

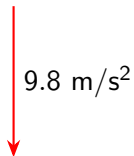
Gravity in One Dimension

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Acceleration of gravity near Earth's surface

- ▶ In the absence of other forces, Earth accelerates objects near its surface at 9.8 m/s^2 toward the center of the Earth (downward).



- ▶ $g = 9.8 \text{ m/s}^2$

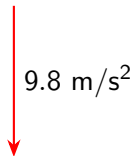
Four Theories of Gravity

1. Gravity causes objects near Earth's surface to accelerate. An object near Earth's surface that is allowed to move or fall freely will accelerate toward the center of the Earth at a rate of 9.8 m/s^2 .
2. Gravity is a force produced by the Earth on objects near its surface. $F_G = mg$ downward.
3. Gravity is a force between any two objects with mass. This is called Newton's law of universal gravitation.
4. Gravity is the curvature of space-time. This is Einstein's general theory of relativity.

Slogan

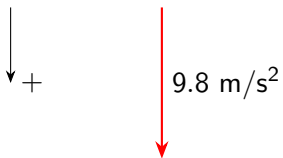
If gravity provides the acceleration, use $a = g$ or $a = -g$ in the CA equations.

Coordinate System option 1: Up is positive



$$a = -g = -9.8 \text{ m/s}^2$$

Coordinate System option 2: Down is positive



$$a = g = 9.8 \text{ m/s}^2$$