

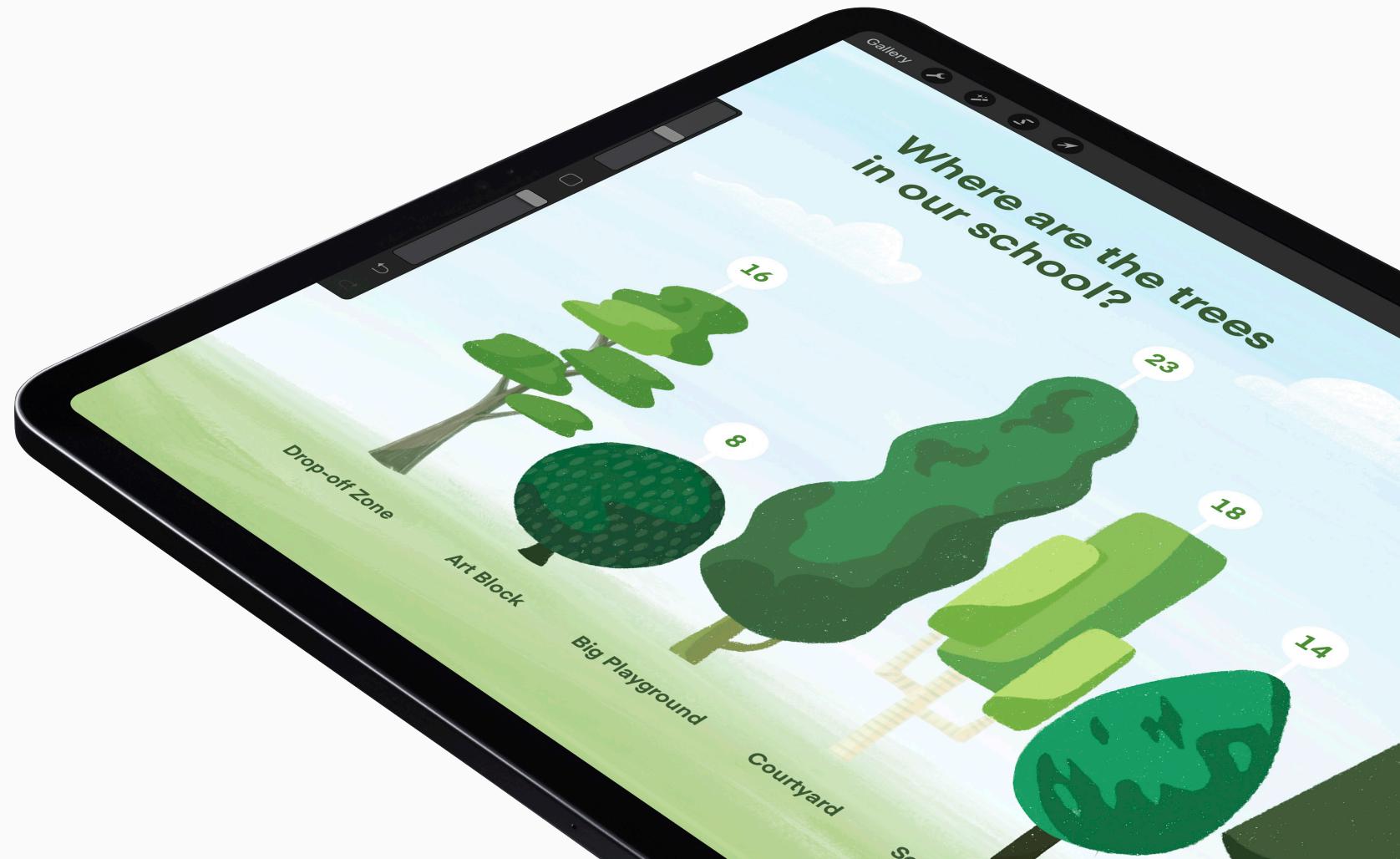
LESSON IDEA

# Visualizing data

ART & DESIGN

MATHS

SCIENCE



Learn with  
**Procreate®**



# Lesson ideas

Use these Lesson Ideas to spark your imagination for using Procreate in the classroom. Feel free to take them further and make them your own.

# Visualizing data

Communicate your research in a way that's meaningful and engaging by creating graphic data visualizations to share with the whole class.

All you need is an iPad and the following apps:



Procreate



Numbers

## Educational Value

- ✓ Students will formulate a research question, gather data, and create an appropriate graph to discover trends and patterns within their dataset.
- ✓ Students will understand the roles of scientific charts and graphic visualizations in scientific communication.
- ✓ Students use digital technologies and creative processes to aid scientific understanding.



