



Northwestern
University

The Process of Visualizing Data

Select the Right Graph Type

Week 4



Common challenges

Common challenges



TIME CONSTRAINTS

It takes too much time to
create new graph types

Common challenges



TIME CONSTRAINTS

It takes too much time to create new graph types



KNOWLEDGE GAP

You might not know what graph to select to replace a common graph

Common challenges



TIME CONSTRAINTS

It takes too much time to create new graph types



KNOWLEDGE GAP

You might not know what graph to select to replace a common graph



TOO MANY OPTIONS

You selected a few potential options, but don't know which one to go with

LET'S GET STARTED!

How to select the right chart type





Titanic case study

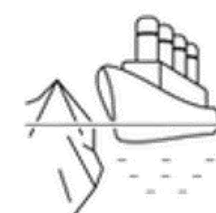
Class	Survival	Name	Gender	Age
3	no	Abbing, Mr. Anthony	male	42
3	no	Abbott, Master. Eugene Joseph	male	13
3	no	Abbott, Mr. Rossmore Edward	male	16
3	yes	Abbott, Mrs. Stanton (Rosa Hunt)	female	35
3	yes	Abelseth, Miss. Karen Marie	female	16
3	yes	Abelseth, Mr. Olaus Jorgensen	male	25
2	no	Abelson, Mr. Samuel	male	30
2	yes	Abelson, Mrs. Samuel (Hannah Witosky)	female	28
3	yes	Abrahamsson, Mr. Abraham August Johannes	male	20
3	yes	Abraham, Mrs. Joseph (Sophie Halaut Easu)	female	18
3	no	Adahl, Mr. Mauritz Nils Martin	male	30
3	no	Adams, Mr. John	male	26
3	no	Ahlin, Mrs. Johan (Johanna Persdotter Larsson)	female	40
3	yes	Aks, Master. Philip Frank	male	1
3	yes	Aks, Mrs. Sam (Leah Rosen)	female	18
3	yes	Albimona, Mr. Nassef Cassem	male	26
2	no	Aldworth, Mr. Charles Augustus	male	30





Titanic case study

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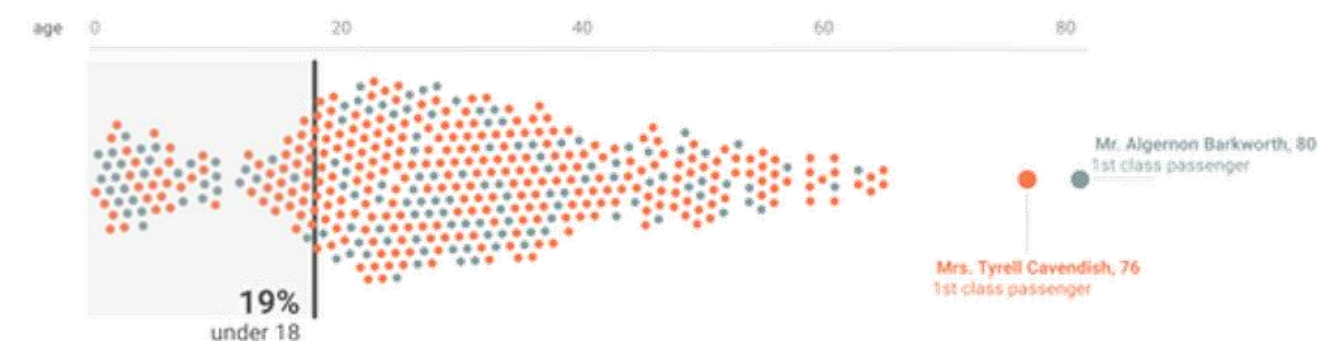


WHO SURVIVED THE TITANIC?

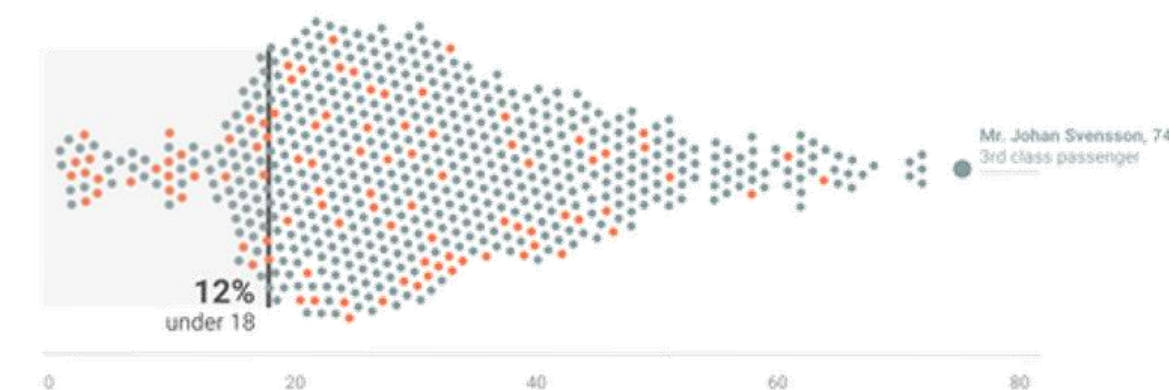
The “Women and children first” (WCF) policy gave women and kids a survival advantage over men



