Physics

Fall 2026

Weeks 5 - 6

Wednesday, September 9

- T: 5B - define scalar and vector quantities related to one- and two- dimensional motion and combine vectors using both graphical vector addition and the Pythagorean theorem

5D - describe and analyze acceleration in uniform circular and horizontal projectile motion in two dimensions using equations

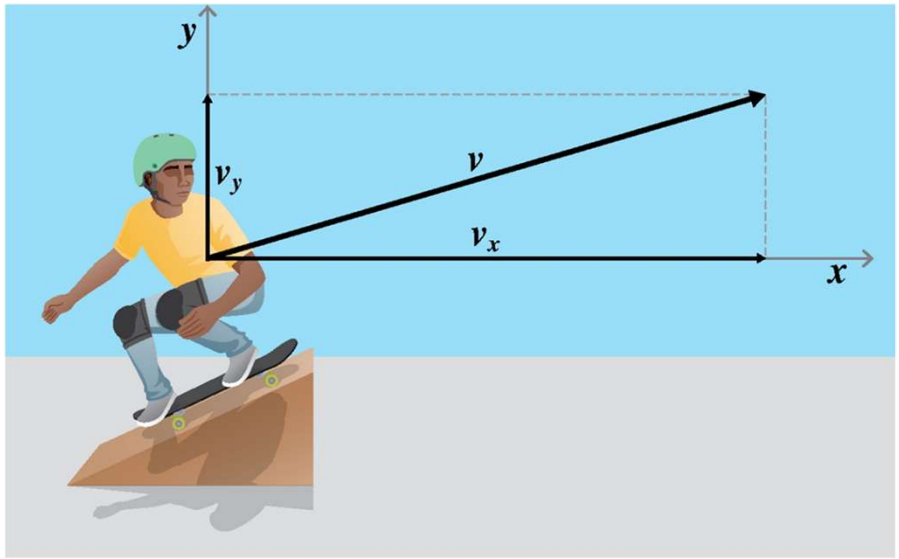
- O: I will be able to demonstrate my understanding of projectile motion as well as previous topics such as velocity, acceleration, and freefall
- D: by completing the worksheet in Canvas and helping my group to succeed with this task.

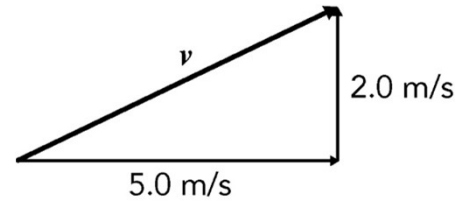
Journal 1.2

- What are some of your goals in the first 2 years after you graduate high school?

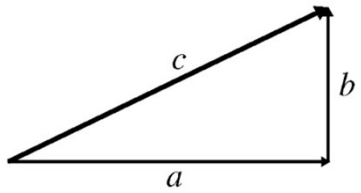
Representing Velocity

Velocity can be represented as a set of vector components which tell how fast an object is moving in the horizontal, *x*, and vertical, *y*, directions. The Pythagorean theorem is used to determine the magnitude of the velocity vector.





