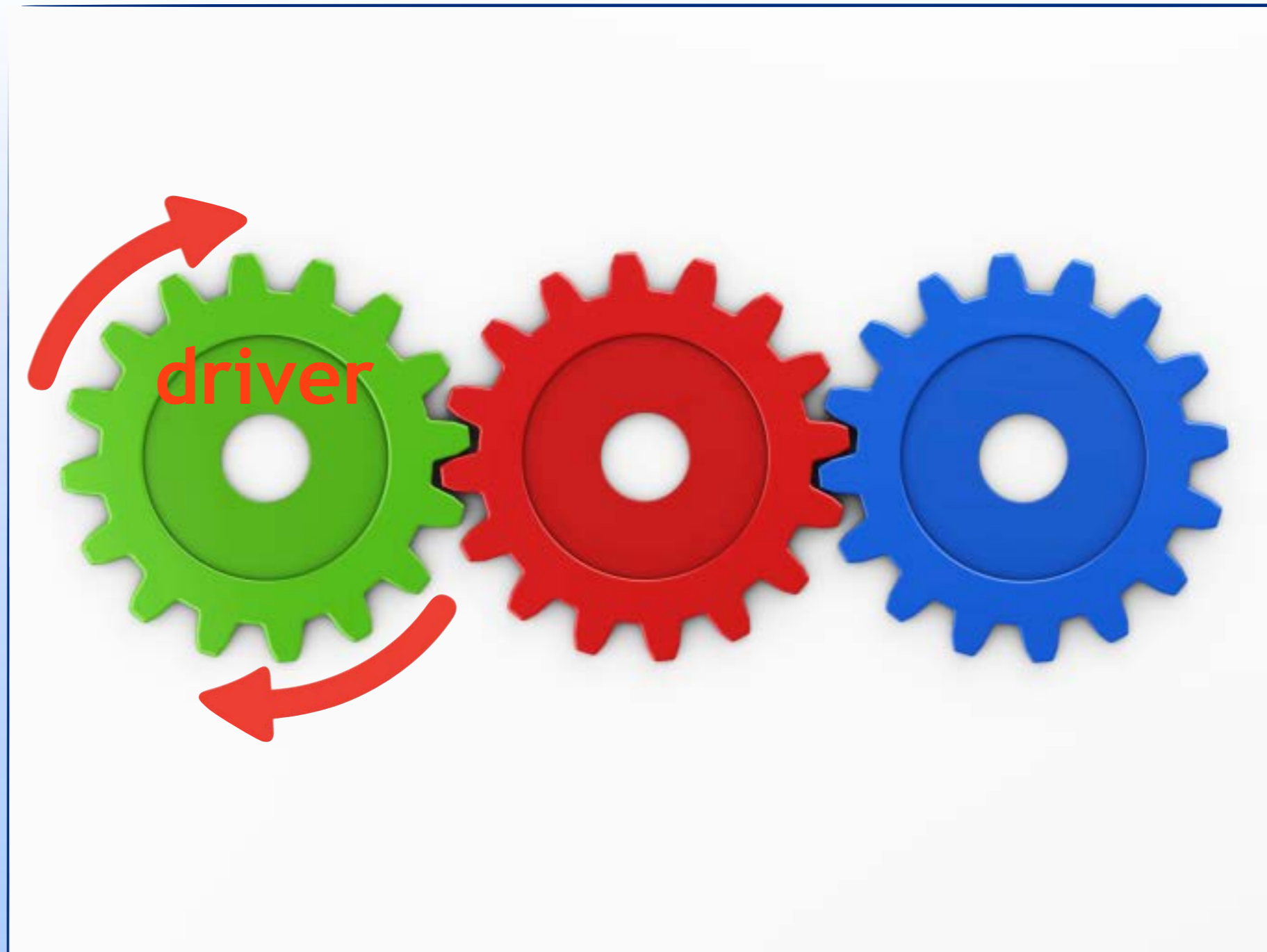


Did you get it right?

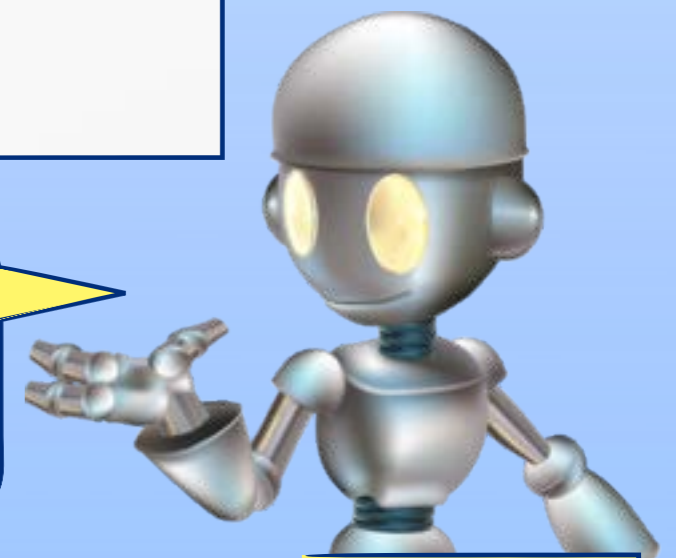


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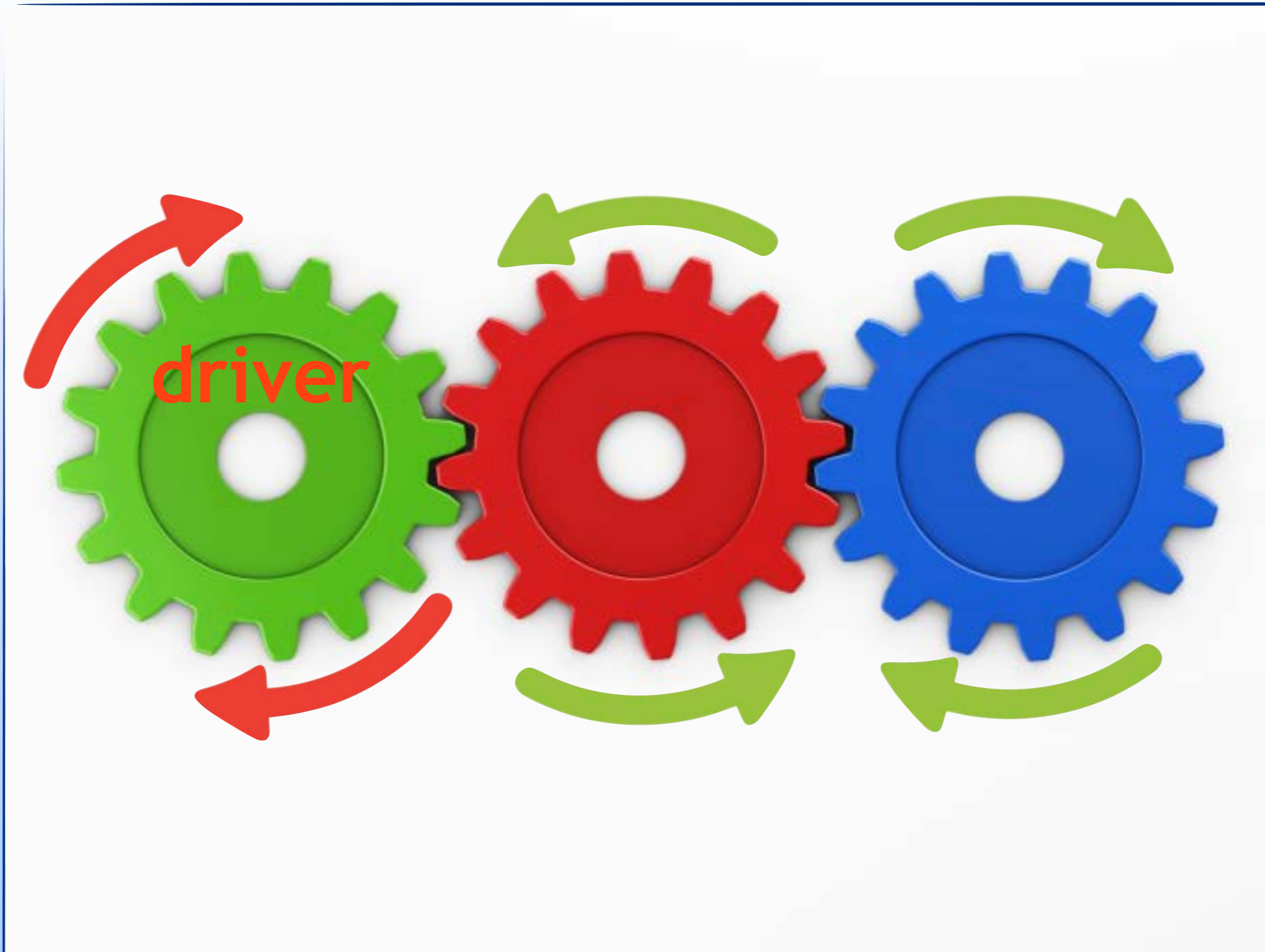


