

Use the [Virtual Science Teachers Snail vs. Grasshopper interactive](#) or the graphic titled “Grasshopper and Snail’s 10 Meter Race” to complete the data table.

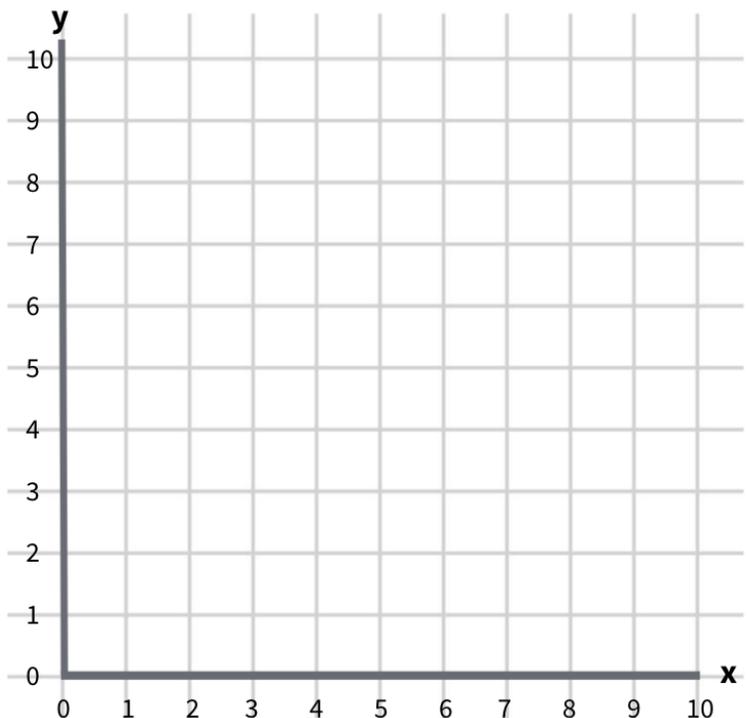
Distance from Starting Line During Race

Time (minutes)	Grasshopper’s Position (meters)	Snail’s Position (meters)
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Use the collected data to create a position vs. time graph for the race between Snail and Grasshopper.

Position vs. Time

1. Label the x axis with *Time* and the y axis with *Position*.
2. Add the appropriate units next to each axis label.
3. Plot and connect the points on the graph for Grasshopper’s positions, preferably in green.
4. Plot and connect the points on the graph for Snail’s positions, preferably in orange.



**Use the completed graph to answer the questions below.**

1. Who had a greater displacement (change in position) during the first five minutes of the race?  
**a.** Grasshopper      **b.** Snail      **c.** They traveled the same distance.
  
2. How long did it take Grasshopper to travel the first 2 meters of the race?  
**a.** 1 minute      **b.** 2 minutes      **c.** 3 minutes      **d.** 4 minutes
  
3. How long did it take Snail to travel the first 2 meters of the race?  
**a.** 1 minute      **b.** 2 minutes      **c.** 3 minutes      **d.** 4 minutes
  
4. How much farther did Grasshopper travel than Snail after the first 3 minutes of the race?  
**a.** 1 meter      **b.** 2 meters      **c.** 3 meters      **d.** 4 meters
  
5. At what time into the race were Grasshopper and Snail tied (at the same position)?  
**a.** 3 minutes      **b.** 4 minutes      **c.** 6 minutes      **d.** 10 minutes
  
6. What was Grasshopper's displacement (change in position) from minute 3 until minute 9?  
**a.** 0 meters      **b.** +1 meter      **c.** +2 meters      **d.** +6 meters
  
7. Select the option that best describes Snail's speed throughout the race.  
**a.** Snail started out fast and then slowed down.  
**b.** Snail started out slow and then sped up.  
**c.** Snail's speed remained constant.
  
8. Select the option that best describes Grasshopper's speed throughout the race.  
**a.** Grasshopper started out very slow and then got faster and faster.  
**b.** Grasshopper started out fast, stopped, and then he moved fast again.  
**c.** Grasshopper's speed remained constant.
  
9. How much farther did Snail travel than Grasshopper by the end of the race (after 10 minutes).  
**a.** 1 meter      **b.** 2 meters      **c.** 3 meters      **d.** 4 meters
  
10. Who had the fastest average velocity for the entire 10 minutes of the race?  
**a.** Grasshopper      **b.** Snail

Use the equation for average velocity to answer the questions below.

$$\text{average velocity} = \frac{\text{displacement}}{\text{time}}$$

Note that displacement and velocity are vectors that indicate both magnitude and direction.

A positive displacement represents a change in position away from the start line and toward the finish line.

A positive velocity represents moving away from the start line toward the finish line at a particular speed.

