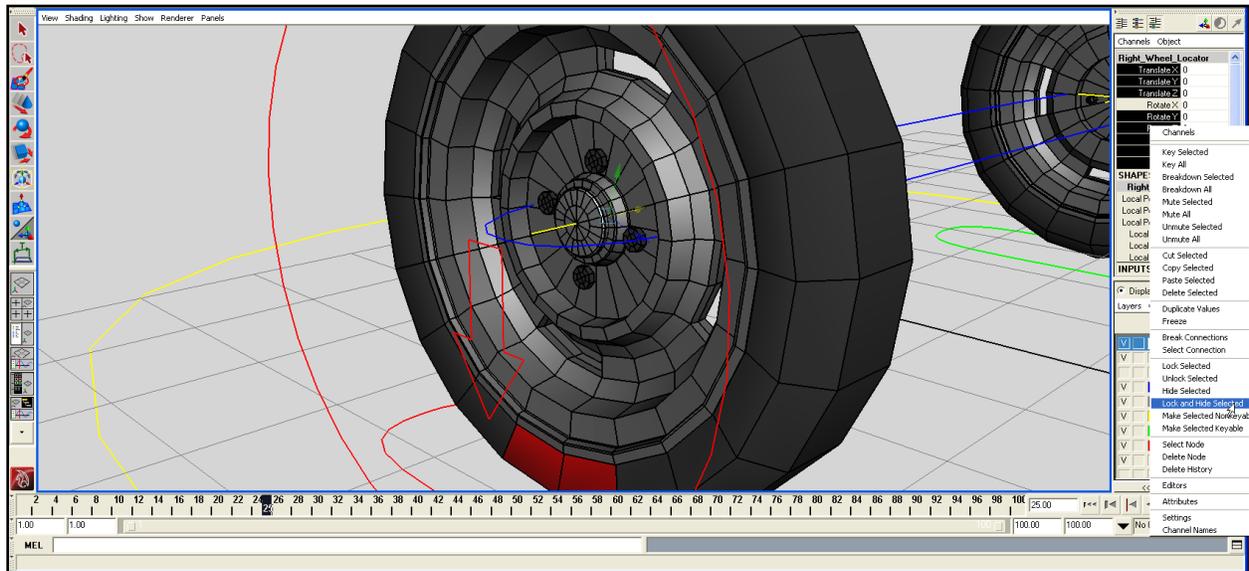# Rigging Wheels

The purpose of this chapter is to show you how to rotate the wheels on a car so they follow the car as it move.

Step 1 Select "Right_Wheel_Locator", we need only rotate X attribute. In attribute editor select (Translation X,Y,Z, Scale X,Y,Z and Rotation Y,Z), right click and "lock and hide selected".

