Plot: Marks

Plots are composed of visual marks representing your data

Observable

version 0.4.0

Creating marks

Select the type of mark to draw, then pass in your data and set the visual channels:

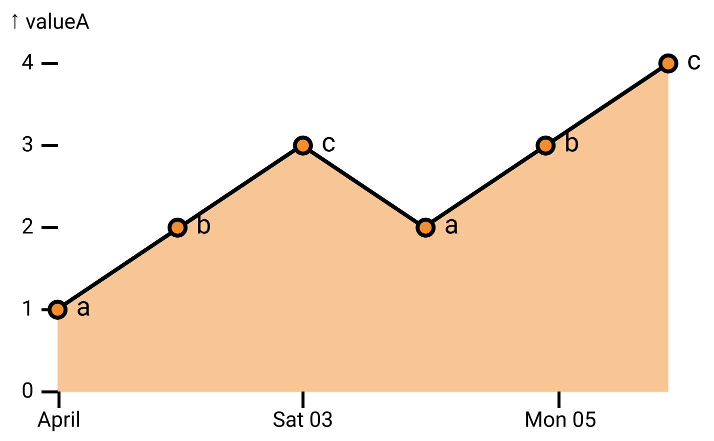
Data:

name	date	valueA	valueB	src
a	2021-04-01	1	4	a.png
b	2021-04-02	2	1	b.png
c	2021-04-03	3	3	c.png
a	2021-04-04	2	0	a.png
c	2021-04-03	3	3	c.png
a	2021-04-04	2	0	a.png

Code:

```
Plot.plot({
  marks: [
    Plot.areaY(data, { x: "date", y: "valueA" }),
    Plot.line(data, { x: "date", y: "valueA" }),
    Plot.dot(data, { x: "date", y: "valueA" }),
    Plot.text(data, { x: "date", y: "valueA",
      text: "name", dx: 10 })
  ]
})
```

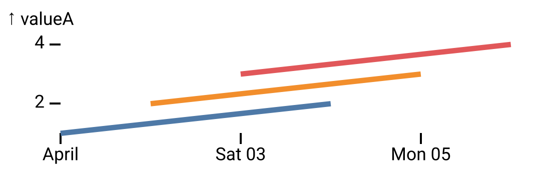
Output:



Types of marks

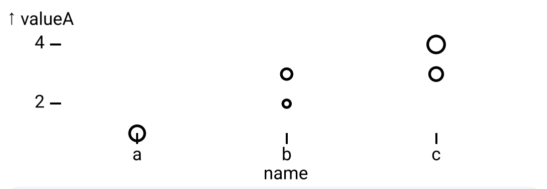
Represent your data using different geometric symbols:

line



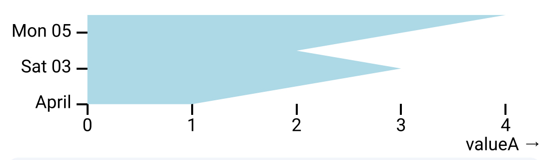
```
Plot.line(data, { x: "date",
y: "valueA", stroke: "name" })
```

dot



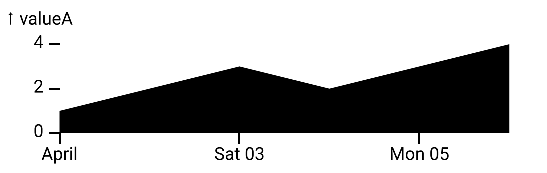
```
Plot.dot(data, { x: "name",
y: "valueA", r: "valueB" })
```

areaX



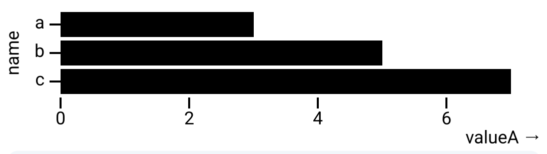
```
Plot.areaX(data, { x: "valueA",
y: "date", fill: "lightblue" })
```

areaY



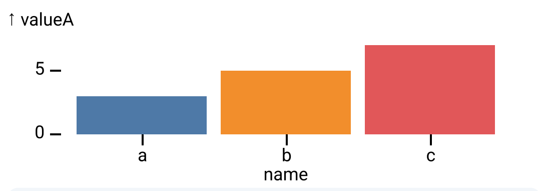
```
Plot.areaY(data, { x: "date",
y: "valueA" })
```

barX



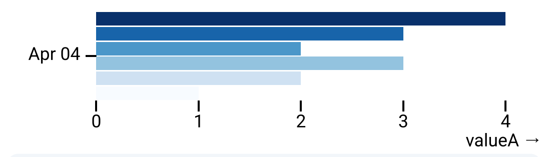
```
Plot.barX(data, { x: "valueA",
y: "name" })
```

barY



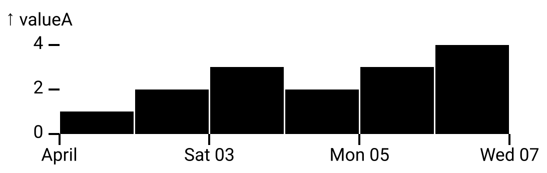
```
Plot.barY(data, { x: "valueA",
y: "name" })
```

rectX



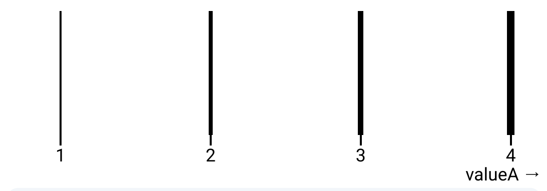
```
Plot.rectX(data, { x: "valueA",
y: "date", fill: "date" })
```

rectY



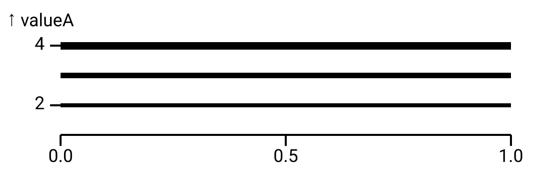
```
Plot.rectY(data, { x: "date",
y: "valueA" })
```

