

How to Create a Stem-and-Leaf Plot in SPSS

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A Stem-and-Leaf Plot is an essential tool in exploratory data analysis, providing a hybrid approach that combines elements of a frequency histogram with the preservation of individual data points. Unlike a standard histogram, which groups data into bins, the Stem-and-Leaf Plot allows researchers to see the exact values while simultaneously visualizing the overall distribution. This powerful statistical graph is easily generated within SPSS (Statistical Package for the Social Sciences), making it accessible for a wide range of academic and professional applications. Understanding how to utilize this plot effectively is key to gaining preliminary insights into your dataset before proceeding with more complex inferential statistics.

The core utility of the Stem-and-Leaf Plot lies in its simplicity and detail. It serves as a robust graphical representation of numerical data where each observed value is split into two components: the ****stem**** (typically the leading digit or digits) and the ****leaf**** (usually the final digit). This structure allows for a quick assessment of central tendency, spread, and shape, including identifying potential outliers or skewness in the data. To generate this plot within the SPSS environment, users generally interact with the 'Explore' function, which is nested within the Descriptive Statistics menu, rather than the dedicated Graphs menu often used for more complex charts.

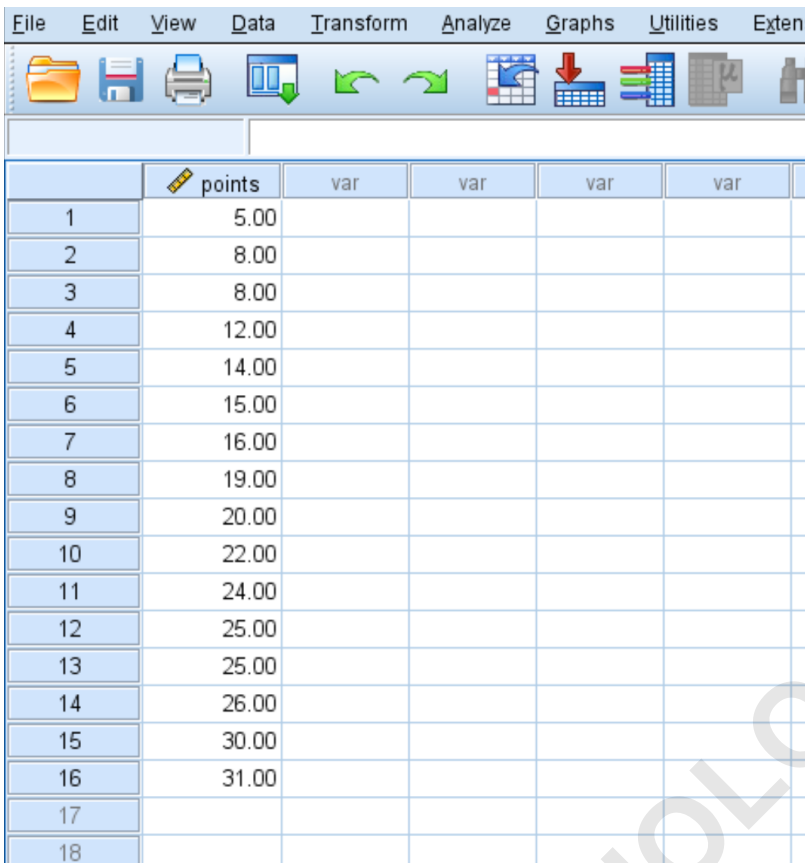
This comprehensive tutorial explains how to create a Stem-and-Leaf Plot in SPSS, guiding you through data preparation, navigation, necessary configuration settings, and detailed interpretation of the resulting output. By the end, you will be equipped to visualize the distribution of any continuous numerical variable effectively.

Data Preparation and Example Scenario in SPSS

Before initiating the procedure, it is vital to ensure your numerical data is correctly structured in the SPSS Data View. A Stem-and-Leaf Plot is specifically designed for quantitative measurements. The dataset used here serves as a practical illustration, showing the average points per game for sixteen distinct basketball players. Each observation must be correctly entered under a defined numerical variable in the datasheet.