# In this guide

1 Be the researcher

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2 Drawing a graph

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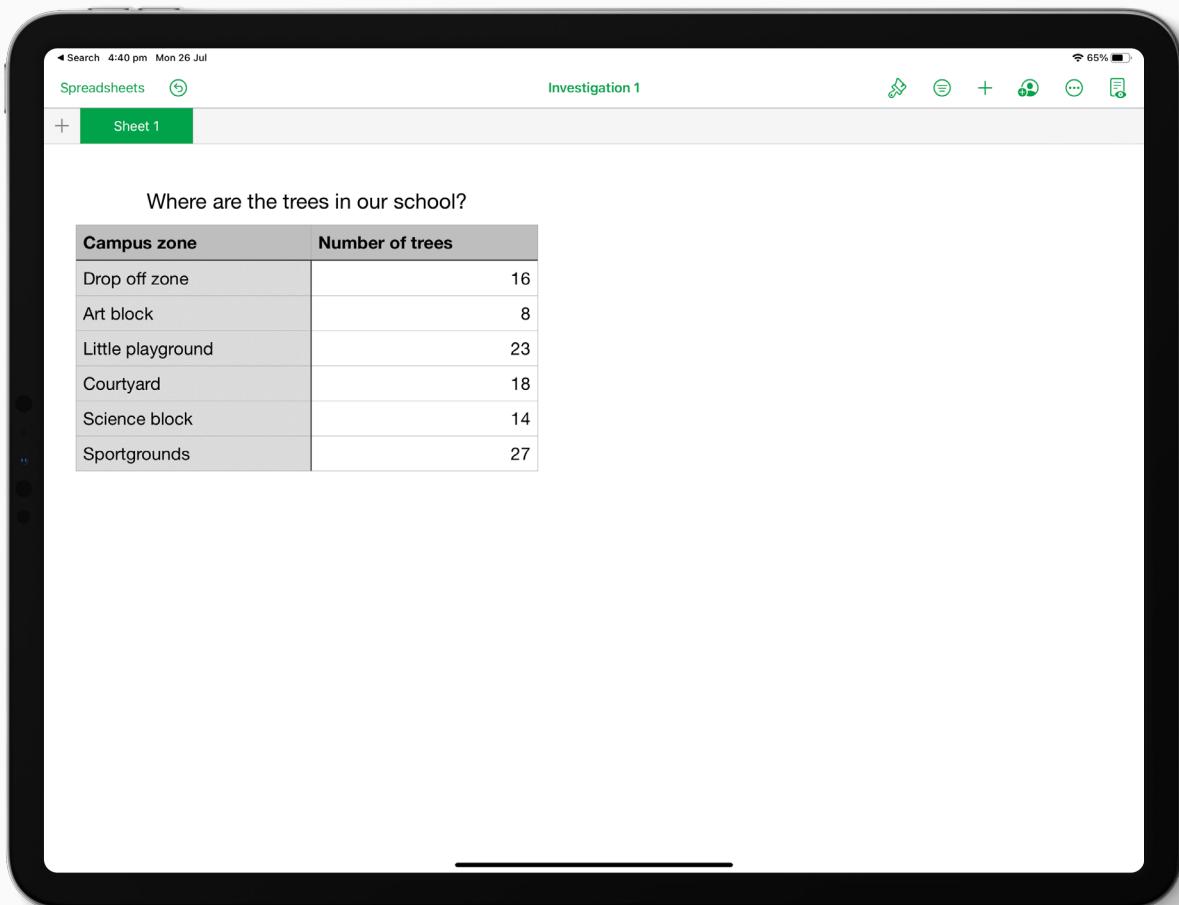
# Be the researcher

## Formulate your research question

- ★ What is it that you'd like to discover or learn? (e.g. Which parts of our school have the most trees?)
- ★ What are your variables (the things you are measuring) and how will you measure them? (e.g. Numeric variable: Number of trees, Categorical variable: Zones of the school)

## Gather your data

Use *Numbers* to document your raw data into a table as you count or measure.



# Drawing a graph

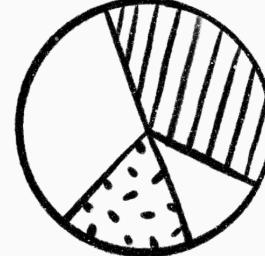
## Bars, lines, and pies

Graphs and charts are a great way to communicate the meaning or trend behind the data, that otherwise would just be a list of numbers that's hard to understand.

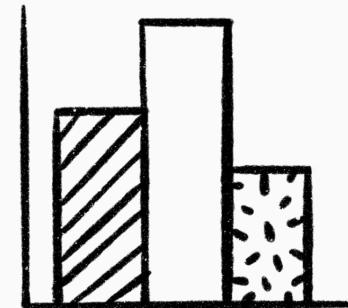
Work out what kind of data you're working with and choose what kind of graph you will create. For example, if you're working with discrete data, you might like to create a bar graph, or a pie chart. If you're working with continuous data, you might like to create a line graph.

### IN THIS EXAMPLE...

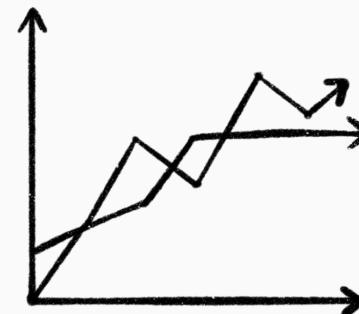
The example in this lesson idea will demonstrate a bar graph, but the tools covered can be used to assist you to make any kind of chart or graph.