ruleX



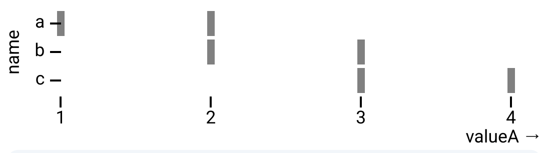
```
Plot.ruleX(data, { x: "valueA",
strokeWidth: "valueA" })
```

ruleY



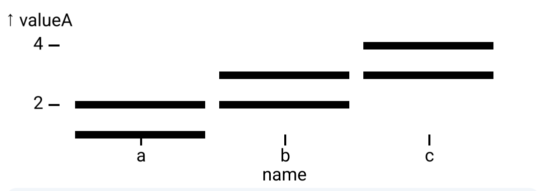
```
Plot.ruleY(data, { y: "valueA",
strokeWidth: "valueA" })
```

tickX



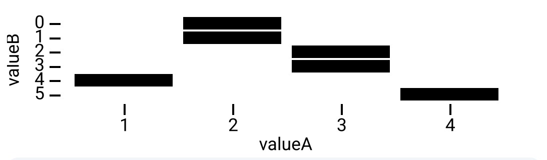
```
Plot.tickX(data, { x: "valueA",
y: "name" })
```

tickY



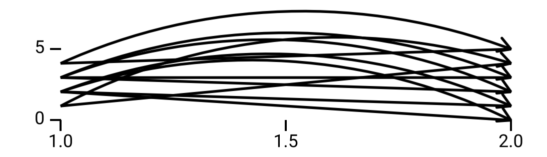
```
Plot.tickY(data, { y: "valueA",
x: "name" })
```

cell



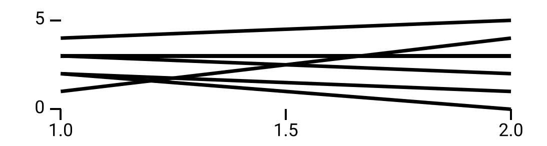
```
Plot.cell(data, { x: "valueA",
y: "valueB" })
```

arrow



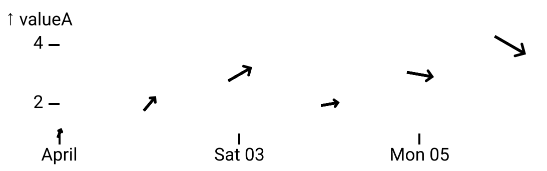
```
Plot.arrow(data, { x1: 1, x2: 2,
y1: "valueA", y2: "valueB" })
```

link



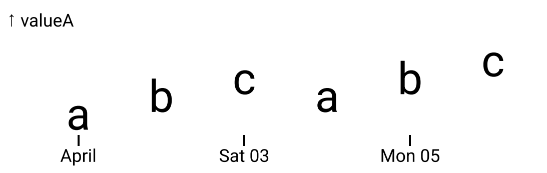
```
Plot.link(data, { x1: 1, x2: 2,
y1: "valueA", y2: "valueB" })
```

vector



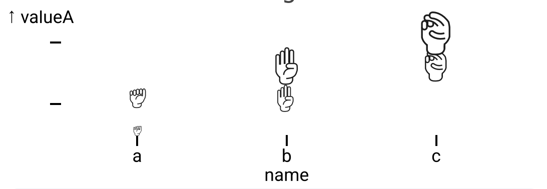
```
Plot.vector(data, { x: "date",
y: "valueA", rotate: "date",
length: "valueA" })
```

text



```
Plot.text(data, { x: "date",
y: "valueA", text: "name",
fontSize: 25 })
```

image



```
Plot.image(data, { x: "name",
y: "valueA", src: "src" })
```

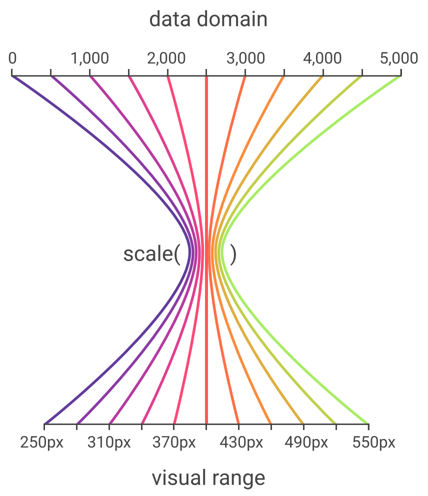
Plot: Scales

Scales project your data from an abstract data domain to a visual range

Observable PLOT
version 0.4.0

Working with scales

How scales map values:

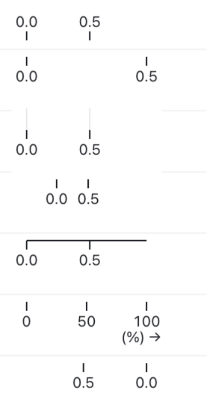


Configure the scale for each channel:

```
Plot.plot({
  // Configure the scale for the x channel
  x: {
    type: "log",        // scale type
    ticks: 5,           // # of ticks
    tickFormat: ".2s",  // tick format
    grid: true,      // show grid lines
    axis: "top"      // show above chart
  }
})
```

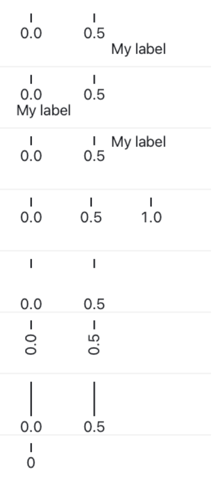
Scale options:

```
axis: "top"
domain: [0, .5]
grid: true
inset: 20
line: true
percent: true
reverse: true
```



Label and tick options:

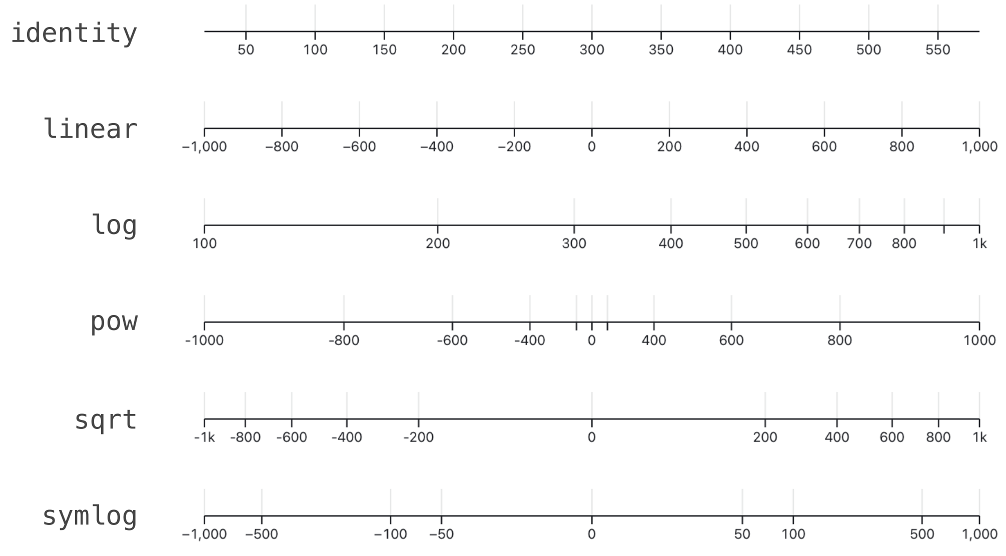
```
label: "My label"
labelAnchor: "left"
labelOffset: 10
nice: true
tickPadding: 20
tickRotate: -90
tickSize: 23
ticks: 1
```



Quantitative

Display continuous data by setting one of these types:

```
Plot.plot({ x: { type: "identity" } })
```



Specify a `tickFormat`: "`[symbol][comma][precision][type]`"

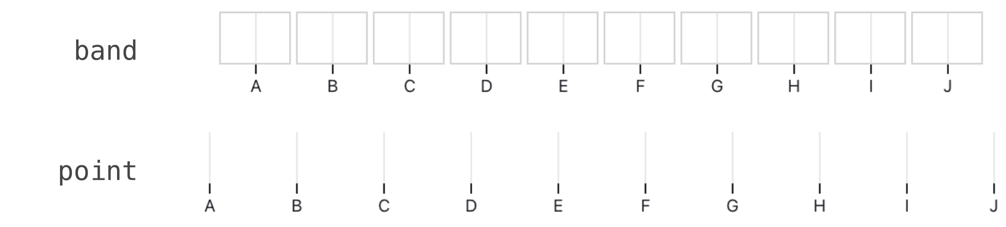
```
Plot.plot({ x: { tickFormat: ".2s" } })
```

Syntax	Description	`format(0.00013)`	`format(543005)`
$	Currency symbol	$0.00013	$543005
,	Comma separated	0.00013	543,005
.2	Precision of 2 digits	0.00013	5.4e+5
.5	Precision of 5 digits	0.00013	5.4301e+5
s	International System of Units (SI).	130.000µ	543.005k
e	Exponent notation	1.300000e-4	5.430050e+5
f	Fixed point notation	0.000130	543005.000000
p	Percentage notation	0.0130000%	54300500%
.2s	Two significant digits, shown in SI.	130µ	540k
,.1f	Comma separated, one fixed value after the decimal place	0.0	543,005.0
,.1p	Comma separated, one digit, percentage type	0.01%	50,000,000%
$,.1	Currency syntax, Comma separated, one digit, percentage type	$0.0001	$5e+5

Categorical

Display categorical data by setting one of these types:

```
Plot.plot({ x: { type: "band" } })
```



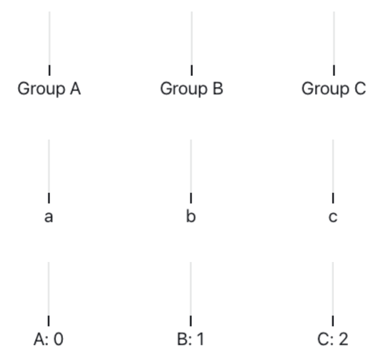
Customize your ticks using a function:

```
Plot.plot({ x: { tickFormat: (d) => `Group ${d}` } })
```

```
tickFormat: d => `Group ${d}`
```

```
tickFormat: d => d.toLowerCase()
```

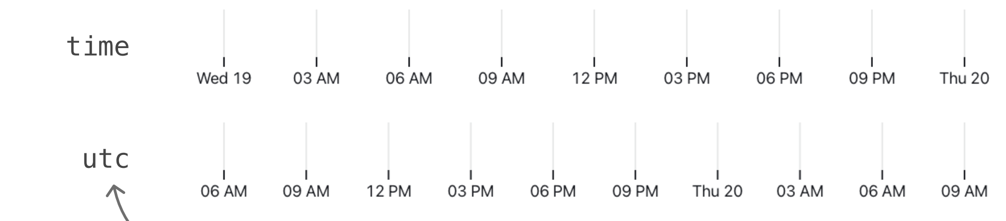
```
tickFormat: (d, i) => `${d}: ${i}`
```



Date

Display temporal data by setting one of these types:

```
Plot.plot({ x: { type: "utc" } })
```



Use Universal Coordinated Time to ensure consistent values across timezones

Compose a time formatter using this syntax:

e.g. Saturday January 01, 2022

```
Plot.plot({ x: { tickFormat: d3.utcFormat("%A %B %d, %Y") } })
```

Year	Month	Day	Hour	Minute	Second	Misc
%Y 2022	%B January	%A Saturday	%I 04	%M 00	%S 00	%p AM
%y 22	%b Jan	%a Sat	%H 16			
	%m 01	%d 01				
		%e 1				

