5W

Pie charts

PURPOSE

To **compare values or proportions in relation to each other** and/or to the whole. Since the whole can always be expressed as 100%, pies are commonly used to show percentages.

DO'S

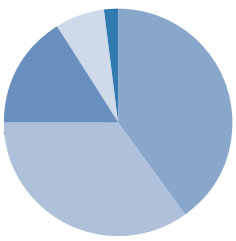
- **MAKE SURE YOU HAVE A COMPLETE DATASET** (all the values to sum 100 percent). If we don't have all the values, use bars.
- **START AT 12 O'CLOCK** and arrange the slices from largest to smallest, in a clockwise direction. If a particular slice needs to be clearly highlighted put it first, in a stronger color.

- **ADD A NOTE** that says "percentages don't add up to 100% due to rounding" if the shown values don't add exactly to 100 percent, a frequent occurrence if we have rounded values.
- **USE VERY FEW SHADES OF COLOR**. Many colors will not enhance comprehension and may confuse.

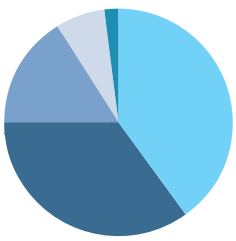
  Use either one muted color or different shades or variations of the same color to display all data. Highlight he most important number with a strong tone if needed. Some strategies are:

1. All the slices in the same color

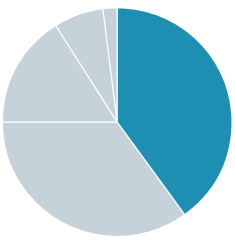
2. Shades of the same color



3. Different colors within the same family



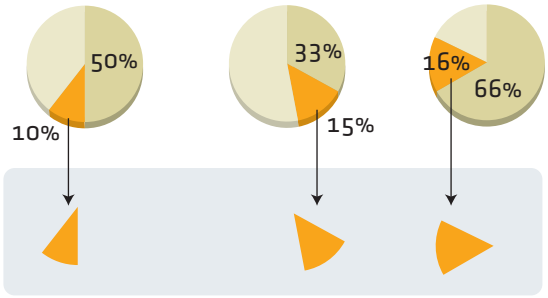
4. A highlight color for the most important piece



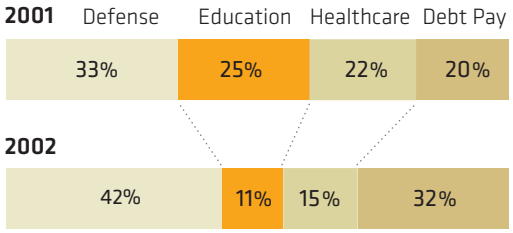
DONT'S

- **DON'T COMPARE PIE CHARTS TO OTHER PIE CHARTS.** One pie is relatively easy to read, but it is visually difficult to compare value across different pie charts. The slices to be compared may be rotated in different angles.

ALTERNATIVE: Percentage bars or stacked bars:



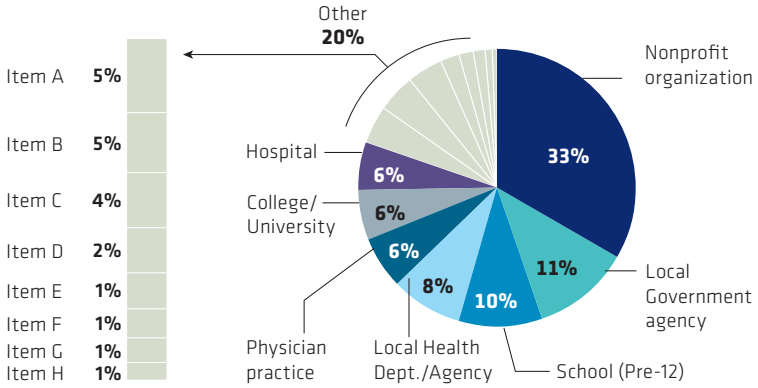
Difficult to compare visually



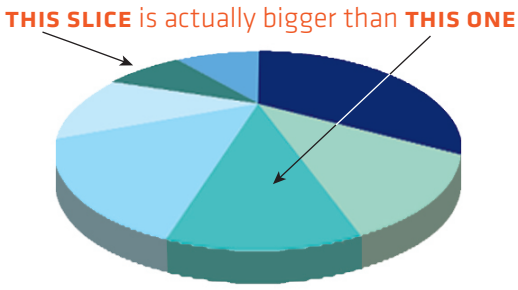
Much easier to compare visually

- **DON'T USE MORE THAN 7 OR 8 SLICES**. The overall impression is confusing and labeling will be hard to do.

SOLUTION: to combine the small slices them in an "others" category.
If the precise values are essential:
- **ZOOM** in on them in a separate chart, or
- **LIST** or table with the values next to the pie.



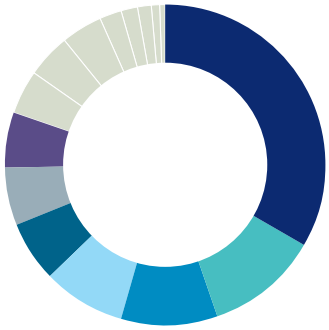
- **DON'T USE PERSPECTIVE OR THREE-DIMENSIONAL EFFECTS**. They can severely distort proportions.



ALTERNATIVE DESIGNS FOR PIES

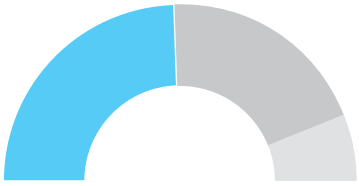
DONUT CHART

Essentially the same as a pie chart, with a more contemporary look. It may look like a round percentage bar but remember that we are still plotting area, not the length of each segment (it looks too similar to a conventional pie chart to do otherwise without confusion).



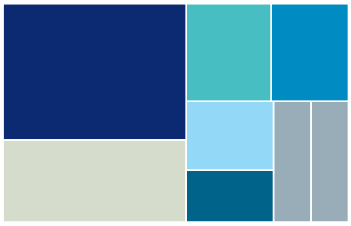
HALF DONUT

Often used for elections charts, but valid in any other context. They are easier to compare than whole pie charts.



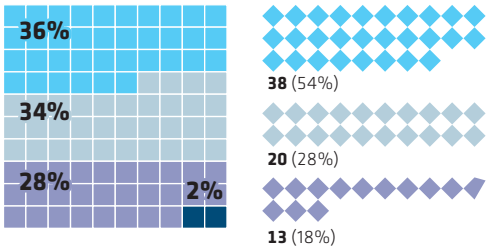
TREE MAP

Rectangular shapes that can be arranged by size or relative importance



SMALL UNITS

Small squares or any other shapes. Each shape can represent one percentage point or absolute values (in which case is best to label both the value and the percentage)



Bar charts

PURPOSE

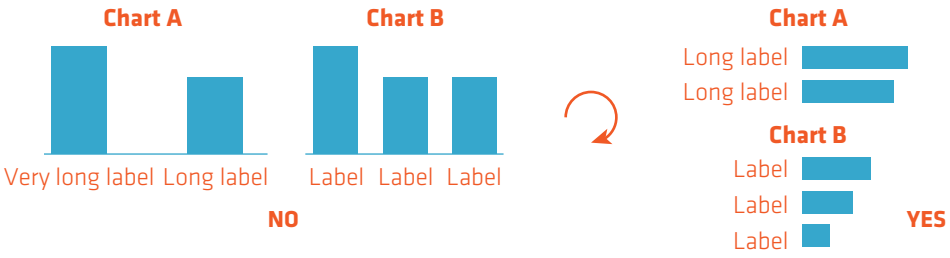
- To **compare one or more variables for multiple categories**

- To show **evolution of a variable over time**. The variable should start at zero for each period of time (a continued evolution such as stock market prices would require a fever line chart). Example: Annual revenue of a company for several years.