PIE CHART



BAR GRAPH

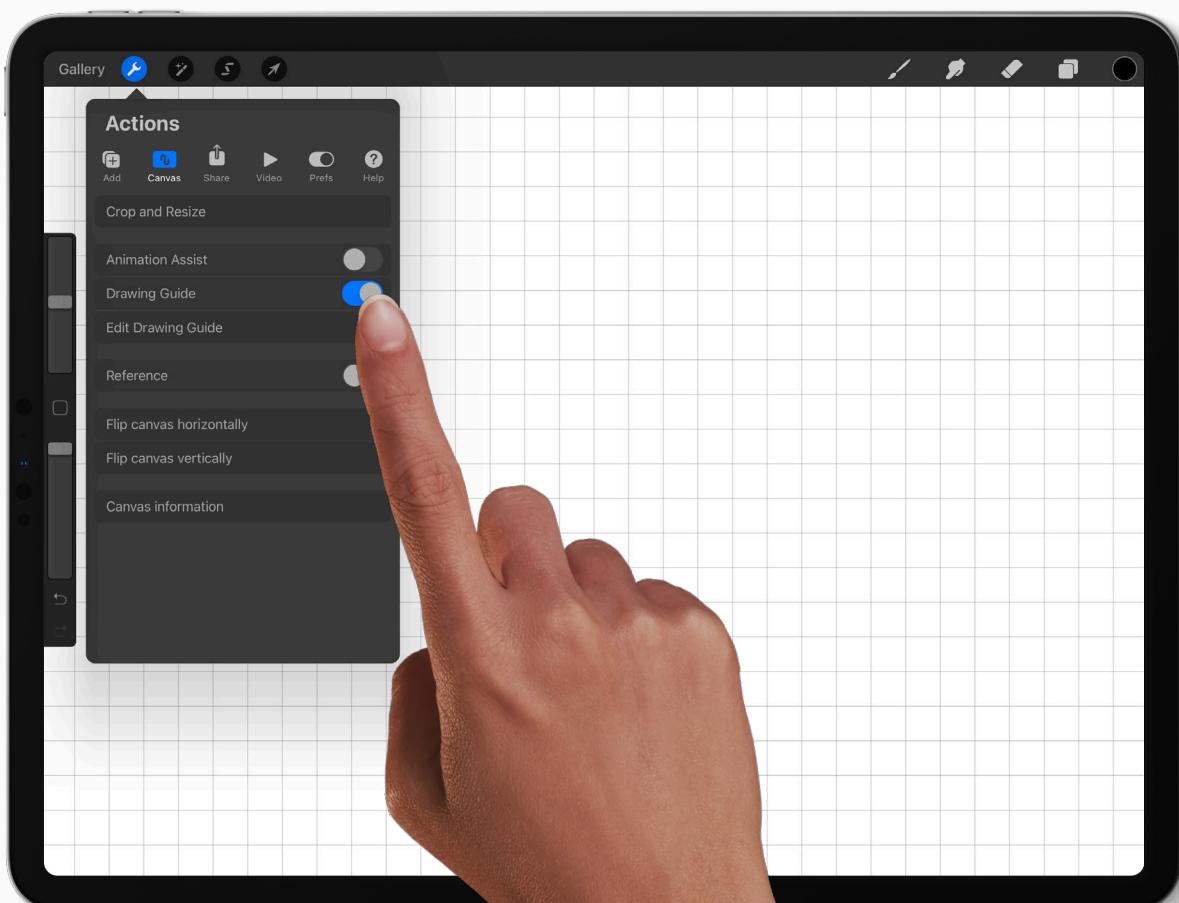


LINE GRAPH

3.

## Create a canvas

- 1 In your *Gallery* tap the + icon to create a screen-sized canvas.
- 2 Tap the wrench icon to open the *Actions* menu.
- 3 Tap *Canvas*, and toggle on *Drawing Guides*.
- 4 Tap *Edit Drawing Guide*.



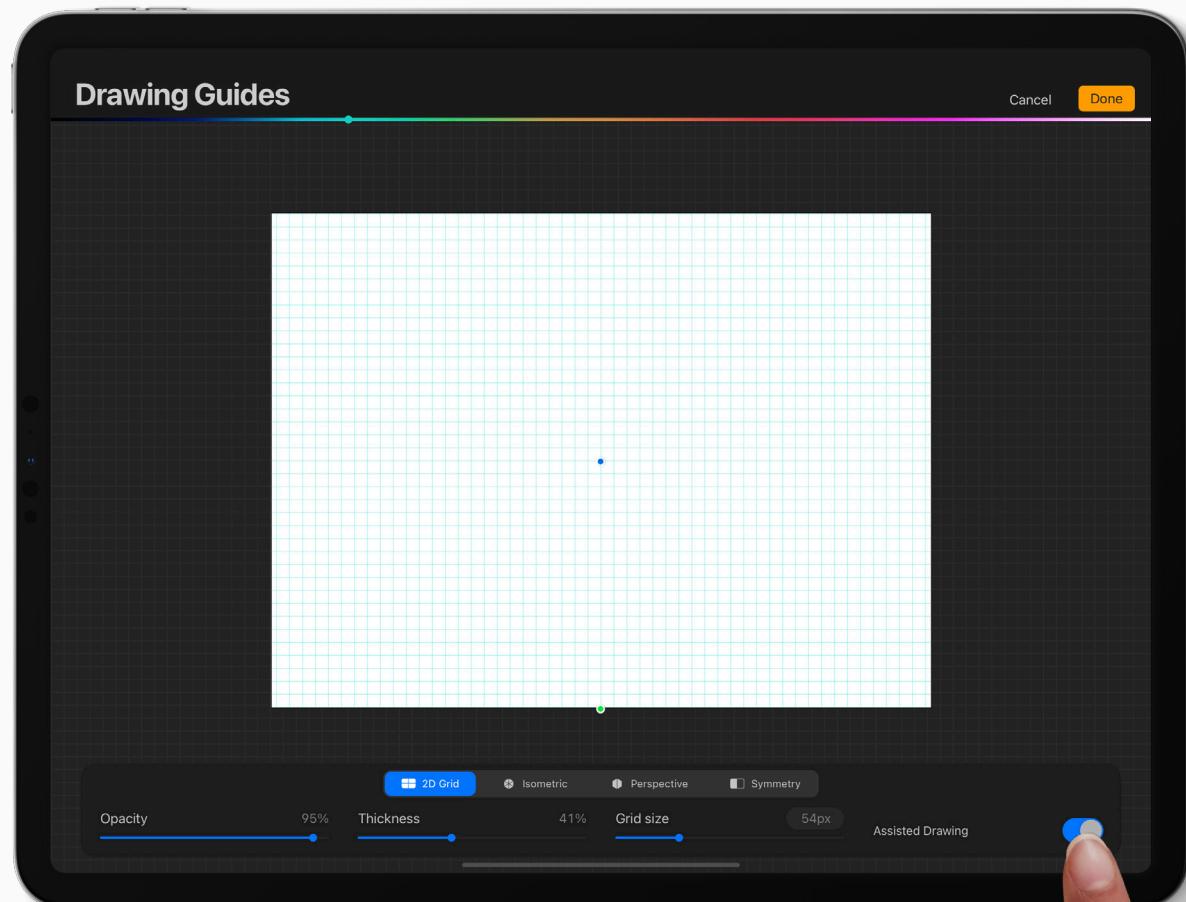
## Drawing Assist

Toggle on Assisted Drawing in the bottom-right corner of the screen.