11. What is Grasshopper's average velocity for the first three minutes of the race?

- a. +1 meter/minute      b. +2 meters/minute      c. +3 meters/minute      d. +4 meters/minute

12. What is Snail's average velocity for the first 3 minutes of the race?

- a. +1 meter/minute      b. +2 meters/minute      c. +3 meters/minute      d. +4 meters/minute

13. What was Grasshopper's average velocity from minute 3 until minute 9?

- b. 0 meters/minute      b. +1 meters/minute      c. +2 meters/minute      d. +3 meters/minute

14. What was Grasshopper's average velocity for the total race (all ten minutes)?

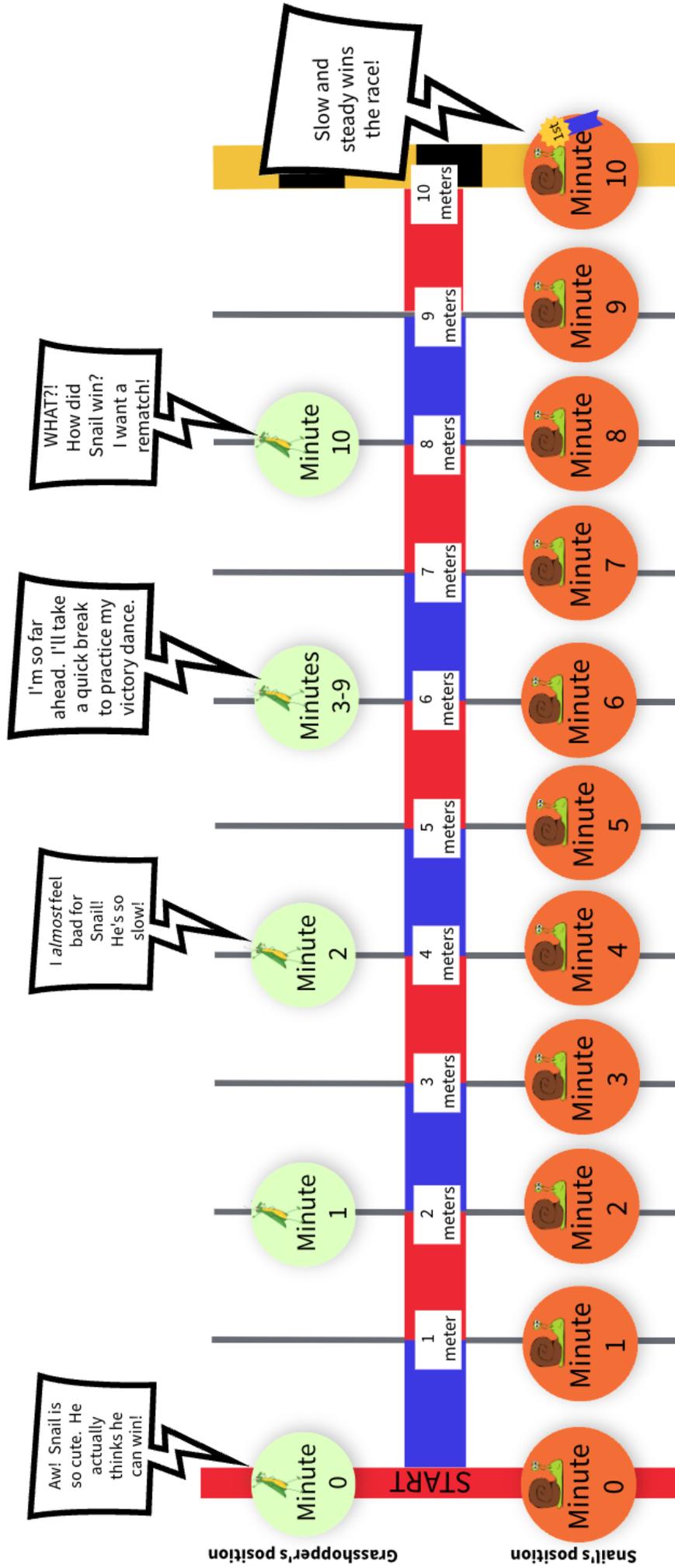
- a. +0.5 meters/minute      b. +0.8 meters/minute      c. +1.0 meters/minute      d. +1.2 meters/minute

15. What was Snail's average velocity for the total race (all ten minutes)?

- a. +0.5 meters/minute      b. +0.8 meters/minute      c. +1.0 meters/minute      d. +1.2 meters/minute

# Grasshopper and Snail's 10 Meter Race

The markers below show the distance away from the start (to the nearest meter) of Grasshopper and Snail after each minute of the race.