DO'S

- **USE VERTICAL BARS FOR TIME SERIES** Although it's not incorrect to do otherwise, time series typically run horizontally on the x-axis from left to right. Respect the habits of the readers.

- **ROTATE TO USE CONSISTENTLY SIZED HORIZONTAL BARS.** Long labels often force us to have wide bars and/or large gaps between them, and to have inconsistent bars sizes in a presentation. It looks clunky and amateurish. In most cases we can flip the axis for consistently thin bars even when we use long labels. **Don't use vertical or diagonal labels**.



- **USE RELATIVELY THIN BARS WITH NARROWER GAPS.** Leave gaps that are about half the width of the bars. If the negative space is similar to the bars, it may create some visual vibration and confusion between data and non-data. Gaps wider than the bars mean the chart is oversized.

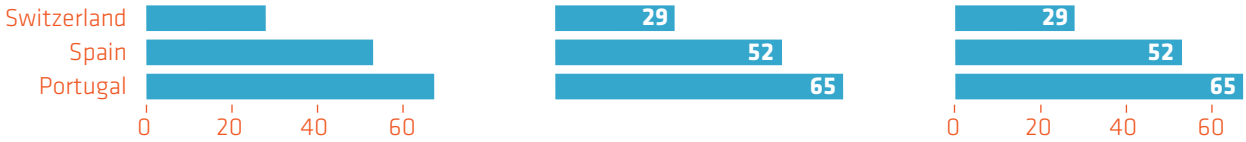
Use a higlight color bar or a line to show average values. Lines are also used for benchmarks.

- **SORT** If a particular order is essential, use it. For all other cases, don't use a random order, sort the bars by default (form largest to smallest or viceversa). If a particular bar is of high interest show it first in a highlight color, followed by sorted bars. Bars showing totals and averages should be highlighted too.

DONT'S

- **DON'T USE EXACT VALUES AND A SCALE REDUNDANTLY**

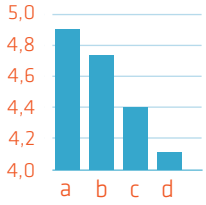
Gridlines and tick marks help guide the reader's eye to know the approximate values. If we are not labeling exact values for each bar, the scale is essential. If we are, it's unnecessary and should be deleted.



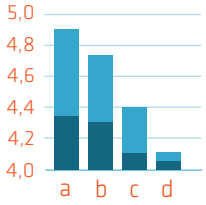
YES **YES** **NO**

- **DON'T TRUNCATE THE SCALE** While there is flexibility with line charts, bar chart scales **should always start at the zero value**. If you want to highlight small differences, show unit or percentage change instead.

Item **d** looks five or six times smaller than **a**. The visual cue is too strong even if the numbers in the scale indicate the real values.



A stacked bar chart makes the problem even worse by showing whole segments on top compared to truncated ones.



- **DON'T USE BARS IF YOU HAVE VERY LARGE AND VERY SMALL VALUES**

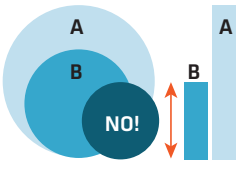
The largest value may be so large that small values become nearly invisible or too hard to differentiate from each other.

NO **NO**

Differences in the values are lost

This commonly used "break" symbol defies the purpose of visualizing data. We are not showing real differences

In both cases the value of B is half the value of A. Circles de-emphsize differences. Plot area, not diameter

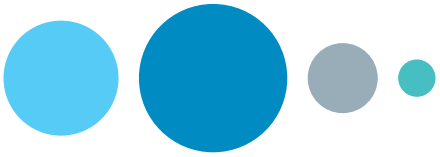


ALTERNATIVE: Bubble charts compare areas rather than lengths. They de-emphasize visual differences, making it possible to include very large and very small values in the same chart. Remember to **PLOT THE AREA, NOT THE DIAMETER OR WIDTH** of the circle. However, sometimes the differences in values may be so large that a **text table** or a **highlight table** is the only option.