Step 2 Go to side view, use the distance tool to measure the radius of the wheel, as shown below.
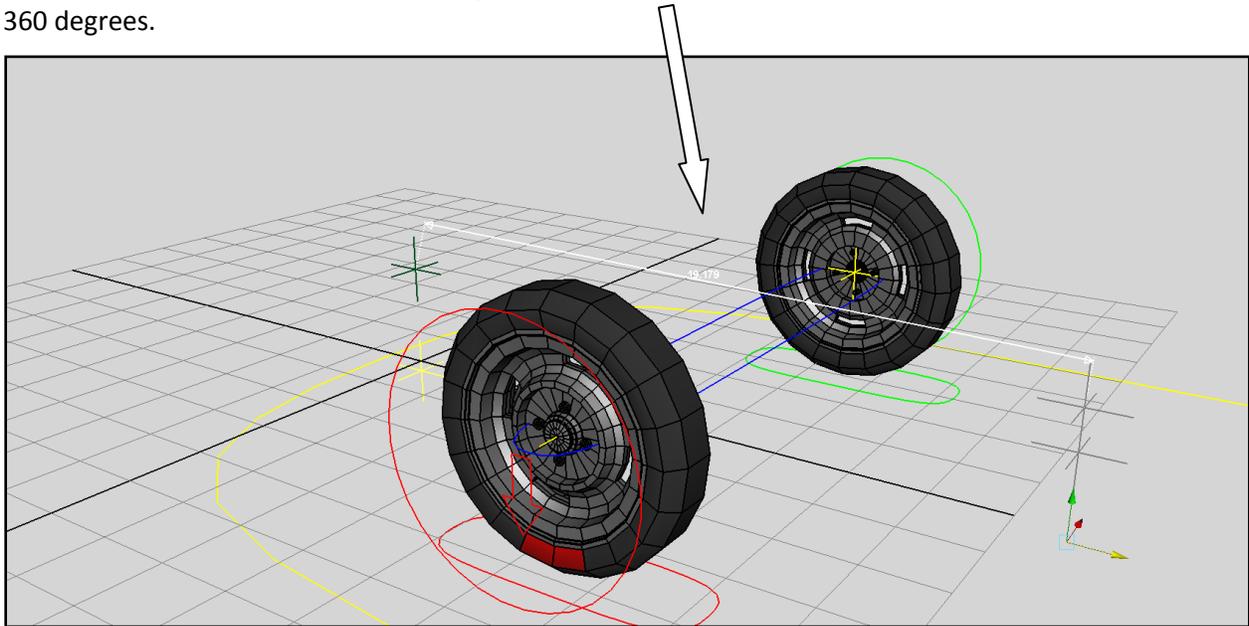->Create -> Measure Tools -> Distance Tool
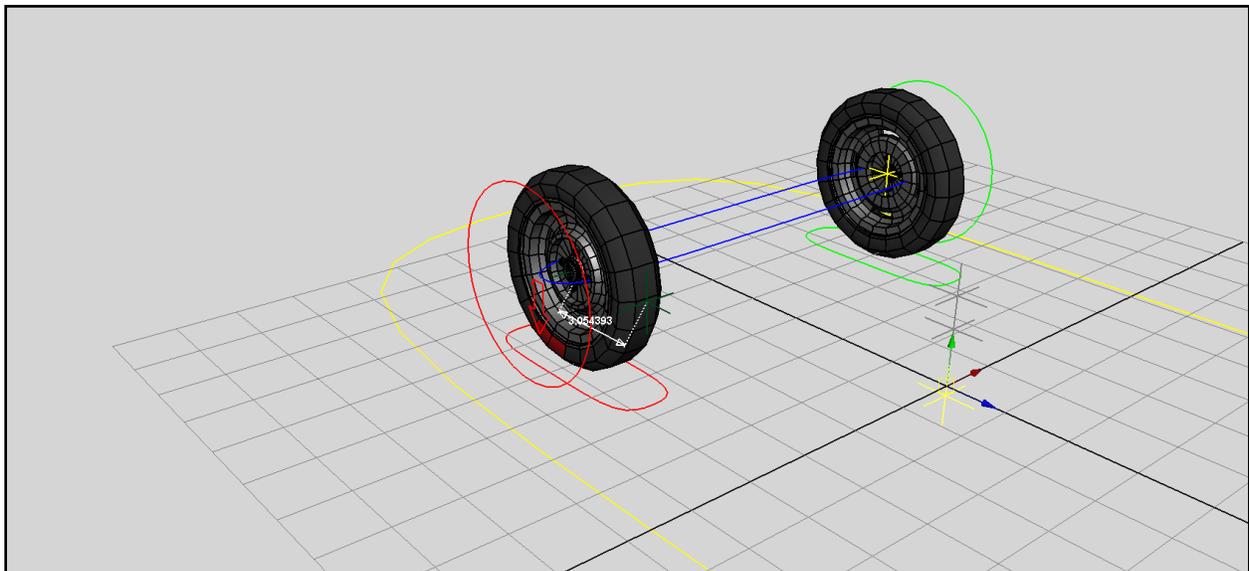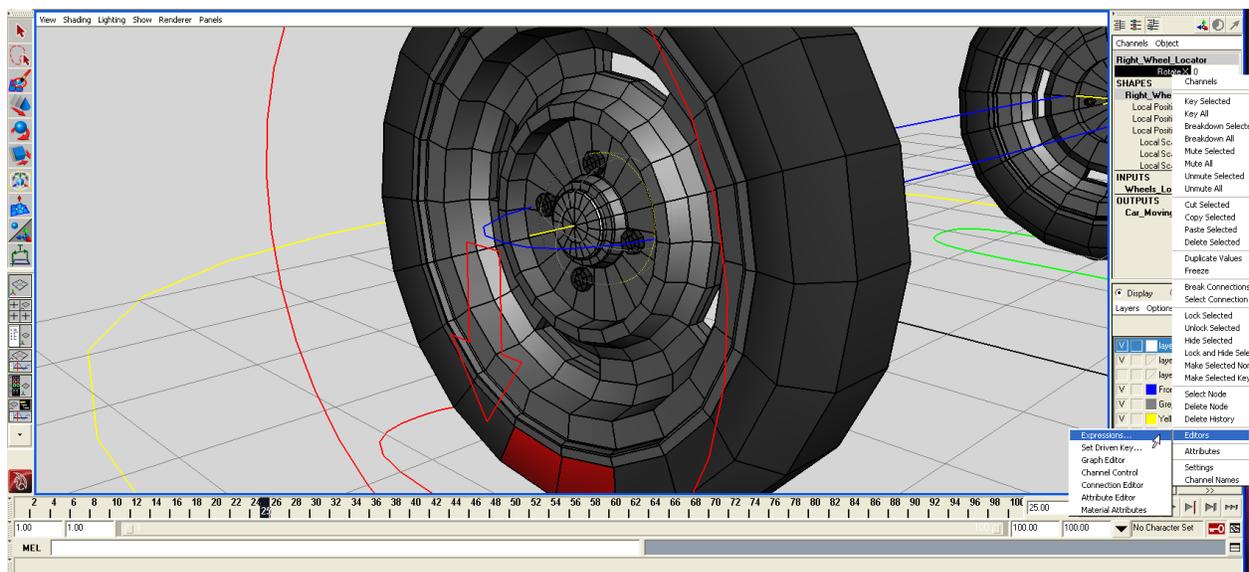

Regal Reliant Wheel radius is r=3.054 units.

