

# Reaction Timer

## To do and notice:

You will need a partner to do this activity!

1. Have your partner sit or stand with their arm on the flat surface so their wrist extends beyond the edge
2. Hold the meter stick vertically above your partner's hand, with the "0" end of the stick just above their thumb and forefinger, but not touching them.
3. Instruct your partner to catch it as quickly as possible as soon as they see it begin to fall.
4. Without warning your partner, drop the meter stick.
5. Record how far it fell before your partner caught it.
6. **Consult the reaction time table to determine reaction time.**
7. Repeat at least two more times.

*Switch places with your partner and repeat. Try dropping a dollar or the large react – o-meter.*

## What's going on?

The reaction time is how long it takes your eyes to tell your brain that the meter stick is falling and how it takes your brain to tell your fingers to catch it.

The time has already been calculated for you on the reaction time table.

This is the actual formula  $d = \frac{1}{2}gt^2$ .

( $d$  = distance object fell;  $g$  = gravitational acceleration ( $9.8\text{m/s}^2$ );  $t$  = time the object was falling)

## LIGO connection:

Measuring accurately and precisely is a challenge. LIGO measures incredibly small changes in the distances between the beam tubes when gravitational waves move the detector!

<b>Distance (inches / centimeters)</b>	<b>Time (seconds / milliseconds)</b>
1.0 / 2.5	.072 / 72.0
2.0 / 5.1	0.1018 / 101.8
3.0 / 7.6	.1247 / 124.7
4.0 / 10.2	.1440 / 144.0
5.0 / 12.7	.1610 / 161.0
6.0 / 15.2	.1764 / 176.4
7.0 / 17.8	.1905 / 190.5
8.0 / 20.3	.2036 / 203.6
9.0 / 22.9	.2160 / 216.0
10.0 / 25.4	.2277 / 227.7
11.0 / 27.9	.2388 / 238.8
12.0 / 30.5	.2494 / 249.4
13.0 / 33.0	.2596 / 259.6
14.0 / 35.6	.2694 / 269.4
15.0 / 38.1	.2788 / 278.8
16.0 / 40.6	.2880 / 288.0
17.0 / 43.2	.2969 / 296.9
18.0 / 45.7	.3055 / 305.5
19.0 / 48.3	.3138 / 313.8
20.0 / 50.8	.3220 / 322.0
21.0 / 53.3	.3299 / 329.9
22.0 / 55.9	.3377 / 337.7
23.0 / 58.4	.3453 / 345.3
24.0 / 61.0	.3527 / 352.7

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