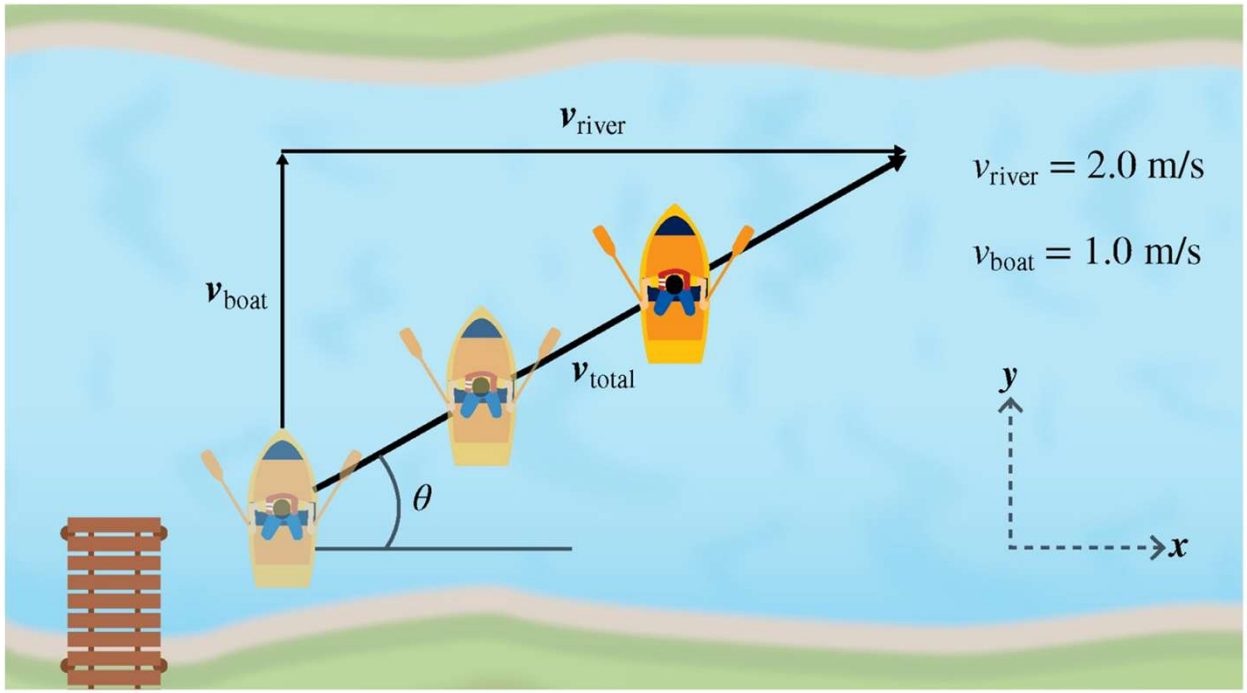
$$c = \sqrt{a^2 + b^2}$$



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Adding Velocities in Two Dimensions

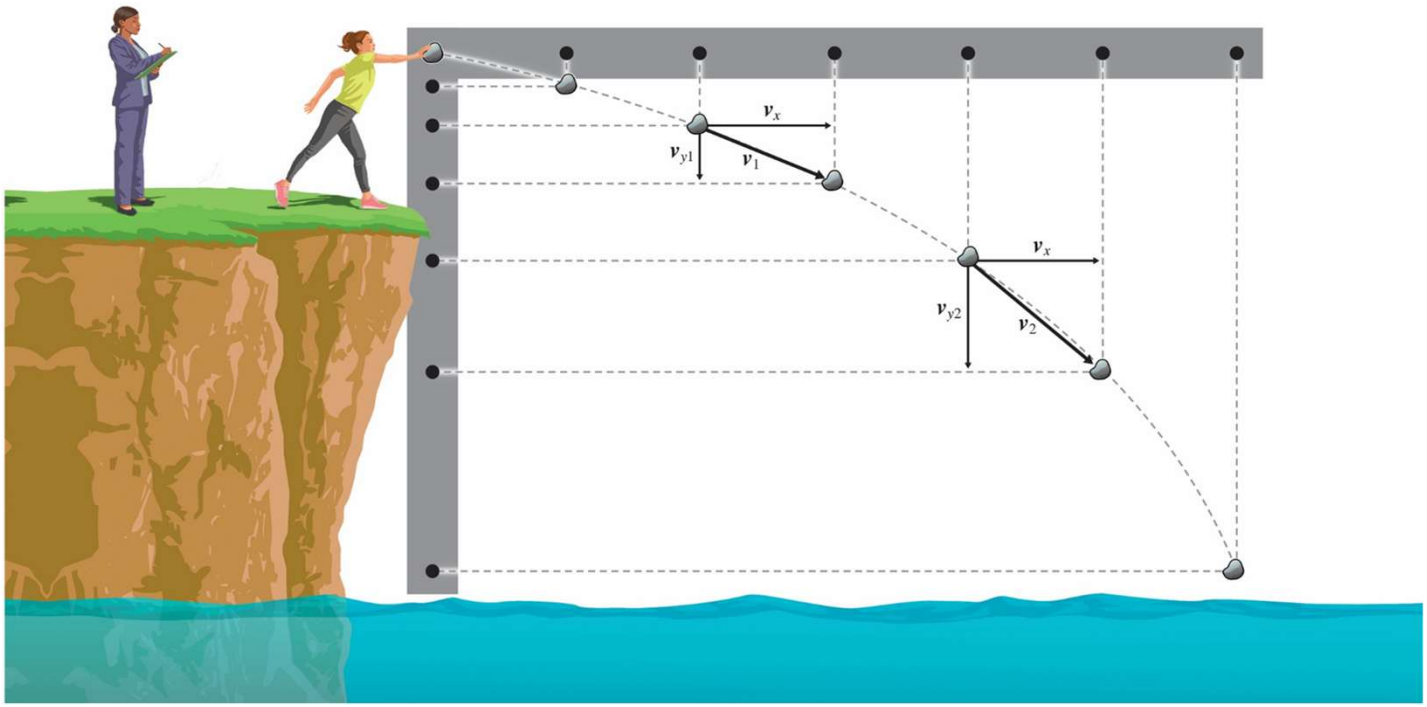
The horizontal and vertical components of velocity are independent of each other and can be added and subtracted analytically.