Circumference of Wheel = 2*r* π = 2 * 3.054 * 3.14 = 19.179

2*r* π = Distance

Now we know that when the Reliant Regal travels a <u>distance of 19.179</u> units the wheels should rotate 360 degrees.
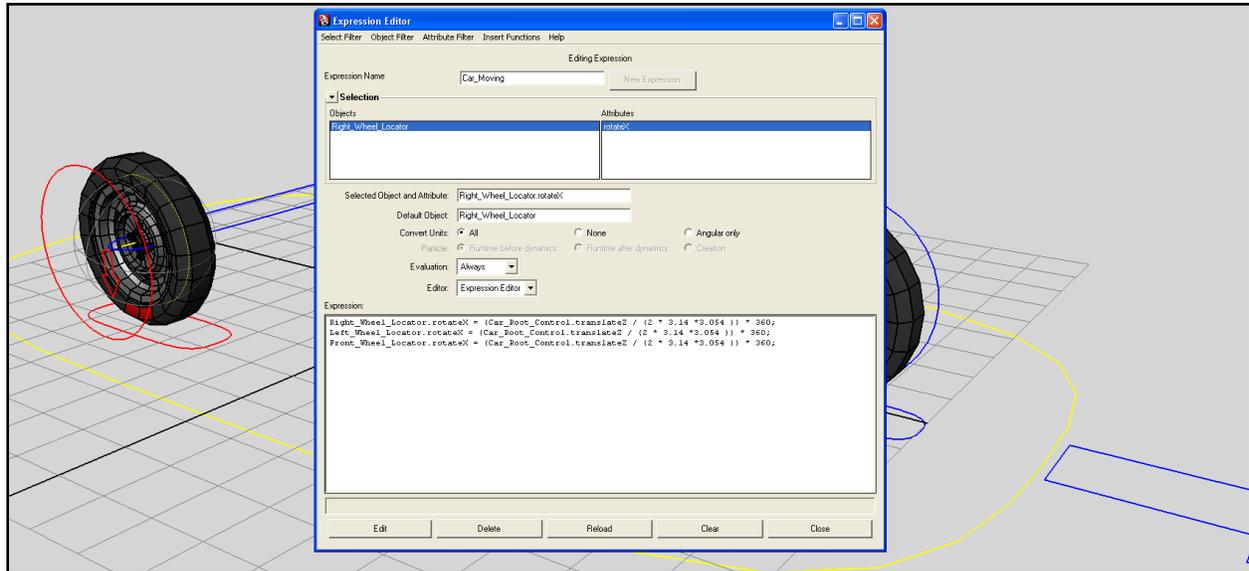

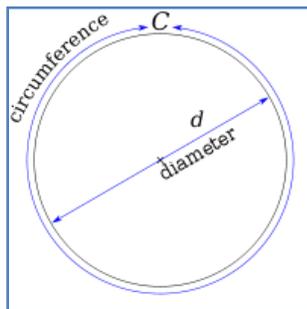Step 3 Select "Right_Wheel_Locator", right click on Rotate X Attribute,go to Editors -> Expressions

In "Expression" field copy/paste:

> *Right_Wheel_Locator.rotateX = (Car_Root_Control.translateZ / (2 * 3.14 *3.054)) * 360;*
>
> *Left_Wheel_Locator.rotateX = (Car_Root_Control.translateZ / (2 * 3.14 *3.054)) * 360;*
>
> *Front_Wheel_Locator.rotateX = (Car_Root_Control.translateZ / (2 * 3.14 *3.054)) * 360;*

Click Edit.

Circumference -The distance around the circle.
Diameter   - The longest distance from one end of a circle to the other.
Radius   - Distance from center of circle to any point on it.
Origin   - The center of the circle.
π /Pi/   - Mathematical constant, 3.141592...

Diameter = 2 x Radius of circle
Circumference of Circle = PI x diameter = 2 PI x radius
Car Distance (Translation) = 2 * r * π = Wheel Circumference

2*r* π = Distance (Car Translation in Z)= Circumference of Wheel = 2*3.054*3.14=19.179 units.

Wheel Rotation = (Car Translation / 2*r* π) *360

*Right_Wheel_Locator.rotateX = (Car_Root_Control.translateZ / (2 * 3.14 *3.054)) * 360*

360 = (19.179/2*3.054*3.14)*360