# Kinematics

AP Physics C: Mechanics · Vocabulary in context

| Word | Example |
|---|---|
| **kinematics** /ˌkɪnɪˈmætɪks/ | **Kinematics** describes how things move. |
| **scalar** /ˈskeɪlə/ | Mass is a **scalar** because it has no direction. |
| **magnitude** /ˈmægnɪtjuːd/ | The force has a **magnitude** of 20 N.<br>20 N |
| **vector** /ˈvektə/ | Velocity is a **vector** because it has a direction. |
| **displacement** /dɪˈspleɪsmənt/ | After walking 3 km east, your **displacement** is 3 km east.<br>3 km 3 km |
| **velocity** /vəˈlɒsɪti/ | The ball's **velocity** is 5 m/s to the left.<br>5 m/s |
| **acceleration** /əkˌseləˈreɪʃn/ | The car speeds up quickly, so its **acceleration** is large. |
| **resolve** /rɪˈzɒlv/ | **Resolve** the force into x- and y-components.<br>x y |
| **components** /kəmˈpəʊnənts/ | Split the velocity into horizontal and vertical **components**. |
| **unit vectors** /ˈjuːnɪt ˈvektəz/ | The **unit vectors** i and j point along the x- and y-axes.<br>i j x y |
| **derivatives** /dɪˈrɪvətɪvz/ | Velocity and acceleration are **derivatives** of position with respect to time. |
| **integrate** /ˈɪntɪgreɪt/ | **Integrate** acceleration to find velocity. |
| **position** /pəˈzɪʃn/ | The **position** of the car is its distance from the start. |
| **average velocity** /ˈævrɪdʒ vəˈlɒsɪti/ | **Average velocity** is displacement divided by time. |



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| **instantaneous velocity** /ˌɪnstənˈteɪnɪəs vəˈlɒsɪti/ | **Instantaneous velocity** is velocity at one moment. |
| **slope** /sləʊp/ | A steeper line has a larger **slope**. |
| **tangent line** /ˈtændʒənt laɪn/ | The **tangent line** touches the curve at one point and has the same slope there. |
| **speedometer** | A car's **speedometer** shows instantaneous speed. |
| **inverse operations** | Differentiation and integration are **inverse operations**. |
| **kinematic equations** | The **kinematic equations** link displacement, velocity, acceleration and time. |
| **free fall** /friː fɔːl/ | A stone dropped from a bridge is in **free fall**. |
| **air resistance** /eə rɪˈzɪstəns/ | **Air resistance** slows down a falling leaf. |
| **negligible** /ˈneglɪdʒəbl/ | For a heavy stone, air resistance is **negligible**. |
| **reference frame** /ˈrefrəns freɪm/ | A train is a **reference frame** for the people inside it. |
| **vector addition** | Relative velocities combine by **vector addition**. |
| **relative motion** /ˈrelətɪv ˈməʊʃn/ | **Relative motion** depends on who is watching. |
| **independently** | Without air resistance, analyse horizontal and vertical motion **independently**. |
| **projectile motion** /prəˈdʒektaɪl ˈməʊʃn/ | One model of **projectile motion** ignores air resistance. |

| Word | Example |
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| **parabola** /pə'ræbələ/ | A thrown ball follows a **parabola**. |
| **axis** /'æksɪs/ | Label each **axis** of the graph. |
| **dot product** /dɒt 'prɒdʌkt/ | To find the **dot product**, multiply matching parts and add. |
| **cross product** /krɒs 'prɒdʌkt/ | Torque is the **cross product** of r and F.<br>r F |
| **torque** /tɔːk/ | A longer spanner gives more **torque**. |
| **angular momentum** /'æŋgjʊlə məʊ'mentəm/ | A spinning ice skater has **angular momentum**. |



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