

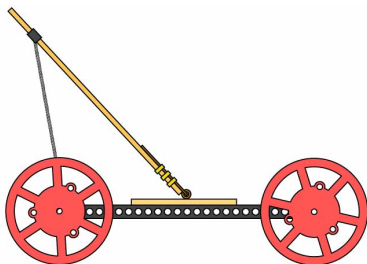
Name: _____

Date: _____

Learn how to use levers
to make your vehicle go
farther or faster!

Long Levers
VS
Short Levers

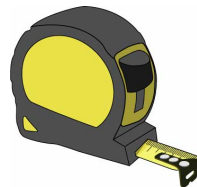
Lab Supplies



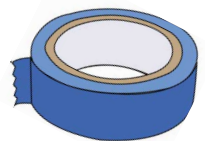
Built Mousetrap Vehicle



Stopwatch



Measuring Tape



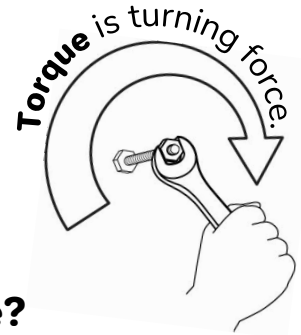
Tape

For marking
start/finish lines

Build your electromagnet using the [Go Guide](https://www.teachergeek.com/mousetrap),
available at [teachergeek.com/mousetrap](https://www.teachergeek.com/mousetrap)

How do levers work?

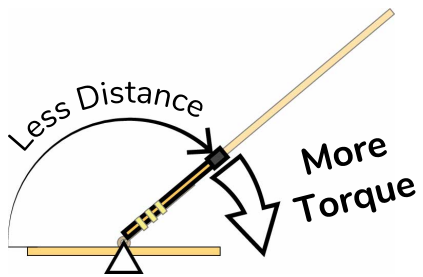
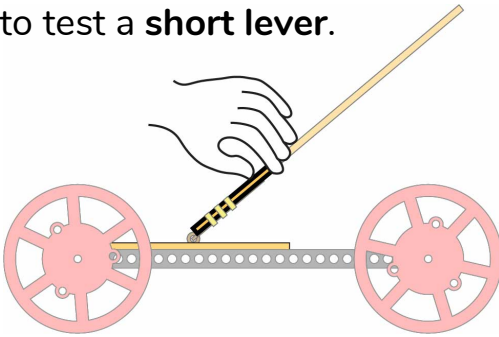
Levers trade between distance and torque (turning force).



Do short or long levers have more torque?

Test the Short Lever

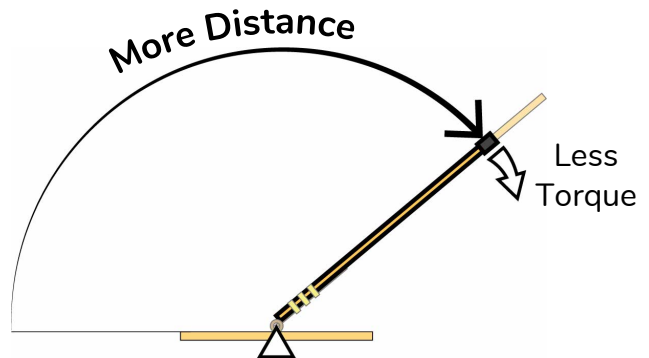
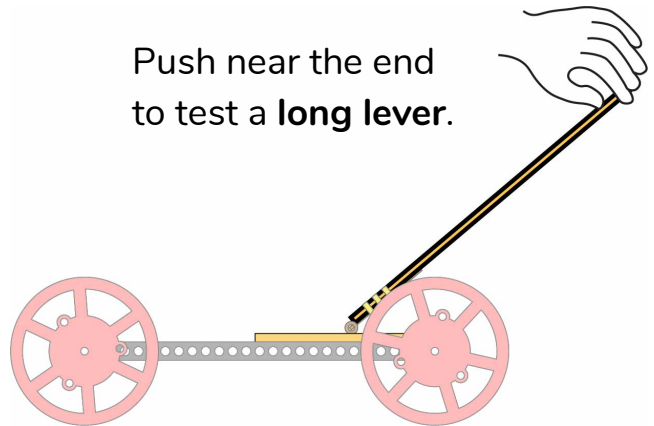
Push near the mousetrap to test a **short lever**.



