Data Visualization Worksheet | Ways to Visualize Data

The Training Hub Powered by StriveTogether | Measure Well

= Potential use cases for cradle-to-career data

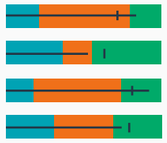
Comparison | How different categories measure up against each other



Bar Chart
Rectangular bars represent the value of each category, making it easy to compare quantities across discrete groups.

Comparing enrollment or participation across partners or programs; comparing outcomes across demographic subgroups or schools

+ Easy for broad audiences to read at a glance
+ Stacked variants enable comparison across dimensions
- Gets cluttered with too many bars/ subcategories



Bullet Graph
A compact bar showing actual performance against a target value, plus qualitative performance ranges, in one visual.

Tracking progress toward a milestone target (e.g., % reduction in chronic absenteeism)

+ Space efficient, showing multiple metrics in a compact space
+ Combines qualitative and quantitative info
- Less intuitive to first-time viewers
- Not built for showing trends over time

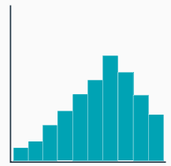


Heatmap
A grid where color intensity represents the magnitude of a value, making patterns and outliers easy to spot.

Comparing chronic absenteeism rates by school and month to spot seasonal patterns

+ Reveals patterns a table would hide
+ Scales well to many categories
- Color choice can hinder readability
- Precise values can be hard to read

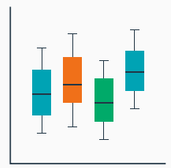
Distribution | How values spread or cluster across a range.



Histogram
Bars represent the frequency of data falling into bins across a continuous range.

Showing the distribution of test scores or attendance records within a district

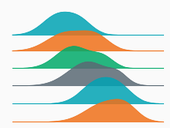
+ Good for seeing shape, skew, and clusters
+ Simple and widely understood
- Bin-size choice can distort the story
- Only shows one variable at a time



Box & Whisker Plot
Boxes and lines show the median, quartiles, and outliers of a distribution.

Comparing spread and median of test scores across several schools

+ Compact way to compare multiple distributions
+ Highlights variability and outliers
- Can be unintuitive
- Hides underlying shape of the distribution



Ridgeline Chart
A series of overlapping distribution curves, stacked by category or time, used to compare distribution shapes.

Showing how kindergarten readiness shifted across years or varies by district

+ Compares many distributions with minimal clutter
+ Preserves distribution shape
- Hard to read precise values
- Needs enough data per group for a smooth curve

Relationships | How two or more variables connect or correlate.



Scatter Plot
Points plotted on two axes show the relationship or correlation between two variables.

Exploring the relationship between chronic absenteeism and academic performance

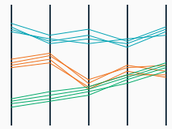
+ Reveals correlation, clusters, and outliers
+ Two-variable relationships are easy to interpret
- Correlation isn't causation — risk of misinterpretation
- Lots of overlapping points become unreadable



Bubble Chart
A scatter plot where a third variable is encoded as the size of each point.

Showing program cost per person by proficiency gain, sized by total people reached

+ Adds a third dimension without needing a third axis
+ Good for spotting outliers
- Bubble size can mislead if not scaled carefully
- Overlapping bubbles reduce readability

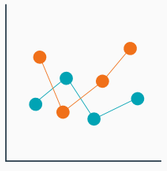


Parallel Coordinates Plot
Each variable gets its own vertical axis, and each item is drawn as one line connecting its values across all the axes.

Profiling how individual schools/partners perform across the cradle-to-career continuum

+ Scales to many variables and cases in one view
+ Highlighting can isolate specific patterns
- Can look cluttered without interactivity
- Axis order affects perceived relationships

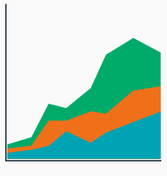
Time | How variables change over time.



Line Graph
Points connected by a line show quantitative values over a continuous time period, illustrating trends.

Tracking a milestone (e.g., high-school graduation) over multiple years; comparing trend lines across districts

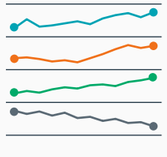
+ Intuitive and widely understood for trends
+ Easily overlays multiple series for comparison
- Too many lines becomes overwhelming
- Needs consistent time intervals



Area Graph
A line chart with the area beneath it filled in; stacked area graphs show how parts contribute to a changing total over time.

Showing how total program participation or funding breaks down by programs over multiple years

+ Emphasizes magnitude alongside trend
+ Stacked version shows total and composition simultaneously
- Hard to compare trends of middle/top layers

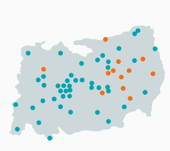


Sparkline Graph
Minimalist line chart embedded inline with text or in a table, showing a data trend at a glance.

Showing quick attendance trends next to specific schools in a summary table.

+ Compact to embed within text, tables, or dashboards
+ Great for showing the shape of multiple trends over time
- Limited ability to read precise values
- Easy to misread without context or additional detail

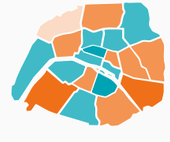
Geospatial | Where variables occur and how they vary by location.



Dot Map
Individual points placed on a map show location or clusters of events/values.

Mapping location and density of community assets across a geographic region

+ Intuitive and precise for point-level location data
+ Reveals clustering and gaps at a glance
- Can become cluttered with large datasets
- Doesn't show magnitude unless dots are sized/colored



Choropleth Map
Shading or color across geographic regions shows the magnitude of a variable.