Plot: Layouts

Adjust the sizing and spacing of your plot

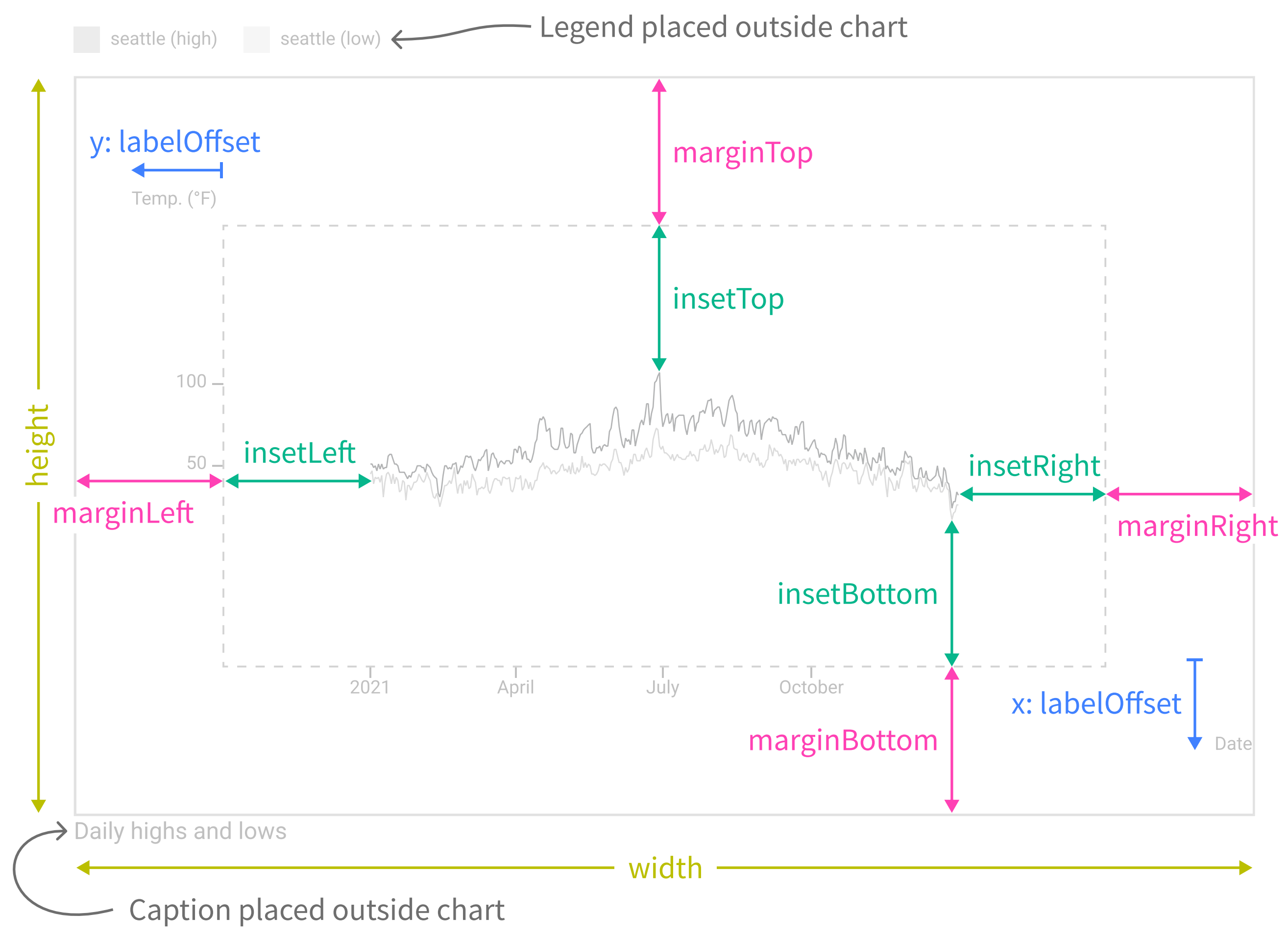
Observable PLOT

version 0.4.0

Sizing and spacing

Adjust plot layout:

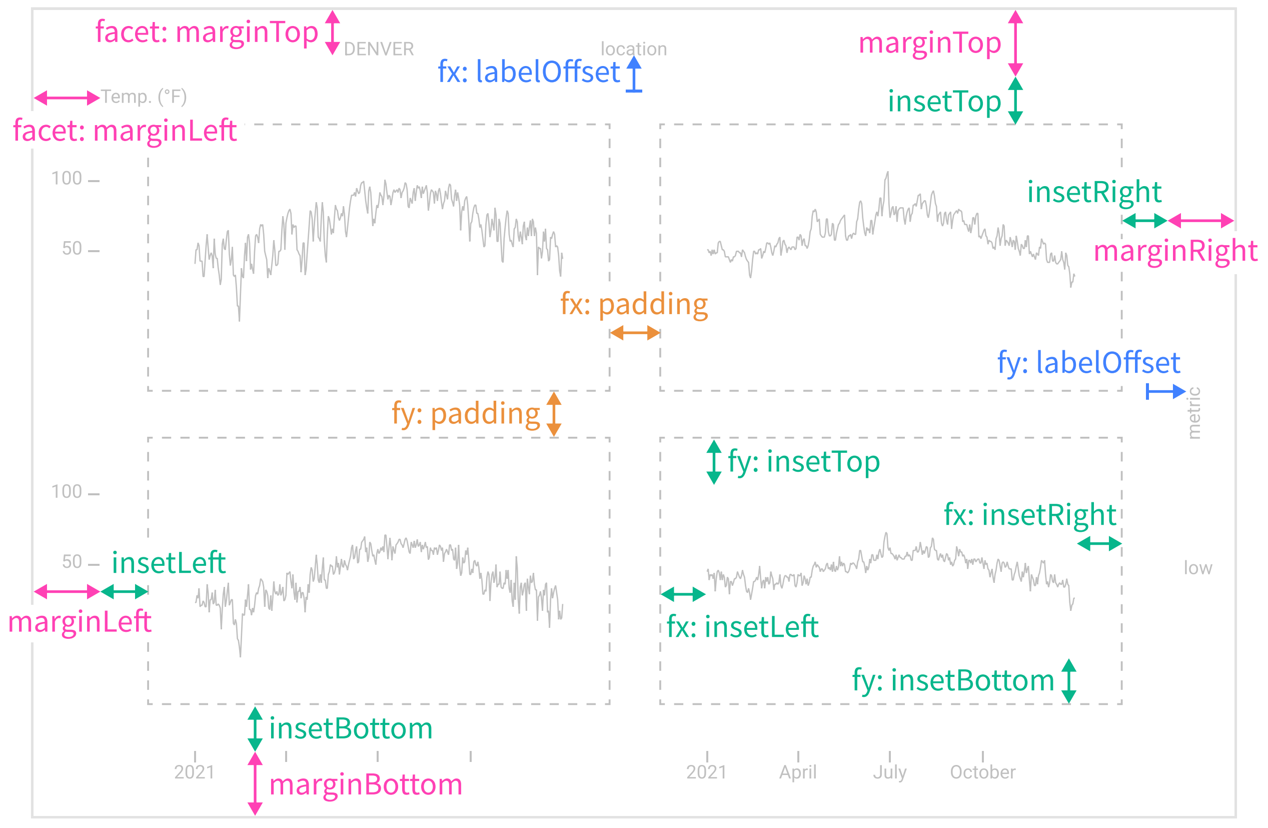
```
Plot.plot({
  margin: 80,     // space around (all sides)
  inset: 80,      // space within (all sides)
  width: 640,     // width of plot
  height: 400,    // height of plot
  x: {
    label: "Date",
    labelOffset: 50
  },
  y: {
    label: "Temp. (°F)",
    labelOffset: 50
  },
  caption: "Daily highs and lows",
  color: {
    legend: true  // include a legend
  }
})
```



