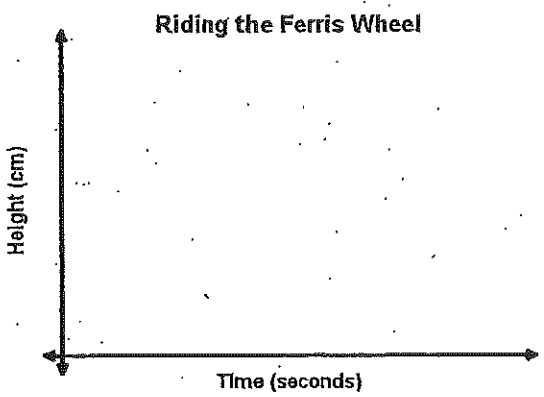
The Ferris Wheel

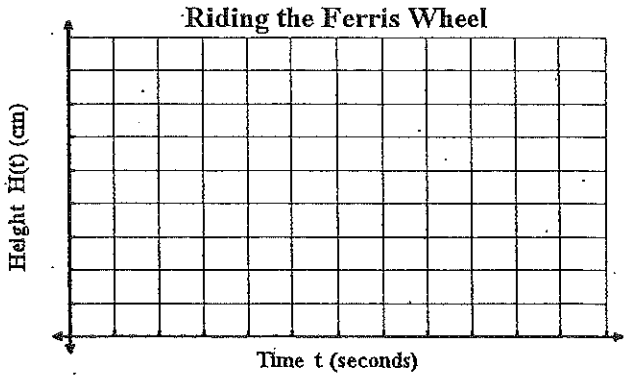
Using K'nex

1. Place a small plastic figure or attach a pipe cleaner to a seat of the Ferris wheel at its lowest point. Turn th motor on and observe the motion of the wheel. Draw a sketch of the figure's height at any time t during two complete revolutions.



2. Use the Ferris wheel, metersticks, and a timer to gather data to complete the table below. Record at least 6 measurements for each rotation and use at least 2 complete revolutions. Collect a minimum of 12 data points.
3. Plot the data points from the table on the axes below.
4. Draw a "smooth" curve that is "close" to these data points.
5. What type of function would be most appropriate to choose to represent this curve? Why?

Time (seconds)	Height of Seat (cm)



Using Technology

6. Plot the data points from the table on your calculator.

7. In paragraph form, describe below the following process to obtain a function that models the height of a particular seat on the Ferris wheel as it revolves.

   (*a*) Make an educated guess of a trigonometric function that best fits these data and explain why you have chosen this particular function. Describe how the numbers in the function relate to the diameter of the Ferris wheel and the period of the rotation.

   (*b*) Examine the graph of your function on your calculator. Describe how to modify one of the constants so that the function more accurately fits your data.

   (*c*) Test the modified constant by examining the graph of your function. Describe how to further modify one of the constants so that the function more accurately fits your data.

   (*d*) Repeat steps (*b*) and (*c*) until your conjecture looks "close." For each function, describe how the numbers in the formula relate to the diameter of the Ferris wheel and the period of the rotation.

p. 283 The Sinusoid of Best Fit

hours of daylight

sinusoidal regression

- radian mode
- need at least 5 points

p270 data

day of year	-10	80	172	264	355	L1
hours	7.68	12.23	16.80	12.30	7.68	L2

set [WINDOW]

clear $y =$

[STAT] enter data L1 L2 { }

[STAT PLOT] type scatterplot

[GRAPH] scatterplot

[STAT] → [CALC] → [C: SINREG] L1, L2

[VARS] → [Y-VARS] → [1: Y_1] [Enter] (graph)

result sinusoidal curve of best fit

SinReg

$y = a \cdot \sin(bx + c) + d$

$a = 4.56 \ldots$

$b = .017 \ldots$

$c = -1.36 \ldots$

$d = 12.24 \ldots$

[p. 283]