Pictures of Data and Their Shapes

Use the site's statistics tool or a graphing calculator to draw the plots. Ask the three questions: shape, center, spread.

Name _____ Date _____

Words we use

say the math word, then the plain English

WORD	PLAIN ENGLISH	WHAT YOU DO
Data set	A list of values for one quantity.	Ask: what shape, where is the center, how spread out?
Distribution	How the values are spread out along the number line.	Picture it before you compute anything.
Dot plot	One dot per value, stacked when values repeat.	Best for small data sets.
Histogram	Bars that count how many values fall in each bin.	Best for the shape of a big data set.
Bin	An interval of values grouped into one bar.	Changing the bin width changes the picture.
Box plot	A picture of the 5-number summary: box for the middle half, whiskers to the ends.	Best for comparing groups.

Part A The songs data

25 students, songs downloaded in a week: 10, 20, 12, 14, 12, 27, 88, 2, 7, 30, 16, 16, 32, 25, 15, 4, 0, 15, 6, 1, 0, 15, 12, 10, 7.

1. Put the values in order. Write the 5-number summary.

2. Make a histogram with bins of width 10 (0 to 10, 10 to 20, and so on). Count each bin.

3. Sketch the box plot. What is its shape, and what does the long whisker tell you?

Part B Which picture?

QUESTION	DOT PLOT, HISTOGRAM, OR BOX PLOT	WHY
See every value in 11 class periods		
See the shape of 400 test scores		
Compare the middle halves of two classes		

Part C Name the shape

DATA	SHAPE	WHERE IS THE TAIL, AND WHY
Incomes of professional athletes		
Scores on an easy test		
Heights of the students in a grade		
Songs downloaded (above)		
Number of pets per house: mostly 0 or 1, one house with 9		

Part D Read box plots

1. Whiskers from 45 to 70, box from 50 to 65, line at 60: write the 5-number summary and say where the middle half is.

2. Draw a box plot with 5-number summary 2, 5, 8, 12, 20. Is it symmetric or skewed?

Part E Exit ticket

1. The three questions, in order.

2. Whiskers 0 to 88, box 6.5 to 18, line at 12: the 5-number summary.

3. Most values low, a few very high: the shape, and why.

Answer key

Part A. 1. 0, 6.5, 12, 18, 88. 2. Bins: 0 to 10: 10; 10 to 20: 9; 20 to 30: 3; 30 to 40: 2; 80 to 90: 1. 3. Skewed right; one student downloaded far more than the rest.

Part B. Dot plot (every value, small set). Histogram (shape of a big set). Box plots (compare middle halves).

Part C. Skewed right, tail to the big incomes. Skewed left, tail to the low scores. Symmetric, piled in the middle. Skewed right, tail to 88. Skewed right, tail to 9.

Part D. 1. 45, 50, 60, 65, 70; the middle half is 50 to 65. 2. The right whisker and right half of the box are longer: skewed right.

Part E. 1. Shape, center, spread. 2. 0, 6.5, 12, 18, 88. 3. Skewed right: the tail points to the big numbers.