Faceting

Break a plot into small multiples:

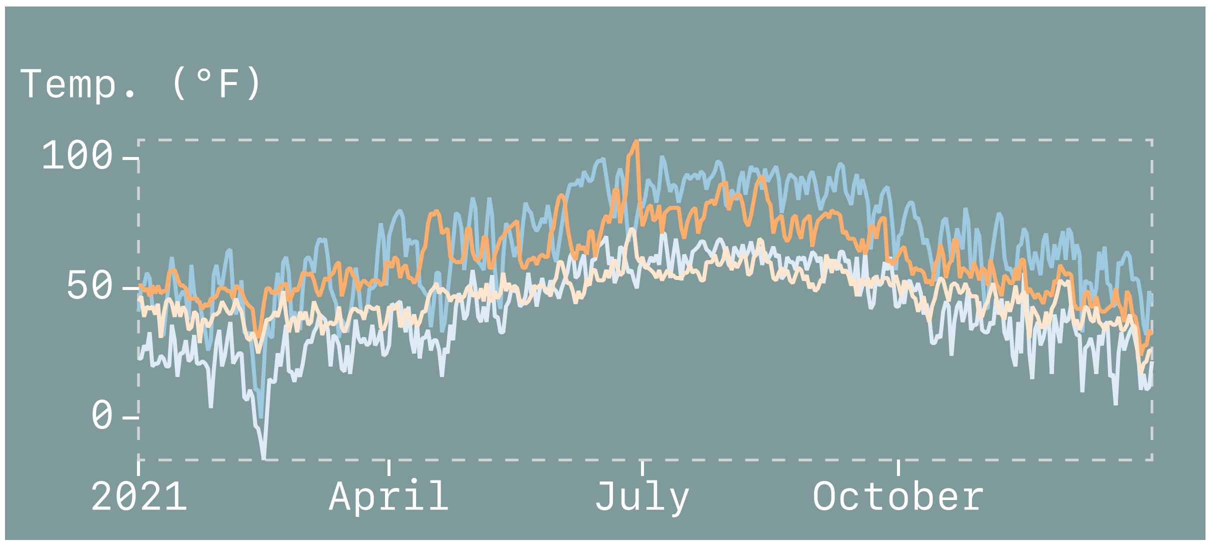
```
Plot.plot({
  facet: {
    data: data,     // pass data for faceting
    x: "location", // by `location` in the x direction
    y: "metric",    // by `metric` in the y direction
    margin: 35
  },
  // Customize the x facet layout and scale
  fx: {
    inset: 25,
    labelOffset: 20,
    padding: .1     // [0–1] 10% of facet width
  },
  // Customize the y facet layout and scale
  fy: {
    inset: 25,
    labelOffset: 20,
    padding: .15    // [0–1] 15% of facet height
  },
  inset: 25,
  margin: 35
})
```



Styles

Customize plot styles with CSS:

```
Plot.plot({
  style: {
    background: "#7e9a9a",
    fontSize: 25,
    fontFamily: "monospace",
    color: "white",
    padding: "5px"
  }
})
```



Plot: Transforms

Augment your data for plotting

Observable PLOT
version 0.4.0

Group to categorize data

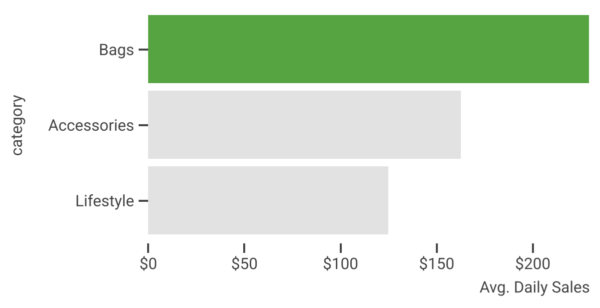
`Plot.group`, `Plot.groupX`, `Plot.groupY`, `Plot.groupZ`