This will act as a ruler so you can draw perfectly straight lines along the direction of the grid vertically and horizontally

You can also use the sliders to adjust the size of the grid to best suit your data set, and opacity and thickness so that it is more visible while you're drawing.

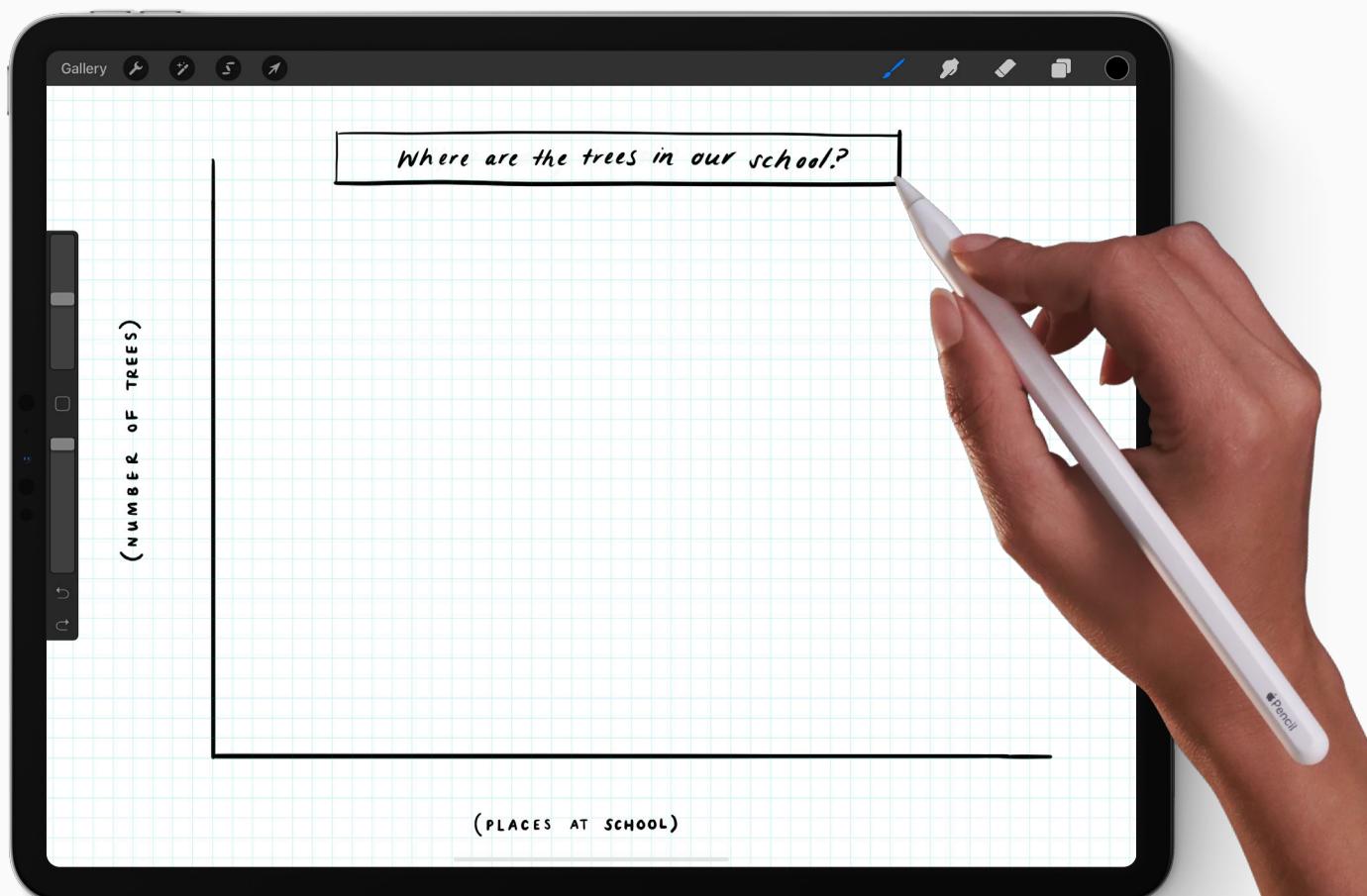
Tap *Done* to return to your canvas.



5.

