Misleading graphs

Mana Maths

Te reo Māori terms

kauwhata
graph
Open in Te Aka

hē
wrong/error
Open in Te Aka

whakapohehe
mislead/deceive
Open in Te Aka

taitara
title
Open in Te Aka

Misleading graphs — Foundation

1. Which of the following is a characteristic of a good graph? (a) No title (b) Clearly labelled axes (c) Missing data points (d) Unlabelled axes

2. True or False: A graph with a y-axis that starts at 50 instead of 0 can be misleading.

3. Which graph is misleading? Graph A: y-axis starts at 0, bars proportional. Graph B: y-axis starts at 100, making small differences look large.

4. What is missing from a graph that has no title?

5. Which of these could make a graph misleading? (a) Using a 3D effect (b) Having a clear title (c) Labeling both axes (d) Using consistent scaling

6. True or False: A pie chart that uses 3D perspective can make some slices appear larger than they are.

7. Identify the misleading feature: A bar graph where the bars are drawn as cylinders, making the front cylinder appear larger.

8. Which graph correctly represents the data? Graph A: bars heights match numbers. Graph B: bars heights are doubled.

9. What should you check first when evaluating a graph? (a) Colors used (b) Whether axes are labelled (c) The font size (d) The paper size

10. True or False: A graph with no axis labels is still acceptable if the title explains everything.

11. Which of these is a good practice for graphs? (a) Start the y-axis at a high number to emphasize differences (b) Use a clear, descriptive title (c) Use as many colors as possible (d) Omit data points that don't fit

12. What is wrong with a graph that uses pictures instead of bars?

13. True or False: A line graph that omits zero on the y-axis is always misleading.

14. Which graph is more likely to be misleading? Graph A: y-axis has a break (zigzag) near zero. Graph B: y-axis is continuous from 0 to 100.

Misleading graphs — Proficient

1. A bar graph shows sales for five products. The y-axis starts at 200 instead of 0. Why might this be misleading?

2. Describe two ways a pie chart can be misleading.

3. A line graph shows temperature over a week. The y-axis is truncated (starts at 15°C). How could this affect interpretatio

4. Which of the following graphs uses a misleading scale? Graph A: y-axis goes 0, 10, 20, 30. Graph B: y-axis goes 100, 110, 120, 130.

5. A company uses a pictogram where each icon represents 100 units, but the icons are drawn larger for higher numbers. Why is this misleading?

6. True or False: Using a 3D effect in a bar graph can make the bars appear larger than they are.

7. A graph has no title, but the axes are labelled "Time (months)" and "Profit (dollars)". What additional information should be included?

8. Which of these is a sign of a misleading graph? (a) Consistent spacing on axes (b) Clear labels (c) Missing zero on y-axis (d) Descriptive title

9. A graph shows two sets of data with different y-axis scales on the same plot. Why is this problematic?

10. A histogram uses unequal bin widths. Why might this be misleading?

11. What is the effect of using a logarithmic scale without indicating it?

12. A scatter plot uses different symbol sizes to represent a third variable. Is this misleading? Explain.

Misleading graphs — Excellence

1. Critique the following graph description: A bar graph shows company profits over five years. The y-axis starts at 1 million dollars, and the bars are drawn as 3D cylinders. Identify at least three misleading aspects.

2. A pie chart shows market share of four companies. The slices are not labeled with percentages, and a 3D effect makes the front slice appear larger. How would you improve this chart?

3. A line graph shows population growth from 1950 to 2020. The y-axis uses a logarithmic scale but is not indicated. Explain why this is misleading.

4. Design a non-misleading bar graph for the following data: Product A: 150 units, Product B: 200 units, Product C: 180 units. Describe your choices of scale, labels, and title.

5. A graph uses a broken axis (zigzag) to omit zero. When is this acceptable? When is it misleading?

6. Compare two graphs of the same data: one with y-axis starting at 0, one with y-axis starting at the minimum data value. Discuss the visual impact.

7. A histogram has bins of unequal width. How would you adjust the presentation to avoid misinterpretation?

8. A scatter plot uses different sized circles to represent a third variable. Is this an effective or misleading technique? Justify.

9. Identify the misleading features in this description: A pictogram uses icons of different sizes to represent quantities, and the axis is not labeled.

10. A company presents a graph where the x-axis intervals are uneven (2000, 2005, 2020). Why is this misleading?

11. What are the five characteristics of a "good graph"? Explain each.

12. A graph shows a strong positive correlation, but the data points are few and the scale is exaggerated. How would you assess the validity of the conclusion?

13. You are given a misleading graph. List steps you would take to correct it.

14. True or False: A graph can be misleading even if all data is accurately plotted. Explain with an example.

15. A graph uses a secondary y-axis for a different unit. Discuss the potential for misinterpret

16. A bar graph uses horizontal bars with gradient shading that makes some bars appear darker and more prominent. Is this misleading? Why?