

Guidelines for scientific data visualization

ENS-215
(Winter 2025)

Considerations when preparing a graphic

- What point/argument does it support?
- What is the goal/purpose of the graphic?
- Who is the audience?
 - Experts in your field
 - General scientific audience (range of disciplines)
 - General public, policy makers,...

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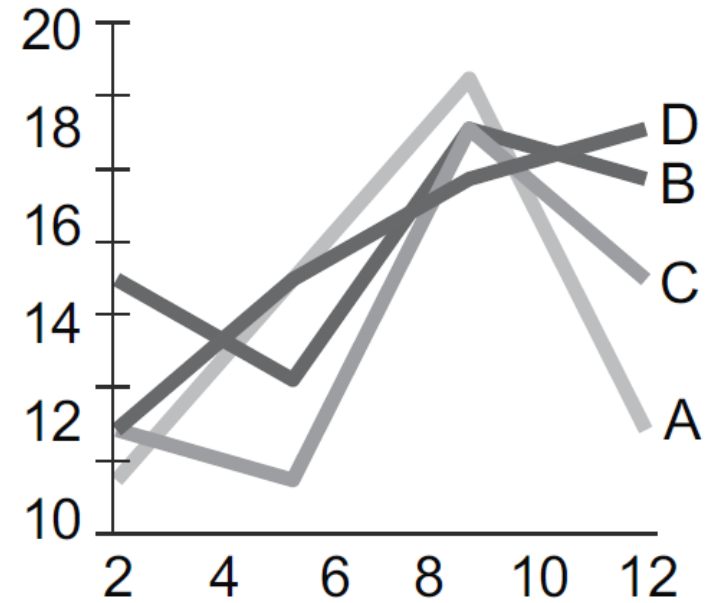
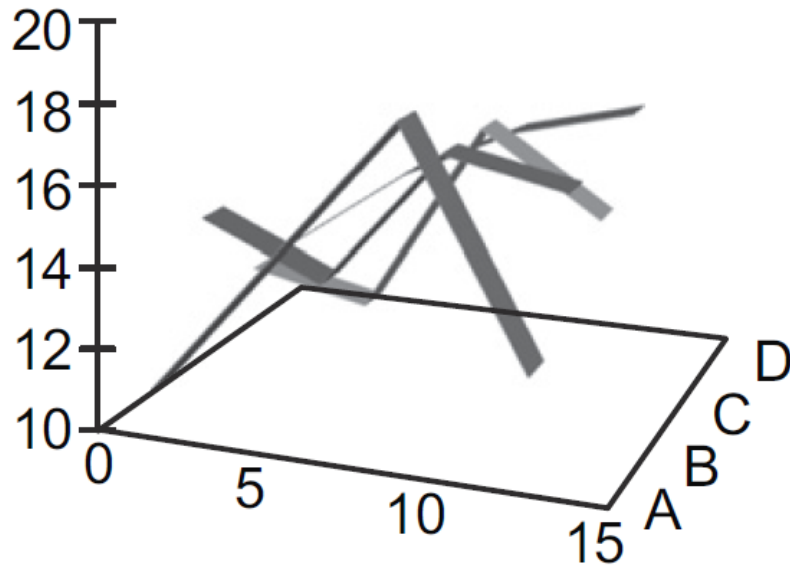
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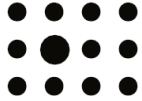
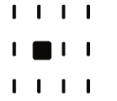