SURVIVED



DIED



**How to select
the right graph?**



Audience

Audience

- ▶ Size
- ▶ Data literacy
- ▶ Knowledge on the topic
- ▶ Level of seniority
- ▶ Specific needs/Objective
- ▶ Time available

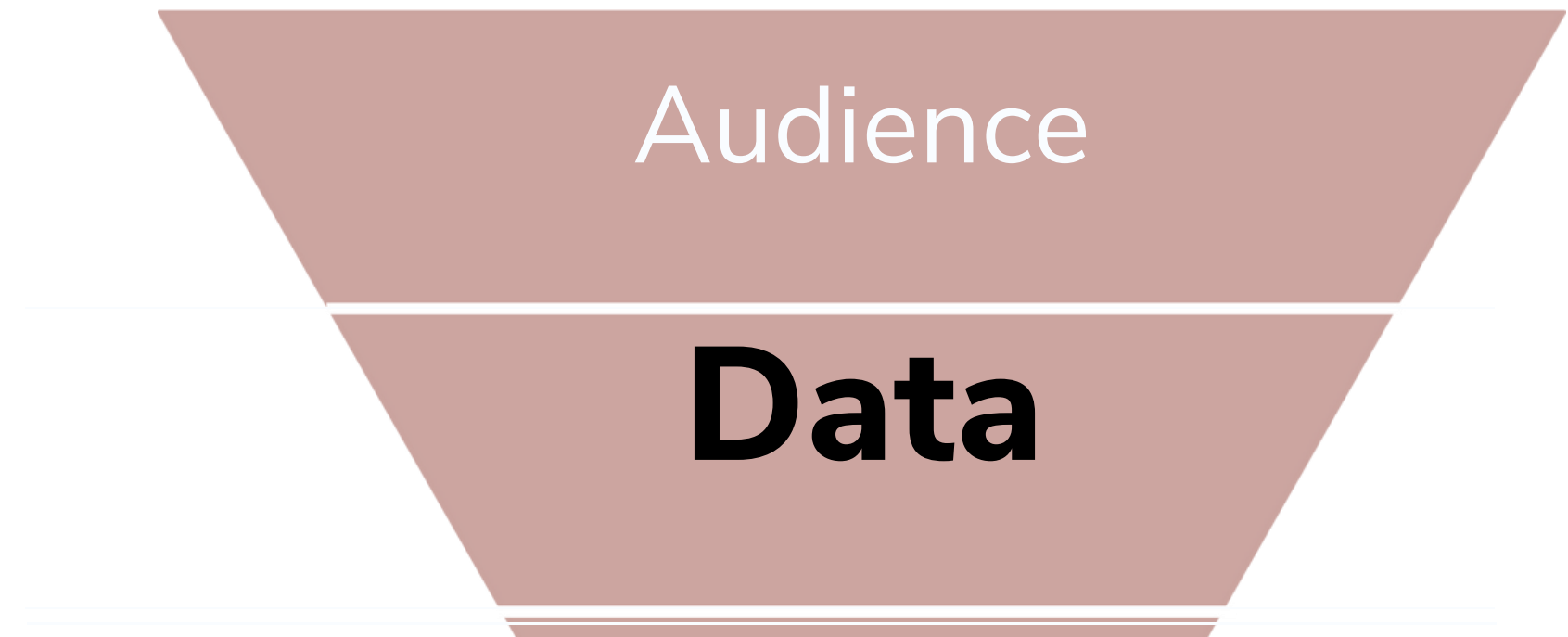


Titanic case study

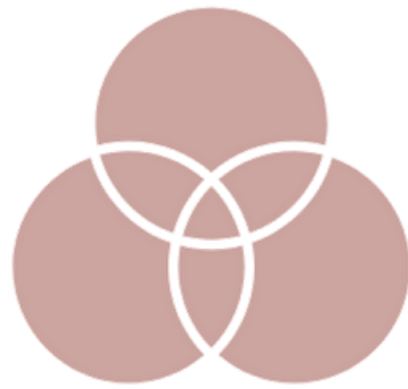
◀ **WHO** ▶
is your audience

Size	Data Literacy	Knowledge of the topic	Level of seniority	Specific needs	Time available
Large	Low to average	Almost everyone knows the Titanic story!	N/A	Learn more	Limited

How to select the **right graph**?



Data



RELATIONSHIP



COMPARING CATEGORIES



DISTRIBUTION



TIME



PART-TO-WHOLE



GEOSPATIAL

Data



RELATIONSHIP



COMPARING CATEGORIES



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GEOSPATIAL

Chart choosers

Visual Vocabulary

Deviation

Correlation

Ranking

Distribution

Change over Time

Part-to-Whole

Magnitude

Spatial

Flow

Visual Vocabulary

There are so many ways to visualise data - how do we know which one to pick? Click on a category below to decide which data relationship is most important in your story, then look at the different types of charts within the category to form some initial ideas about what might work best. This list is not meant to be exhaustive, nor a wizard, but is a useful starting point for making informative and meaningful data visualisations.

Click any section below to view the charts

↓

Deviation

Emphasise variations (+/-) from a fixed reference point. Typically the reference point is zero but it can also be a target or a long-term average. Can also be used to show sentiment (positive/neutral/negative).