The plot displays data by splitting up each value in the dataset into a **stem** and a **leaf**. This is a highly useful plot for easily visualizing the underlying distribution of a dataset while preserving the exact numerical scores. For researchers, this visual check is often the first step in assessing normality and identifying potential data irregularities.

Suppose we have the following dataset that shows the average points per game for 16 basketball players, ready for analysis in the SPSS Data Editor:



The screenshot shows the SPSS software interface. The menu bar includes File, Edit, View, Data, Transform, Analyze, Graphs, Utilities, and Extensions. Below the menu bar is a toolbar with various icons for file operations and data manipulation. The main data editor window displays a table with 18 rows and 6 columns. The first column contains row numbers from 1 to 18. The second column is labeled 'points' and contains the following values: 5.00, 8.00, 8.00, 12.00, 14.00, 15.00, 16.00, 19.00, 20.00, 22.00, 24.00, 25.00, 25.00, 26.00, 30.00, 31.00, and an empty cell for row 17. The remaining columns are labeled 'var' and are empty.

	points	var	var	var	var
1	5.00				
2	8.00				
3	8.00				
4	12.00				
5	14.00				
6	15.00				
7	16.00				
8	19.00				
9	20.00				
10	22.00				
11	24.00				
12	25.00				
13	25.00				
14	26.00				
15	30.00				
16	31.00				
17					
18					

The variable is named 'points' and contains integer values ranging from 5 to 31. This range suggests that the stem will primarily represent the tens digit, and the leaf will represent the ones digit, providing an efficient summary of the central tendencies and spread of the athletes' performance scores.