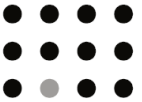






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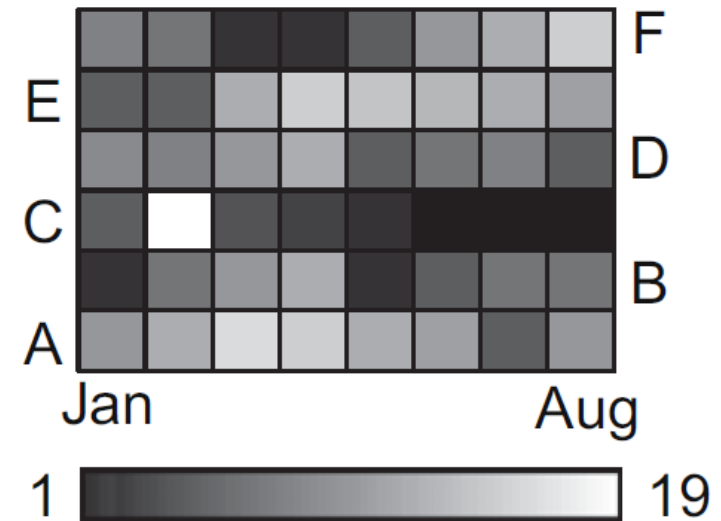
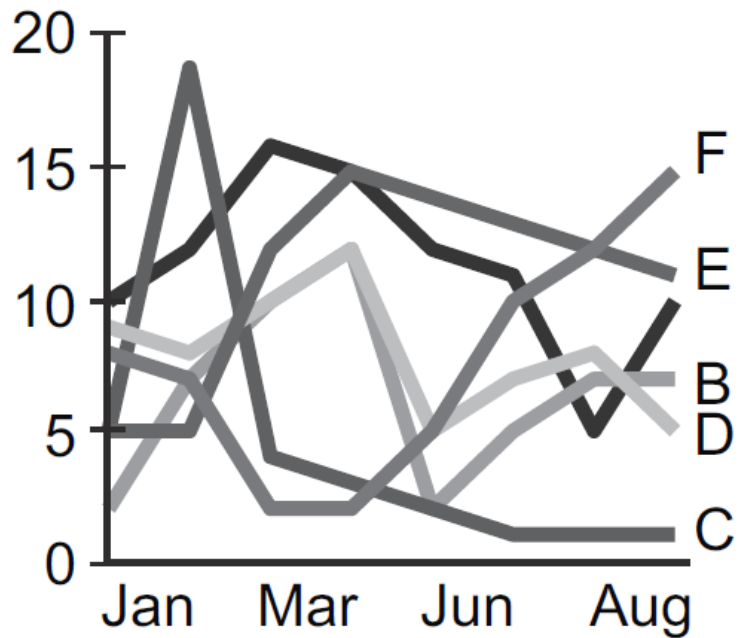
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- Does it achieve the overall goals/purposes you intended it to?
- **Is it accessible/does it reach the intended audience?**



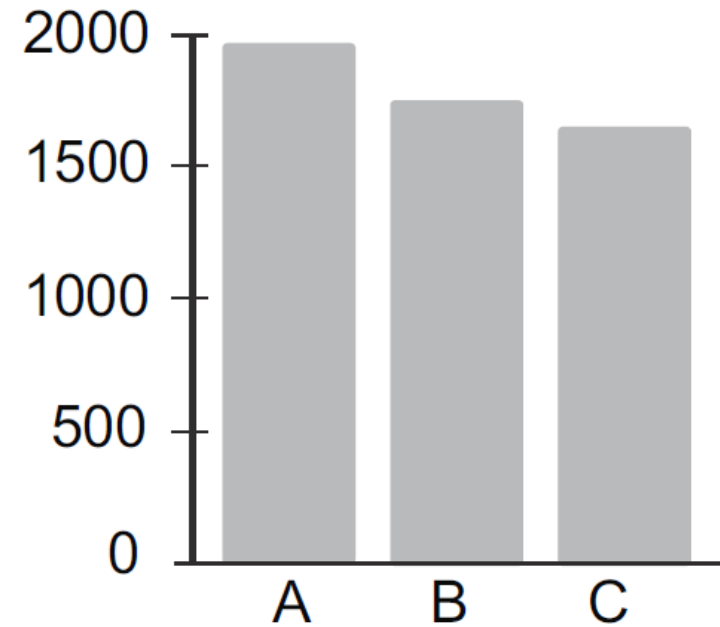
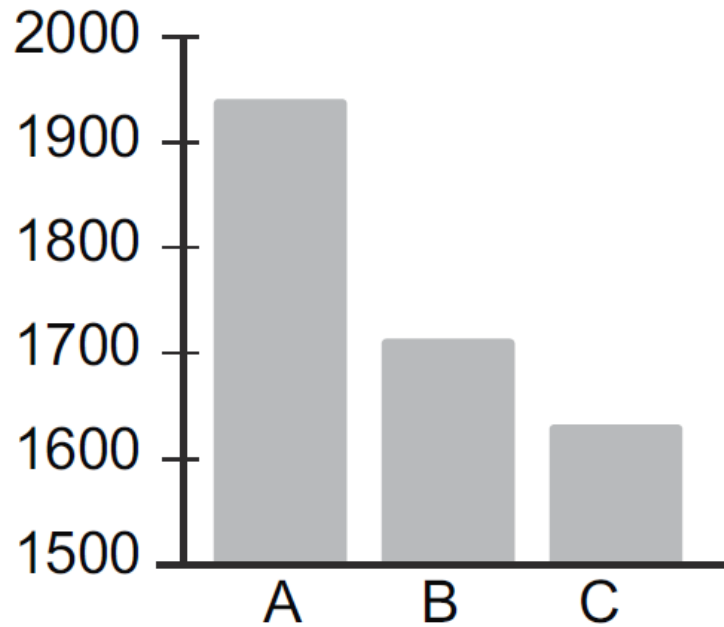
Guideline: Create the simplest graph that conveys the information you want to convey

