

# VPYTHON – Syntax tutorial

*words in italics:* Key words that must be typed in verbatim  
 words in **red**: Different types of variables  
**vector** – requires a three-dimensional vector (x, y, z)  
**scalar** – requires a single, non-vector number  
**boolean** – requires 1 (true) or 0 (false)  
**name** – a collection of letters

## Vector

*vector*(x, y, z) This denotes a vector with components x, y, and z. This does NOT draw anything! But it can be used when you specify the position, axis, etc. of a vector.

## Drawing objects

*sphere*(pos = **vector**, radius = **scalar**, color = color.**colorname**)

*arrow*(pos = **vector**, axis = **vector**, color = color.**colorname**)

other attributes:    *shaftwidth* = **scalar**  
                           *headwidth* = **scalar**  
                           *headlength* = **scalar**

*box*(pos = **vector**, length = **scalar**, width = **scalar**, height = **scalar**)

OR

*box*(pos = **vector**, size = **vector**)

*curve*(pos = [**vector**, **vector**, **vector**, **vector**, ...])

other methods:    If you name your curve, you can append points to the curve: *nameofcurve.append* (**vector**)

applicable to all drawing objects:

other attributes:    *opacity* = **scalar** (range 0 (transparent) to 1 (opaque))  
                           *visible* = **boolean**

**Naming objects**

## DEFINING AN OBJECT

**name** = *sphere(...*

When you introduce the variable **name** with a statement **name** = ..., the program creates a new object and assigns it this name. This is called “defining” an object, because you are telling the program what your name “means.” If it is a drawing object, the program immediately draws it. This is true even if this variable has already been introduced before.

SAMPLE CODE:

```
x = 0
while x < 5:
    Jim = arrow (pos = vector(x,0,10), axis = vector(0,10,0))
    x = x + 1
```

**The above loop will create five different arrows, since the definition statement occurs five times.**

## CHANGING AN EXISTING OBJECT

**name.attribute** = newvalue

When you want to change something about an existing object, you tell the program to do so by “addressing” that attribute of the object. For instance,

```
Fred.pos = vector(3, 5, 0)
```

changes Fred’s position to the location  $x = 3$ ,  $y = 5$ ,  $z = 0$ . If Fred is a drawing object, the old object is erased and the new one is drawn in its stead.

You can’t change an object until you define it first.

SAMPLE CODE:

```
x = 0
Jim = arrow (pos = vector(0,0,0), axis = vector(0,10,0))
while x < 5:
    Jim.pos =vector(x,0,10)
    x = x + 1
```

**the above loop while erase the existing arrow “Jim” and draw a new one in the new location. This will happen five times.**