

# EXPERIMENT



## Lesson 2 Physics Experiment

### Classical Physics

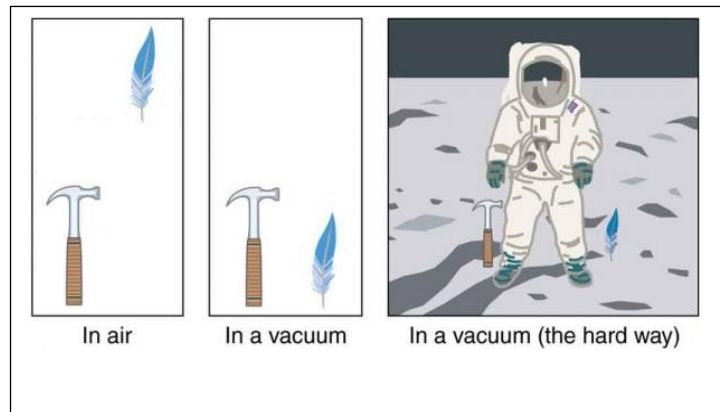
#### OBSERVE:

*Look at the world around you.*

How do objects fall? Do light objects fall slower than heavy objects?

**EXPLORE:** If the velocity of a falling object is caused by Earth's mass, why do objects fall at vastly different rates on Earth?

(Guess) \_\_\_\_\_



#### EXPERIMENT 1:

Try dropping an 8 x 11" paper one meter. How does it fall? Why does it float in various ways?

Try dropping an 8 x 11" paper that is tightly wadded (a ball) one meter? How is it different than a flat paper of the same weight?

Think about the cause of the acceleration (the mass of the earth).

What causes the difference observed? \_\_\_\_\_

#### EXPERIMENT 2:

Watch the Apollo 10 video of the hammer and feather drop. Each are dropped ~ 1 meter.

<https://youtu.be/Oo8TaPVsn9Y?si=ftgrdTQUiwUm1FT1>

What happens to the hammer and the feather in this video?

Think about the cause of the acceleration (the mass of the moon).

#### ANALYZE:

1. Why are results different between a wad of paper and a flat piece of paper?
2. Why does a heavy object fall at the same rate/velocity as a light object on the moon but not on the earth?

### Basic (SS) Math Skills

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**PROBLEM:** If an object on earth falls 1 second, its velocity is 10 m/s (in a vacuum). At the end of 2 seconds, its velocity is 20 m/s; at the end of 3 seconds, its velocity is 30 m/s.

What do you think its velocity will be if it falls 5 seconds? \_\_\_\_\_ meters per second

### Advanced (CS) Math Skills

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Since acceleration ( $10 \text{ m/s}^2$ ) in the previous question means velocity increases every second, what does that mean about the distance an object falls during each second?

After 1 sec \_\_\_\_\_ meters After 2 sec \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_ meters

After 3 sec \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ = meters

After 5 sec \_\_\_\_\_ = \_\_\_\_\_ meters

### Applied (SS+) Math Skills

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Average velocity can be determined by adding total meters traveled over the 5 seconds (calculated in the previous problem), then divide by 5 seconds.

Total distance an object on earth falls (in a vacuum) in 5 seconds \_\_\_\_\_

Equation to give average velocity: Total distance in meters/Total time in seconds

ANSWER: \_\_\_\_\_ m/s (average velocity)

### Compute (CP) Math Skills

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Make a graph of speed/velocity and time by adding the numbers to the graph below. Make a graph of acceleration by adding numbers to the graph below.