Value encoding attribute			
	Length	Width	Orientation
Form			
	Size 	Shape 	Curvature 
	Enclosure 	Blur 	
Color	Hue 	Intensity 	Transparency 
Spatial Position	2-D Position 	Spatial Grouping 	Density 
Motion	Direction 	Pathway 	

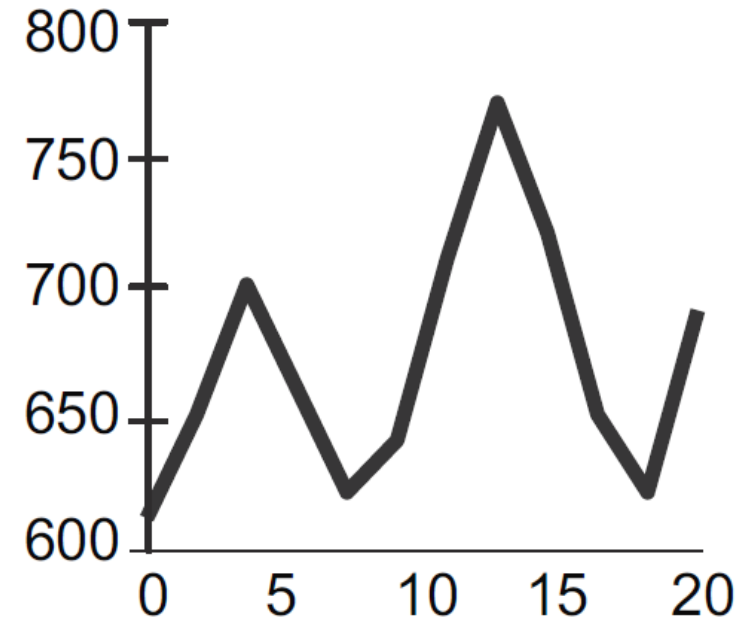
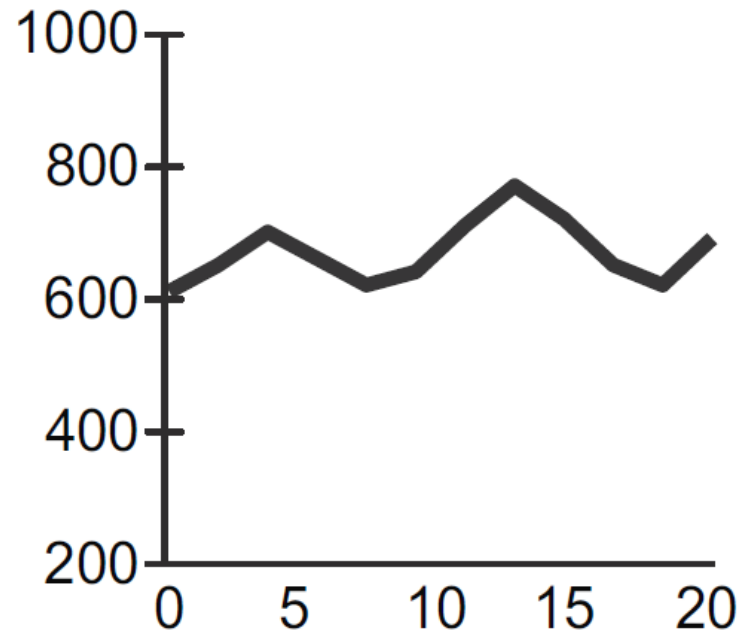
Guideline: consider the type of encoding object and attribute used to create a plot