Which way will the **follower** gears turn? Clockwise or anticlockwise?

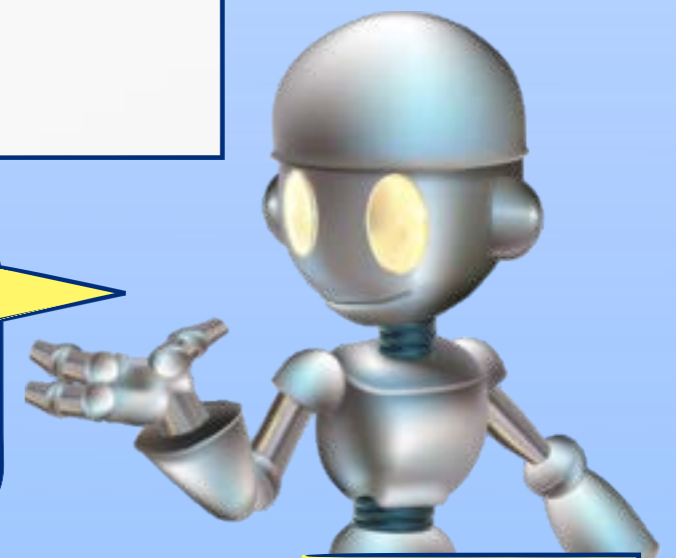


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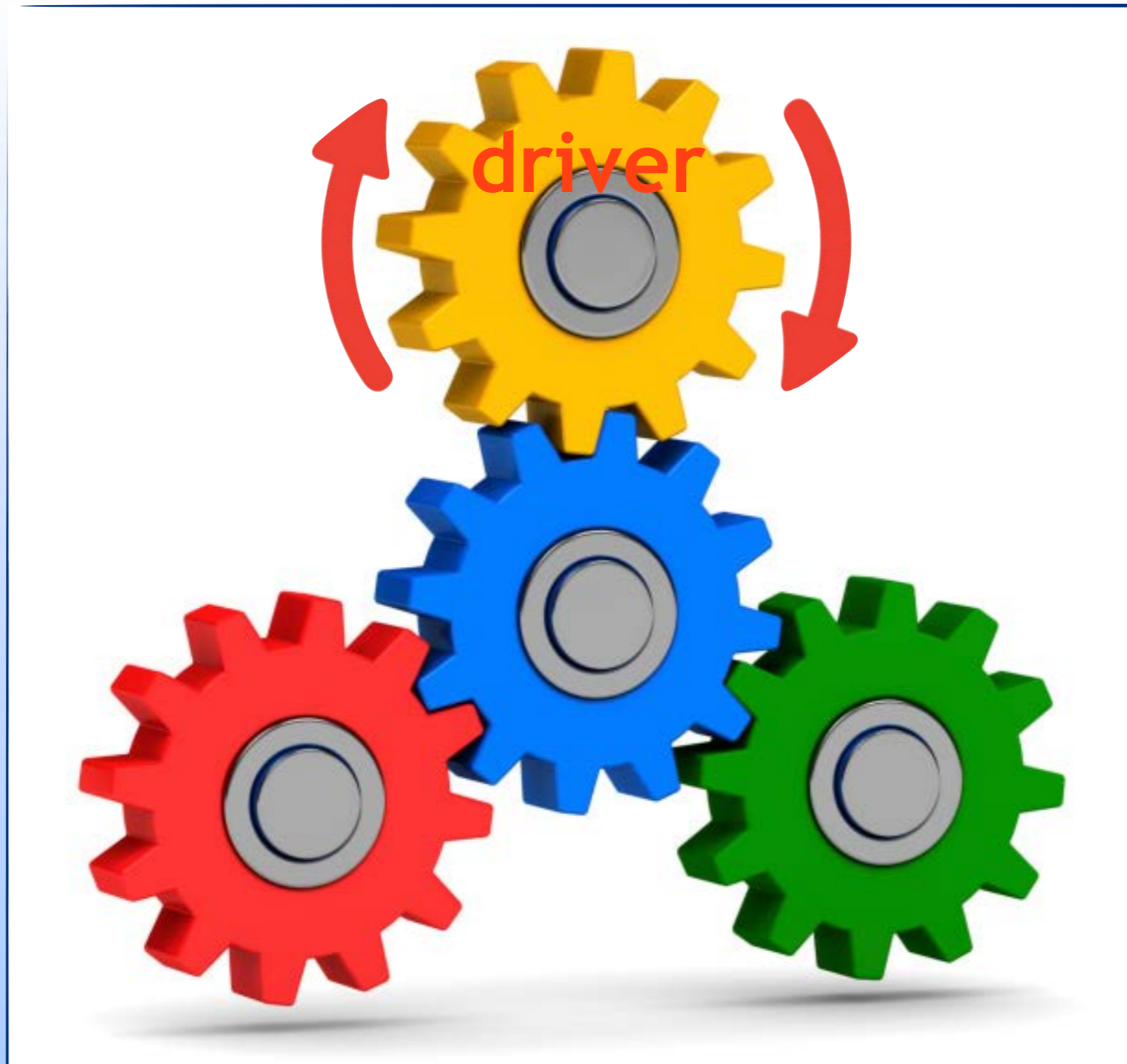


Did you get it right?