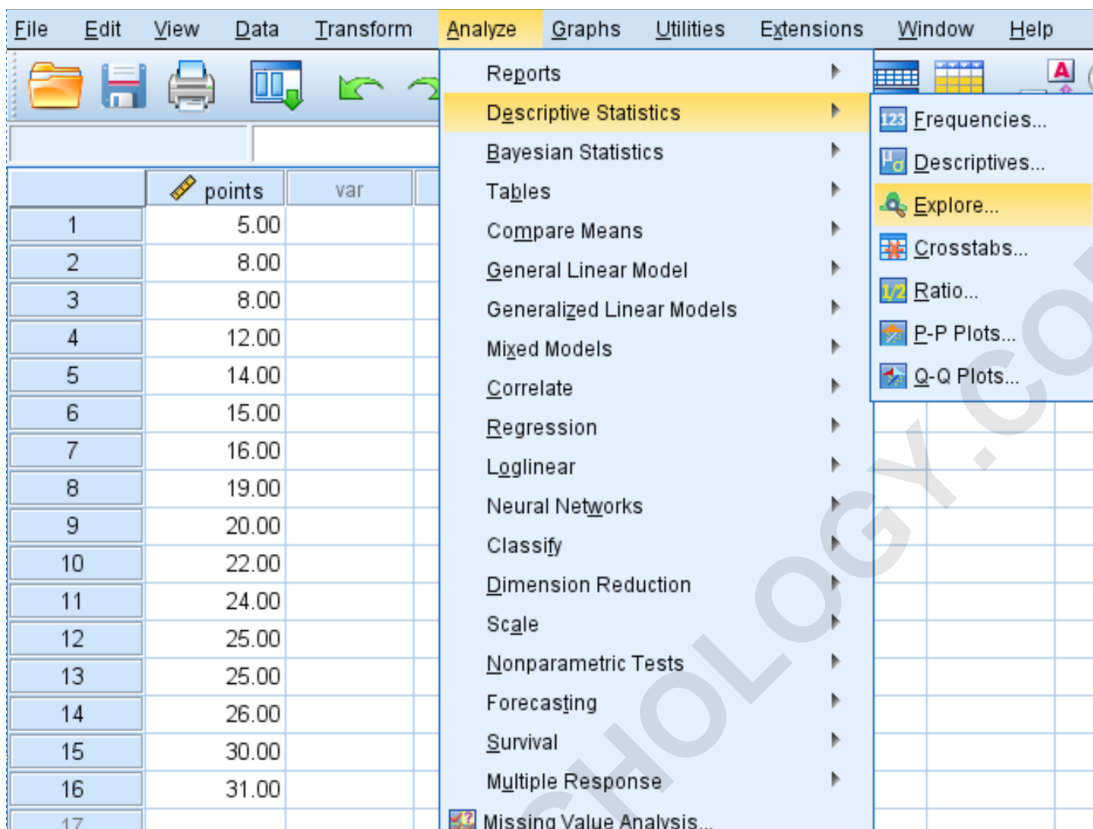
Navigating to the Explore Dialogue Box

To generate a Stem-and-Leaf Plot for this dataset, you must utilize the comprehensive data exploration features found under the Descriptive Statistics menu. This pathway ensures that the plot is generated alongside crucial numerical summaries, providing a holistic overview of the variable's characteristics. The process begins by selecting the primary analytical tab.

Specifically, click the **Analyze** tab located in the top menu bar of the SPSS window. This action opens the main statistical procedures menu. From there, select **Descriptive Statistics**. This module is dedicated to summarizing data and examining distributions. Finally, select the **Explore** option from the submenu. The 'Explore' command is robust, designed to perform detailed univariate analysis, including the generation of specialized plots like the Stem-and-Leaf display.

The systematic click sequence is: **Analyze** → **Descriptive Statistics** → **Explore**. This sequence

is necessary because the Stem-and-Leaf Plot is integrated into the exploratory analysis toolkit, rather than being located under the dedicated Graphs menu.

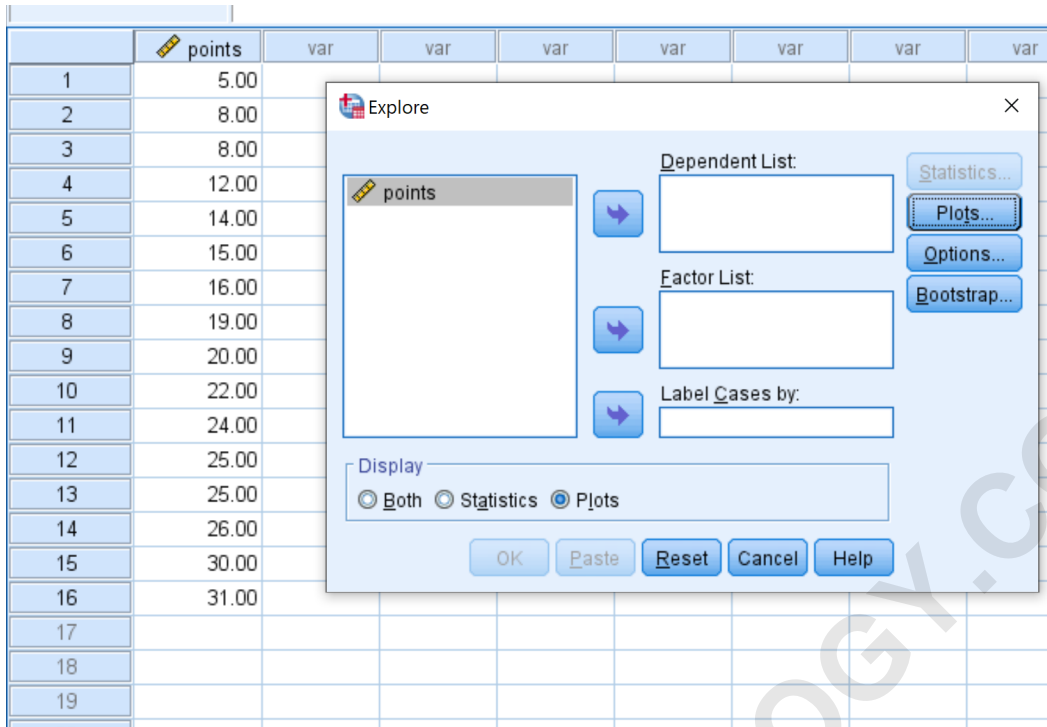


This action will successfully launch the "Explore" dialog box, which is the control center for defining the parameters of your analysis.