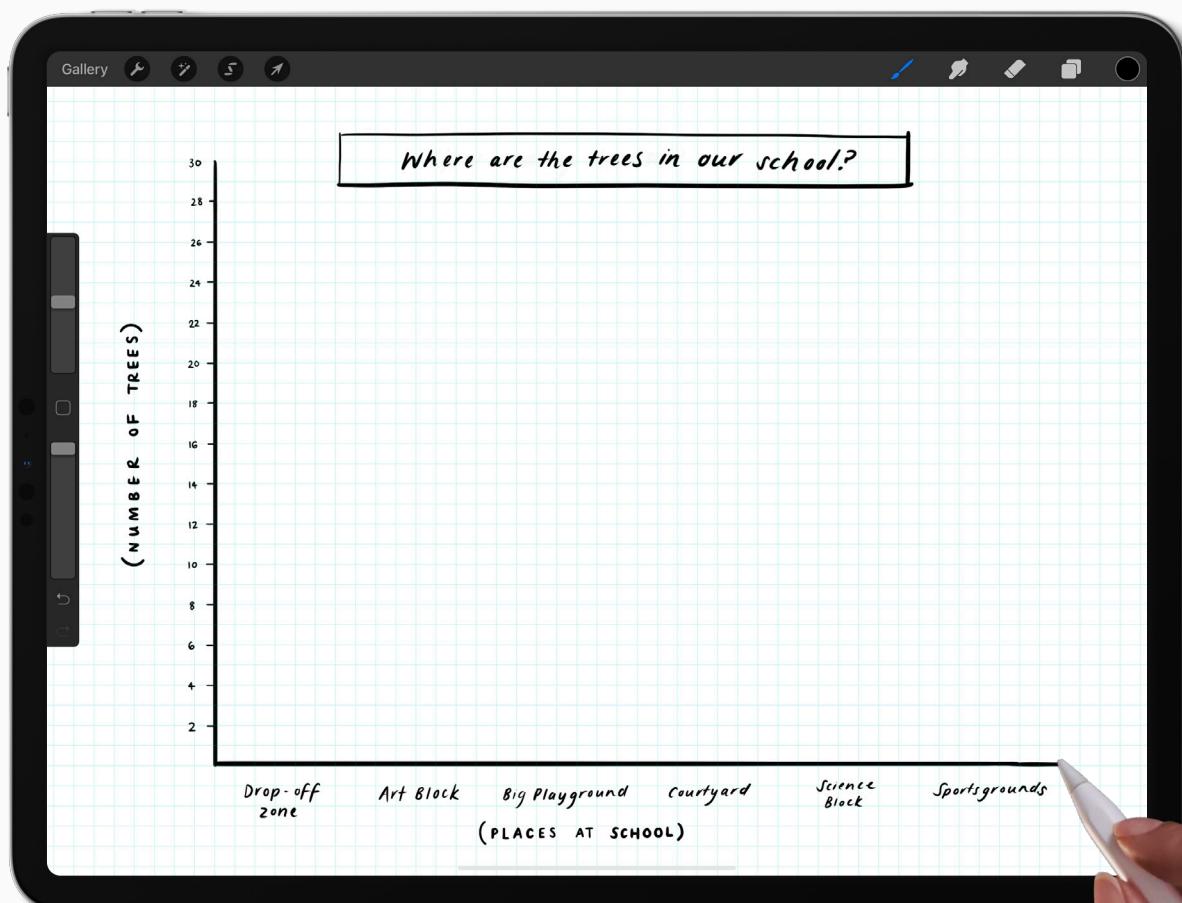
## Draw the axes

- 1 Select the *Brush* tool and draw an X (horizontal) and Y (vertical) axis.
- 2 Tap the two squares in the top right to open the *Layers Panel*.
- 3 Tap the + icon to create a new layer.
- 4 On this new layer, give your graph a title, and label each axis with your variables so your audience understand what data they are looking at.



## Add a scale

- 1 This shows the units of measurement shown on the Y axis. In this example, it shows number of trees in intervals of 2.
- 2 Then add the labels to your Y axis. In this example, this is the areas of the school grounds.