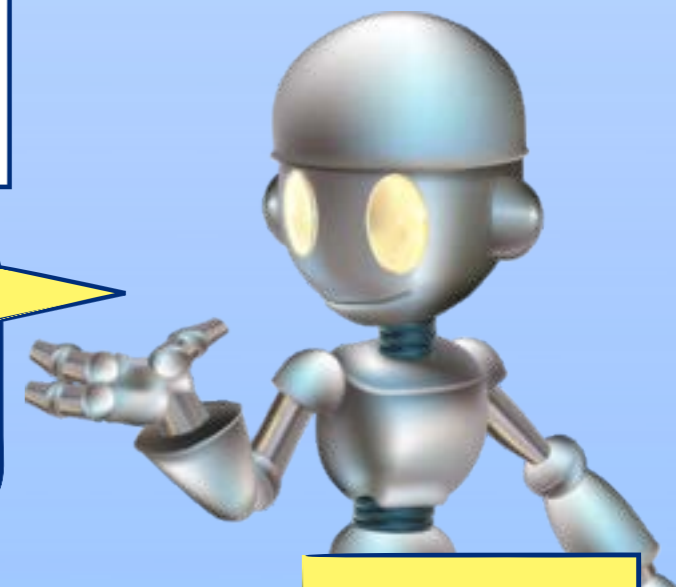


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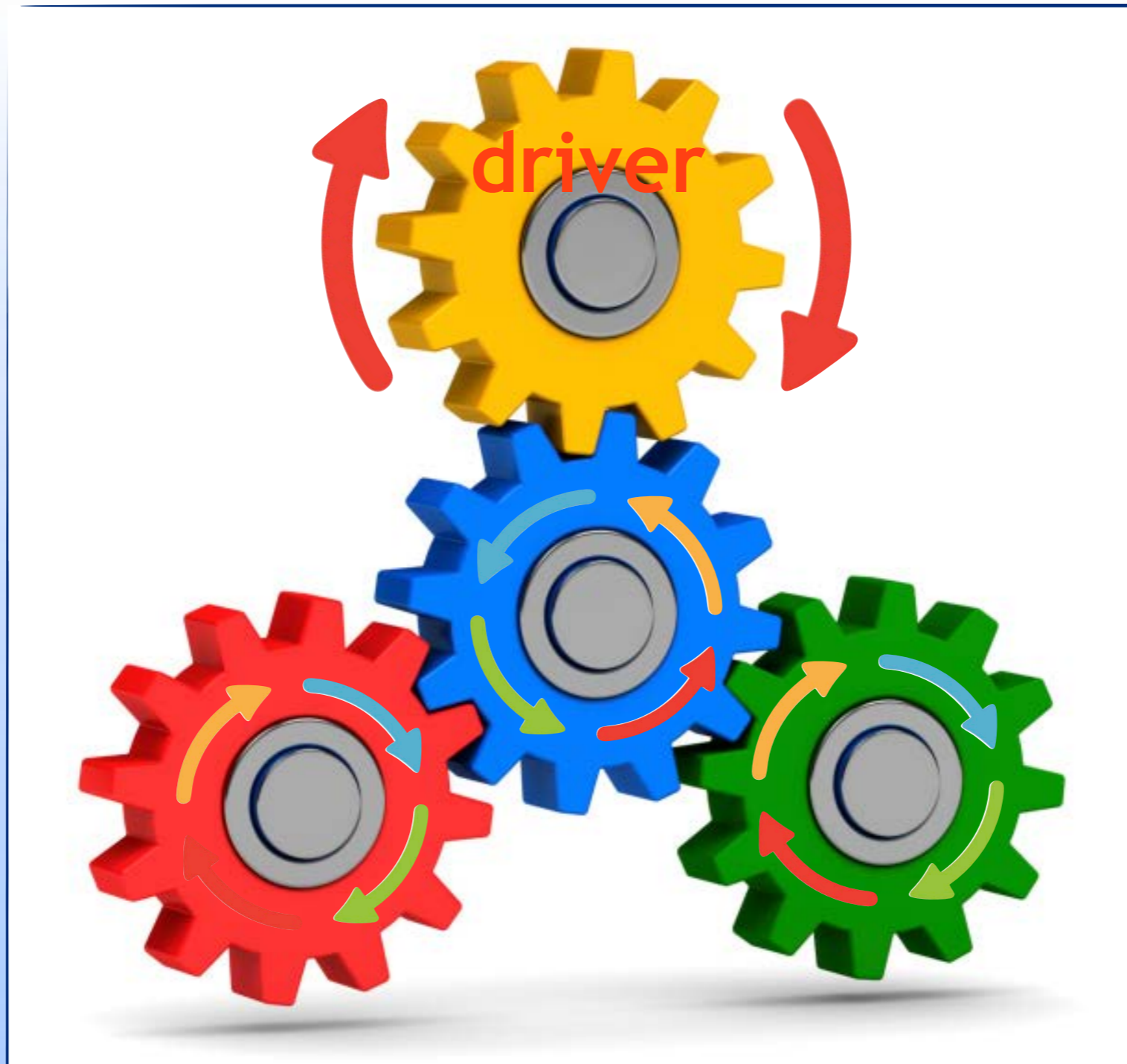


Which way will the **follower** gears turn?