Correlation

Show the relationship between two or more variables. Be mindful that, unless you tell them otherwise, many readers will assume the relationships you show them to be causal (i.e., one causes the other).

Ranking

Use where an item's position in an ordered list is more important than its absolute or relative value. Don't be afraid to highlight the points of interest.

Distribution

Show values in a dataset and how often they occur. The shape (or 'skew') of a distribution can be a memorable way of highlighting the lack of uniformity or equality in the data.

Change over Time

Give emphasis to changing trends. These can be short (intra-day) movements or extended series traversing decades or centuries. Choosing the correct time period is important to provide suitable context for the reader.

Part-to-Whole

Show how a single entity can be broken down into its component elements. If the reader's interest is solely in the size of the components, consider a magnitude-type chart instead.

Magnitude

Show size comparisons. These can be relative (just being able to see larger/bigger) or absolute (need to see fine differences). Usually these show a 'counted' number (for example, barrels, dollars or people) rather than a calculated rate or per cent.

Spatial

Used only when precise locations or geographical patterns in data are more important to the reader than anything else.

Flow

Show the reader volumes or intensity of movement between two or more states or conditions. These might be logical sequences or geographical locations.

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INSPIRED BY PT Graphics: Alan Smith, Chris Campbell, Ian Bott, Liz Paines, Graham Parry, Billy Ehrenberg, Paul McCalum, Martin Stobb <small>Visual Vocabulary Booklet: Re-use it on your own</small>	Diverging Stacked Bar		Steve Hower	Data Resolutions	Art Chart	Ken R.	KenRagsdale.com
	Sunburst Chart		Lennix Bous	SuperData Science	Radar Chart	Adam.	Quelins Data
	Surplus/Deficit Filled Line		Jeffrey Scatter	Data Science	Scaled Cartogram	Ken R.	KenRagsdale.com
	Violin Plot		Ben Moore	YouTube	Venn Diagram	Lennix	SuperData Science

Visual Vocabulary

Designing with data

There are so many ways to visualise data - how do we know which one to pick? Click on the coloured categories below to decide which data relationship is most important in your story, then look at the different types of chart within the category to form some initial ideas about what might work best. This list is not meant to be exhaustive, nor a wizard, but is a useful starting point for making informative and meaningful data visualisations.

Inspired by the Graphic Continuum by Jon Schwabish and Severino Ribacca

Deviation

Correlation

Change v Time

Ranking

Distribution

Part to whole

Magnitude

Spatial

Flow

Ranking

Use where an item's position in an ordered list is more important than its absolute or relative value. Don't be afraid to highlight the points of interest.

Examples of use

Wealth, deprivation, league tables, constituency election results

Chart types

bar-ordered

Standard bar charts display the ranks of values much more easily when sorted into order

column-ordered

Standard column charts display the ranks of values much more easily when sorted into order

symbol-proportional-ordered

Use when there are big variations between values and/or saving fine differences between data is not as important.

dot-dot-strip

Data placed in order on a strip are a space-efficient method of laying out ranked across multiple categories.

slope

Perfect for showing how ranks have changed over time or vary between categories.

lollipop-h

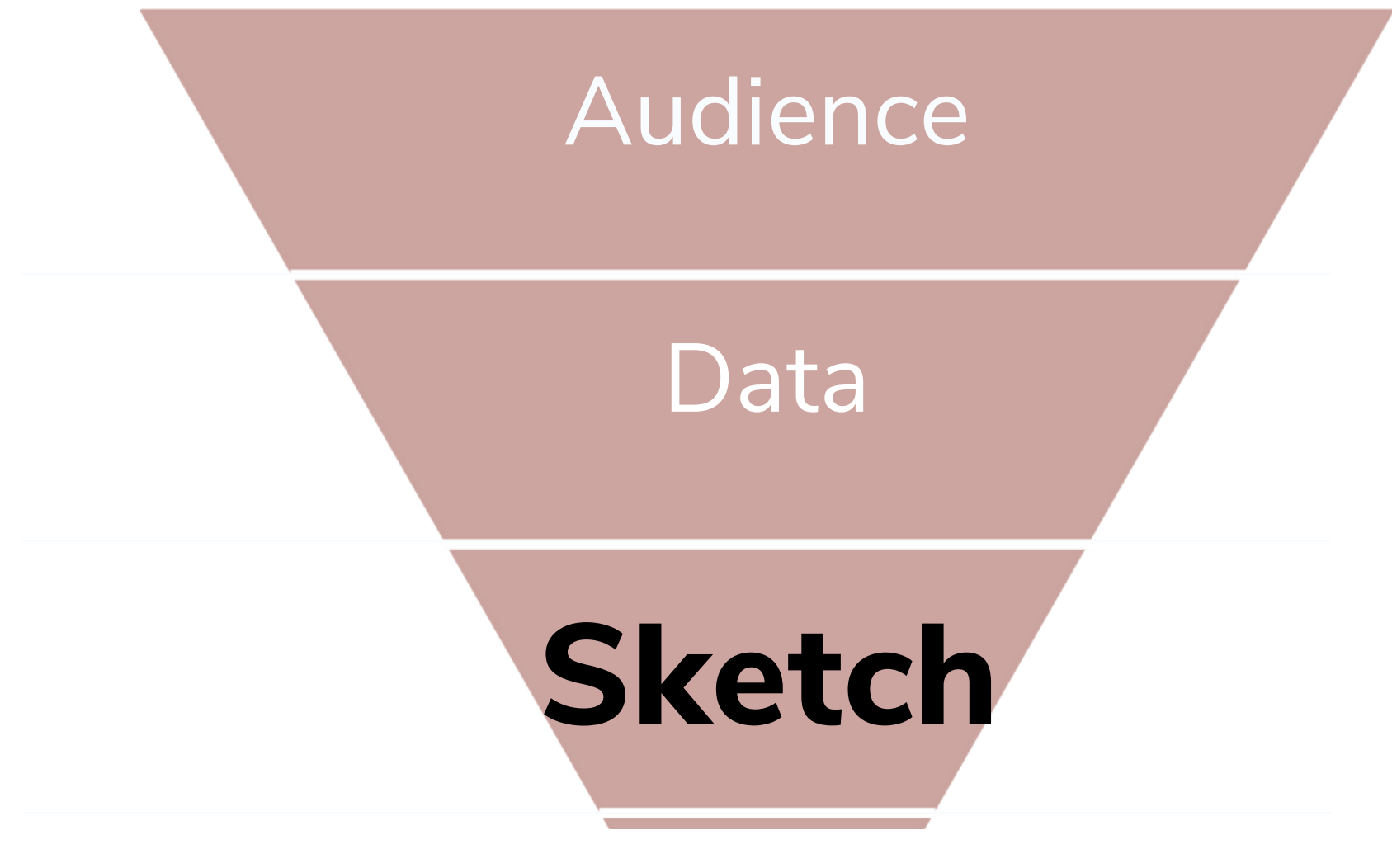
Lollipop charts draw more attention to the data value than standard bar/columns and can also show rank effectively

