Astronomy

Fall 2025

Weeks 9 – 10

Oct 6 - 17

Monday / Tuesday (October 6 & 7)

- SmarkBook

- T:**5) Science concepts. The student understands how astronomy influenced and advanced civilizations. The student is expected to:**
- **5B** research and evaluate the contributions of scientists, including Ptolemy, Copernicus, Tycho Brahe, Kepler, Galileo, and Newton, as astronomy progressed from a geocentric model to a heliocentric model; and
- O: I will be able to explain the concepts of chapter 2
- D: by completing the MHE Smart Book assignment.
- A: n/a
- Y: What were the major steps in developing the modern view of astronomy?

Wednesday / Thursday (October 8 & 9)

- Unit 2 Test

- T::**(5) Science concepts. The student understands how astronomy influenced and advanced civilizations. The student is expected to:**
- **5B** research and evaluate the contributions of scientists, including Ptolemy, Copernicus, Tycho Brahe, Kepler, Galileo, and Newton, as astronomy progressed from a geocentric model to a heliocentric model; and

(6) Science concepts. The student conducts and explains astronomical observations made from the point of reference of Earth. The student is expected to:

- **6D** understand the difference between astronomy and astrology, the reasons for their historical conflation, and their eventual separation.
- O: I will demonstrate my understanding of the origins of astronomy
- D: by making an "out of this world" grade on my Unit 2 Test.
- A: Unit 2 Vocab
- Y: What were the steps that lead us to today's understanding of the universe?

Tuesday (October 14)

- PSAT Shutdown Day – No classes, no assignments

Wednesday / Thursday (October 15 - 16)

- Begin New Unit

Journal 2.2

- Who is your hero and why?

- T: **(7) Science concepts. The student knows our relative place in the solar system. The student is expected to:**
- **7B** model the scale, size, and distances of the Sun, Earth, and Moon system and identify the limitations of physical models; and
- **(11) Science concepts. The student uses models to explain the formation, development, organization, and significance of solar system bodies. The student is expected to:**
- **11A** relate Newton's law of universal gravitation and Kepler's laws of planetary motion to the formation and motion of the planets and their satellites;
- O: I will be able to describe Newton's 3 laws of motion
- D: by completing a PhET simulation and participating in a lecture and class discussion.
- A: Newton's 3 Laws, force, inertia
- Y: How do Newton's 3 laws interact with one another?

