

Warm up

Check your answers from your homework (edhelper book)

1. C

2. True

3. D. The speed of an object during a given time

4 Instantaneous velocity is the speed of an object at a particular instant. Average velocity is the total distance an object travels over the total time span it takes for that object to travel that distance.

5 Acceleration is when force is applied to a moving object, and as a result, the velocity of that object is increased. The force must be applied in the same direction as the velocity. Deceleration is the decrease in a moving object's velocity when force is applied in the opposite direction of the velocity.

6 500 miles (displacement) / 10 hours = 50 miles/hour (average velocity)

7 1,500 miles (displacement) / 60 miles per hour (average velocity) = 25 hours (time)

8 False

Which will reach the ground first? A massive medicine ball or a basketball?

- ▶ What does your gut say?
- ▶ <https://www.youtube.com/watch?v=mCC-68LyZM>

Gravity Tab

- ▶ Gravity is the earth's pull on things. Things on or near the earth are pulled toward it by the earth's gravity. Gravity is always present.
- ▶ All objects fall at the same rate of acceleration independent of its mass if there are not frictional forces acting upon them.
- ▶ Free fall in a vacuum (NO AIR)--- An object that falls through a vacuum is subjected to only one outside force which is gravity.

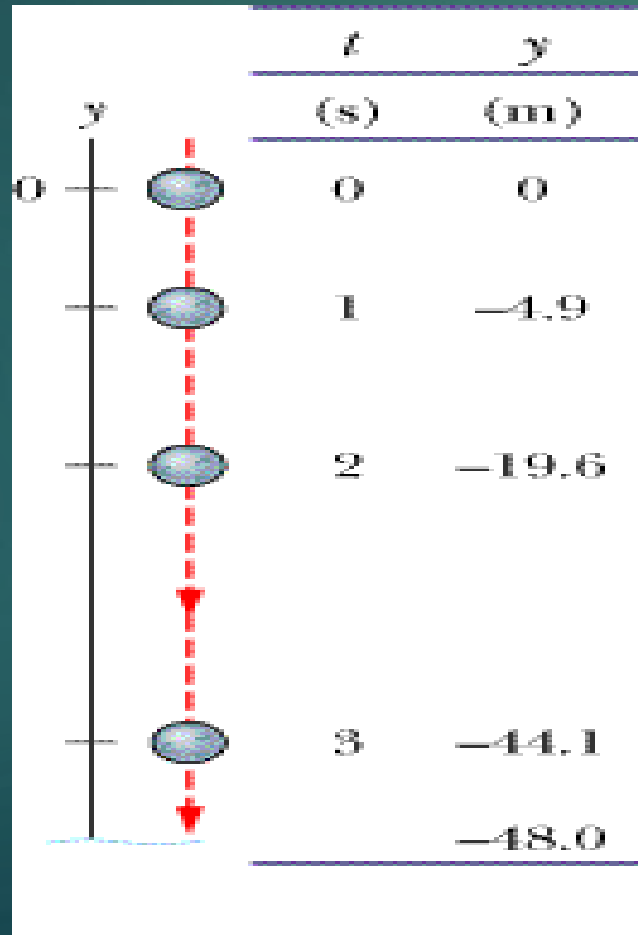
Gizmo

- ▶ <https://www.explorelarning.com/index.cfm?method=cResource.displayView&ResourceID=387>

LET'S INVESTIGATE!

Gravity Tab

- ▶ Gravity is a force that causes objects to accelerate at a rate of 9.8m/s/s (changing 9.8 m/s every second)



Gravity causes all things to accelerate at the same rate. However, other unbalanced forces such as air resistance may affect the time of landing.

So why does the medicine ball and basketball fall to the ground at the same rate? **ANSWER IT**

Mass Tab

- ▶ What is mass?
- ▶ The amount of matter in an object

The affect of gravity relies on two things:

- Mass of object
- Distance between objects

Your mass doesn't change; its what makes you YOU!

Gravity is a force that acts between any 2 masses.

Two factors affect the gravitational attraction between objects: **mass and distance**.



The force of gravity acts between all objects.



If mass increases, the force of gravity increases.



If distance increases, the force of gravity decreases.

Draw on mass tab

HOW DO WE KNOW.... EVIDENCE IS IN OUR SOLAR SYSTEM!

http://phet.colorado.edu/sims/html/gravity-force-lab/latest/gravity-force-lab_en.html

Weight

- ▶ What is weight?
- ▶ The size of gravitational force exerted on an object?
- ▶ Measures your weight. It measures the gravitational force between you and the Earth.
- ▶ Calculated: $W = m (9.8 \text{ m/s/s})$
- ▶ Weight would change on other planets!

Terminal Velocity (don't write)

- ▶ Terminal velocity happens when an object is falling it speeds up (due to gravity)
- ▶ At the same time, the force of air resistance is pushing upwards against it (this is increasing too).
- ▶ When the upward force is equal to the downward force... you fall at a constant speed.