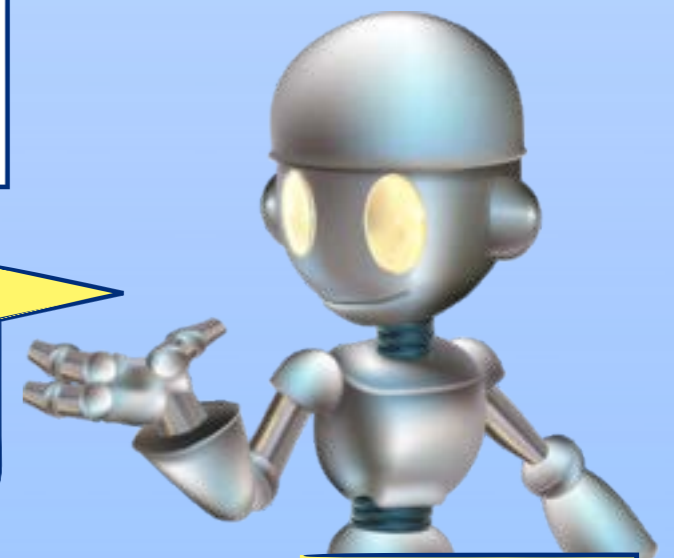


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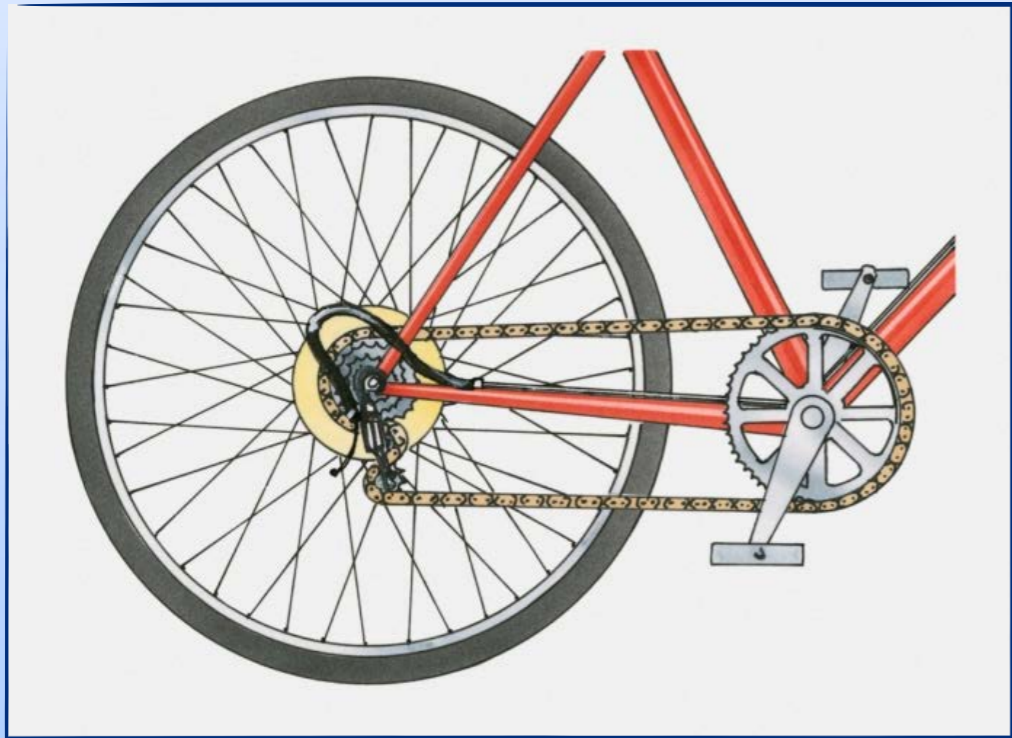
Did you get it right?



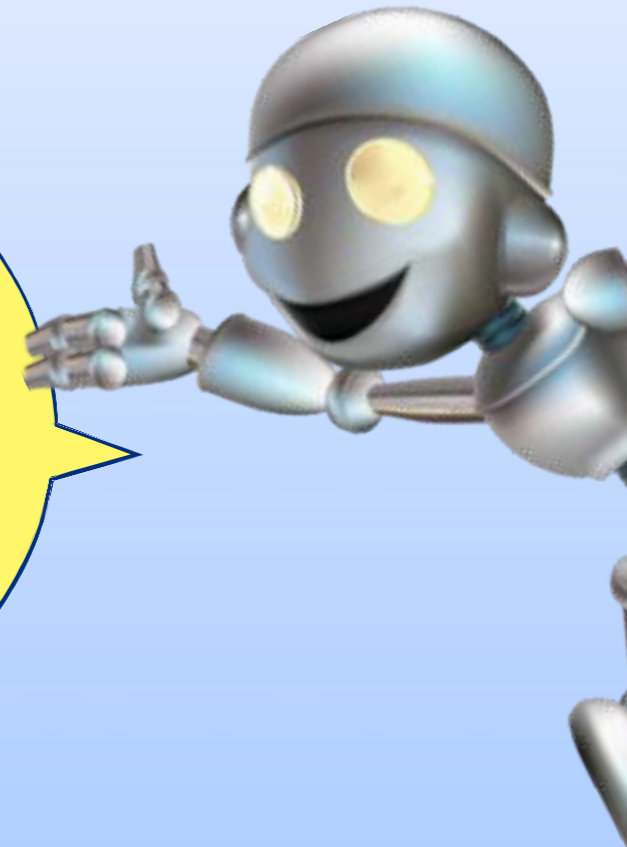
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There are lots of different types of transmission. All of them are designed to help us transmit force from one place to another or use a small amount of force to have a greater effect.



Let's find out more about how bicycle transmissions work...

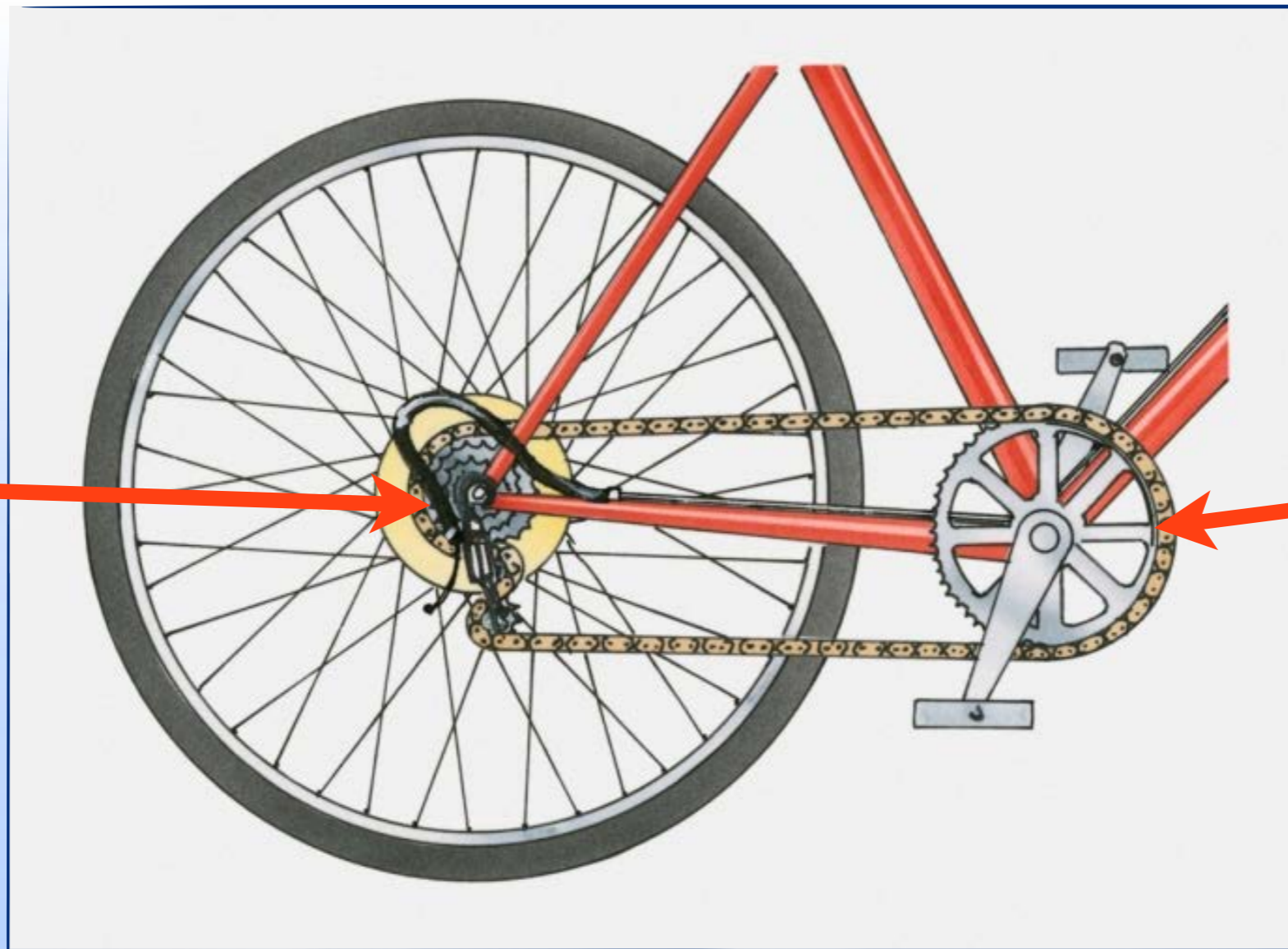


Bicycles have a special kind of transmission. Rather than meshing together, gears are connected by a **chain drive**. Gears connected in this way turn in the same direction.