Short levers pull the string harder (more torque), but over a smaller distance.

Test the Long Lever

Push near the end to test a **long lever**.

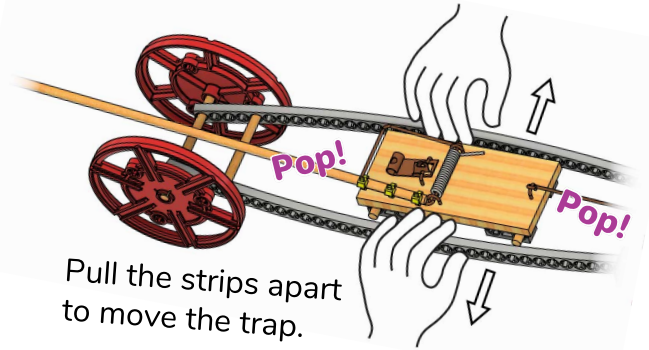


Long levers pull the string farther, but with less torque.

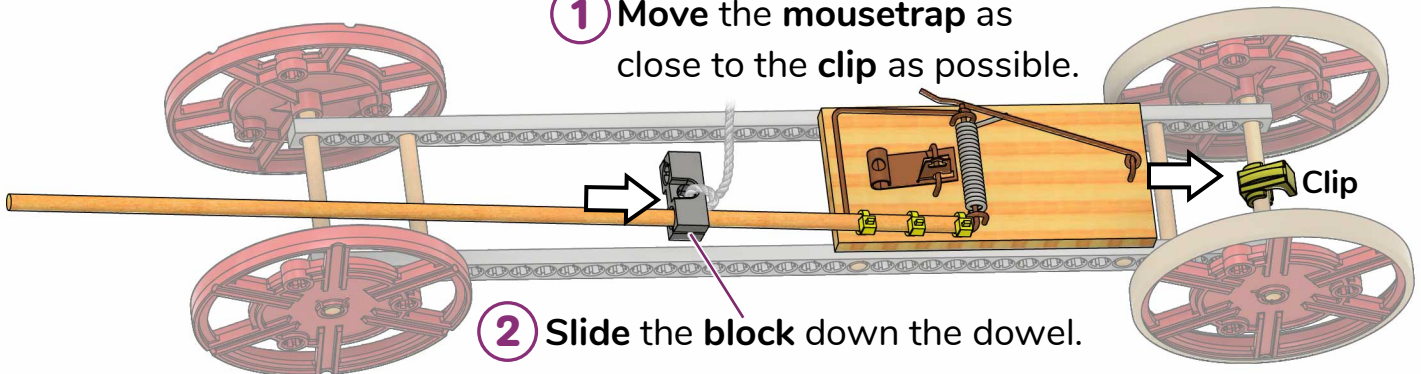
Now that you've got a feel for levers, it's time to see what torque and distance do on the racetrack!

Shorten the Lever

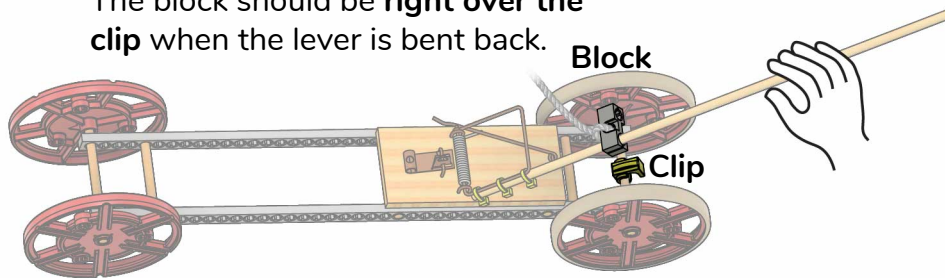
You're going to move your mousetrap and string to make a shorter lever.



