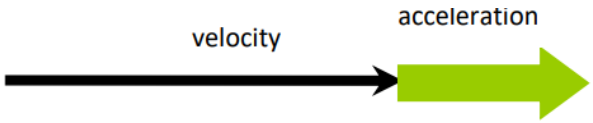
Acceleration 2

All objects in Earth gravity would fall with the same acceleration (**Gravitational acceleration), g=9.81 m/s²** (~10 m/s²) directed downward.

For the case of motion with acceleration there are **two major cases**:

1)Acceleration is directed along the velocity (both are **in the same direction**)



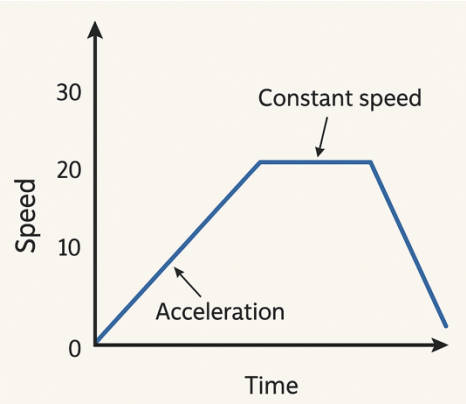
In this case the **velocity and acceleration** have same sign and speed of the object is increasing with time. The acceleration magnitude gives us the rate of speed increase. For example, acceleration of 5 meters per second per second (this is not a typo!) means that the **speed increases** for 5m/s every second. It is usually denoted as 5m/s² (five meter per second square).

2)



In this case the **velocity and acceleration have opposite signs** and speed of the object decreases with time. The acceleration magnitude gives us the rate of the speed decrease. For example, acceleration of -5m/s² means that the speed decreases by 5m/s every second.

We can **draw a diagram** to interpret speed and time.



On the x – axis we put time, and speed on the y – axis.

From this graph, we can see three things: how fast something is moving (speed), how far it goes (distance), and how its speed changes (acceleration). The speed is shown on the graph, the distance is the area under the line – we will discuss it next class, and the **acceleration is how steep the line is – its slope**.

No HW this week. Please review the previous topics and make sure you understand acceleration.

Optional problem:
Imagine that you dropped a penny from Empire State Building (please, don't do it in real life!). Calculate the speed of the coin in 5 seconds.