Configuring Variables and Plot Options

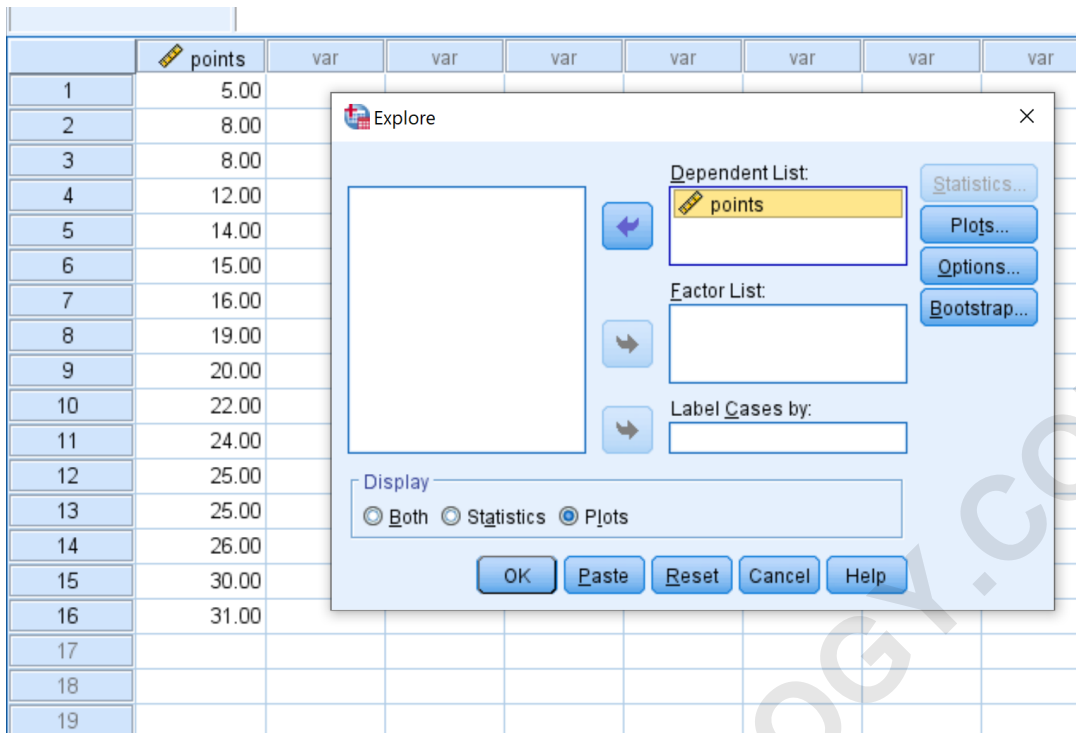
The "Explore" dialog box presents various options for structuring the analysis. Our primary goal here is to specify which variable to plot and to ensure that the graphical output is enabled. This requires correctly moving the variable of interest into the designated list and confirming the output display setting.

This will bring up the following window:



To create the Stem-and-Leaf Plot, we need to move the variable **points** from the list on the left into the box labelled **Dependent List**. Variables placed in this list are the ones on which the descriptive and graphical analyses will be performed. This identifies 'points' as the quantitative variable whose distribution we seek to visualize.

Next, you must confirm the setting under the option that says **Display** near the bottom of the box. Ensure that **Plots** is selected. Alternatively, selecting **Both** will provide the complete numerical summary tables alongside the required graphical outputs. If only "Statistics" is selected, the Stem-and-Leaf Plot will not be generated, regardless of other settings.



After configuring these settings, click the **OK** button to execute the command and generate the output in the SPSS Viewer.