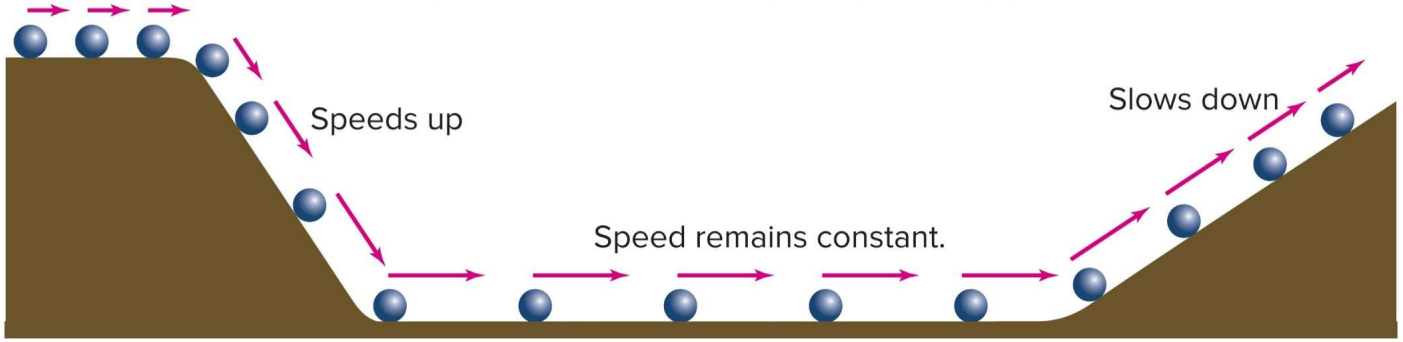
Unit 3: Gravity and Motion

- NASA/Rick Wetherington-Tim Powers

Inertia

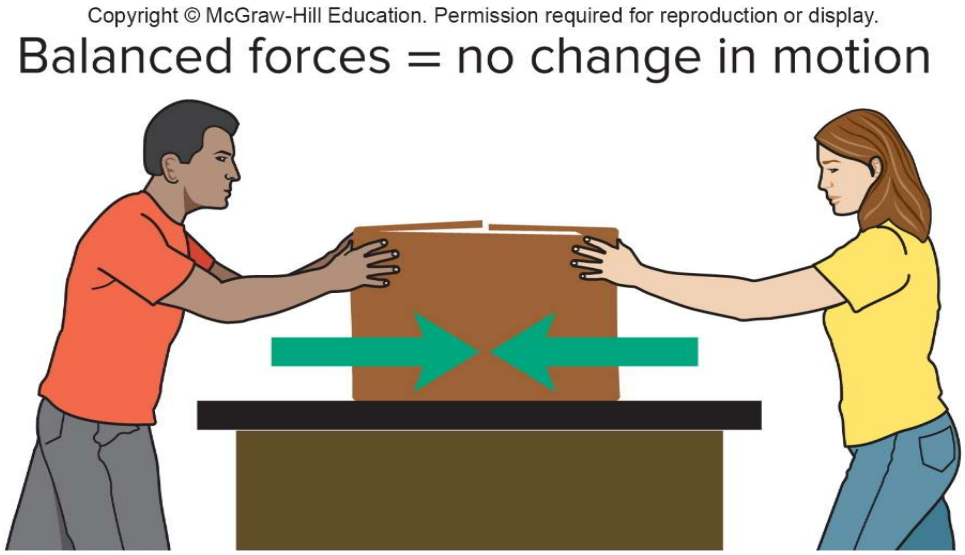
- Galileo established the idea of *inertia*:
- A body at rest tends to remain at rest.
- A body in motion tends to remain in motion.
- Through experiments with inclined planes, Galileo demonstrated the idea of inertia and the importance of forces (friction).

Inertia and Newton's First Law



- This concept was incorporated in *Newton's First Law of Motion:*
- A body continues in a state of rest or uniform motion in a straight line unless made to change that state by forces acting on it.

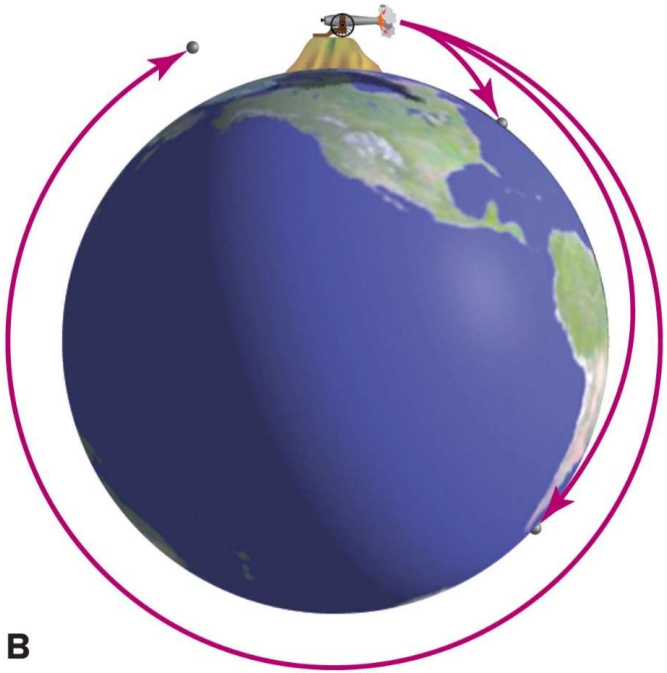
Newton's First Law



- Important ideas of Newton's First Law.
- Force: A push or a pull.
- The force referred to is a net force.
- The law implies that if an object is not moving with constant velocity, then a nonzero net force must be present.

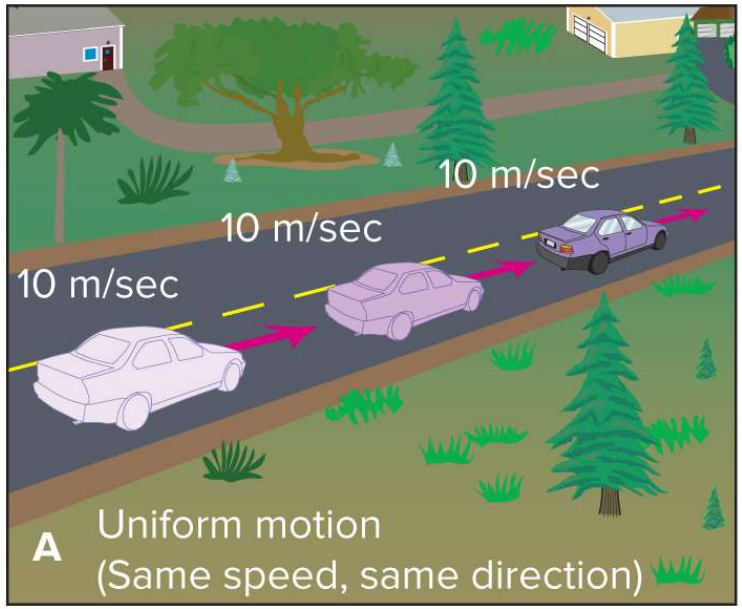
Newton's First Law in Action

- At a sufficiently high speed, the cannonball travels so far that the ground curves out from under it.
- The cannonball literally misses the ground!
- The ball, now in orbit, still experiences the pull of gravity!