lollipop-v

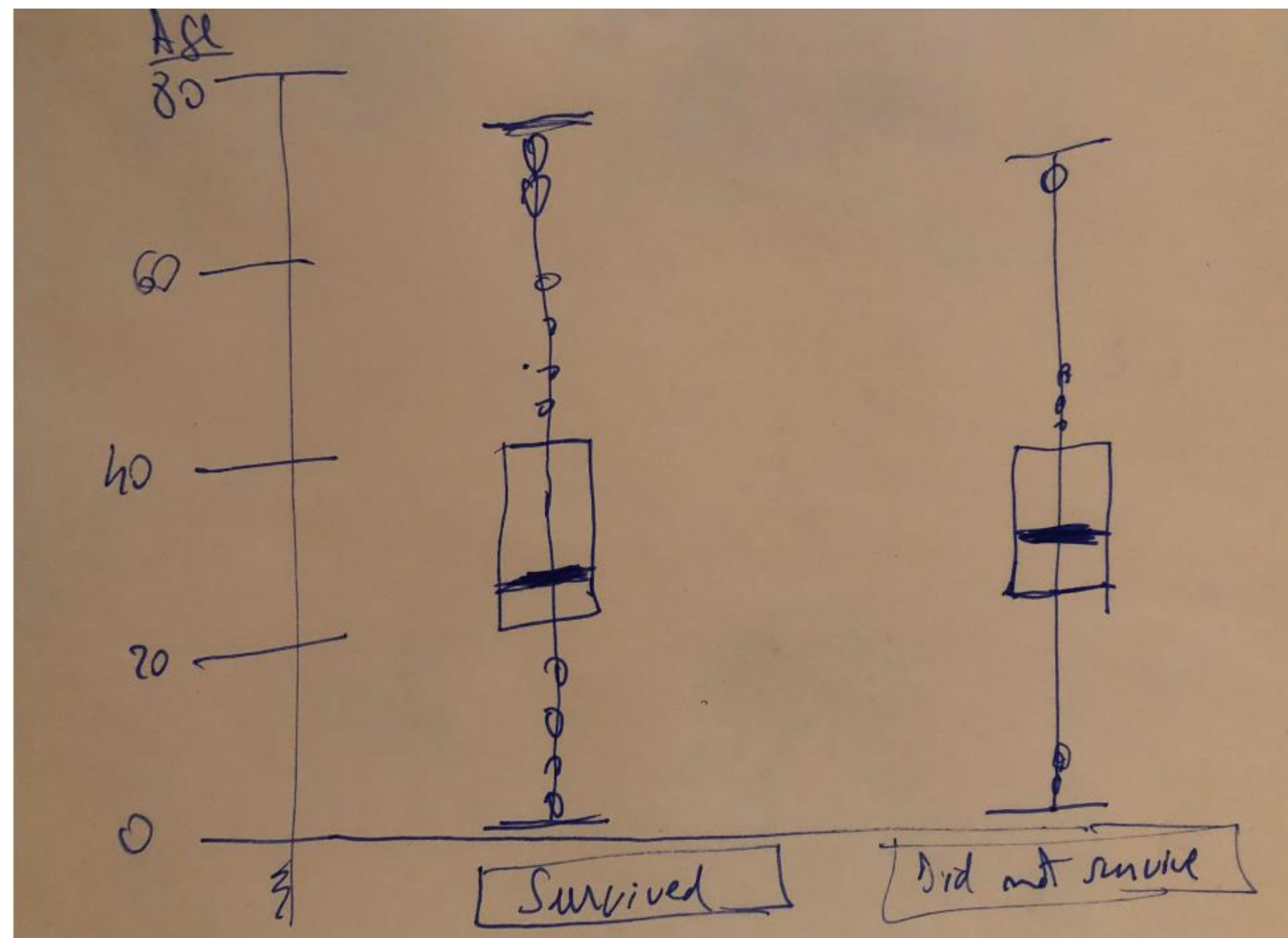
Lollipop charts draw more attention to the data value than standard bar/columns and can also show rank effectively

