

**GPS – Hallway Acceleration Lab**

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period\_\_\_\_\_\_\_\_\_\_

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| I can… |
| *Solve and interpret speed problems.**Solve and interpret acceleration problems.* |

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| Pre-Lab Questions |
| 1. What is the formula for speed?
2. What are the units for speed?
3. What is the formula for acceleration?
4. What are the units for acceleration?
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| ***Procedure*** |
| 1. Each lab group of 3 will take turns going out into the hall. Two of you will be the ***timers***, one will be the ***mover***.
2. At each 15 m mark in the hallway, one ***timer*** will stand with a stopwatch. When the ***mover*** passes that 15 m mark, each ***timer*** will stop the watch and keep it stopped to record the time.
3. The ***mover*** will start at the 0 m mark and finish at the 30 m mark down the hallway.
4. After two trials have been completed, the group will come in and report their data on the boards.
5. Each group will repeat steps 2-4.
6. Fill in the data tables provided, make calculations, graph the data, and answer the questions.
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| ***Data Tables*** |
| ***Group 1 data*** Mover name: | Meter mark | 15 | 30 |
| Time |  |  |
| ***Group 2 data*** Mover name: | Meter mark | 15 | 30 |
| Time |  |  |
| ***Group 3 data*** Mover name: | Meter mark | 15 | 30 |
| Time |  |  |

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| ***Calculations*** |
| 1. Image result for speed triangleFind the speed at each 15m mark using the speed formula or triangle provided.

$Speed= \frac{distance}{time}$ |
| ***Group 1 speed*** Mover name: | $$speed= \frac{15 m }{( )}$$ | $$speed= \frac{30 m }{( time 2-time 1)}$$$$speed= \frac{30 m }{( - )}$$ |
| ***Group 2 speed***Mover name: | $$speed= \frac{15 m }{( )}$$ | $$speed= \frac{30 m }{( time 2-time 1)}$$$$speed= \frac{30 m }{( - )}$$ |
| ***Group 1 speed*** Mover name: | $$speed= \frac{15 m }{( )}$$ | $$speed= \frac{30 m }{( time 2-time 1)}$$$$speed= \frac{30 m }{( - )}$$ |
| 1. Find the acceleration using the times you calculated.

$acceleration= \frac{(final velocity-initial velocity)}{time}= \frac{(vf-vi)}{t}$ |
| ***Group 1 acceleration*** | $acceleration= \frac{(vf-vi)}{t}=\frac{ ( -0 ) }{ }$ **=**  |
| ***Group 2 acceleration*** | $acceleration= \frac{(vf-vi)}{t}=\frac{ ( -0 ) }{ }$ **=**  |
| ***Group 3 acceleration*** | $acceleration= \frac{(vf-vi)}{t}=\frac{ ( -0 ) }{ }$ **=**  |

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| Analysis & Conclusions |
| 1. What does the data suggest about the **difference** between acceleration and speed?
2. Did either mover have the same speed for every 5 meter mark? ***Why or why not***?
3. Did any mover ***decelerate*** (or in other words, have negative acceleration)?
4. What is the direction for each of your accelerations (remember, acceleration is a **vector**)?
5. How did the object in motion accelerate? (Speed, direction, or both)
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***Bonus:*** Record the time it takes you to walk from the 0m mark to the 30 m mark and calculate your average speed.