ALTERNATIVE DESIGNS FOR BARS

BUBBLE CHART

Using circles. Remember to pot area, not length (diameter).



LOLLIPOP CHART

Thin lines with small circles at the data points.

WORD CLOUD

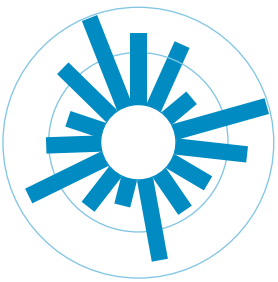
Type is sized according to the numerical values.

CIRCULAR BAR CHART

An engaging design useful in squarish layouts, it can also show percentages for multiple variables.

RADIAL BAR CHART

A concentric arramgement with a radial scale.



HIGHLIGHT TABLE

A text table with shades of color indicating the magnitude of values. Useful to visualize patterns behind large sets of numbers.

Category A	2	4	2
Category B	4	8	2
Category C	2	6	8
Category D	8	2	6

Line charts

PURPOSE

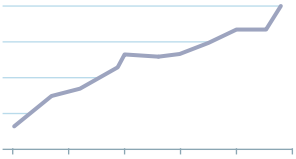
To display **continuous evolution over time of variables that instead of starting from zero for each period of time, are added or substracted from the value of the previous period**. Examples: Temperature, the daily value of an stock market index, population of a country.

DO'S

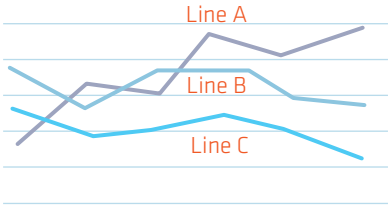
- **TRUNCATE THE BASELINE IF NEEDED** to show small differences clearly. Unlike a bar chart, a line chart doesn't always require a zero baseline. For example, if we track fever in a patient or the daily change of a stock with a range in the thousands from a zero baseline we'll get a flat, unhelpful line that obscures the relevant message.

- **AVOID BUSY GRIDLINES** by showing some of them but not all (for example, every 5 years instead of every year. Or, even better, **USE ONLY TICK MARKS** instead of the gridlines to avoid clutter.

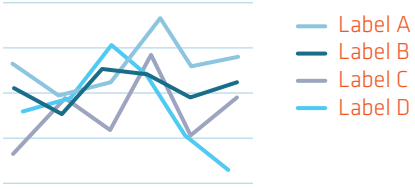
Gridlines are needed to guide the eye in wide charts (you can end them when they touch the line).



- **PLACE LABELS DIRECTLY** next to each line, rather than using a key (which requires readers to dart back and forth many times cross-referencing between the key and the line). Use a legend only when space is tight and lines intersect extensively. The order should match the ranking of the end points since they are the most current.



Direct labeling whenever possible



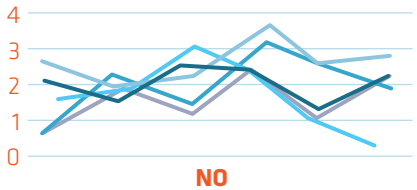
Key needed. Follow the order of the end points

- **USE A DIFFERENT COLOR OR STYLE FOR PROJECTED DATA.** If a portion of the line shows future data, change the style (dotted, different color, etc.)

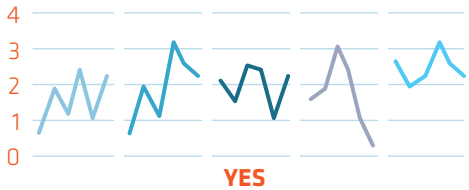
DONT'S

- **DON'T USE MORE THAN FOUR OR FIVE LINES** unless they barely intersect with each other. It creates big confusion even using different colors.

ALTERNATIVE: Small multiples. In many cases a better solution is an array of small individual charts (known as small muliples) shown side by side. Arrange them horizontally if possible to share the same y-scale and make them comparable.