bump

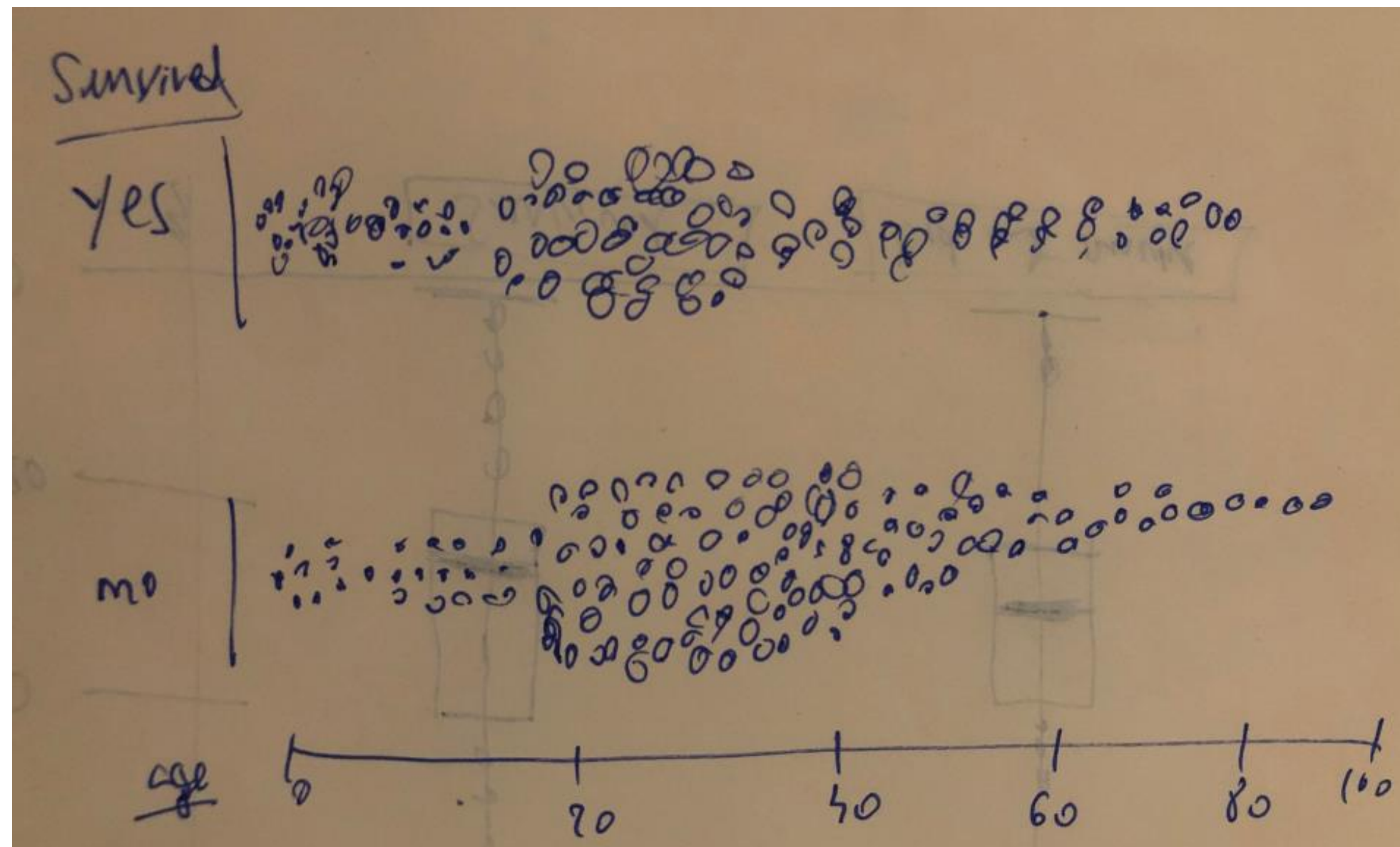
How to select the **right graph**?



