Maya
2024
Session#3
Local Coordinate Systems & Origins

Local vs. Global (World) systems

A Maya scene takes place within a Cartesian coordinate system
  This is the scene's <u>world</u> *aka* <u>global</u> coordinate system
  Right-handed XYZ coordinates
    0,0,0 = the <u>origin</u> of the coordinate system

    X+ is to screen right
    Y+ is up
    Z+ is towards you

Each object has (lives in) its own <u>local</u> coordinate system
  with its own local origin *aka* "pivot point"

You can transform objects within either...
  the scene's global coordinate system
    or
  the object's local coordinate system

Local Origin/Pivot Point of a cylinder

Create a polygon cylinder
Scale it so it is taller
  e.g., scale = 1, 5,1

Select the cylinder
Hit the **e** key for Rotate
  Rotate the cylinder
  The cylinder rotates about its center
    because its default local origin/pivot point
    is in the center of the cylinder

Hit the ***Insert*** key (upper right of keyboard)

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This puts you in "move pivot point" mode
Drag the icon to the bottom of the cylinder

Hit **Insert** again to leave "move pivot point" mode

Now rotate the cylinder.
It rotates about its new pivot point/local origin
        at the bottom of the cylinder

<u>Transform within the World or Local coordinate systems</u>

You can transform an object (move, rotate, scale)
        within either the global coordinates of the scene
        or the object's local coordinate system

Select the cylinder
Make sure it is rotated
Hit **w** key for Translate
        Drag the icon's Y axis
        This moves the cylinder straight up
                i.e., along that <u>global/world</u> Y axis

>Modify >Transformation Tools >Move Tool []
        Inside the Options menu,
                Axis Orientation:
                        Change from *World*
                        to *Object*

The icon on the cylinder changes
        Now the Y axis is the local Y of the cylinder
        It is tilted because when you rotated the cylinder,
                you rotated its local coordinate system

Now translate along the local Y axis of the cylinder
        The cylinder moves along its length