## LAYERS PANEL

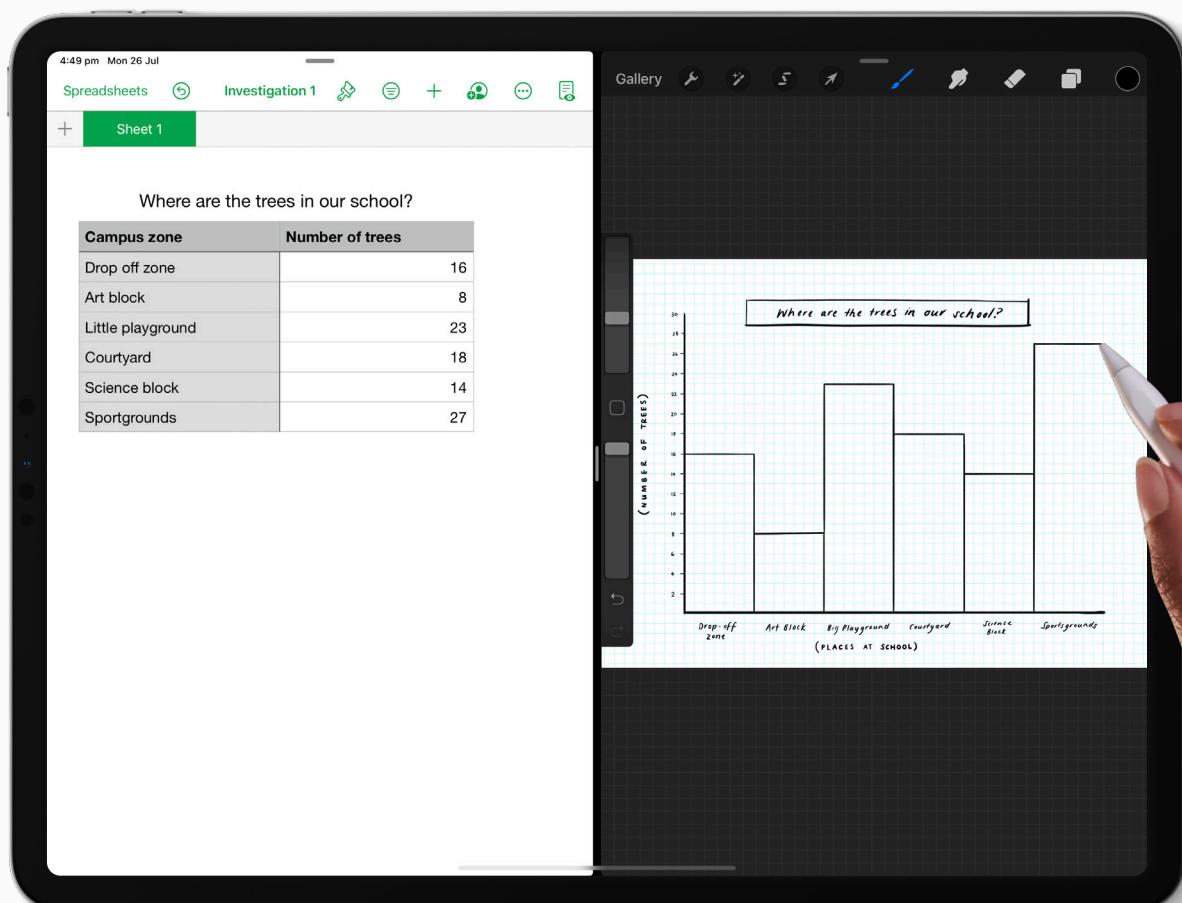


## Plot your data

- 1 Tap + in the *Layers Panel* to add another new layer, then tap on it to open *Layer Options*.
- 2 Tap *Drawing Assist* to turn it back on for your new layer.
- 3 Now, referring to your *Numbers* document, and plot your data onto your graph.

### MULTI-TASKING

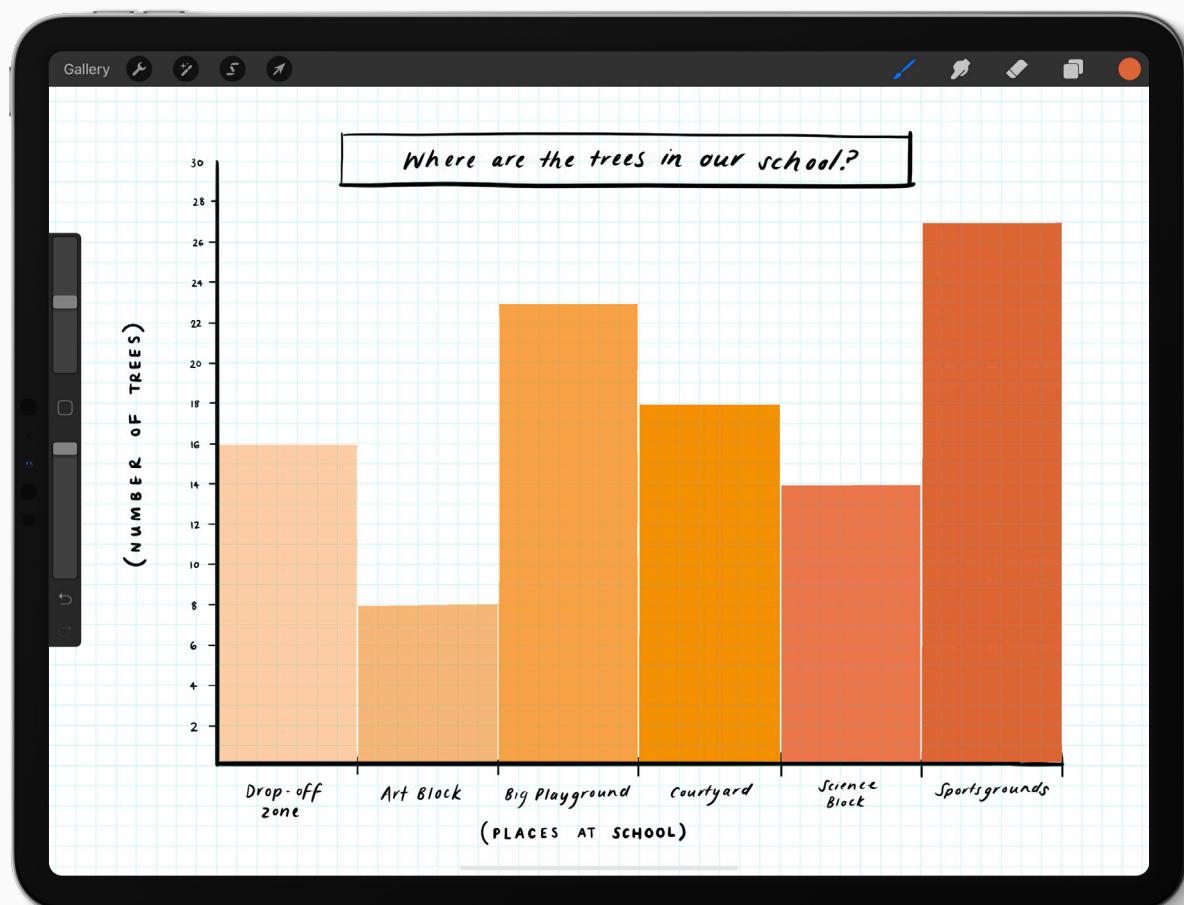
You can use multi-tasking mode to have both Procreate and your *Numbers* document open on your iPad at the same time. To enter multi-tasking mode, swipe up from the bottom of the screen to open the Dock while in Procreate. On the Dock, touch and hold the *Numbers* app. Then drag it off the dock to the left or right edge of the screen.



## Nice one!

Now you've got an accurate and scientific summary of the data that you have gathered.

But what if you wanted to make it a little more engaging?