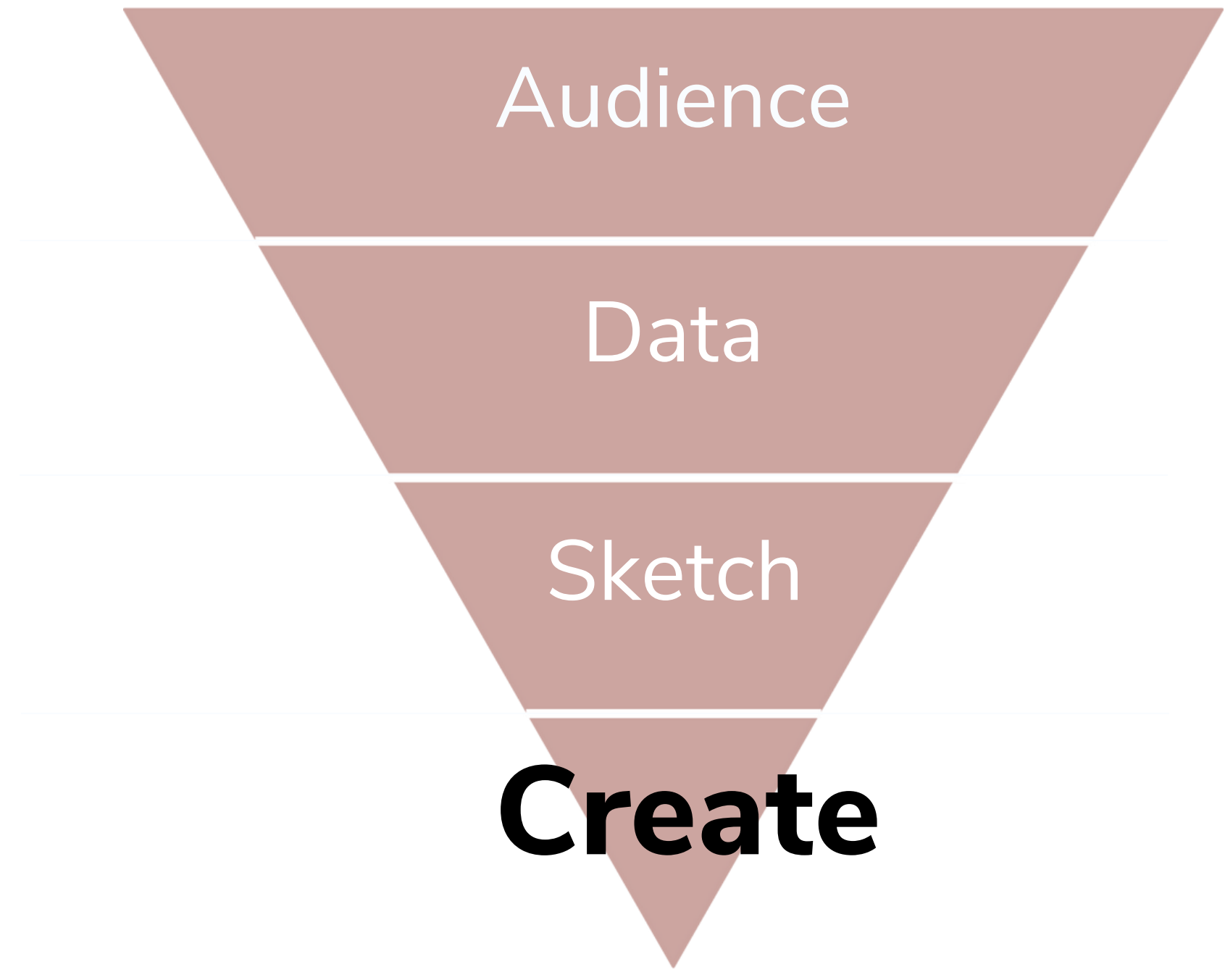
Sketch #1



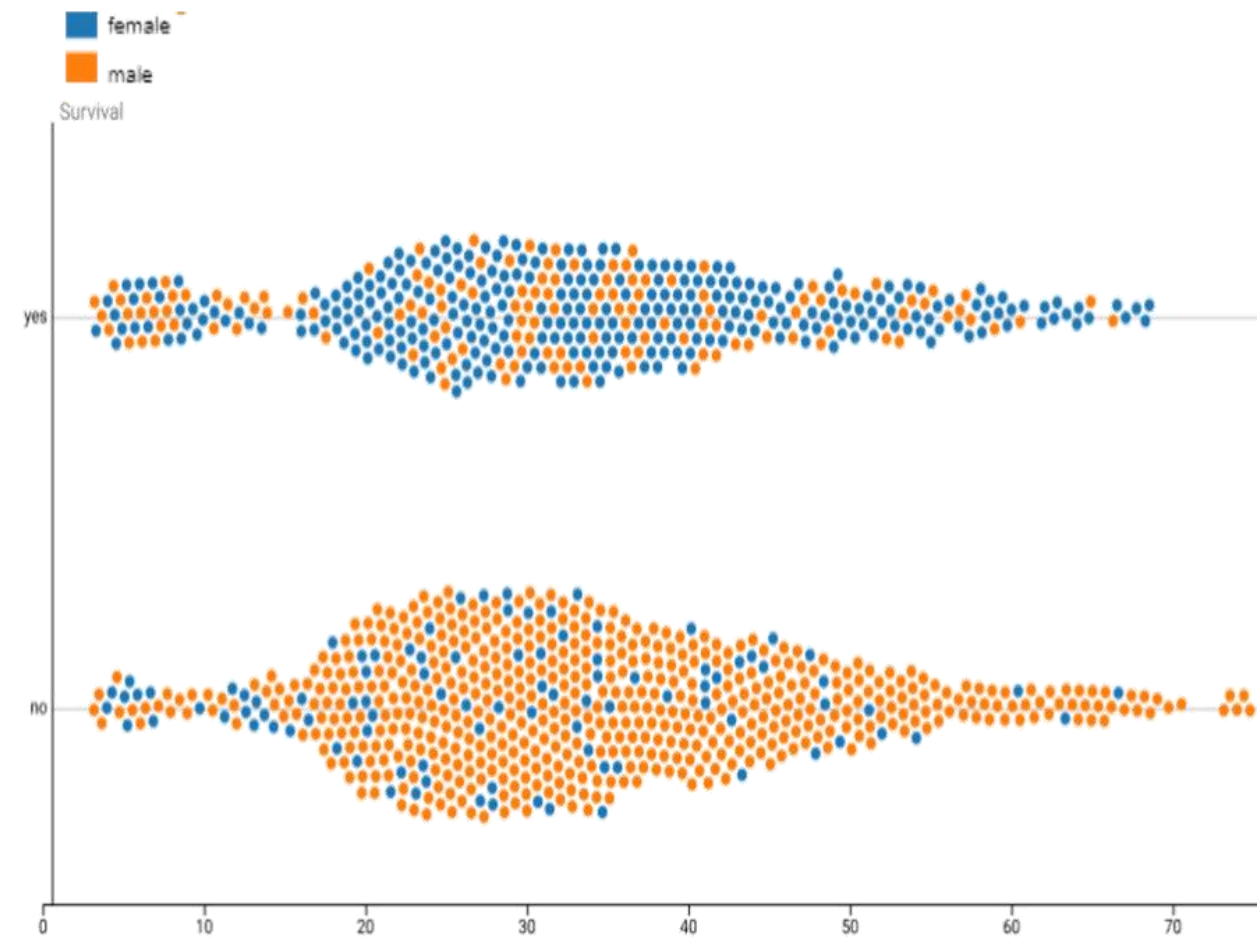
Sketch #2



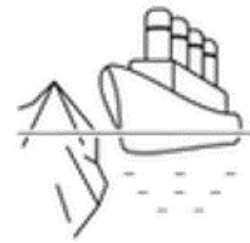
How to select the **right graph**?