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follower



driver

On a bicycle, the rider applies force to the **driver gear** by pressing the pedals and making it turn. The **follower gear** is attached to the back wheel of the bike.

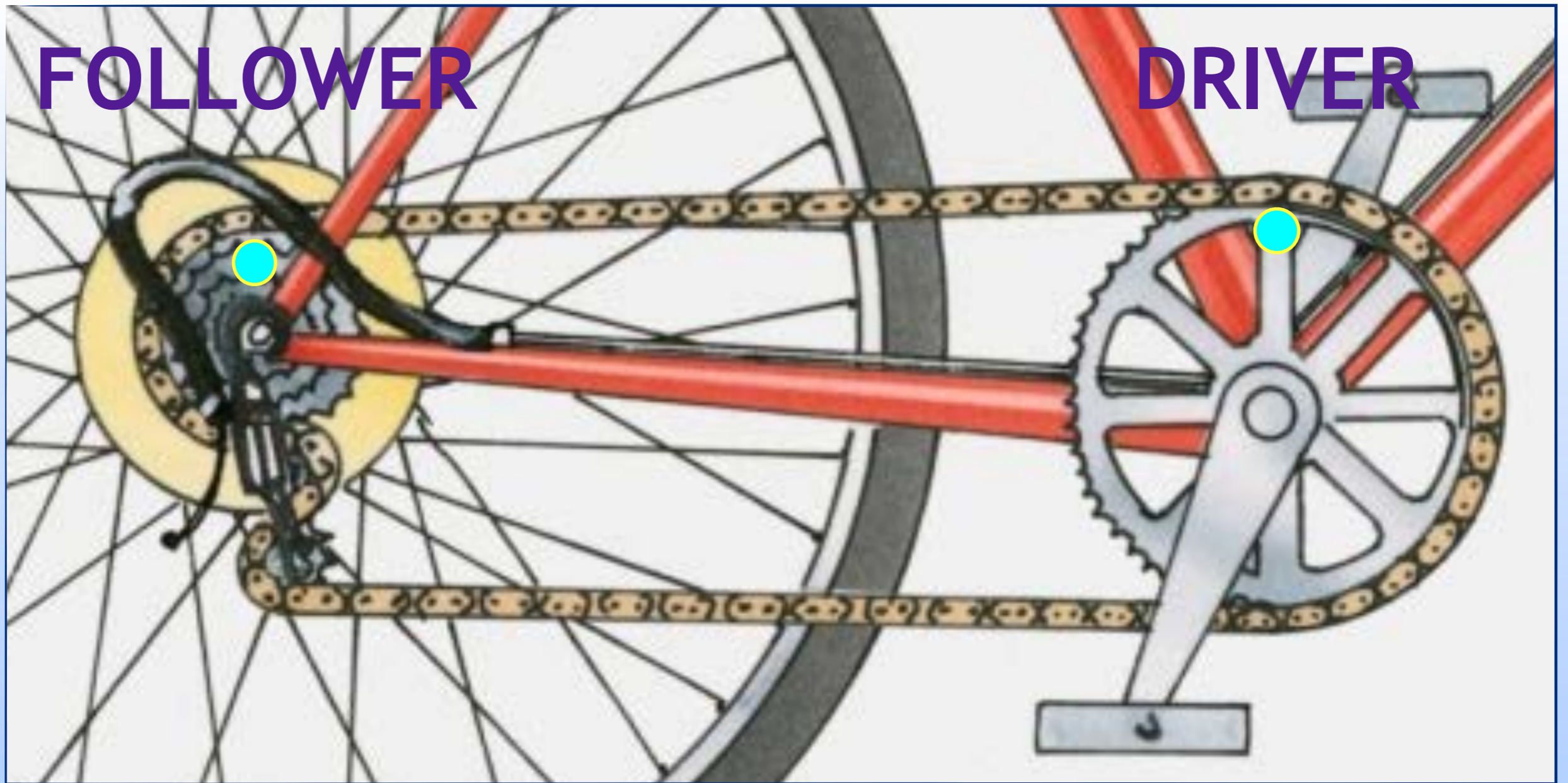
Because it is **smaller** it turns **more quickly** than the driver gear. One turn of the pedals goes a long way!