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Projectile Motion

Projectile motion is the combination of uniform motion parallel to Earth's surface and free-fall motion with constant acceleration due to gravity.



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Modeling Projectile Motion

The equations of projectile motion describe the horizontal and vertical components of an object's velocity and displacement at all times.

Horizontal Equation of Motion

$$\Delta x = v_x t$$

Δx is horizontal displacement component

v_x is horizontal velocity component

Vertical Equations of Motion

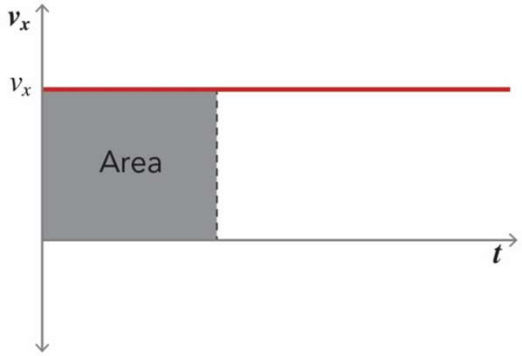
$$v_y = v_{iy} + gt;\ \Delta y = v_{iy} t + \frac{1}{2} g t^2$$

v_y is vertical velocity component

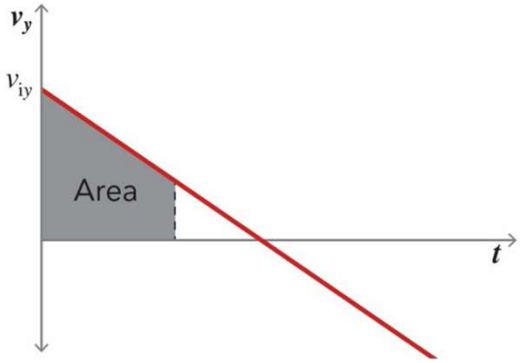
v_{iy} is initial vertical velocity component

Δy is vertical displacement component

Horizontal motion



Vertical motion



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Friday, September 11

- T: **5B - define scalar and vector quantities related to one- and two-dimensional motion and combine vectors using both graphical vector addition and the Pythagorean theorem**

  5D - describe and analyze acceleration in uniform circular and horizontal projectile motion in two dimensions using equations
- O: **I will improve my understanding of projectile motion**
- **D: by completing the PhET simulation.**

Monday, September 14

- T: **5B - define scalar and vector quantities related to one- and two-dimensional motion and combine vectors using both graphical vector addition and the Pythagorean theorem**
- **5C - describe and analyze motion in one dimension using equations with the concepts of distance, displacement, speed, velocity, frames of reference, and acceleration**
- **5D - describe and analyze acceleration in uniform circular and horizontal projectile motion in two dimensions using equations**
- O: I will demonstrate my understanding of motion
- D: by completing DCA #1

Wednesday, September 16

- Substitute: Students will complete intro activities to Newton's laws.

Monday, September 21

- **5E** - explain and apply the concepts of equilibrium and inertia as represented by Newton's first law of motion using relevant real-world examples such as rockets, satellites, and automobile safety devices

- O: I will be able to explain the concept of force
- D: by completing an a Lab involving inertia.