Create in a tool

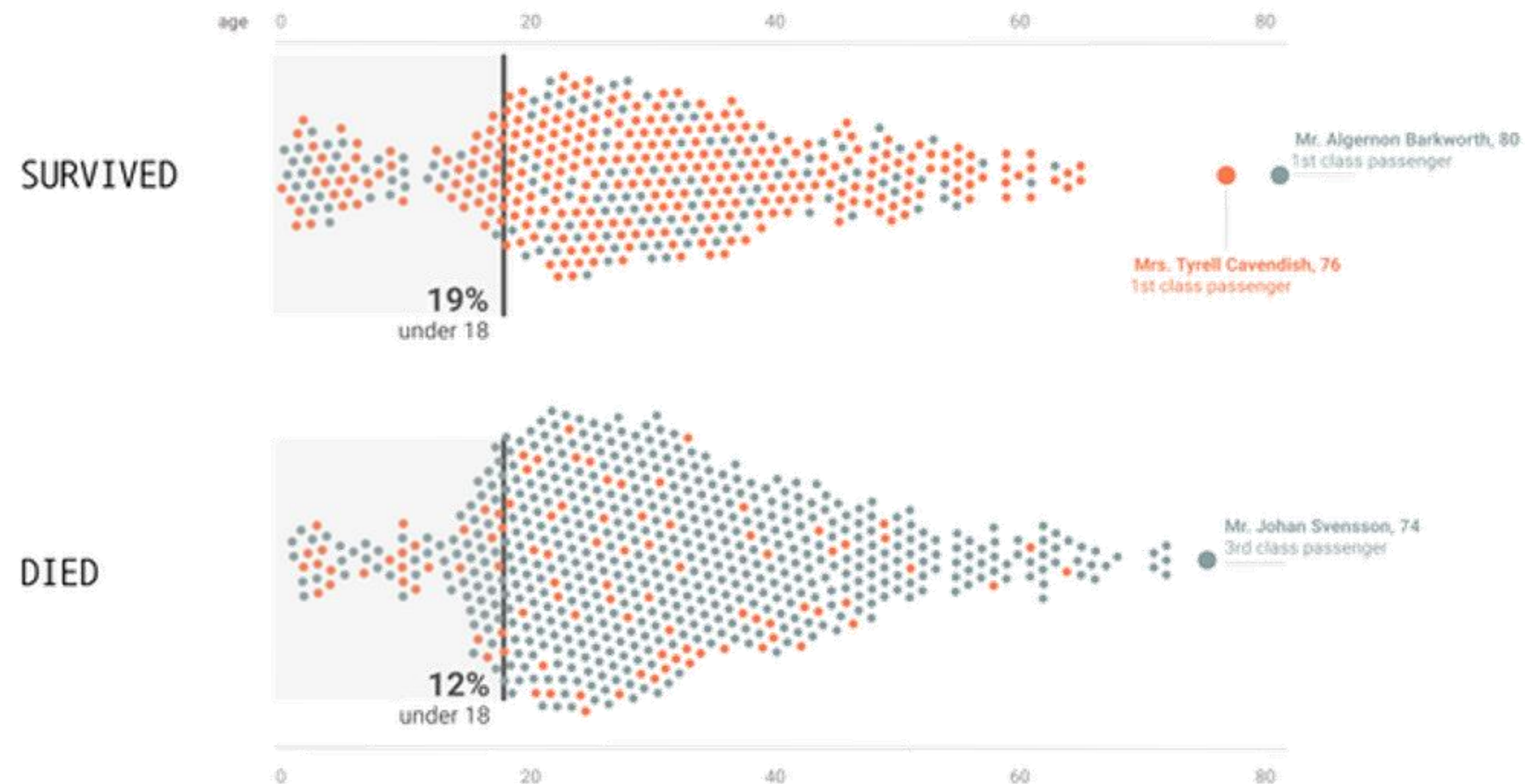


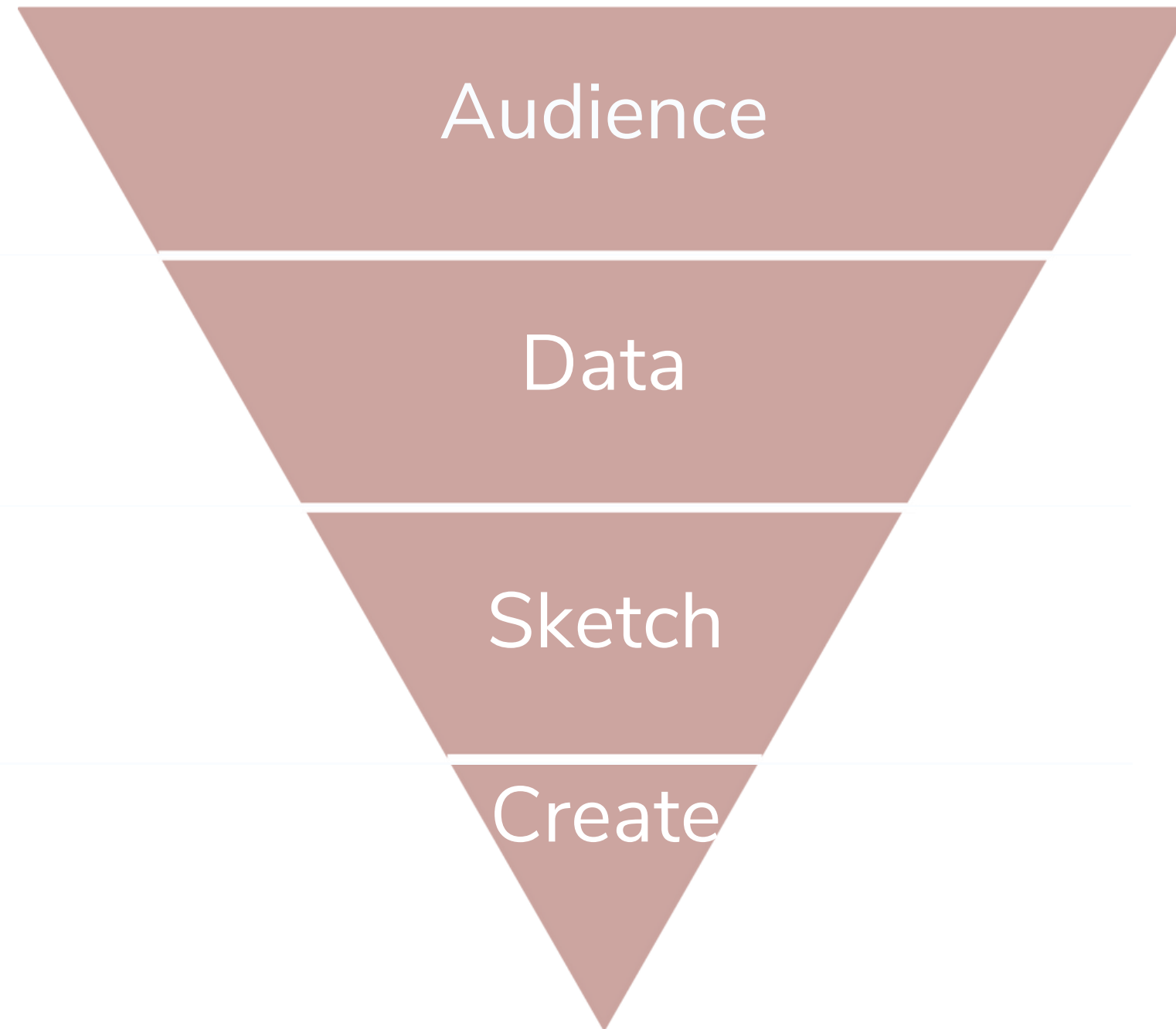
Create in a tool



WHO SURVIVED THE TITANIC?

The “Women and children first” (WCF) policy gave women and kids a survival advantage over men







EXERCISE

Use the Titanic data set and try to replicate the beeswarm plot in RawGraphs. Edit the chart in Figma.

The data set is available on Canvas.

Save your final graph on Canvas before class.