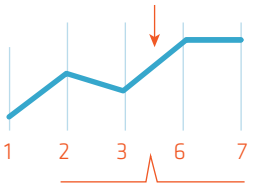
NO



YES

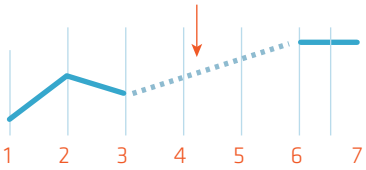
- **DON'T USE UNEVEN INTERVALS**. Space intervals in the x-axis should be proportional to the time intervals between them, regardless of wether we have data points for each time period or not. However, in most cases we should not interpolate missing data, and if we do we need to indicate it.

THIS INCREASE appears more dramatic than it is



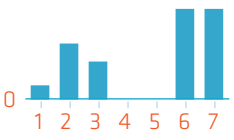
NO Missing days here

NO Don't interpolate, it implies unknown mid values



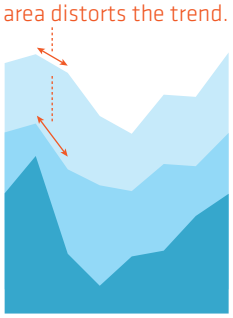
YES Show full scale even with no data points

A bar chart works better as long as it has a zero baseline



- **DON'T USE STACKED AREA CHARTS**. Stacked area charts show the evolution of multiple data series. They are confusing because only the portion at the bottom has a common baseline for all datapoints. On any portion above it, the moving baseline distorts the perceived movement of the values.
The only exception is when the cumulative value of all variables added together is the most important take away message, rather than how the parts evolve.

Counterintuitive
These two values are going up but the first area distorts the trend.

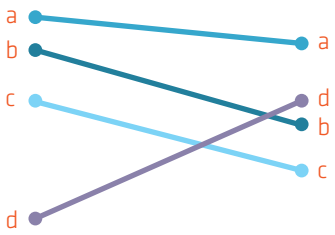


ALTERNATIVE DESIGNS FOR LINE CHARTS

There is no real equivalent to line charts but there are related alternative ways of showing evolution over time.

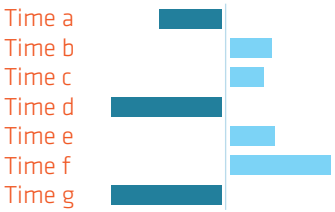
SLOPE CHART

It compares change between two points in time with a line. It can indicate simple ranking or movement along a numerical scale. It indicates the comparative rate of change and elements bucking the trend.



SPLIT AXIS BAR CHART

It plots the comparison between two points in time by charting the change that has occurred in that time frame (in units or percentage points).



STEP CHART

It plots evolution of a variable that is not continous but has constant-value segments that jump to a next level at certain points, like stamp prices or mortgage rates.

The principles: Do's and Dont's of infographics

DO **Be accurate and inquisitive**

Show only accurate, reliable information that is true and relevant for your audience. Show what you know and nothing else. Good data and infomation is the foundation of every infographic, so when you have a dataset on hand, take the time to learn what it's about, where it's from, the methodology behind it and what makes it interesting and unique.

DO **Strive for clarity**

Show information in the most simple, clear and easy to understand way possible. But remember the goal is not just to simplify, but to clarify. Spend time thinking of how to add clarity without eliminating substance and important information. Your readers are often busy and speed of understanding is critical. If the message is not understood quickly, the readers will turn away.

DO **Know your audience and your platform**

The content and level of complexity of an infographic should be customized for the specific audience we are trying to reach. Experts in a topic will understand complex issues and require less context. A lay reader will need more explanations and simplicity. Also, think of much time your average reader will have and about their platform. Print, web and mobile require different ways of presenting information.