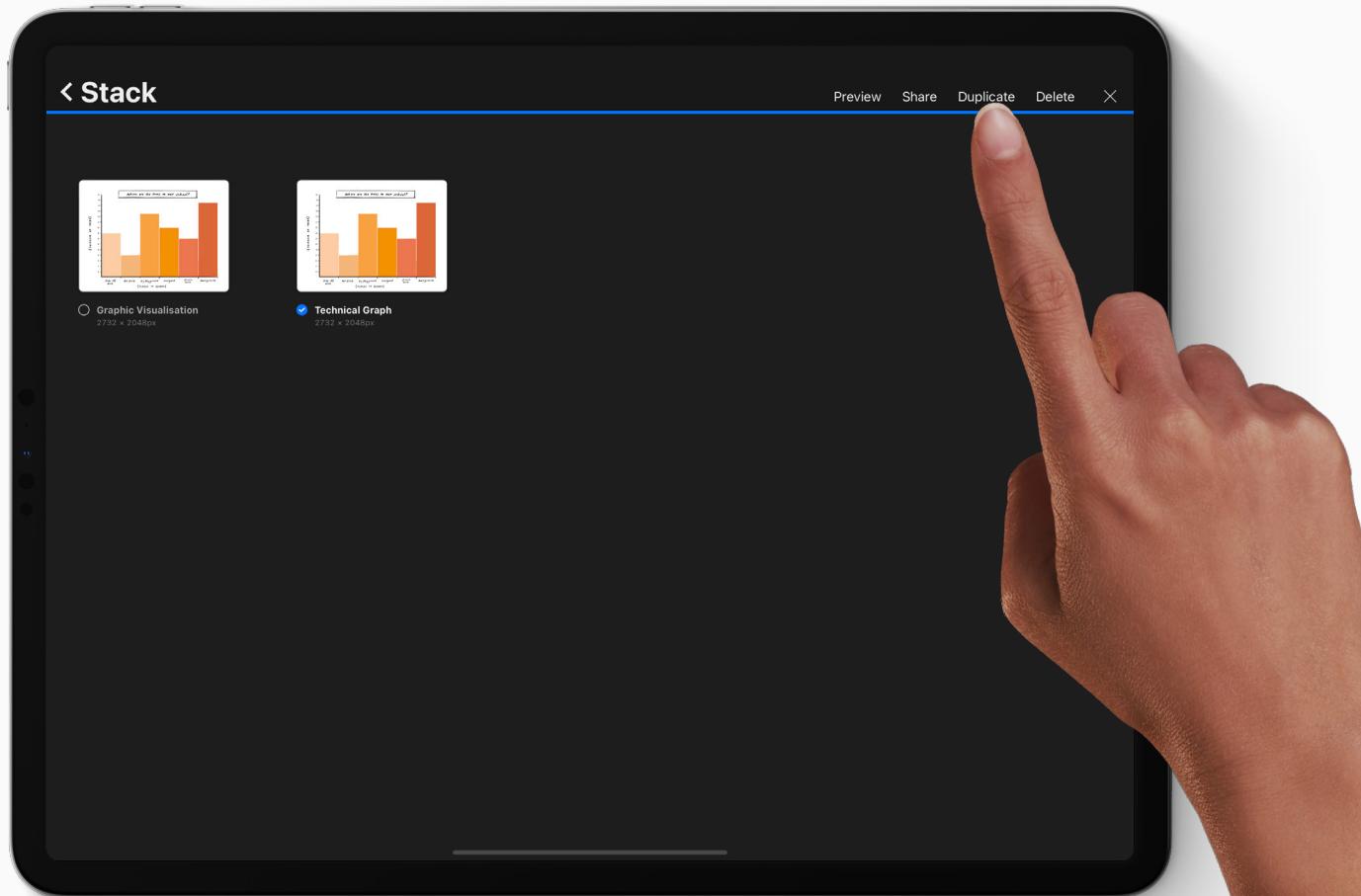
# Visualizing your data

## Make it engaging

Being able to communicate information in a meaningful and engaging way is an excellent life skill – it allows you to take complex ideas and data sets, and break them down into something that anyone can understand quickly and easily.

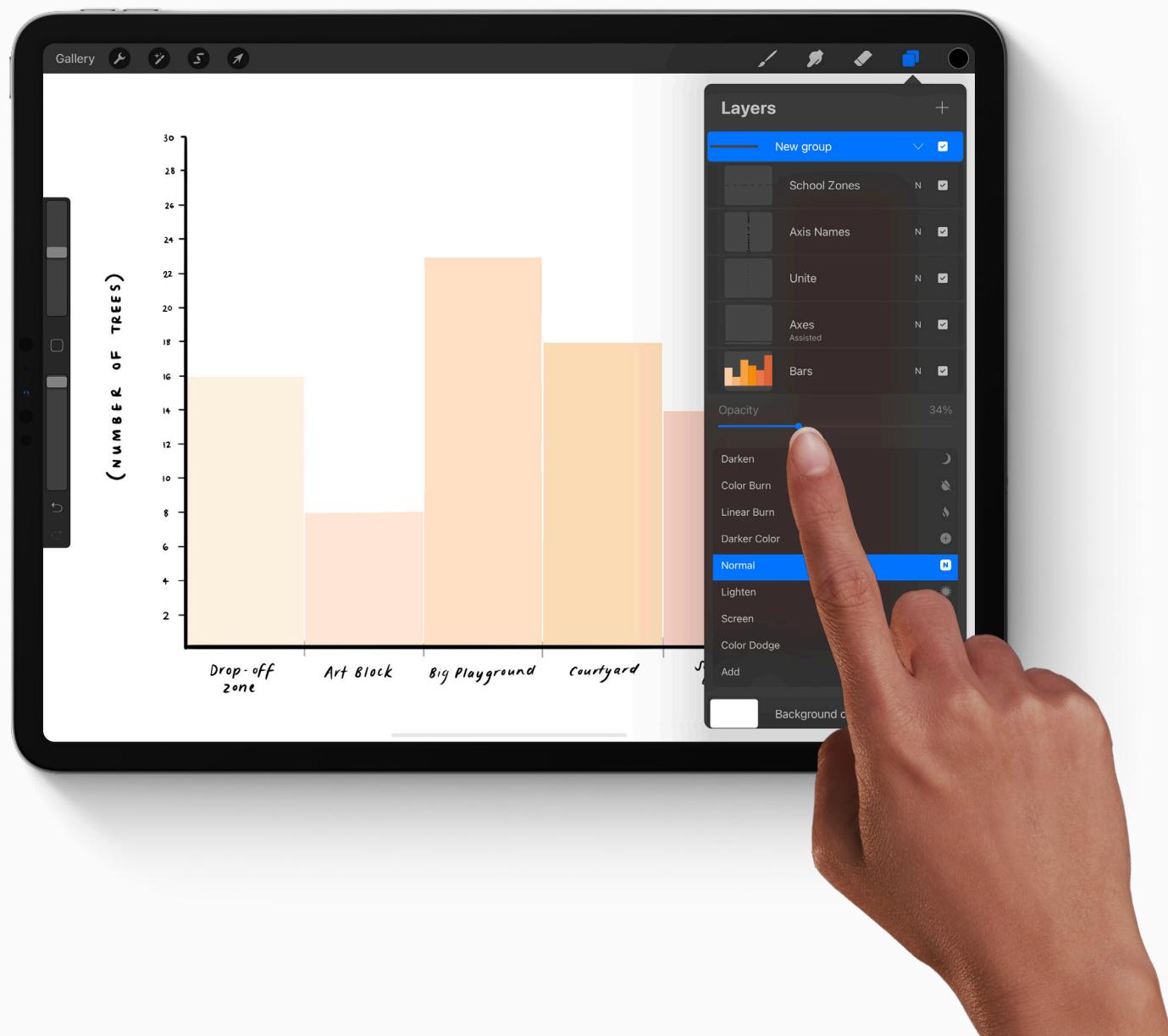
Use your chart or graph as a basis for a data visualisation, so that you have both a traditionally scientific, and a graphically engaging summary of your data.

