9.1 Describing Acceleration

An object traveling with uniform motion has \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Not all objects exhibit uniform motion.

It is important to be able to analyze situations where the motion is **not uniform**.

An object travelling with non-uniform motion will:

* have different \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* take different amounts of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* have a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Positive and Negative Changes in Velocity**

A change in velocity \_\_\_\_\_ occurs when the \_\_\_\_\_\_\_\_\_\_\_ of an object changes and/or its \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of motion changes.

A change in velocity can be calculated by:

If the change in velocity is the same sign (+, -) as the initial velocity, the speed of the object is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

If the change in velocity is the opposite sign (+, -) of the initial velocity, the speed of the object is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

If the change in velocity is zero, the object is travelling with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Acceleration**

Acceleration (*a*) is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

This change in velocity can be due to a change in \_\_\_\_\_\_\_\_\_\_\_\_\_and/or a change in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

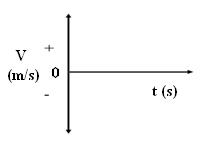
Two objects with the same change in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ can have different \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

This is because acceleration describes the rate at which the change in velocity occurs.

**Positive and Negative Acceleration**

The direction of the acceleration is the same as the direction of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

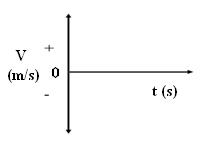
Acceleration that is opposite the direction of motion is sometimes called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Acceleration can be described in a\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. BE CAREFUL not to confuse this with a **position-time** graph!

Examples of acceleration:

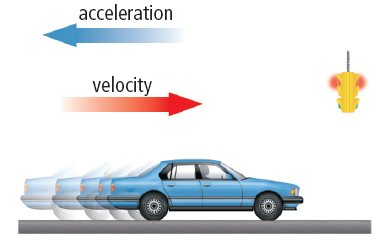
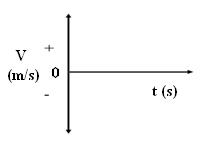
1. A car \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

If we designate the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ direction as positive (+), then the change in velocity is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ , therefore the acceleration is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

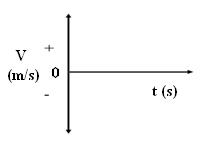


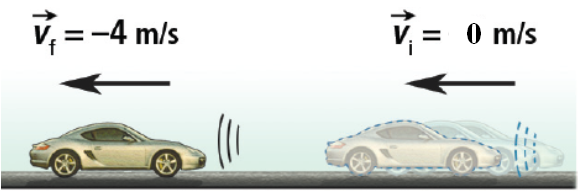
2. A car \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

If we designate the forward direction as positive (+), then the change in velocity is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, therefore the acceleration is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .



3. A car \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

If we designate the backward direction as negative (-) then the change in velocity

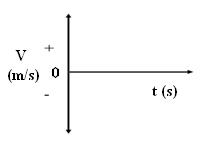
is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.



This means that the acceleration is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ even though the car is increasing its speed. **Remember positive (+) and negative (-) refer to directions**!!!!

4. A car \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

If we designate the backward direction as negative (-) then the change

in velocity is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



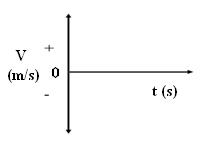


This means that the acceleration is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (+) even though the car is decreasing its speed. **Remember positive (+) and negative (-) refer to directions!!!**

**Zero Acceleration**

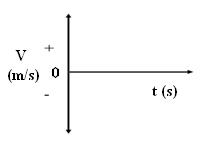
5. A car is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 The change in velocity is \_\_\_\_\_\_\_\_\_\_\_\_. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

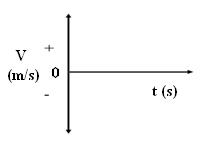




6. A car has \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 The change in velocity is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.









This means that the acceleration is **\_\_\_\_\_\_\_\_\_\_\_\_\_\_. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**