# Force and Translational Dynamics

AP Physics C: Mechanics · Vocabulary in context

| Word | Example |
|---|---|
| **system** /ˈsɪstəm/ | A pond is a **system** with water, plants and animals. |
| **center of mass** /ˈsentə ɒv mæs/ | The **center of mass** is the balance point. |
| **force** /fɔːs/ | You use a **force** to push a door open. |
| **free-body diagram** /friː ˈbɒdi ˈdaɪəgræm/ | Draw a **free-body diagram** with an arrow for each force. |
| **Newton's third law** /ˈnjuːtnz θɜːd lɔː/ | **Newton's third law** says forces come in equal and opposite pairs. |
| **inertia** /ɪˈnɜːʃə/ | **Inertia** keeps you moving forward when a bus stops suddenly. |
| **net force** /net fɔːs/ | The **net force** is the sum of all forces. |
| **translational equilibrium** /trænˈsleɪʃənl ˌiːkwɪˈlɪbrɪəm/ | A car at a steady speed is in **translational equilibrium**. |
| **differential equation** /ˌdɪfəˈrenʃl ɪˈkweɪʒn/ | A **differential equation** links a quantity and its rate of change. |
| **incline** /ɪnˈklaɪn/ | The block slides down an **incline**. |
| **tension** /ˈtenʃn/ | The **tension** in the rope holds up the lamp. |
| **Newton's law of gravitation** /ˈnjuːtnz lɔː ɒv ˌgrævɪˈteɪʃn/ | **Newton's law of gravitation** gives the pull between two masses. |



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|---|---|
| **Friction** /ˈfrɪkʃn/ | **Friction** slows things down. |
| **kinetic** /kɪˈnetɪk/ | **Kinetic** friction acts while a box slides across the floor. |
| **static** /ˈstætɪk/ | **Static** friction stops a parked car from sliding down the hill. |
| **normal force** /ˈnɔːml fɔːs/ | The **normal force** acts perpendicular to the contact surface. |
| **Hooke's law** /hʊks lɔː/ | **Hooke's law** says the extension is proportional to the force. |
| **spring constant** /sprɪŋ ˈkɒnstənt/ | A stiff spring has a large **spring constant**. |
| **resistive force** /rɪˈzɪstɪv fɔːs/ | Air drag is a **resistive force** that slows a falling ball. |
| **terminal velocity** /ˈtɜːmɪnl vəˈlɒsɪti/ | A skydiver reaches **terminal velocity** when drag equals weight. |
| **separate the variables** /ˈseprət ðə ˈveərɪəblz/ | To solve $\mathrm{d}v/\mathrm{d}t = -kv$, **separate the variables** and integrate both sides. $$\mathrm{d}v/\mathrm{d}t = -kv$$ |
| **centripetal acceleration** /senˈtrɪpɪtl əkˌseləˈreɪʃn/ | A car turning a corner has a **centripetal acceleration**. |



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