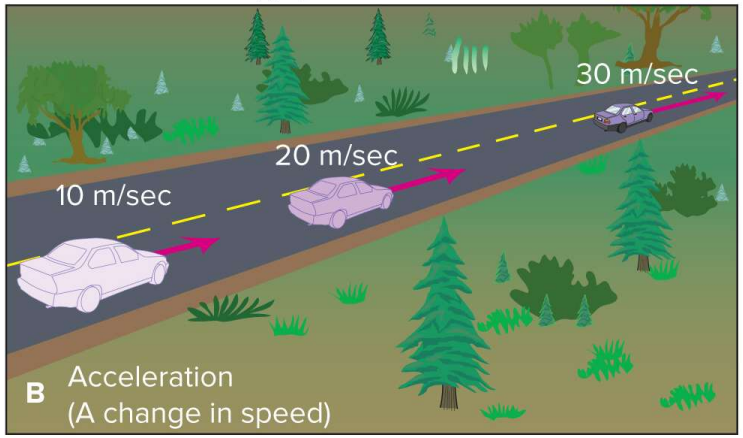


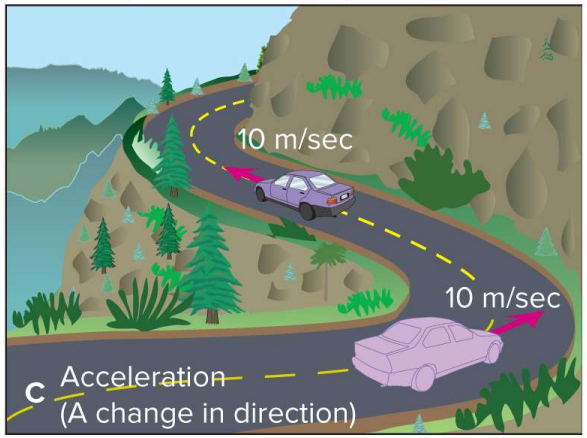
Newton's Second Law: Motion

- Motion.
- An object is said to be in uniform motion if its speed and direction remain unchanged.
- An object in uniform motion is said to have a constant velocity.
- A force will cause an object to have non-uniform motion, a changing velocity.
- *Acceleration* is defined as a change in velocity.



Newton's Second Law: Acceleration

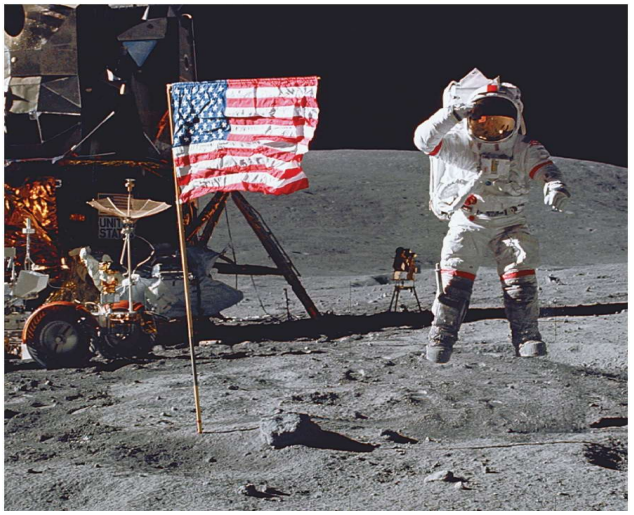




- Acceleration.
- An object increasing or decreasing in speed along a straight line is accelerating.
- An object with constant speed moving is a circle is accelerating.
- Acceleration is produced by a force and experiments show the two are proportional.

Newton's Second Law: Mass

- Mass is the amount of matter an object contains.
- Technically, *mass* is a measure of an object's inertia.
- Mass is generally measured in kilograms.
- Mass should not be confused with weight, which is a force related to gravity – weight may change from place to place, but mass does not.