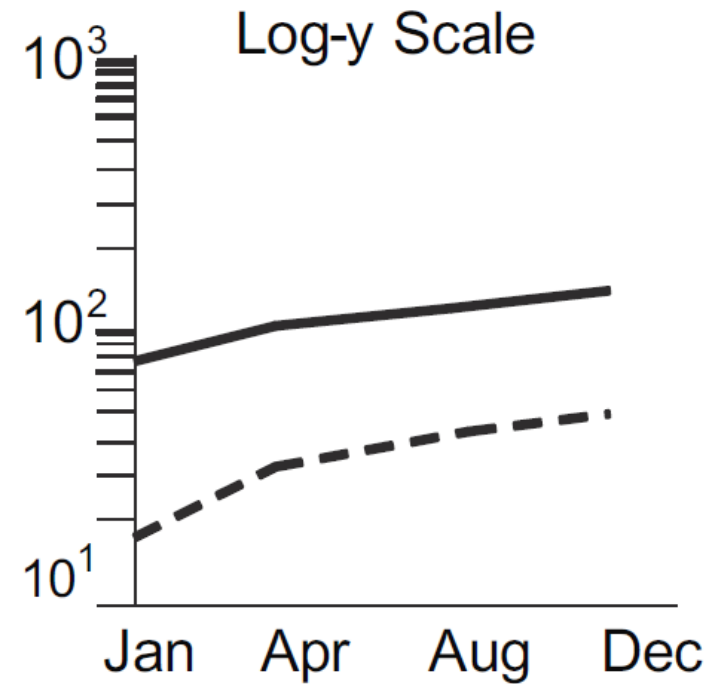
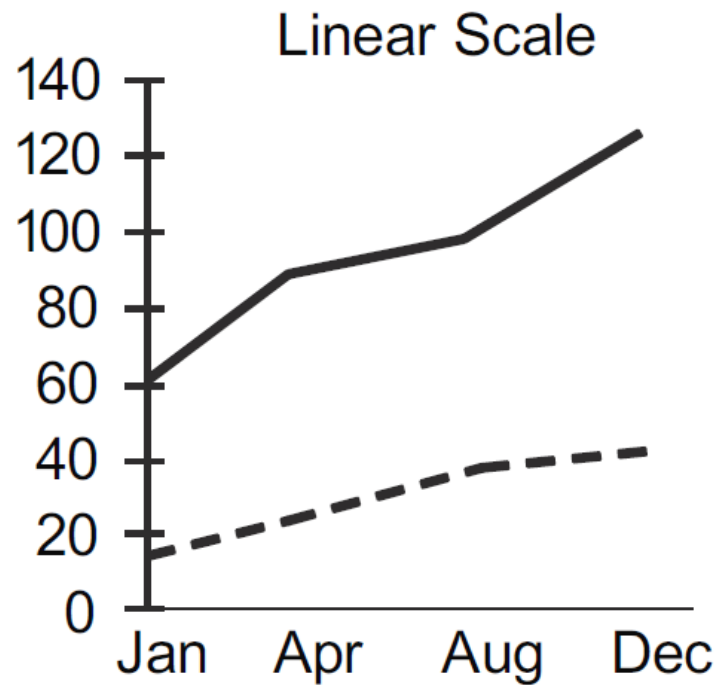
Guideline: focus on visualizing patterns or on visualizing details, depending on the purpose of the plot