Comparing graduation rates or kindergarten readiness by census tract

+ Great for regional patterns and equity gaps
+ Familiar and intuitive to most audiences
- Can mislead when region sizes vary a lot
- Needs a careful color scale to avoid overstating differences

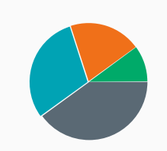


Bubble Map
A map with different sized (and sometimes colored) circles, showing magnitude of a value in addition to place.

Showing a partner organization's reach (students served) by location across a region

+ Combines location and magnitude in one view
+ Region size doesn't distort the encoded value the way it does in choropleths
- Overlapping bubbles can be hard to compare precisely
- Scale bubbles by area (not diameter) to prevent distortion

Composition | How different parts make up a whole.



Pie Chart
A circle divided into slices shows a part-to-whole relationship. Donut charts are pie charts with the center removed.

Showing proportion of community members in a census tract accessing services

+ Simple and familiar for one snapshot with few categories
- Struggles with more than ~5–6 categories
- Hard to compare across multiple pies
- Requires labels as slice size is not intuitive



Treemap
Nested rectangles sized by value show hierarchical part-to-whole relationships.

Showing a funding or program participation breakdown by category and subcategory

+ Handles more categories and shows hierarchy
+ Size differences are easy to spot
- Small categories can become unreadable
- Less precise for exact value comparisons



Sankey Diagram
A flow diagram with width-weighted arrows showing how a quantity moves or transforms across stages.

Visualizing the cradle-to-career continuum for a particular cohort of students

+ Excellent for flow, transitions, and drop-off
+ Makes bottlenecks and leakage points obvious
- Can become visually complex with many flows/stages
- Not great for reading precise values

Data Visualization Worksheet | Choosing a Data Visual

The Training Hub Powered by StriveTogether | Measure Well

Before you create your visualization, answer:

1 Know your audience

Who is the audience you are trying to reach?

What do they already know about this topic?

- ◯ Nothing / new to topic
- ◯ Familiar with the basics
- ◯ Strong background but not an expert
- ◯ Domain expert

What is their comfort and familiarity with data visualizations?

- ◯ **Low** - They don't often work with data / data visualizations
- ◯ **Medium** - They work with data and basic visualizations
- ◯ **High** - They are data experts and very comfortable with data visualizations

How much time will they spend with this visualization?

- ◯ Quick glance (e.g., slide in live presentation)
- ◯ Variable (e.g., chart in an annual report)
- ◯ Sustained review (e.g., working session, live discussion)

2 Identify your goal

In one sentence, what should your audience walk away with?

What question(s) should your visualization answer to help your audience understand root causes and make informed decisions?

What is the "job" of your visualization?

Select all that apply

- ☐ Show how groups measure up against each other or compare
- ☐ Show how values cluster or spread out
- ☐ Show how 2+ variables relate
- ☐ Show how something changed
- ☐ Show where something happens
- ☐ Show how parts make a whole

Is your goal to make a specific point or aid in exploration of the problem/topic?

- ◯ Make a specific point
- ◯ Aid in exploration

3 Understand your data

What type of variable(s) are you working with?

Select all that apply

- ☐ Categorical
  School, program, sector, demographic groups, cradle-to-career milestone
- ☐ Continuous
  Graduation rate, kindergarten readiness score, attendance rate, funding amount, proficiency gain
- ☐ Time-based
  School year, cohort year, age/grade band
- ☐ Geographic
  Census tract, neighborhood, district, zip code, service area

How many variables are you trying to show at once?

- ◯ One
- ◯ Two
- ◯ Three or more

What does your data show?

Time horizon:

- ◯ Historical data
- ◯ A point-in-time snapshot
- ◯ Real-time or live data
- ◯ Future projections or predictive

Depth of detail:

- ◯ High-level summary only
- ◯ Somewhat specific or drillable
- ◯ Very detailed, drillable

Based on your answers above, and referring to the chart types on the first page, what visualization will help you convey your point best?

Comparison



◯ Bar Chart ◯ Bullet Graph ◯ Heatmap

Distribution



◯ Histogram ◯ Box & Whisker Plot ◯ Ridgeline Chart

Relationships



◯ Scatter Plot ◯ Bubble Chart ◯ Parallel Coordinates Plot

Time



◯ Line Graph ◯ Area Graph ◯ Sparkline Graph

Geospatial



◯ Dot Map ◯ Choropleth Map ◯ Bubble Map

Composition



◯ Pie Chart ◯ Treemap ◯ Sankey Diagram

Guiding Principles for Every Visualization

1. **Focus on clarity**
   Cut clutter and detail that doesn't aid understanding.
2. **Choose the right chart**
   Understand the goal of your visualization to pick the right chart type.
3. **Highlight the takeaway**
   Use color, annotations, and other visual cues to aid interpretation.
4. **Mind data integrity**
   Don't distort the graph to misrepresent claims.
5. **Design for your audience**
   Match complexity and detail to who is reading it.

Use appropriate encodings based on your chart's purpose.



POSITION & LENGTH

Best for precise comparisons

Bar height, dot position on a shared axis, and line height allow viewers to judge accurately.



COLOR

Great for category or intensity

Color is great for "which group is this" or "roughly how strong/weak," but don't rely on it when someone needs to know *how much*.



AREA & SIZE

Use for rough estimations

Area is hard to judge accurately and can be risky when the chart's job is precise comparison.



Avoid unnecessary visual effects.

3D visuals and unnecessary labels/elements create clutter that hides the key takeaway.



Never encode meaning in color alone.

Pair color with labels, patterns, or shapes so colorblind users can still read the chart.