Graph Choice Chart

What question would you like to explore? Write your question as a complete sentence.

- Does your question ask about the **variability** of a group of data points? (i.e. the range of the data, the shape of the distribution, or what the center of the data is)
  - Yes: Examples:
    1. Do all high tides rise to the same height?
    2. How variable are wind speeds here?
    3. What is the range and distribution of incomes in the United States?
  - No: For each group make a
    - FREQUENCY PLOT
    - either
      - DOT PLOT
      - HISTOGRAM
      - BOX PLOT

- Does your question **compare two or more groups** to decide if the groups are the same or different?
  - Yes: Are you comparing **single numbers** that summarize a group? (such as mean, median, or total...)
    - Examples:
      1. Which of the two car designs is most consistently the fastest?
      2. Is there a meaningful difference in the heights of fertilized and unfertilized bean plants?
    - No: make a
      - BAR GRAPH
  - No: make a
    - SCATTER PLOT

- Does it ask if **two numeric factors are correlated**?
  - Examples:
    1. Is the temperature inside the house correlated with the temperature outside?
    2. How did electricity used by the kitchen circuit fluctuate during the past week?
  - No: How something changes through **linear TIME**?
    - Yes: Examples:
      1. Is the fuel efficiency of a car related to its weight?
      2. Are smoking rates correlated with median income?
      3. Given a fixed volume, how are temperature and pressure related?
    - No: make a
      - LINE GRAPH

- Does your question ask how a **total** is proportioned into sub-groups? (Or what proportion a sub-group is of a total?)
  - Yes: Examples:
    1. Which circuit accounts for the largest proportion of the electricity use by our household?
    2. What proportion of U.S. energy comes from wind?
    3. What proportion of U.S. residents take public transportation to work?
  - make either
    - PIE CHART
    - STACKED BAR CHART

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Graphing tips

<table>
<thead>
<tr>
<th>Variability questions:</th>
<th>Frequency plot (3 kinds)</th>
<th>Dot plot</th>
<th>Box &amp; whisker plot</th>
<th>Histogram</th>
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</thead>
<tbody>
<tr>
<td>Kind of data:</td>
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<tr>
<td>One categorical group</td>
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<tr>
<td>and One numeric variable</td>
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<tr>
<td>Frequency plots show how variable the group is. Describe variability by range, measure of center (mean, median, or mode), and the shape of the distribution.</td>
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<tr>
<th>Comparing groups questions:</th>
<th>Frequency plots OR Bar graph</th>
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<tbody>
<tr>
<td>Kind of data:</td>
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<tr>
<td>Two or more categorical groups &amp; One numeric variable</td>
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<tr>
<td>Frequency plots allow you to compare how variable the groups are. Bar graphs only show a single number (ie. sum, average, percent or count) for each group.</td>
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<tr>
<td>(To compare two groups of values)</td>
<td>(To compare two summary values)</td>
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<thead>
<tr>
<th>Correlation questions:</th>
<th>Scatter plot OR Line graph (for time series)</th>
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<tbody>
<tr>
<td>Kind of data:</td>
<td></td>
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<tr>
<td>Two numeric variables</td>
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<td>Both variables must be continuously numeric. Connect dots only if one variable is linear time (i.e. days, years...) Put time on the X-axis. Show correlation with a ‘line of best fit’.</td>
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<tr>
<th>Proportion (percentage) questions:</th>
<th>Pie chart OR Stacked bar graph</th>
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<tr>
<td>Kind of data:</td>
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<tr>
<td>Size of a subgroup as a percentage of the whole group (Total of sub-groups must = 100%)</td>
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<td>In pie charts and stacked bar graphs, all sub-group percentages must total 100%.</td>
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Criteria for an informative graph:

___ Graph type fits the question
___ Axes are drawn & scaled correctly
___ Axes are labeled clearly, correctly
___ Units are given
___ Data are plotted accurately
___ Legend is present, if needed
___ Graph is overall neat & legible
___ Title and/or caption present
___ Trend line shown (scatter plot or line graph only)
___ Graph helps answer the question

(There are other kinds of questions and other kinds of graphs, and often more than one graph type is useful for a given question. Learn to graph data for these basic kinds of questions first.)