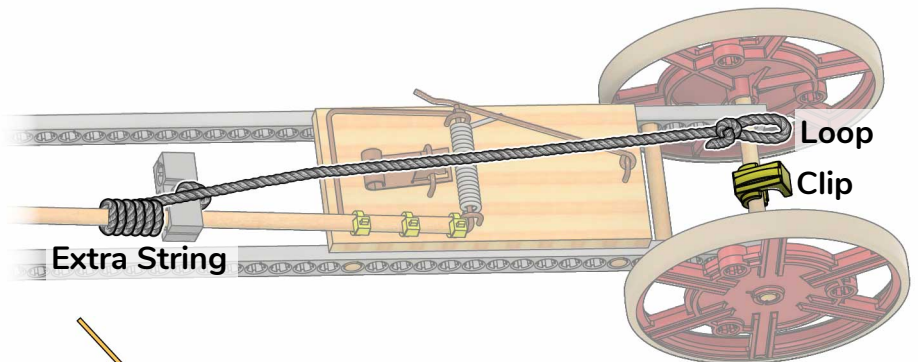
1 Move the **mousetrap** as close to the **clip** as possible.



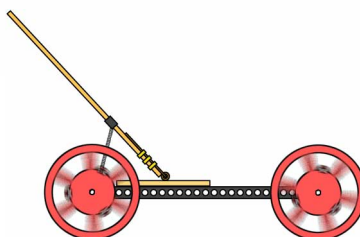
The block should be **right over the clip** when the lever is bent back.



3 Wrap extra string around the **dowel** until the loop reaches **just past the clip**.



✓ Your short lever is ready to test!



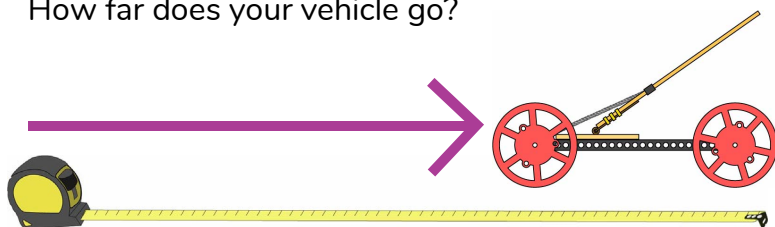
Test It Out!

Test your vehicle and fill in data for the Short Lever.

! Only fill in the Short Lever Data **!**
You'll test a Long Lever after you make it on the next page.

Distance

How far does your vehicle go?



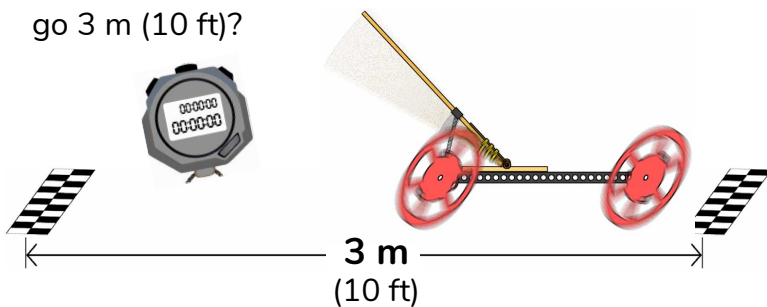
Distance Data

Short Lever Long Lever

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Speed

Time your vehicle – how long does it take to go 3 m (10 ft)?



Speed Data

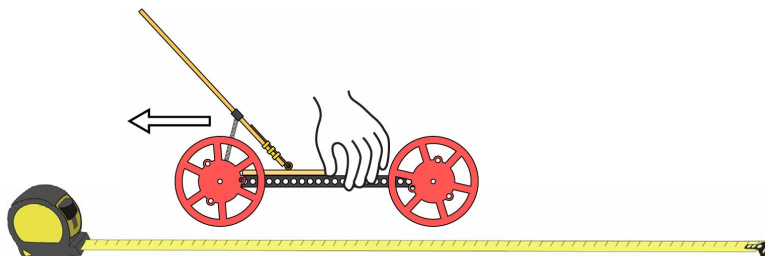
Short Lever Long Lever

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Distance Under Power

How far backwards do you need to roll your car to wind it up?