DO **Think of helpful context elements, comparisons and visual metaphors**

A number by itself means very little. We know our data is relevant or irrelevant, big or small, improving or getting worse, when we find adequate comparisons to put them in context. Find those during the research phase. Think of metaphors that make complex concepts more relatable to the reader.

DO **Make the infographic make sense by itself as a stand-alone presentation**

A good infographic should be self-contained, explaining something fully. In fact we can often have an infographic replace a written report entirely. Even if it's part of a longer text report, remember most readers look at infographics first (sometimes only), so it should summarize the content well.

DO **Edit and keep text to a minimun**

A graphic that needs long text is a failed visual explanation, and will be uniting for readers. Let the image talk. Spend time editing text for maximum brevity. Do not repeat what is shown in the visuals. Text and image support and reinforece each other.

DON'T **Overload with information**

A good infographic is not an encyclopaedia of everything you know about a topic. It should keep a strong focus on explaining one thing well and succintly. Discard anything that doesn't support the explanation for the sake of focus and legibility.

DON'T **Decorate**

It's tempting to approach infographics from purely a design and aesthetics perspective, but that's only one half of the equation. An infographic is not an illustration, it's an explanation. Do not add illustrative or decorative elements that are not essential to the explanation, you will lose credibility.

DON'T **Work in isolation**

Like anything that involves creative thinking, our brilliant idea could be not so great for others. Show your infographic to other people to make sure it makes sense and it's clear. This includes getting feedback from people familiar with the information and also from people that have nothing to do with its creation. Do they understand it easily and completely?

Have one of your colleagues double-check the numbers in your chart. Mistakes happen all the time.

DON'T **Compromise clarity for the sake of creativity**

There is always potential to be really creative and original with charts and visualizations , but also to confuse the reader with unusual, complex and non intuitive design that obscures infomation. The main goal is clarity and we shouldn't lose sight of it as we experiment with creative presentation.

DON'T **Use illustration or perspective in charts**

Don't use perspective or three-dimensional effects in chart as you will distort the data. Don't use illustrations of different heights as a bar chart or similar visual devices. Not only it may distort the data but readers will associate the"cartoony" look with less serious information. A clean, straighforward presentation conveys precision and authority.

Effective and impactful design and styling

Efficient design makes infographics more attractive, sophisticated and, most importantly, easier to read and understand. Here are some tips that start at the sketching phase and continue as you finish in the computer.

1 Always start with hand sketching

Use the best tool in infographics: the pencil! Simple hand drawing lets your ideas flow quickly. Make several quick sketches to help you brainstorm visually. Detail and refinement don't matter at this point. The sketch shows which elements will be in the graphic, the overall composition and the storytelling flow.

2 Define a clear reading order

In infographics with multiple components, it's important to guide the reader eye with a clear and logical reading order, tipically from top left to bottom right. Always think of what the reader will see first, and make sure it's clear where to go next.

3 Define a visual hierarchy

In most cases, it's best to have a dominant element that carries the visual weight of the infographic and is a powerful image that attracts and engage readers. The secondary elements around it should be smaller and simpler. Many elements of similar size will compete with each other.

4 White space is your friend

You don't need to cram every empty spot with information, it will be overwhelming and create unwanted "where to go next" situations. Some empty space usually helps a lot to define a reading order and to separate elements clearly. Designers use white space for clean, well organized content.

5 Provide context and summarize with a good headline and introduction

As you sketch, don't forget to always start with a clear, large headline and an introduction paragraph to give the reader some context. A good headline is descriptive and even catchy, and the introduction paragraph should make clear what is the purpose of the infographic and summarize it in a nutshell.

6 Define the text hierarchy and placement early on

It's important that our pencil sketch shows where text will be, its estimated length and the relative hierarchy between text blocks. Do we need subheads for different sections? Most people sketch out just the drawings and then they have a hard time placing supporting text. Make sure text is kept short and use font size and weight to establish a clear hierarchy of what is most important.