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FOLLOWER

DRIVER

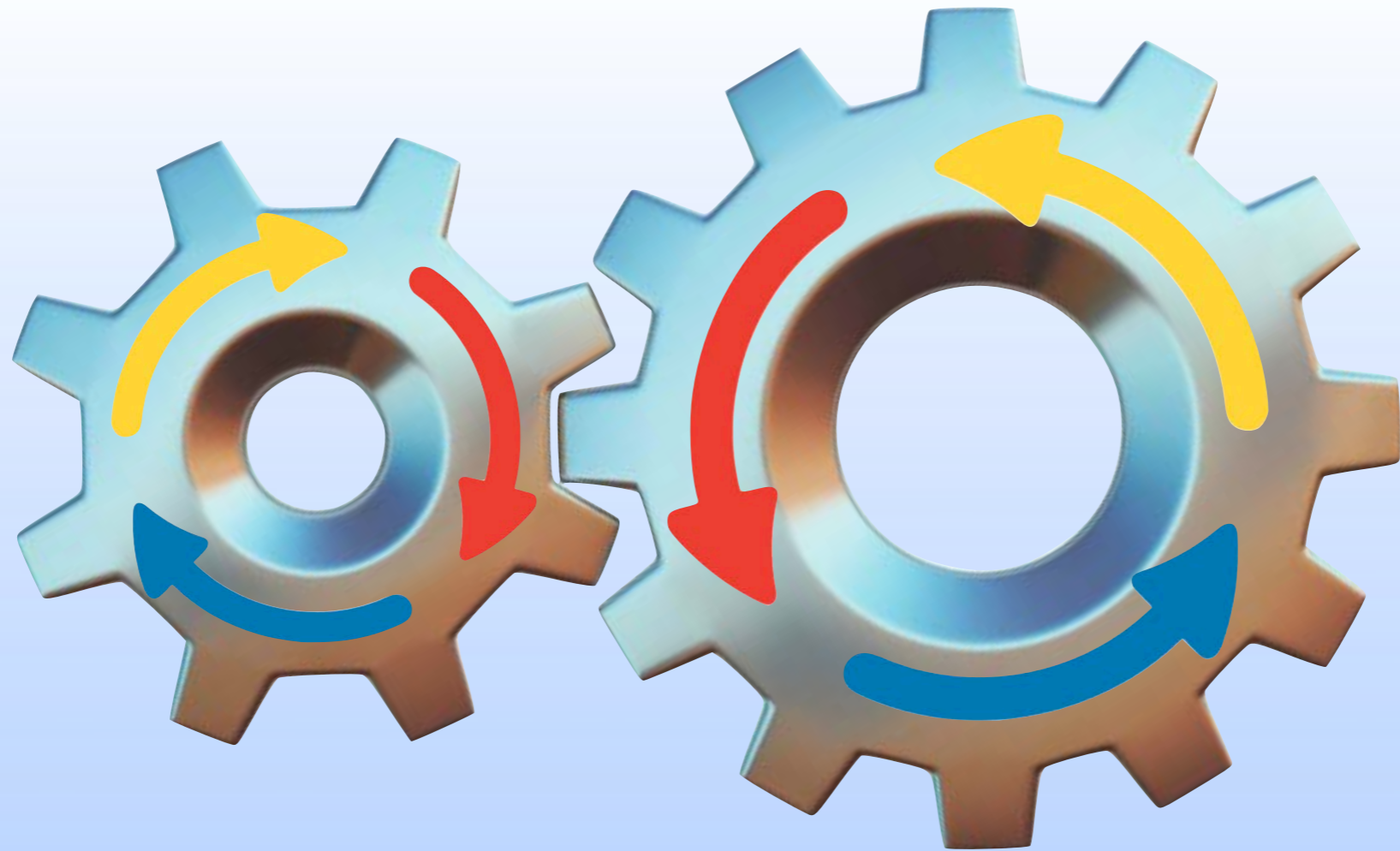


You can see for yourself the way that smaller gears in a transmission turn faster than larger gears. Try sticking a small piece of masking tape to the driver and follower gear on your bike (the blue dots show where to stick the tape). During **one** turn of the **driver** gear, how many times does the **follower** gear turn?

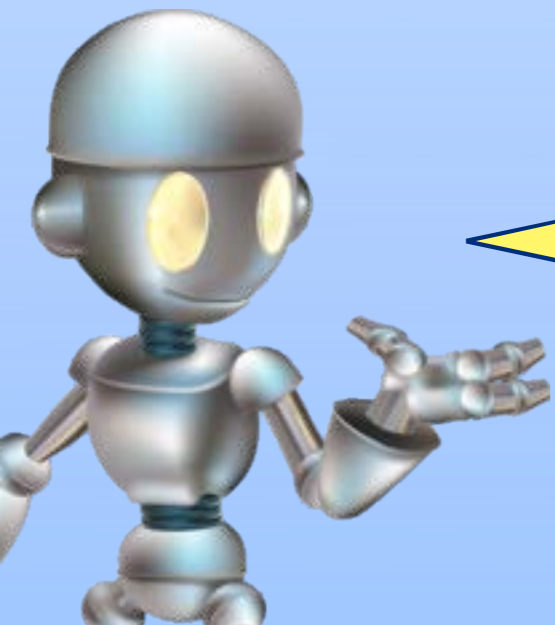
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Driver



Follower

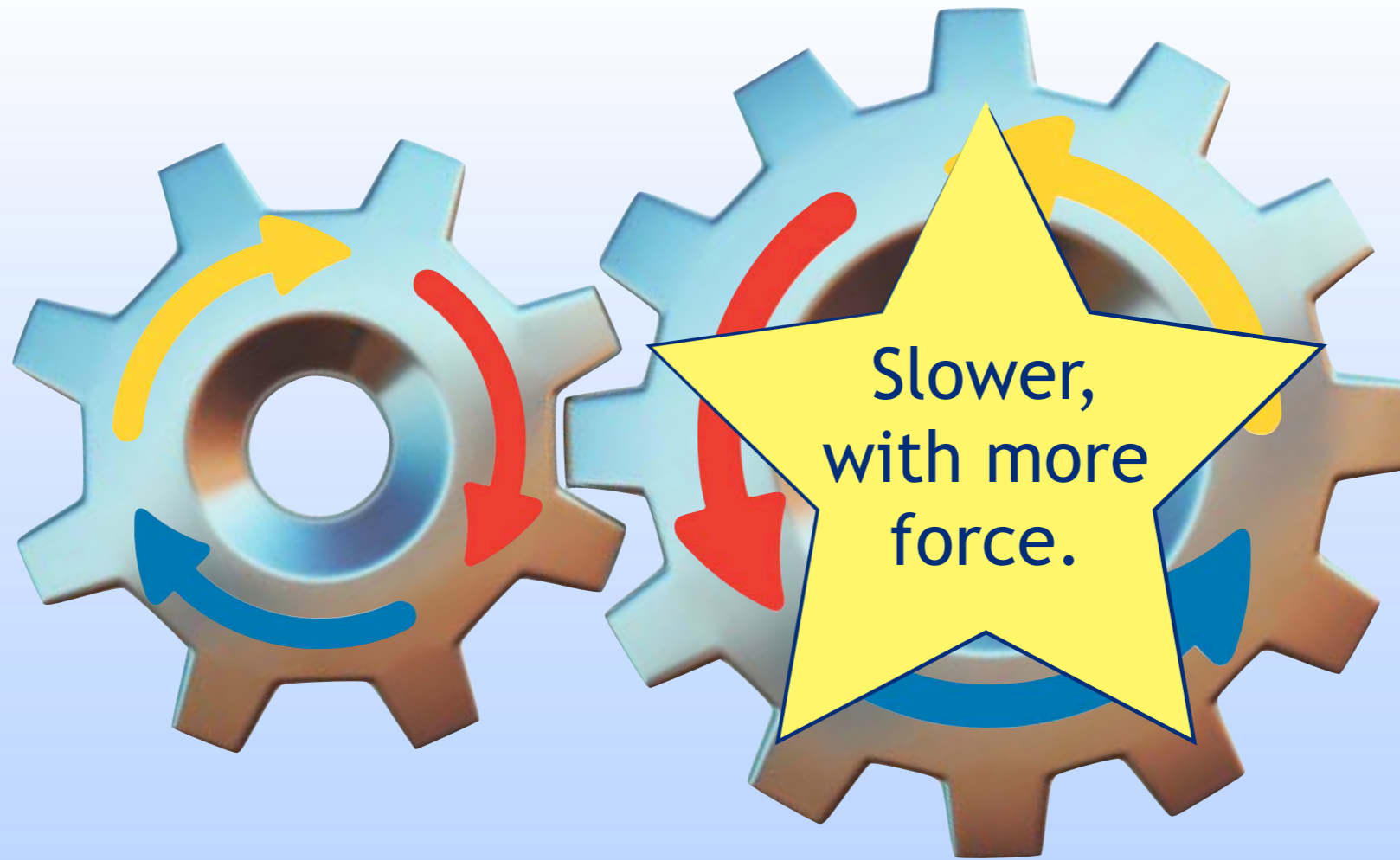


Will the **follower** gear be faster or slower than the **driver** gear?
Will it have more or less force?

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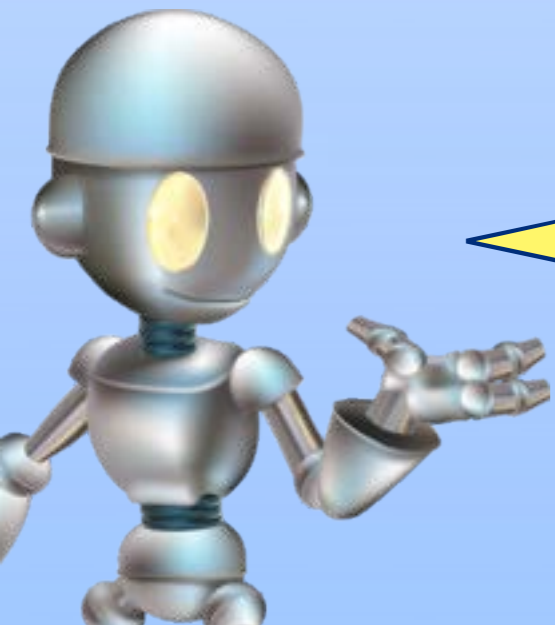
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Driver



Follower

Slower,
with more
force.