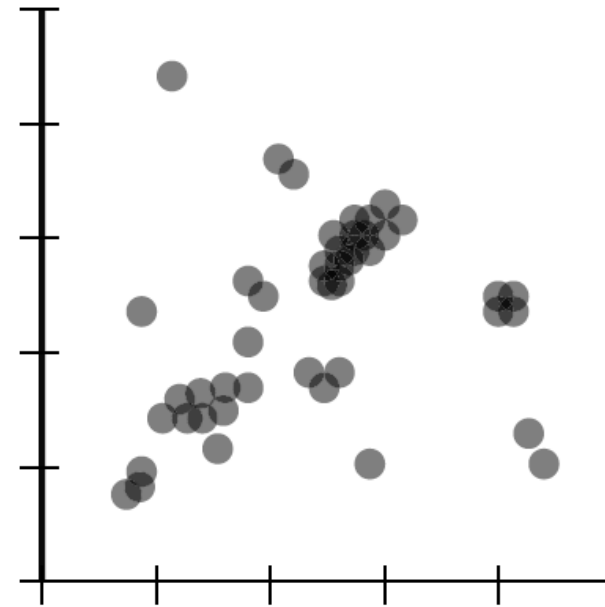
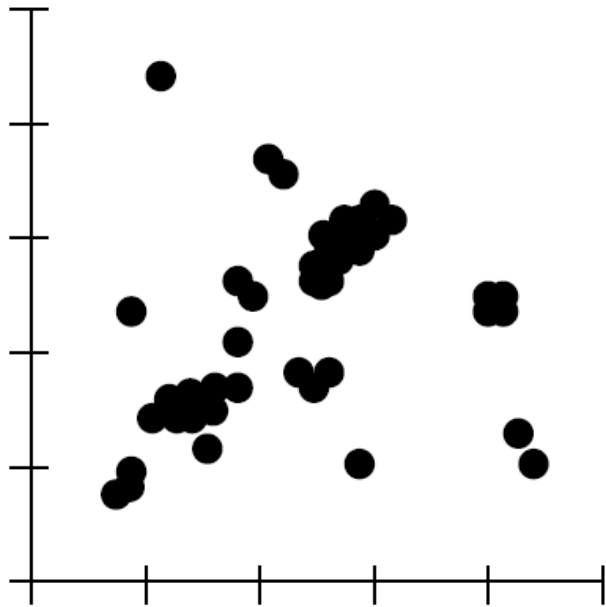
Guideline: select meaningful axis ranges