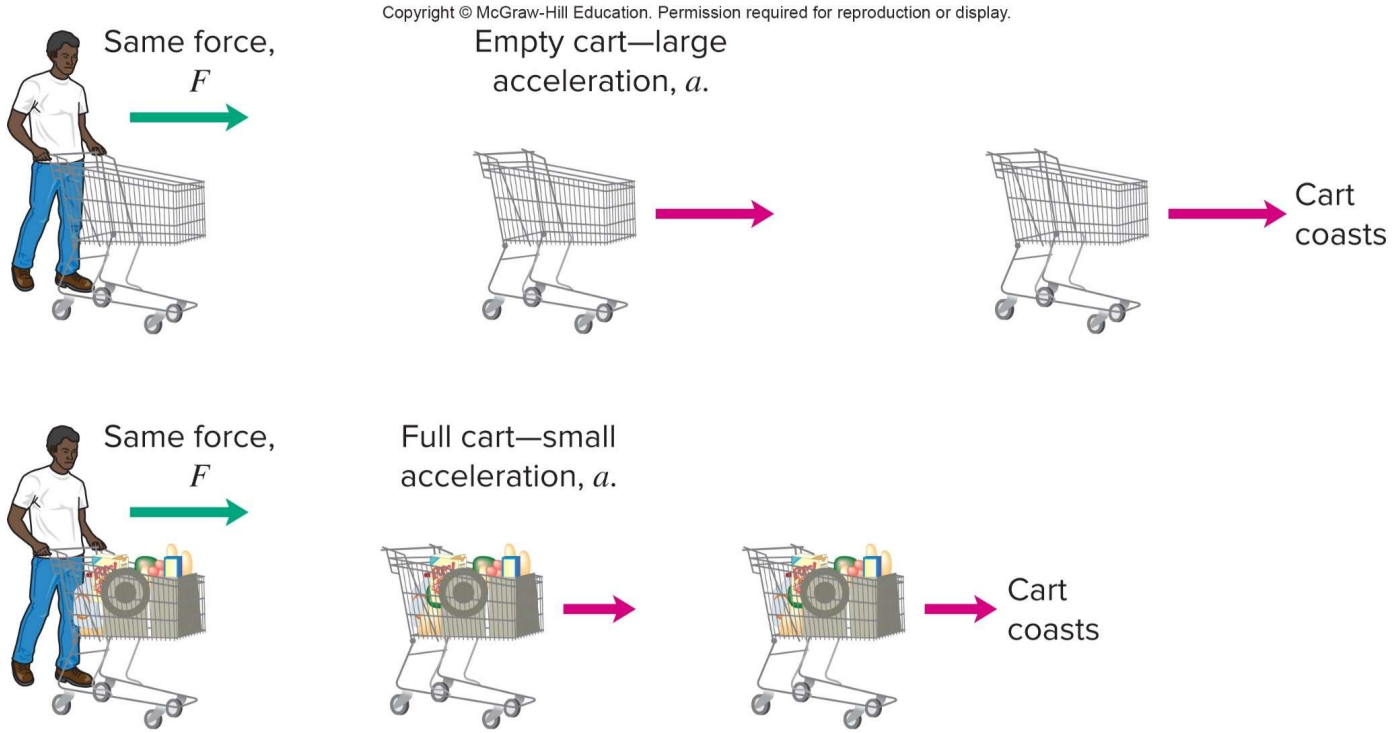
- NASA

Newton's Second Law of Motion

- $F = ma$

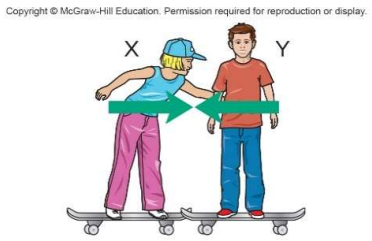
- Equivalently, the amount of acceleration (a) that an object undergoes is proportional to the force applied (F) and inversely proportional to the mass (m) of the object.
- This equation applies for any force, gravitational or otherwise.

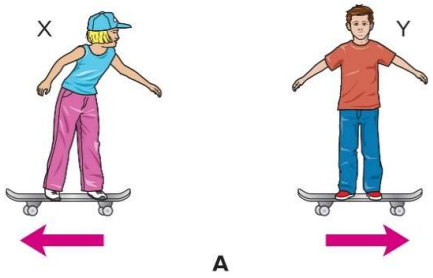
F = *ma* (or More Intuitively, *a* = *F* Over *m*)

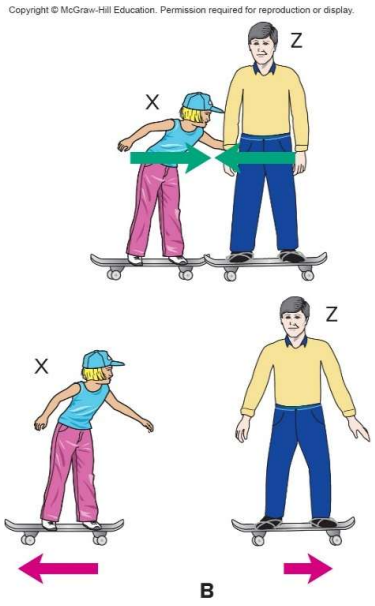


Newton's Third Law of Motion

- When two objects interact, they create equal and opposite forces on each other.
- This is true for any two objects, including the Sun and Earth!







Friday (October 17)

- Substitute