7.7 Model Data with an Exponential Function

MATERIALS • 100 pennies • cup • graphing calculator

TEKS *a.5, a.6, 2A.1.B, 2A.11.F*

QUESTION How can you model data with an exponential function?

EXPLORE Collect and record data

STEP 1 *Make a table*

Make a table like the one shown to record your results.

Number of toss, x	0	1	2	3	4	5	6	7
Number of pennies remaining, y	?	?	?	?	?	?	?	?

STEP 2 *Perform an experiment*

Record the initial number of pennies in the table, and place the pennies in a cup. Shake the pennies, and then spill them onto a flat surface.

Remove all of the pennies showing "heads." Count the number of pennies remaining, and record this number in the table.

STEP 3 *Continue collecting data*

Repeat Step 2 with the remaining pennies until there are no pennies left to return to the cup.

DRAW CONCLUSIONS Use your observations to complete these exercises

1. What is the initial number of pennies? By what percent would you expect the number of pennies remaining to decrease after each toss?
2. Use your answers from Exercise 1 to write an exponential function that should model the data in the table.
3. Use a graphing calculator to make a scatter plot of the data pairs (x, y). In the same viewing window, graph your function from Exercise 2. Is the function a good model for the data? *Explain*.
4. Use the calculator's *exponential regression* feature to find an exponential function that models the data. *Compare* this function with the function you wrote in Exercise 2.