Compute the mean sales for each category:

```
Plot.groupY({ x: "mean" }, { x: "sales", y: "category" })
```

date	category	sales
Nov 20	Accessories	$334
Nov 20	Bags	$90
Nov 20	Lifestyle	$138
Nov 21	Accessories	$250
Nov 21	Bags	$276
Nov 21	Lifestyle	$64
Nov 22	Accessories	$72
Nov 22	Bags	$80
Nov 22	Lifestyle	$162

category	sales
Bags	$229
Accessories	$163
Lifestyle	$125



Bin to count data

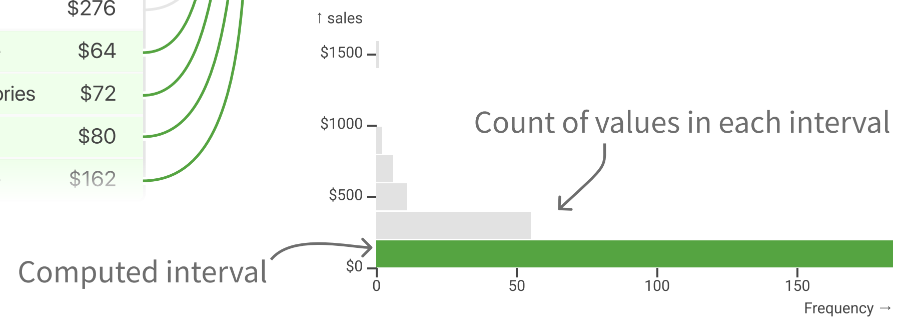
`Plot.bin`, `Plot.binX`, `Plot.binY`

Count observations in each interval, created based on sales:

```
Plot.binY({ x: "count" }, { y: "sales" })
```

date	category	sales
Nov 20	Accessories	$334
Nov 20	Bags	$90
Nov 20	Lifestyle	$138
Nov 21	Accessories	$250
Nov 21	Bags	$276
Nov 21	Lifestyle	$64
Nov 22	Accessories	$72
Nov 22	Bags	$80
Nov 22	Lifestyle	$162

y1	y2	count
$0	$200	184
$200	$400	55
$400	$600	11



Window to smooth values

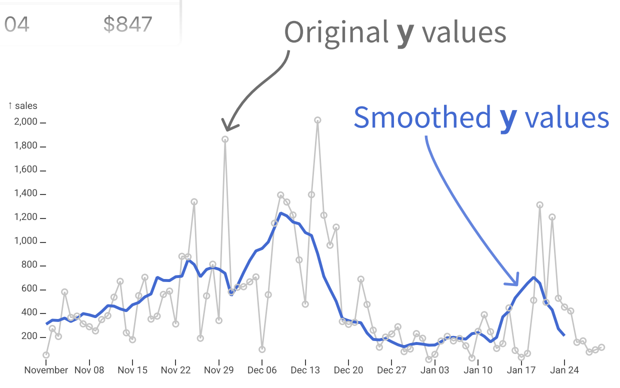
`Plot.window`, `Plot.windowX`, `Plot.windowY`

Compute the 7-day moving average of sales:

```
Plot.windowY({ reduce: "mean", k: 7 }, { x: "date", y: "sales" })
```

date	sales
Dec 01	$584
Dec 02	$622
Dec 03	$627
Dec 04	$668
Dec 05	$709
Dec 06	$100
Dec 07	$560
Dec 08	$1160
Dec 09	$1397
Dec 10	$1338

date	7-day avg
Dec 01	$553
Dec 02	$636
Dec 03	$746
Dec 04	$847



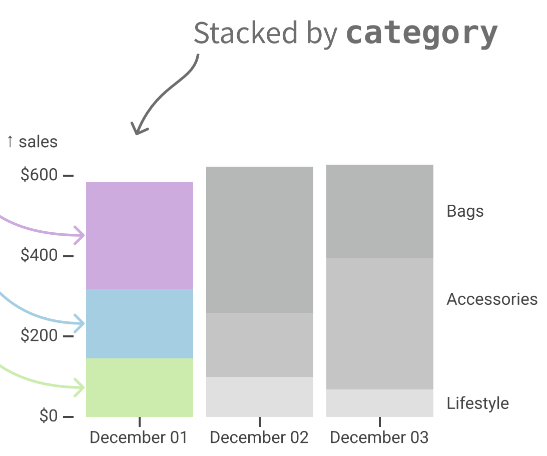
Stack to layer values

`Plot.stackX`, `Plot.stackX1`, `Plot.stackX2`, `Plot.stackY`, `Plot.stackY1`, `Plot.stackY2`, `Plot.barX`, `Plot.barY`, `Plot.areaX`, `Plot.areaY`

Stack a bar chart of sales by category:

```
Plot.barY(data, { x: "date", y: "sales", fill: "category" })
```

date	category	sales
Dec 01	Lifestyle	$146
Dec 01	Accessories	$173
Dec 01	Bags	$265
Dec 02	Lifestyle	$100
Dec 02	Accessories	$159
Dec 02	Bags	$363
Dec 03	Lifestyle	$68
Dec 03	Accessories	$326
Dec 03	Bags	$233



Normalize to see deviations

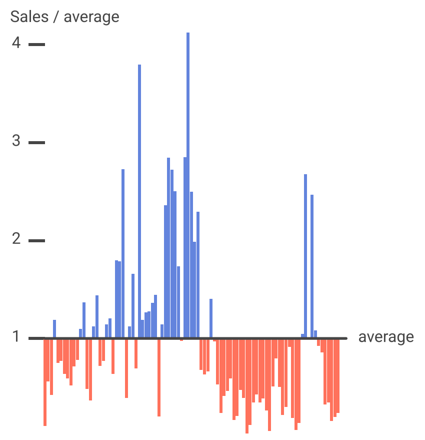
`Plot.normalize`, `Plot.normalizeX`, `Plot.normalizeY`

Divide each sale by the mean of all sales:

```
Plot.normalizeY({ basis: "mean", x: "date", y: "sales" })
```

date	sales
Dec 01	$584
Dec 02	$622
Dec 03	$627
Dec 04	$668
Dec 05	$709
Dec 06	$100
Dec 07	$560
Dec 08	$1160
Dec 09	$1397
Dec 10	$1338

date	sales/avg
Dec 01	1.2x
Dec 02	1.3x
Dec 03	1.3x
Dec 04	1.4x
Dec 05	1.4x
Dec 06	0.2x
Dec 07	1.1x
Dec 08	2.4x
Dec 09	2.8x
Dec 10	2.7x