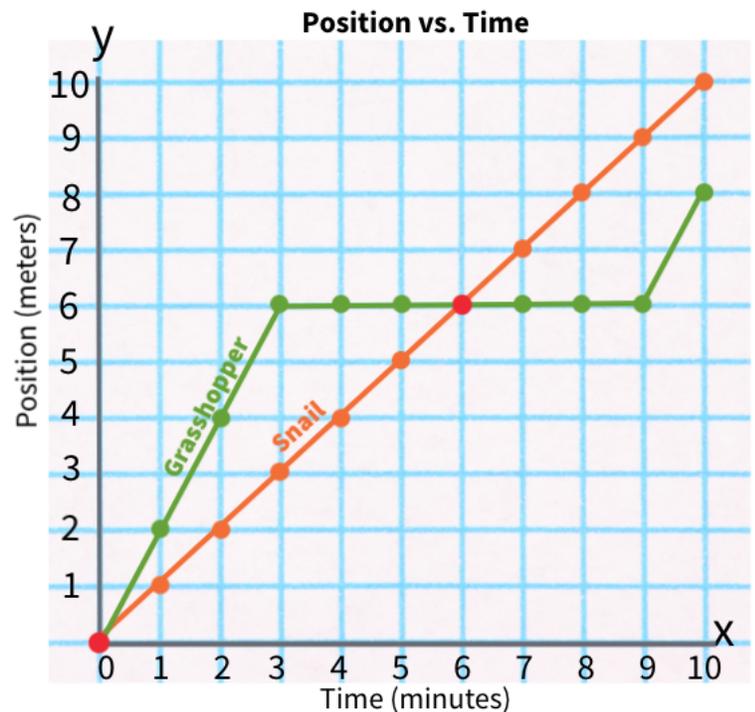
Use the [Virtual Science Teachers Snail vs. Grasshopper interactive](#) or the graphic titled “Grasshopper and Snail’s 10 Meter Race” to complete the data table.

Distance from Starting Line During Race

Time (minutes)	Grasshopper’s Position (meters)	Snail’s Position (meters)
0	0	0
1	2	1
2	4	2
3	6	3
4	6	4
5	6	5
6	6	6
7	6	7
8	6	8
9	6	9
10	8	10

Use the collected data to create a position vs. time graph for the race between Snail and Grasshopper.

1. Correctly label the x axis with *Time* and the y axis with *Position*.
2. Add the appropriate units next to each axis label.
3. Plot and connect the points on the graph for Grasshopper’s positions, preferably in green.
4. Plot and connect the points on the graph for Snail’s positions, preferably in orange.



**Use the completed graph to answer the questions below.**

1. Who had a greater displacement (change in position) during the first five minutes of the race?  
a. **Grasshopper**                      b. Snail                      c. They traveled the same distance.
2. How long did it take Grasshopper to travel the first 2 meters of the race?  
a. **1 minute**                      b. 2 minutes                      c. 3 minutes                      d. 4 minutes
3. How long did it take Snail to travel the first 2 meters of the race?  
a. 1 minute                      b. **2 minutes**                      c. 3 minutes                      d. 4 minutes
4. How much farther did Grasshopper travel than Snail after the first 3 minutes of the race?  
a. 1 meter                      b. 2 meters                      c. **3 meters**                      d. 4 meters
5. At what time into the race were Grasshopper and Snail tied (at the same position)?  
a. 3 minutes                      b. 4 minutes                      c. **6 minutes**                      d. 10 minutes
6. What was Grasshopper's displacement (change in position) from minute 3 until minute 9?  
a. **0 meters**                      b. +1 meter                      c. +2 meters                      d. +6 meters
7. Select the option that best describes Snail's speed throughout the race.  
a. Snail started out fast and then slowed down.  
b. Snail started out slow and then sped up.  
c. **Snail's speed remained constant.**
8. Select the option that best describes Grasshopper's speed throughout the race.  
a. Grasshopper started out very slow and then got faster and faster.  
b. **Grasshopper started out fast, stopped, and then he moved fast again.**  
c. Grasshopper's speed remained constant.
9. How much farther did Snail travel than Grasshopper by the end of the race (after 10 minutes).  
a. 1 meter                      b. **2 meters**                      c. 3 meters                      d. 4 meters
10. Who had the fastest average velocity for the entire 10 minutes of the race?  
a. Grasshopper                      b. **Snail**

Use the equation for average velocity to answer the questions below.

$$\text{average velocity} = \frac{\text{displacement}}{\text{time}}$$

Note that displacement and velocity are vectors that indicate both magnitude and direction.

A positive displacement represents a change in position away from the start line and toward the finish line.

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11. What is Grasshopper's average velocity for the first three minutes of the race?

- a. +1 meter/minute      b. +2 meters/minute      c. +3 meters/minute      d. +4 meters/minute

12. What is Snail's average velocity for the first 3 minutes of the race?

- a. +1 meter/minute      b. +2 meters/minute      c. +3 meters/minute      d. +4 meters/minute

13. What was Grasshopper's average velocity from minute 3 until minute 9?

- a. 0 meters/minute      b. +1 meters/minute      c. +2 meters/minute      d. +3 meters/minute

14. What was Grasshopper's average velocity for the total race (all ten minutes)?

- a. +0.5 meters/minute      b. +0.8 meters/minute      c. +1.0 meters/minute      d. +1.2 meters/minute

15. What was Snail's average velocity for the total race (all ten minutes)?

- a. +0.5 meters/minute      b. +0.8 meters/minute      c. +1.0 meters/minute      d. +1.2 meters/minute