Generating and Interpreting the Plot Output

Once we click **OK**, the SPSS Output Viewer will immediately display the results, including the various tables of descriptive statistics and the visualizations. The resulting Stem-and-Leaf Plot will appear shortly after the initial summary tables.

points

points Stem-and-Leaf Plot

Frequency	Stem &	Leaf
.00	0 .	
3.00	0 .	588
2.00	1 .	24
3.00	1 .	569
3.00	2 .	024
3.00	2 .	556
2.00	3 .	01

Stem width: 10.00
Each leaf: 1 case(s)

The structure of the plot is divided into two primary columns: the ****Stem**** column displays the first digit (or leading digits) for each data value, while the ****Leaf**** column displays the second digit (or trailing digit). This arrangement allows for direct reconstruction of the original numerical observations.

For example, the first leaf shown in the first row corresponds to the stem '0'. Combined, the stem (0) and the leaf (5) represent the observation of 5 points. This observation indicates the lowest average score in the sample and highlights the presence of a potential low-end outlier relative to the main body of scores clustered in the tens and twenties.

points Stem-and-Leaf Plot

Frequency	Stem &	Leaf
.00	0 .	5
3.00	0 .	588
2.00	1 .	24
3.00	1 .	569
3.00	2 .	024
3.00	2 .	556
2.00	3 .	01


Stem width: 10.00
Each leaf: 1 case(s)

Conversely, by examining the final row, we identify the highest score. The last leaf shown in the last row (leaf 1) corresponds to the stem '3'. This reconstruction indicates the player who averages 31 points per game--the maximum score in the dataset.

points Stem-and-Leaf Plot

Frequency	Stem &	Leaf
.00	0 .	
3.00	0 .	588
2.00	1 .	24
3.00	1 .	569
3.00	2 .	024
3.00	2 .	556
2.00	3 .	01

Stem width: 10.00
Each leaf: 1 case(s)



This simple graphical representation successfully helps us get an immediate visual idea of the distribution of the points scored by the 16 players in this dataset, confirming that the majority of scores fall within the 10-29 range.

Advanced Analysis of Distribution Shape

The primary power of the Stem-and-Leaf Plot lies in its use as a diagnostic tool for assessing the shape of the numerical variable's distribution. By visually rotating the plot, you can evaluate characteristics such as symmetry, unimodality, and the presence of extreme scores with precision that histograms often lack due to binning effects. The goal is often to determine if the data approximates a normal distribution, a key assumption for many inferential statistical tests.

In the basketball points example, the plot shows a noticeable concentration of leaves around stems 1 and 2. This clustering indicates the **central tendency** of the data. If the distribution were perfectly normal, the leaves would form a bell-shaped curve. While our plot is reasonably symmetric, the single observation at stem 0 (5 points) and the observation at stem 3 (31 points) define the **spread** and range of the data, alerting the researcher to the endpoints of the performance scale.

Analysts should also look for signs of **skewness** (asymmetry) or **kurtosis** (peakedness). If most leaves pile up on the lower stems with a long tail extending to the higher stems, the distribution is positively skewed. Conversely, if leaves cluster at the high end, it is negatively skewed. By integrating this visual assessment with the numerical measures provided in the

accompanying Descriptive Statistics tables, researchers gain a comprehensive understanding of the variable characteristics before proceeding to subsequent model building.

Conclusion on Using Stem-and-Leaf Plots in SPSS

The procedure for creating a Stem-and-Leaf Plot in SPSS is straightforward, utilizing the dedicated Explore command under Descriptive Statistics. This method is highly efficient for data screening, particularly for smaller datasets where retaining the exact numerical value of each observation is an advantage over traditional histograms.

By correctly identifying the numerical variable and ensuring the ****Plots**** display option is activated, users of SPSS can leverage this technique to gain immediate, meaningful insights into their data's distribution. The resulting plot provides clear visual evidence of data patterning, clustering, and the presence of outliers, which are essential considerations for validating statistical assumptions.

Mastering this technique ensures that your initial data exploration phase is robust and minimizes the risk of basing subsequent inferential analyses on data that violate critical distributional assumptions. Always use the combined visual and numerical output provided by the Explore function for the most reliable assessment of your data.