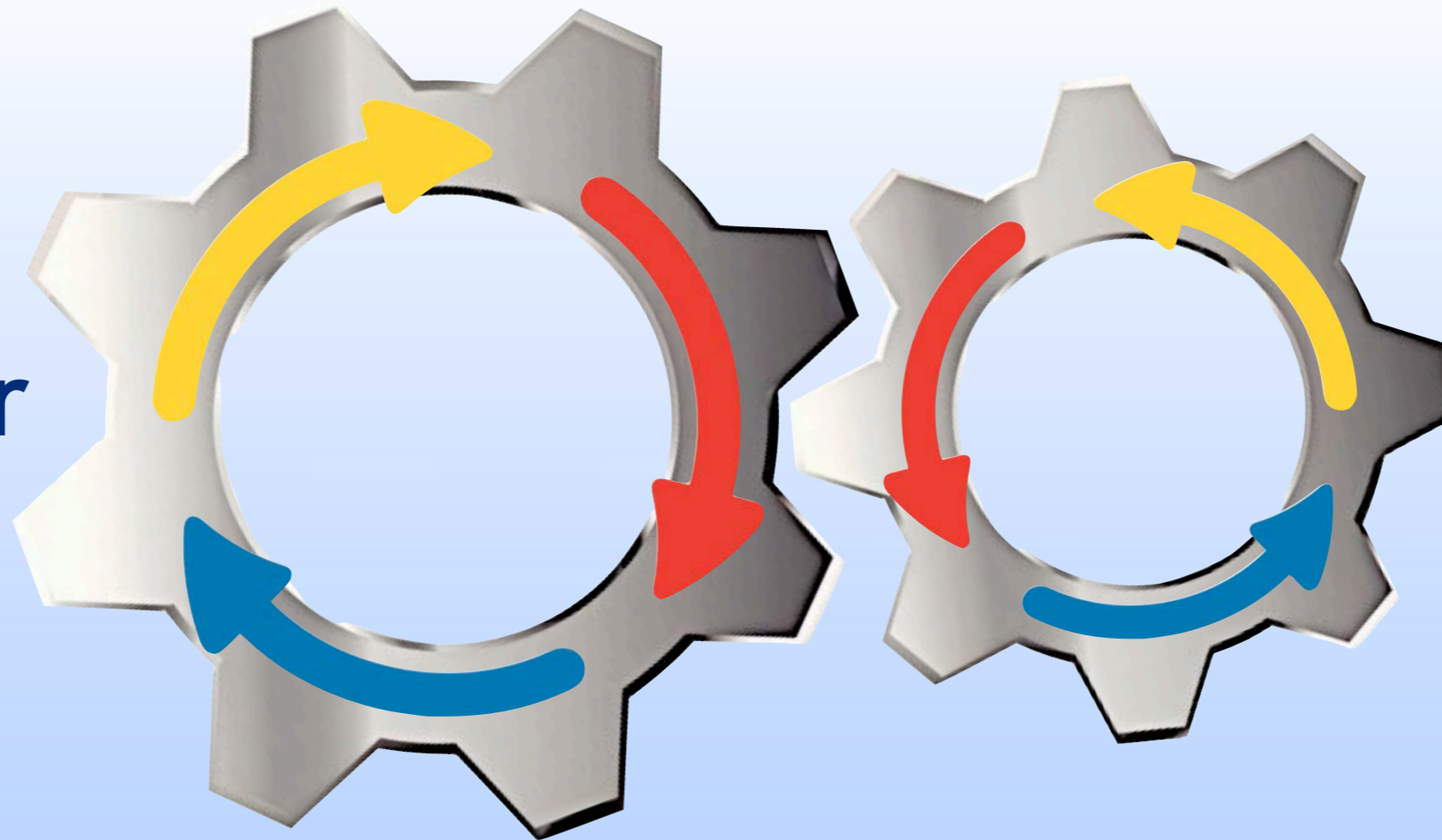


Did you get it right? Did you know that the force transmitted by gears in a transmission is called torque.

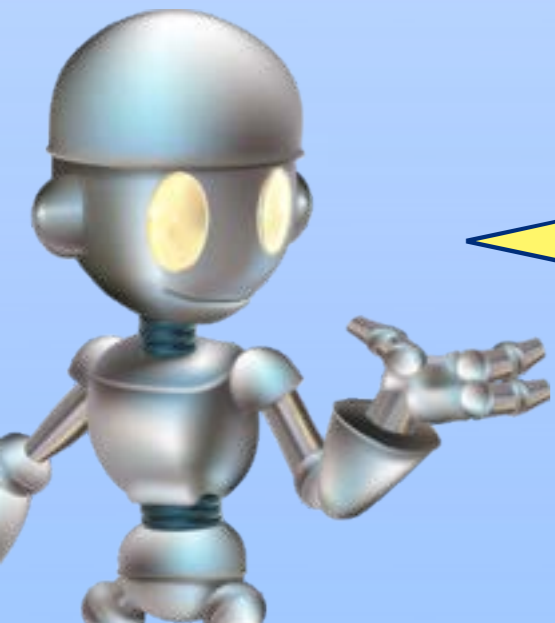
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Driver



Follower



Will the **follower** gear be faster or slower than the **driver** gear?
Will it have more or less force?

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NEXT

Driver



Follower

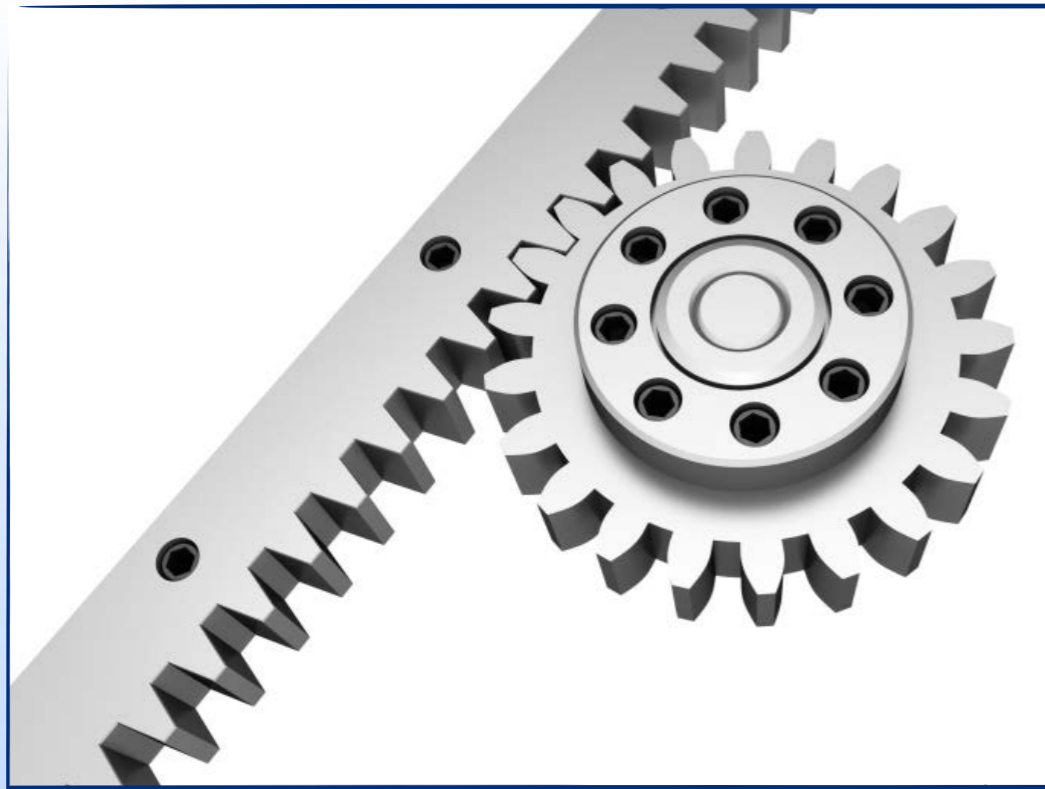
Faster,
with less
torque
(force).