(When you let your car go, it will be under power for that same distance)



Distance Under Power Data

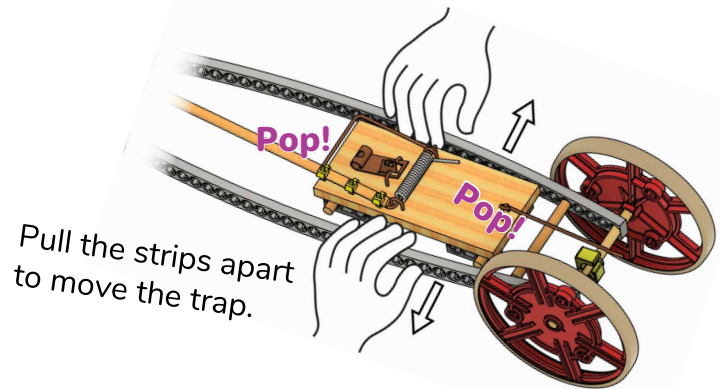
Short Lever Long Lever

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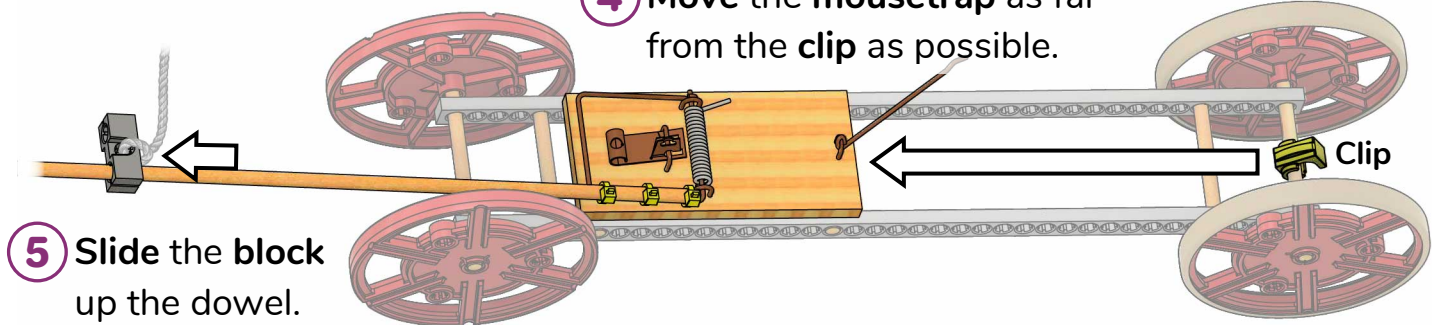
☒ Got all your Short Lever Data?
On the next page, you'll make a Long Lever and return to this page to get the rest of the data.

Lengthen the Lever

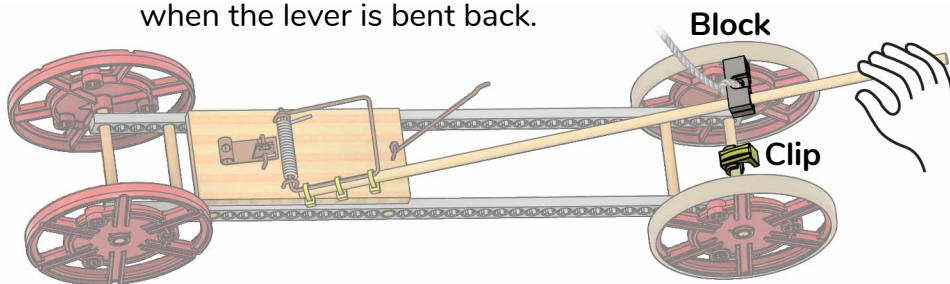
You're going to move your mousetrap and string to make a longer lever.



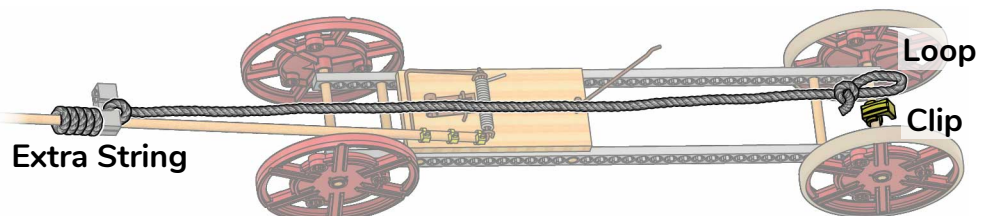
- 4 Move the mousetrap as far from the clip as possible.