Select to pick specific values

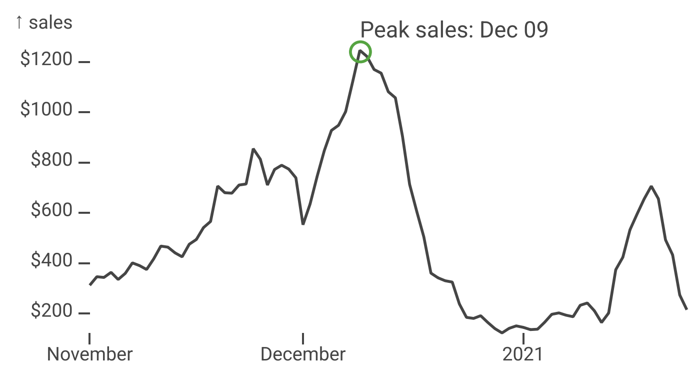
`Plot.selectFirst`, `Plot.selectLast`, `Plot.selectMaxX`, `Plot.selectMaxY`, `Plot.selectMinX`, `Plot.selectMinY`

Select the observation with the highest sales:

```
Plot.selectMaxY({ x: "date", y: "sales" })
```

date	sales
Dec 01	$584
Dec 02	$622
Dec 03	$627
Dec 04	$668
Dec 05	$709
Dec 06	$100
Dec 07	$560
Dec 08	$1160
Dec 09	$1397
Dec 10	$1338

date	sales
Dec 09	$1397



Plot: Colors

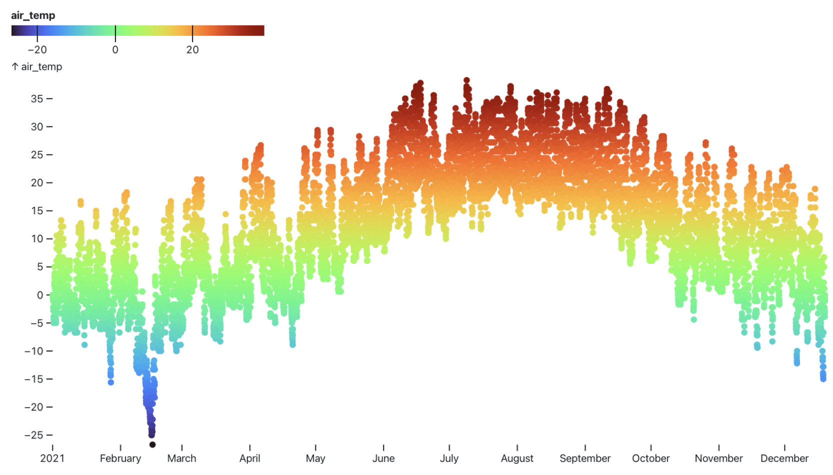
Color scales map from data values to an output range of colors

Observable PLOT
version 0.4.0

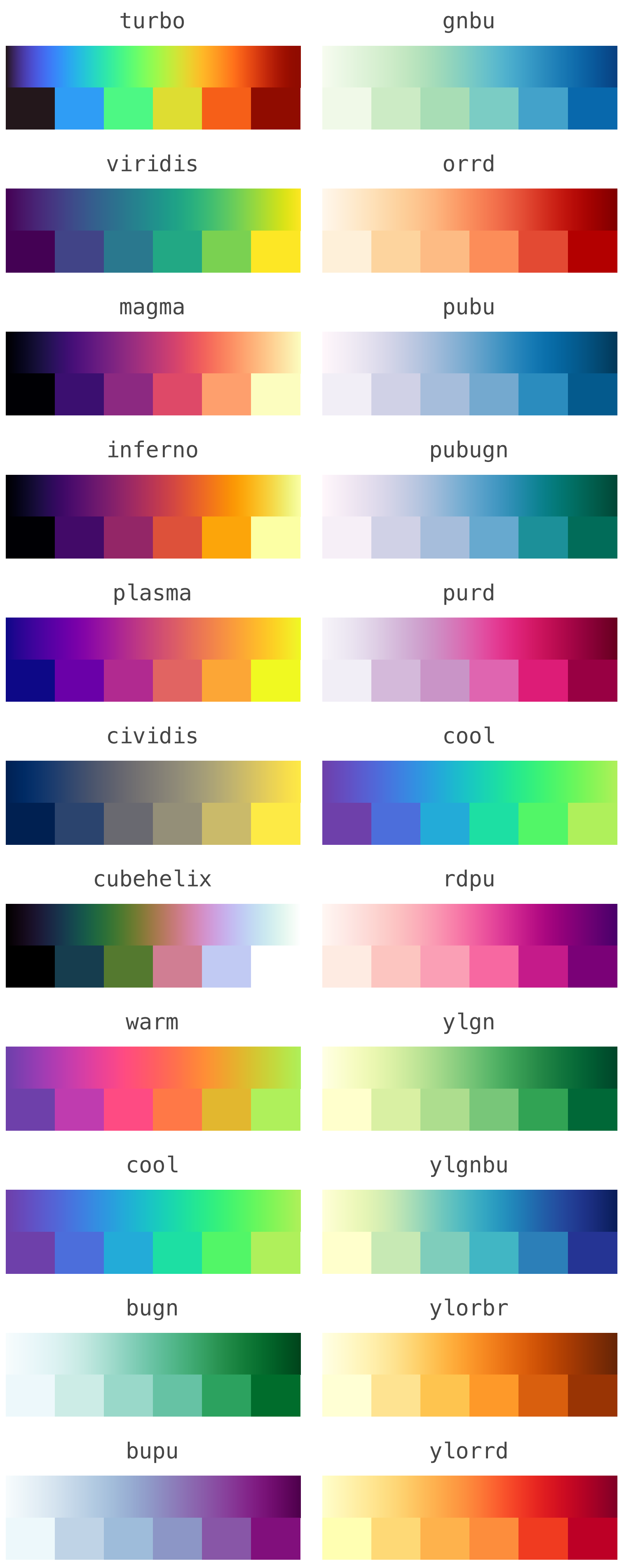
Setting colors

Set colors by choosing from one of the many schemes (see below) or by manually declaring a range of colors.