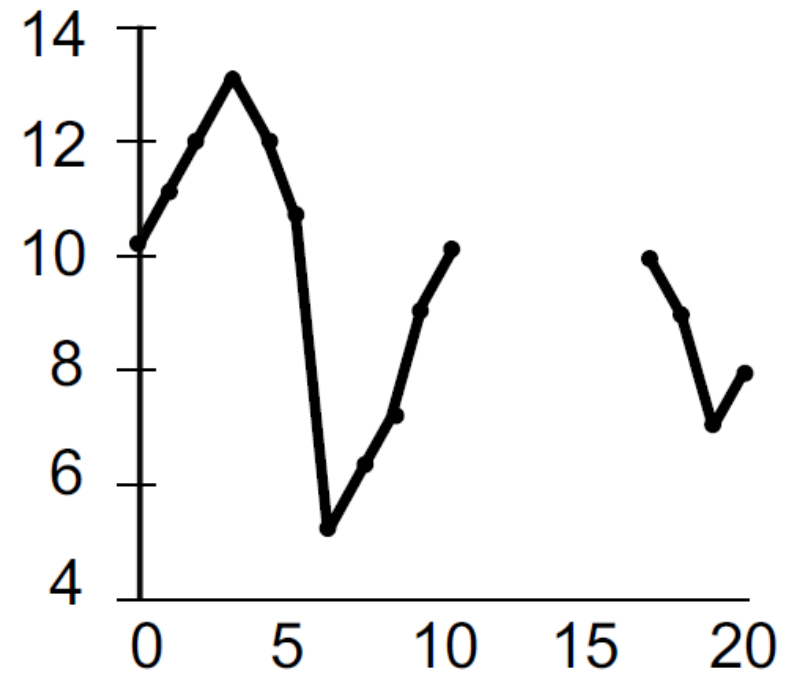
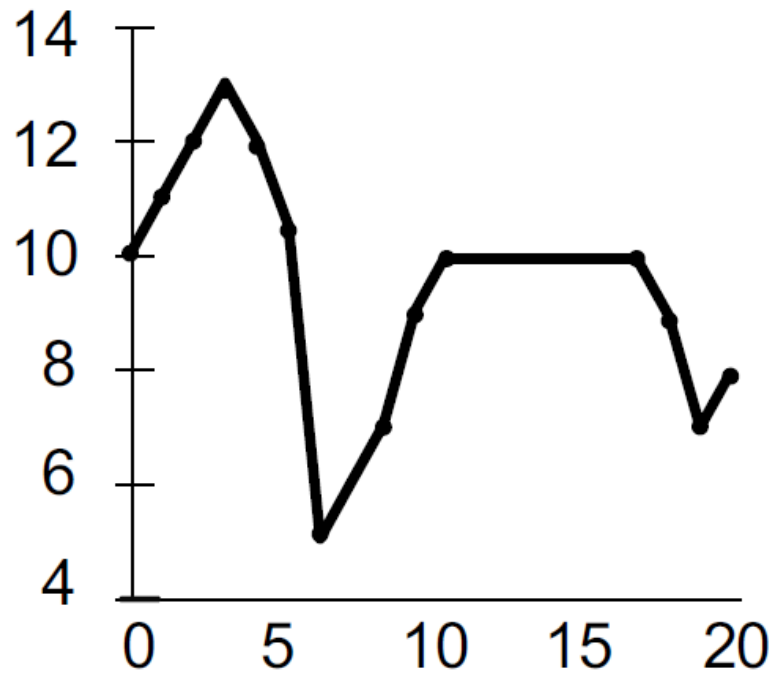
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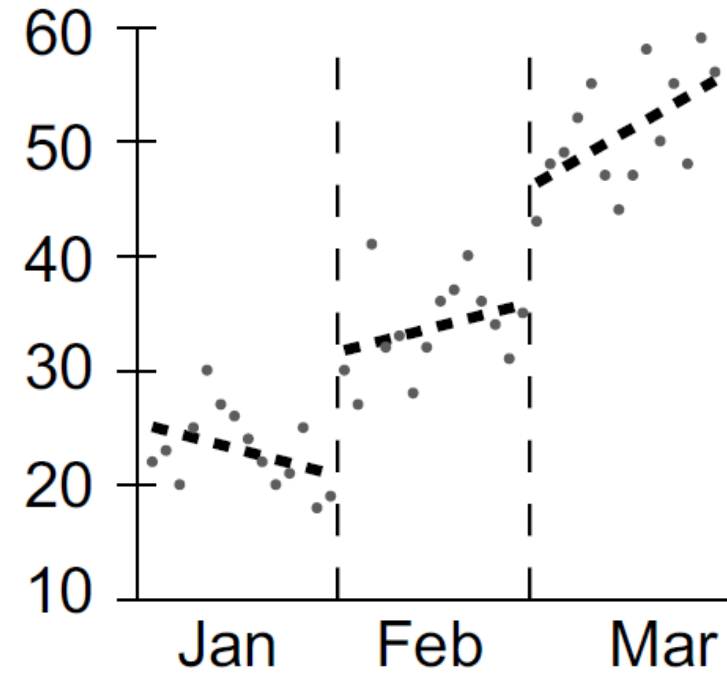
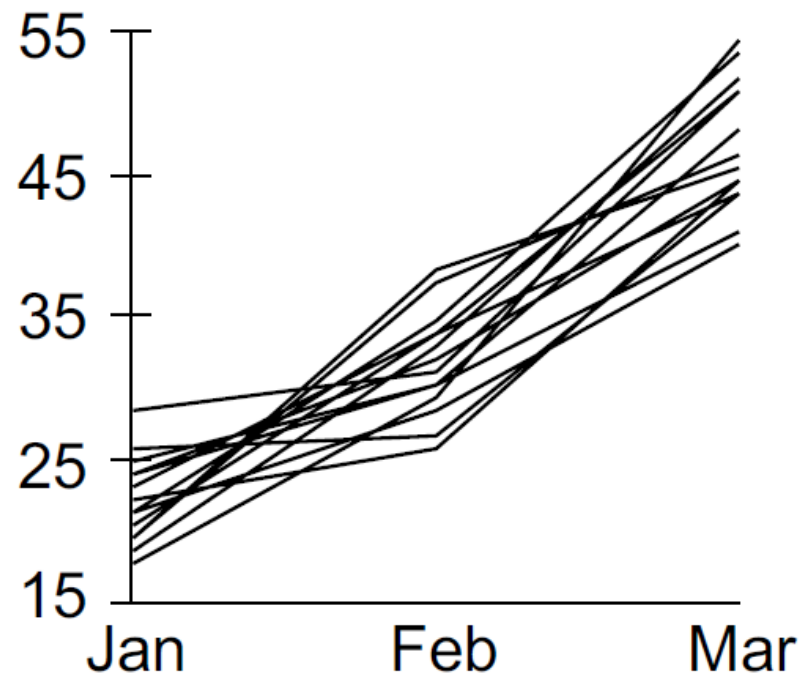
Guideline: data transformations and carefully chosen graph aspect ratios can be used to emphasize rates of change for time-series data