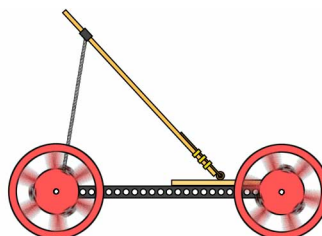
The block should be right over the clip when the lever is bent back.



- 6 Wrap extra string around the dowel until the loop reaches just past the clip.



- 7 Time to test your long lever!
- Record your data on Page 4.



Conclusion

Did you test your Long Lever on Page 4? You're ready to analyze the data.

- 8 If you're designing a vehicle for distance, do you think a Long Lever or a Short Lever will work better? Justify your answer using your lab data.

- 9 To design a vehicle for speed, would you want a Long or Short Lever? Justify your answer using your lab data.

- 10 How do you think Distance Under Power affects your vehicle's distance and speed?

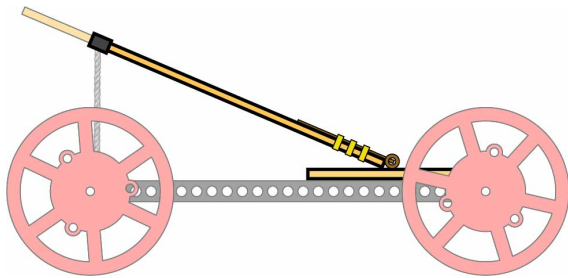
- 11 Your mission: create a mousetrap vehicle that goes 3 m (10 ft) in exactly 3 seconds. You test your vehicle, and it goes 3 m in 2 seconds. What do you do?

Optional

Test Mousetrap Position

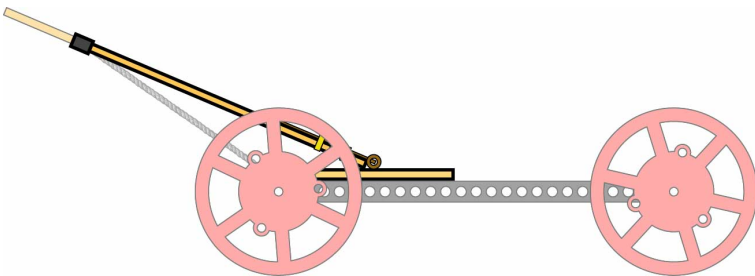
Keeping your lever long, you're going to test how changing your mouse trap's position affects performance.

Far Mousetrap



Test first with the mousetrap as far from the clip as possible.

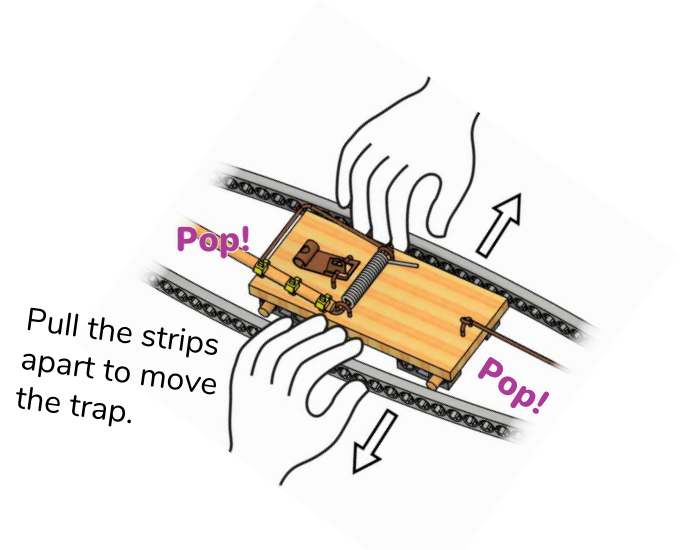
Close Mousetrap



Then move the trap as close to the clip- as possible, and test again.

Which position is better for speed?
What about distance?

Congratulations! You've finished the lab. Now use what you've learned to make your Mousetrap Vehicle even better.



Data

Test both positions as you did on Page 4.

Distance

Far

Close

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Speed

Far

Close

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Distance Under Power

Far

Close

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