7 Keep a clear focus and edit information out. Don't overload it.

A good infographic is not an encyclopaedia of everything you know about a topic. It should keep a strong focus on explaining one thing well and succintly. Discard anything that doesn't support the explanation. Editing or taking out unnecessary information happens at the sketching phase.

8 Use a visual variety of styles

Many infographics and charts don't need any Illustrations at all. If you use them, a clean and simple style always works to help a clear explanation. If you have a large dominant illustration you can have more realism and detail in it, keeping the secondary illustrations small and simple.

9 Use and internal grid and look for alignments

If you have a graphic with multiple elements, it can look very disorganized without an internal structure. Use an invisible grid with "mini-columns" to align elements and to clreate elements of similar width.

10 Use color strategically

Use color with moderation and only to highlight important information. Color should be used as a layer of information, not as decoration. Also, make sure color follows the overall look and palette of the presentation or publication the infographic is in.

11 Eliminate unnecesary clutter, noise and decoration

Elements like boxes and shadows behind elements, too many grid lines in charts, color gradients, etc only add complication and noise without helping clarify. Delete unnecessary clutter and keep it clean.

12 Keep a consistent style

Always follow a consistent typography and presentation style to have a clear identity. Follow a style guide. Don't spend time trying colors and styles, use that time to think how to best explain the information.

Infographics: the step-by-step process

Infographics require a skillful combination of insight, research, creative design, writing, illustration and storytelling. Use a step by step process to make sure the result is sound, engaging and successful.

1 **First, decide if your written story needs an infographic, and what kind**

Don't make an infographic just because you want something visual. It should be done when an infographic is the best possible resource to explain a piece of information. The quality of an infographic is proportional to the quality of insight it facilitates.

When you read a text report you'll often see the potential to benefit from infographics:

- Any story with numbers/statistics CHARTS
- Stories about events that unfold over time TIMELINES
- Stories that mention different locations or date linked to locations MAPS
- Stories that explain sequential processes or how something works PROCESS / EXPLANATORY - DIAGRAMS
- Stories that explain hierarchy and organizations FLOW CHARTS / ORGANIGRAMS
- Stories about things that too small, too large or inaccesible to photograph ILLUSTRATED DIAGRAMS

2 **List the goal and components**

Make a written list to define:

- What is the main goal of the graphic? The key message
- What will be ALL the components or pieces of the graphic? What is their relative hierarchy (what is essential and what is secondary)?. What comparisons can we bring in to add context?

3 **Research thoroughly**

Do enough preliminary research to understand the topic, its relevance and what additional information may be needed. If you are making an infographic about a report created by someone else, interview the original source to have additional context and explanations that can be helpul to understand and explain the topic.

4 **Edit it down**

Revise the list to make sure the graphic keeps a tight focus and doesn't become an encyclopedia. Even good, interesting information needs to be left out most of the time to avoid overwhelming the reader.

5 **Sketch by hand**

Start with really rough sketches just to help you brainstorm and evaluate quickly the potential of different presentation ideas. Then you can create more refined sketches as real information becomes available. Think of how the reader will move through the graphic, and leave adequate space for text

6 **Choose the right chart types**

If your infographics includes chart, make sure you choose the right type. Each data set has a limited number of chart types that are correct to use. It's not a matter of taste. And among the correct charts that can be used for your data set, your should strive to find the one that is most clear and revealing.

7 **Write**

Once the structure and elements are clear, you can write a first draft of text. Start with headlines and subtitles. First make sure you captire all the essential infomation. Later, try to edit for style and brevity.

8 **Create the graphic in the computer**

Create the visuals and add detail in the software tool of your choice. Use color strategically, have the font size and weight help define the structure, and use icons/pictograms to make long text blocks easier to read.

9 **Make sure it all makes sense**

Show your infographic to other people (both familiar an unfamiliar with the topic) to make sure they understand it clearly and to point out the weaker parts.

10 **Ensure accuracy and accountability**

Once you finish make at least a round of editing and fact-checking to avoid errors, typos or unpolished elements. If the infographic contains data from external souces, identify them with a source credit.