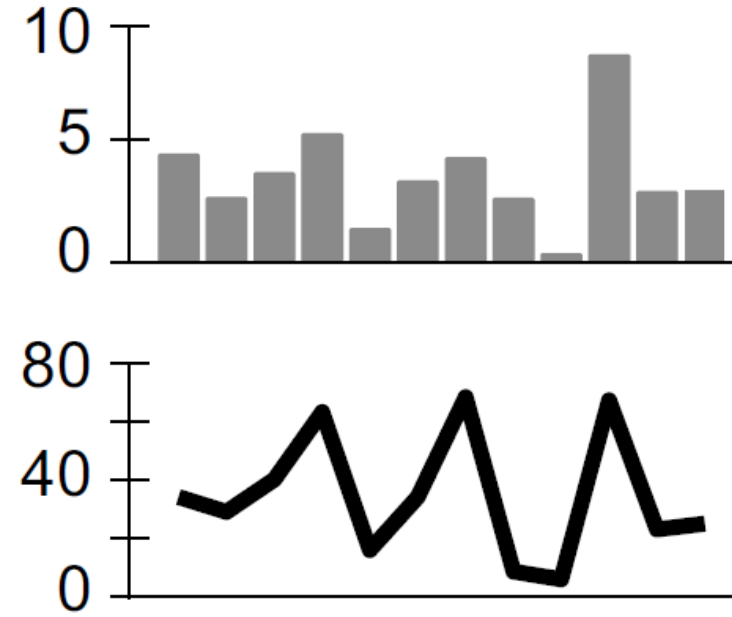
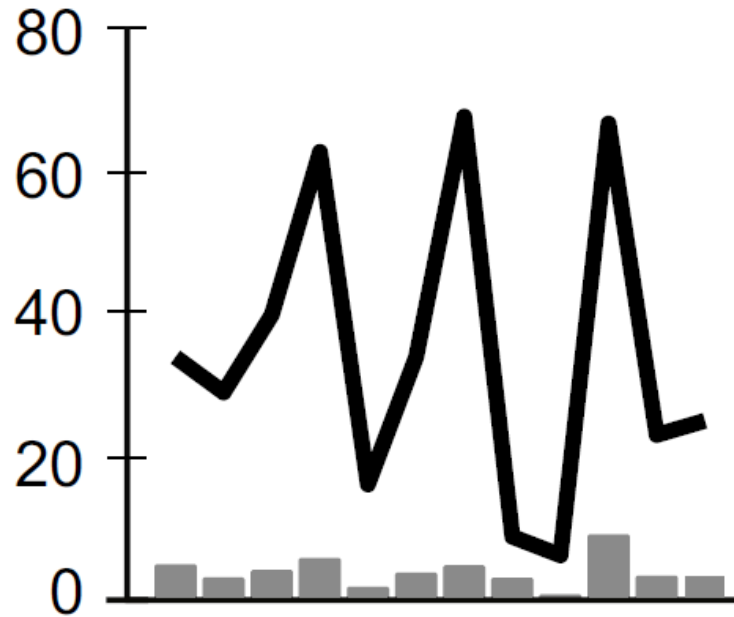
Guideline: plot overlapping points in a way that density differences become apparent in scatter plots



