How to read graphs

In an era where information is readily available, graphs have become essential tools for conveying data in a visually appealing and concise manner. Understanding how to read them accurately is crucial for making informed decisions. However, graphs can be misleading if not interpreted correctly or are even made misleading on purpose at times. This infographic shows common cases of misleading graphs, including leaving out data, not labelling data properly or skipping numbers on the vertical axis. Here are some handy tips to help you identify misleading graphs.

HOW TO READ GRAPHS

eufic

Reading graphs correctly

Graphs are great tools for visually showing data. But they can be misleading if data is poorly presented, e.g., data is left out/badly labelled or axes are distorted.
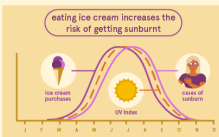
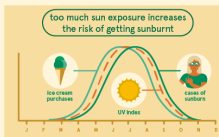Understanding how to read them can help us better assess data and make informed decisions.

1 Misleading title

The title suggests two things are related, but no cause-and-effect relationship exists.

⊗ misleading graph

eating ice cream increases the risk of getting sunburnt

ice cream purchases | UV Index | cases of sunburn
J F M A M J J A S O N D

⊘ accurate graph

too much sun exposure increases the risk of getting sunburnt

ice cream purchases | UV Index | cases of sunburn
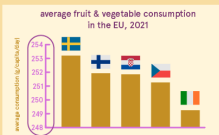J F M A M J J A S O N D

Example: "Correlation doesn't always mean causation." On sunny days, people are both more likely to eat ice cream and get sunburnt, but eating ice cream doesn't cause sunburns; the sun and too much exposure to UV light does!
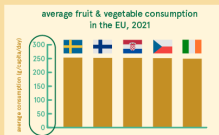
2 Incorrect scale

The vertical or horizontal scale is too big or too small, skips numbers or doesn't start at zero.

⊗ misleading graph

average fruit & vegetable consumption in the EU, 2021

average consumption (g/capita/day)
254 253 252 251 250 249 248

⊘ accurate graph

average fruit & vegetable consumption in the EU, 2021

average consumption (g/capita/day)
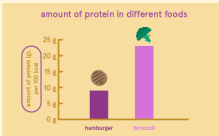300 250 200 150 100 50 0

Example: Even though it seems that Sweden is doing well on their fruit & vegetable consumption in comparison to other countries, all countries have a similar consumption and are far from reaching the recommended minimum of 400 grams per day.
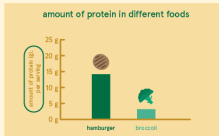
3 Misleading labels

The data is not properly labelled, or misleading labels are used.

⊗ misleading graph

amount of protein in different foods

amount of protein (g) per 100 kcal
25 g 20 g 15 g 10 g 5 g 0 g
hamburger | broccoli

⊘ accurate graph

amount of protein in different foods

amount of protein (g) per serving
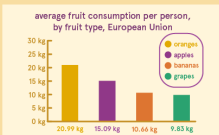25 g 20 g 15 g 10 g 5 g 0 g
hamburger | broccoli

Example: Displaying the protein content of different foods per 100 kcal isn't a useful measure since it doesn't take regular portion sizes into account. To get 14 g of protein from broccoli, we would have to eat almost a whole head of it!
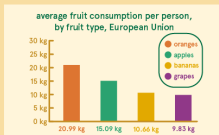
4 Unclear key or legend

Colours and symbols are not used properly.

⊗ misleading graph

average fruit consumption per person, by fruit type, European Union

30 kg 25 kg 20 kg 15 kg 10 kg 5 kg 0 kg
● oranges ● apples ● bananas ● grapes
20.99 kg | 15.09 kg | 10.66 kg | 9.83 kg

⊘ accurate graph

average fruit consumption per person, by fruit type, European Union

30 kg 25 kg 20 kg 15 kg 10 kg 5 kg 0 kg
● oranges ● apples ● bananas ● grapes
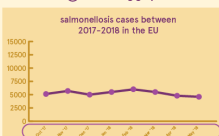20.99 kg | 15.09 kg | 10.66 kg | 9.83 kg

Example: At first, you might think bananas are the most consumed fruit because the highest bar is yellow and bananas are yellow. However, the key is misleading, and the yellow colour actually represents the oranges.
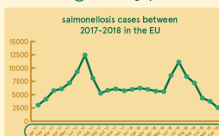
5 Data is left out

The graph doesn't show the full range of data we need to interpret it.

⊗ misleading graph

salmonellosis cases between 2017-2018 in the EU

15000 12500 10000 7500 5000 2500

⊘ accurate graph

salmonellosis cases between 2017-2018 in the EU

15000 12500 10000 7500 5000 2500 0

Example: In the left graph, it may seem Salmonellosis cases have stabilised. However, food poisoning increases in summer because bacteria spread faster in warm weather and handling food safely is harder when cooking outdoors. Showing data for the winter only gives an inaccurate picture.