

- Tapping Block Optional
- Small Hammer
- Pliers -Optional
- Philips Screwdriver

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## BUILD GUIDE FOR ADVANCED RUBBER BAND RACER





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# BUILD GUIDE FOR ADVANCED RUBBER BAND RACER



## CHALLENGES



Redesign your racer to break a speed record or win a race.

## Long Shot



Redesign your racer go the greatest distance.

Find the challenges at teachergeek.com/rubberband

## Target



Redesign your racer to stop on a target.

## TROUBLESHOOTING



Check for wheels rubbing the frame. Add slide stop as a spacer, if necessary.





Make sure boss (bump) on the axle hole is on the inside to give more space.

## STORE MORE ENERGY



stretched rubber band.

**Try adding more rubber bands** to store more potential energy.



## The racer is TURNING



Make sure the frame and axles are straight and symmetrical.

asymmetrical



The axles should be close to the frame (not touching), so they can't bounce around.



## Can you use all the rubber bands to maximize kinetic energy?

Not with this design! Your clip will slip, your axle will bend, and if you fix those, your wheels will spin in place! Read on for tips that will help you improve your car so it can handle more force.

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## **IMPROVE THE DESIGN**

## **Parallel or Series**

Rubber bands can be connected in series (forming a thin, long band) or in parallel (forming a short, thick band).



### Add a Lever

Use levers to slow the transfer of potential to kinetic **energy**.

#### Levers create mechanical advantage they trade force for distance.



Move the fulcrum to adjust the output force.



Ream the holes for the fulcrum (where the dowels go through the lever).

> Tie a string to the lever. Add a loop to the other end for the stop clip.

## **Use Pulleys**

Pulleys can be used to change the direction of a rubber band or string. Dowels, that can spin, can be used as pulleys.



## **Use Gears**

Gears create mechanical advantage, just like levers.



Every revolution of the big gear makes the small gear go 5 revolutions, but with less force.



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