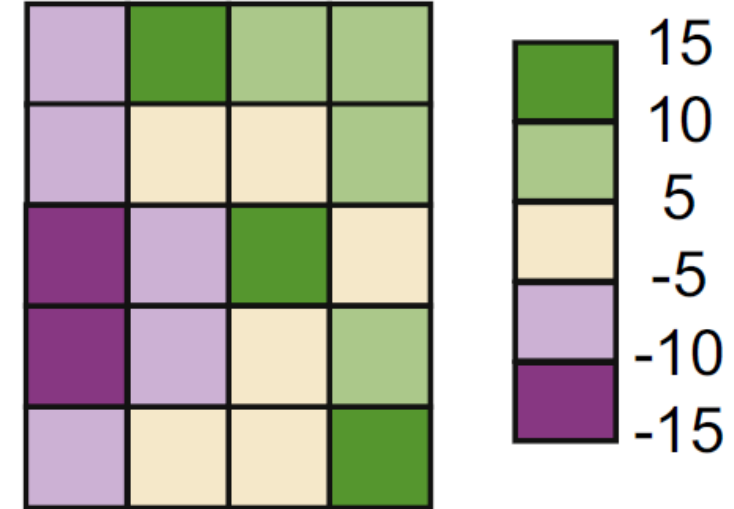
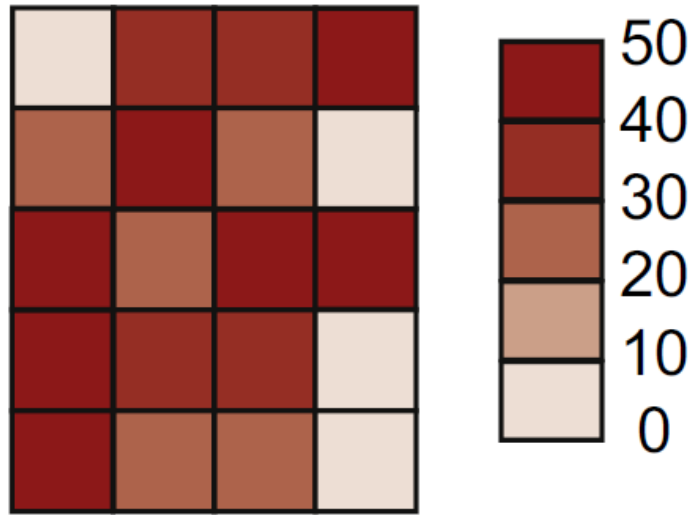
Guideline: use lines when connecting sequential data in time-series plots



Guideline: aggregate larger datasets in meaningful ways



Guideline: Keep axis ranges as similar as possible to compare variables



Guideline: select an appropriate color scheme based on the type of data