Did you get it right?

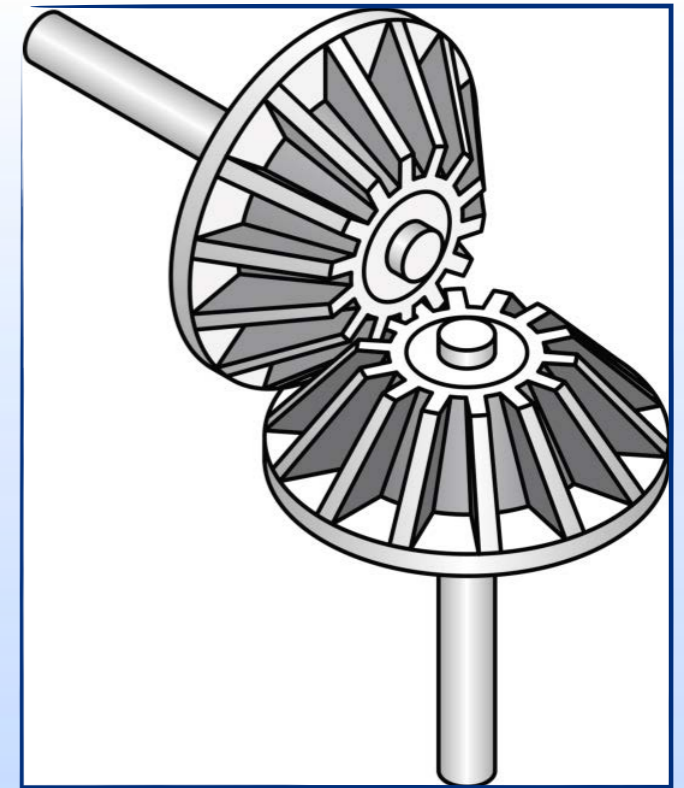
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rack gear

Do you know what those worm gears are attached to?



bevel gear



worm gear

Bevel gears, rack gears and worm gears allow force to be transmitted in different directions.

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NEXT



Worm gears are often used on guitars. They are attached to the tuning keys which, when turned, make the strings tighter or looser.

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This picture shows how lots of different gears can work together in a transmission.



Can you remember the names of the different gears shown here?

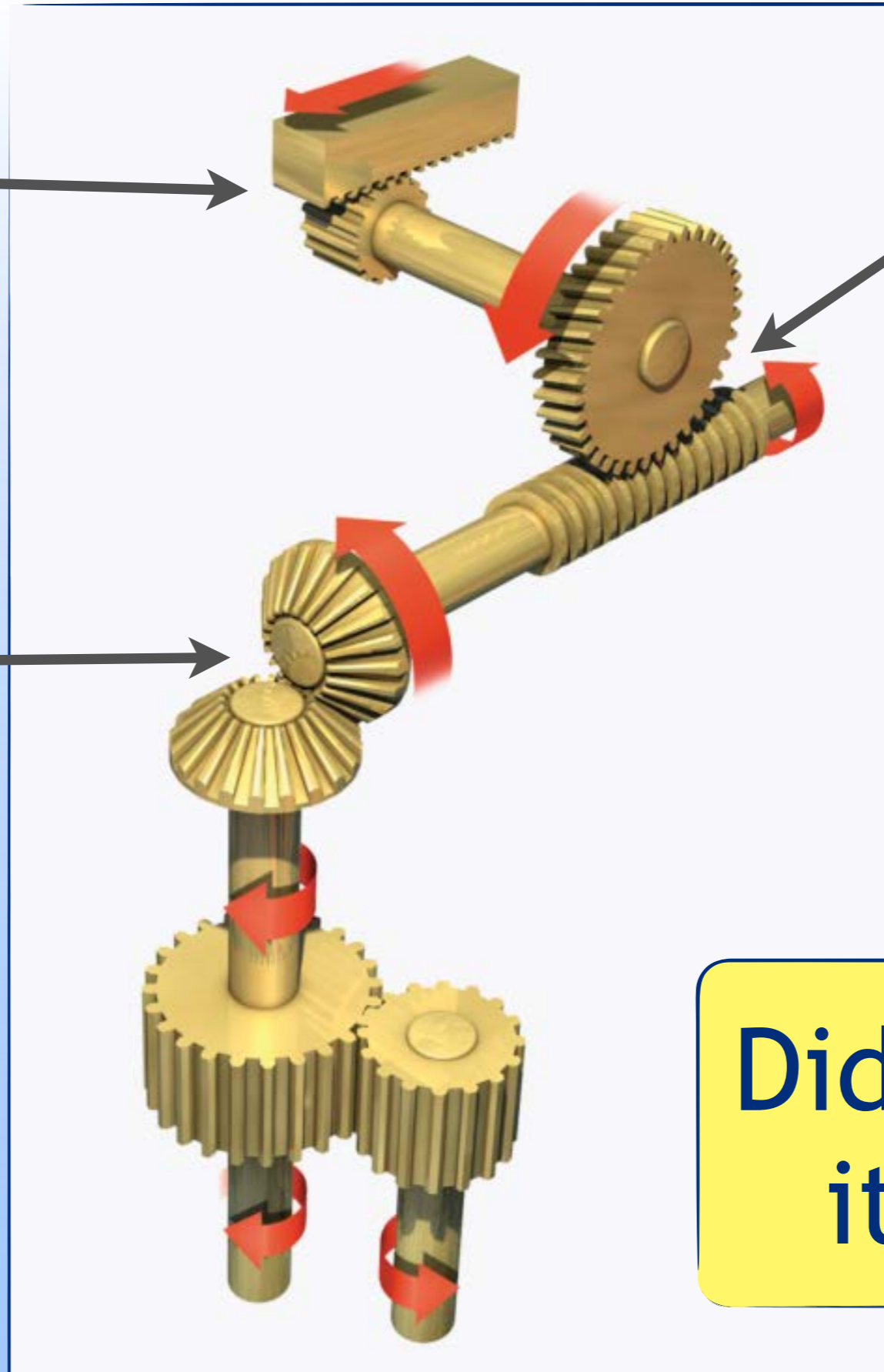
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rack gear

worm gear

bevel gear



Did you get it right?

BACK

NEXT



Today we
will be using gears to
make different types
of transmission.

Can you make a
transmission where two or
more gears work
together?

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