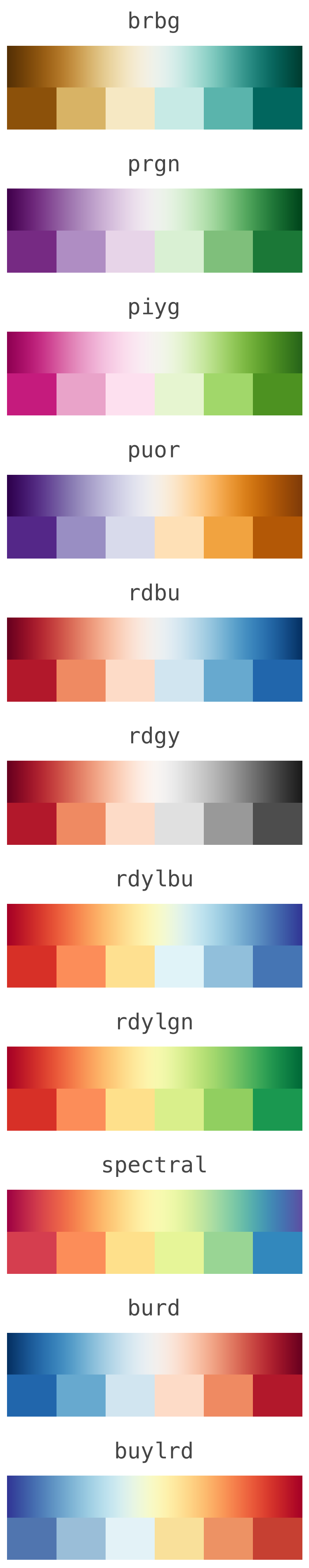
```
Plot.plot({
  marks: [
    Plot.dot(data, {
      x: "date", y: "air_temp", fill: "air_temp"
    })
  ],
  color: {
    type: "linear", scheme: "turbo", legend: true
  }
})
```



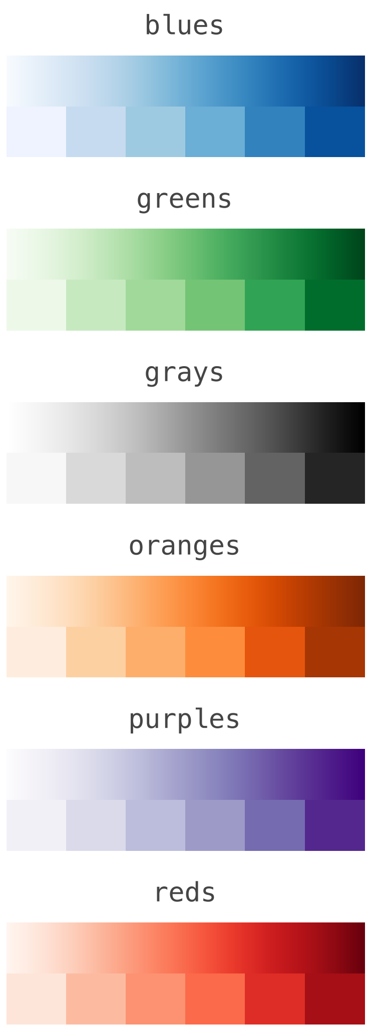
Multi-hue



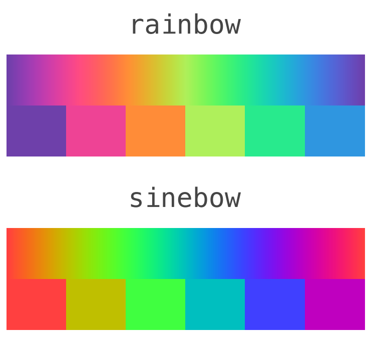
Diverging



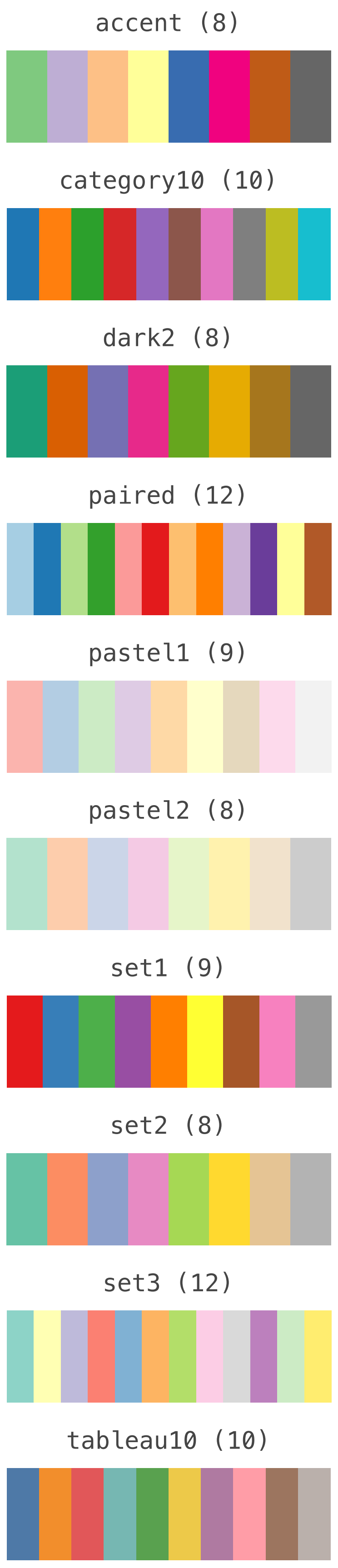
Single hue



Cyclical



Categorical


accent (8)
category10 (10)
dark2 (8)
paired (12)
pastel1 (9)
pastel2 (8)
set1 (9)
set2 (8)
set3 (12)
tableau10 (10)