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| **Free Fall Mini Labs** | Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_ |

# Air Time – [Video Tutorial](https://youtu.be/VUfC59KY2G4)

Calculate the air time of your jump without using a stop watch

### Procedure:

* Standing flat footed next to the wall, place a piece of tape as high up as you can reach.
* Stick second piece of tape on the wall as high as you can by jumping straight up.
* Measure the distance between the two pieces of tape and calculate your total air time. Be careful!! Going up to the top is just half of your total air time.

# **Reaction Time** – [Video Tutorial](https://youtu.be/0NjNneDnXS0)

Calculate your reaction time without a stop watch

### https://www.wpclipart.com/education/supplies/ruler/ruler_metal_T.pngProcedure:

Using your knowledge of physics, calculate your reaction time when catching and dropping a ruler

* It’s probably a good idea to collect multiple trials worth of data and average them before calculating anything with our motion equations…

Check your answer using [www.humanbenchmark.com/tests/reactiontime](http://www.humanbenchmark.com/tests/reactiontime)

|  |  |  |  |  |  |
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| Online Reaction Time Test |  |  |  |  |  |

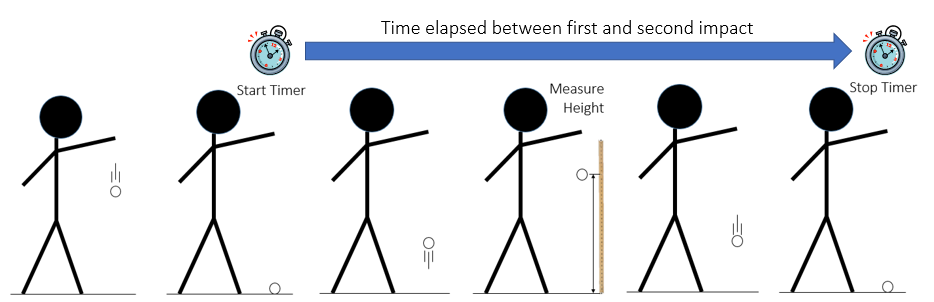
# Follow the Bouncing Ball – [Video Tutorial](https://youtu.be/-bQzy2hylS4)

Using a simple bouncing ball, measure and calculate the acceleration due to gravity.

|  |  |  |
| --- | --- | --- |
| Scientist #1 - Dropper | Scientist #2 - Measurer | Scientist #3 - Timer |
| *Tallest in the Group* | *Middle height in the Group* | *Shortest in the Group* |
|  |  |  |

## Procedure:

1. **Scientist #1** (the dropper), stands next to the wall, reaches as high as they can and drops the golf ball.
2. **Scientist #2** (the timer) starts the stopwatch when the ball hits the ground the 1st time.
3. **Scientist #3** (the measurer) marks the highest spot on the wall that the ball reaches on the first bounce and measures it in meters.
4. **Scientist #2** (the timer) stops the stopwatch when the ball hits the ground the 2nd time.
5. Repeat steps 1-4 five times to complete the table below



|  |  |  |
| --- | --- | --- |
| Trial # | Time between 1st and 2nd bounce | Maximum height of first bounce |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |
| Average |  |  |

## Analysis

List the data that you know from your measurements and **solve for the acceleration due to gravity**. For simplicity, only look at half of the time between bounces (time moving up or time moving down).