Map the Wrap -- Unwrapping the Unit Circle   **For the Teacher**
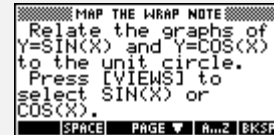
Objectives:

Using the **MAP THE WRAP** aplet, the student will investigate the relationship between the unit circle and the graphs of y=sin x and y=cos x.
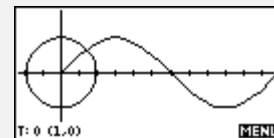
Functionality:

When the student presses **START**, the **MAP THE WRAP NOTE** will be displayed.
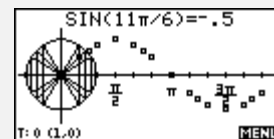
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VIEWS allows the student to investigate sine or cosine and to draw the triangles in the unit circle.

Wrap Y=SIN(X) graphs the unit circle and one period of the sine curve. The calculator is automatically in TRACE mode. Using the left and right arrows, the student can trace around the unit circle. The up and down arrows will move the cursor to the other curve.
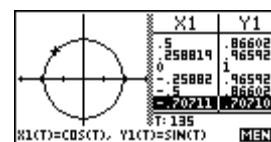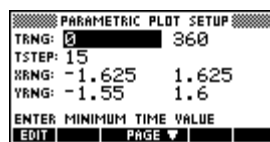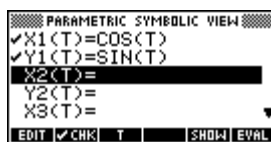
Draw Triangles will display the graph of the unit circle. The screen is frozen. Pressing any key will inscribe a triangle into the unit circle, plot the arc length vs. the x- or y-coordinate on the coordinate plane, and display the value of the trig function across the top of the screen. Continue pressing any key until one period has been displayed.

Additional Exploration:

Using the **Parametric** Aplet, let X1(T)=cos x and Y1(T)=sin x. Using the Plot-Table feature, trace and analyze the sine and cosine values using the table. For this example, the calculator is set in degree mode.

Note: A more advanced version of this aplet, called **Sine Define** covering tangent also, is available from **The HP HOME view** at http://www.hphomeview.com

Programs associated with this aplet:
        .UC.SIN, .UC.COS, .UC.DT, .UC.ST, .UC.SV

Map the Wrap	Name _____
Unwrapping the Unit Circle	Date _____

Directions: Complete the following tables. Using the information in the second table, plot the graph of y = sin x on the grid below the table.

Unit Circle

Angle	x-value	y-value
0	1	0
π/6 ≈ 0.524	√3/2	1/2
π/4 ≈ 0.783		
π/3 ≈ 1.0472		
π/2 ≈		
2π/3 ≈		
3π/4 ≈		
5π/6 ≈		
π ≈		
7π/6 ≈		
5π/4 ≈		
4π/3 ≈		
3π/2 ≈		
5π/3 ≈		
7π/4 ≈		
11π/6 ≈		
2π ≈		

Function: y = sin x

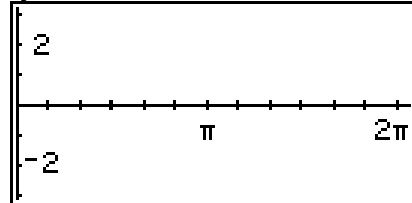| x-value	y-value
0	
π/6	

Based on the above information, draw a conclusion about the connection between the values of the unit circle and the graph of y=sin x.

_____

_____

y = sin x

Based on the information above, plot the graph of y=cos x.   Draw a conclusion about the connection between the values of the unit circle and the graph of y=cos x.

_____

_____

y = cos x