All sections marked with a ⚡ are considered essential concepts and must be completed to receive full credit on WS.

Speed (S) or Velocity (V) — Scalar (S) or Vector (V)

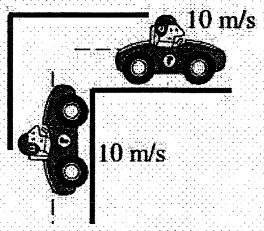
V A bike goes 25 m/s toward main street.	V 40 mph toward Dallas.
S A person walks 4 mph.	V 3 m/s² to the left.
S A plane flies 200 m/s.	V 10 meters up the hill.
V A bird flies 100 mph due south.	S 12 meter per sec².
	V Direction matters.
	S No direction is needed

Mass, Time, Distance, Velocity, or Acceleration?

T 2 hrs	T 5 sec	M 8 kg
V 3 m/s	V 9 mph	A 4 m/s²
A 6 mph/sec	D 12 m	D 1 in

Accelerating? Yes, No, or Maybe?

N At constant velocity.
Y Going 5 m/s then going 3 m/s.
Y A car going around a corner. (*see graphic at right*).
Maybe At constant speed. turning corner
Y Stopping.
N A car at rest.



Object A: slowing down — neg accel
Object B: speeding up — pos accel
Object C: constant speed
Object D: constant speed changing direction

Choose which of the above applies to the following

C&D Constant speed.	B Distance increases
B Positive acceleration.	B Starts at rest.
C At constant velocity.	A Is stopping.
A,B,D Accelerating.	A,B,C Constant direction.
A Decelerating.	A Negative acceleration.
C Acceleration = 0.	C $V_i = V_f$

Object A accelerates at 10 m/s²; Object B accelerates at 5 m/s².

Both Which one will go faster?
B Which one will take more time to reach a high speed?
A If they start at rest, which one will reach 40 m/s first?
Both Which one goes farther (longer distance)?
A Which one will be 100m away sooner?

Give what you know for the following: (V_i, V_f or a)

An object at constant velocity. $a = 0$ $V_i = V_f$
An object that is stopping. a = neg $V_f < V_i$
An object that accelerates from rest. a = pos $V_f > V_i$
An object at rest. $a = 0$ $V_i = V_f = 0$

A person starts running from 2 m/s to 6 m/s in 2 seconds. Calculate the person's acceleration.

Variables:
a —
~~Vf~~ 6m/s
V_i 2m/s
t 2s
Formula:
$a = \frac{V_f - V_i}{t}$

Solve:
$a = \frac{6\text{m/s} - 2\text{m/s}}{2\text{sec}}$
$a = 2\text{ m/s}^2$

A dragster's top acceleration is 60 m/s². If it starts from rest at the starting line, how fast will it be going after 3 seconds?

Variables:
a 60m/s²
V_f —
V_i 0m/s
t 3sec
Formula:
$a = \frac{V_f - V_i}{t}$

Solve:
$V_f - V_i = a \cdot t$
$V_f - 0\text{m/s} = 60\text{m/s}^2 \cdot 3\text{sec}$
$V_f = 180\text{ m/s}$

A plane stops from 250 mph in 25 seconds. Calculate the planes acceleration.

Variables:
a
V_f 0mph
V_i 250mph
t 25sec
Formula:
$a = \frac{\Delta V}{t}$

Solve:
$a = \frac{0\text{mph} - 250\text{mph}}{25\text{sec}}$
$a = -10\ \frac{\text{mph}}{\text{sec}}$

A car travels 30 m in 5 seconds. After accelerating for 3 seconds, it travels 20 m in 2 seconds. Calculate the car's acceleration.

1) Find V_i. V_i: $d = 30\text{m}$, $t = 5\text{sec}$ $V = \frac{d}{t} = \frac{30\text{m}}{5\text{sec}} = 6\text{m/s}$
2) Find V_f. V_f: $d = 20\text{m}$, $t = 2\text{sec}$ $V = \frac{d}{t} = \frac{20\text{m}}{2\text{sec}} = 10\text{m/s}$
3) Calculate a. $t = 3\text{sec}$ $a = \frac{V_f - V_i}{t} = \frac{10\text{m/s} - 6\text{m/s}}{3\text{sec}} = \frac{4\text{m/s}}{3\text{sec}}$
$a = 1.33\text{ m/s}^2$