- 1 In your *Gallery*, select and duplicate your graph file so you have two copies to work from.
- 2 Tap your file name to rename them so you don't get them mixed up while you work.



## Group your layers

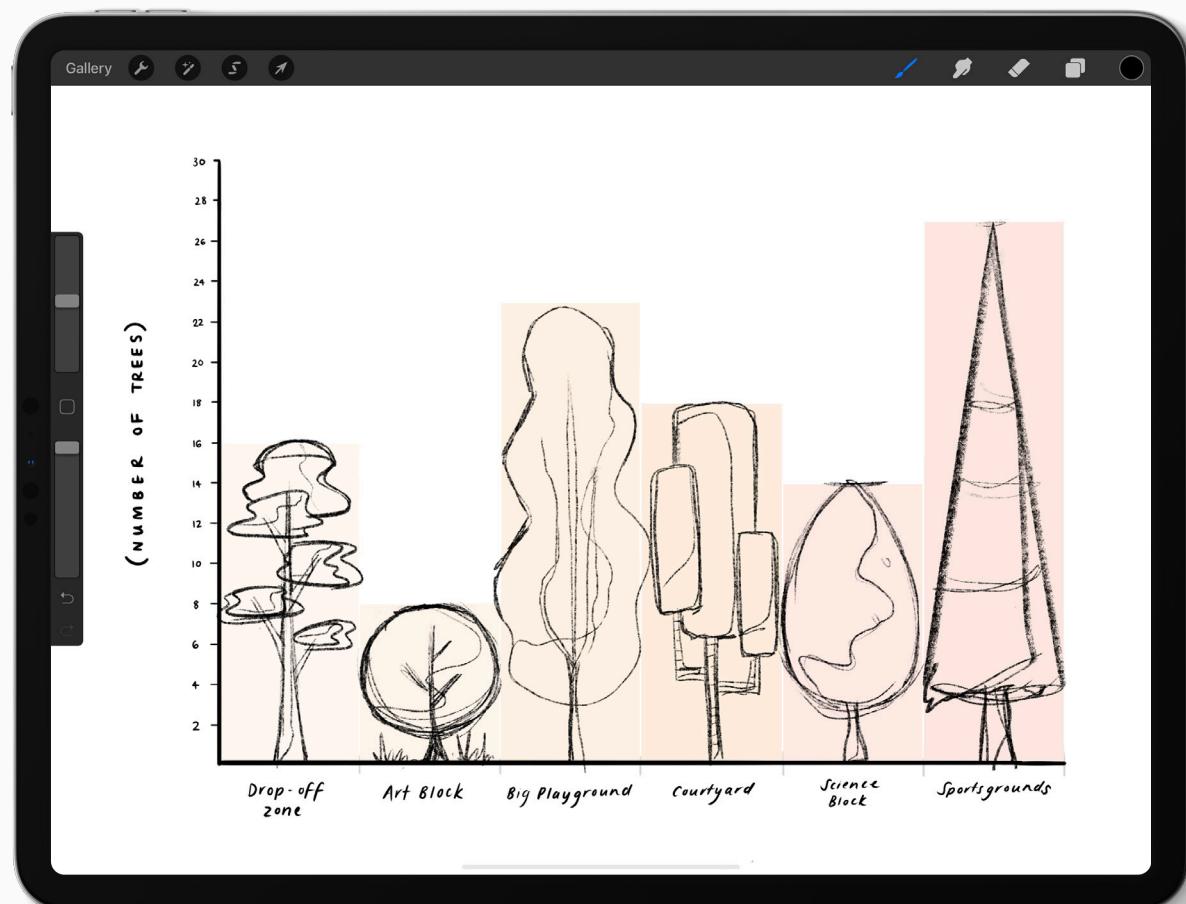
- 1 Swipe right to select all of your layers, and tap *Group*.
- 2 Tap to select your data layer, tap the *N*, and decrease the opacity by pulling the slider to the left.
- 3 Then tap to select the whole group, and tap the *+* to create a new layer.



## Sketch your visuals

On your new layer, sketch out a plan for your graphics.

Consider what kind of subject matter best summarizes what your data represents. In this example it's quite simple because the units are trees – you might have to be creative to come up with an engaging visual representation of your data.



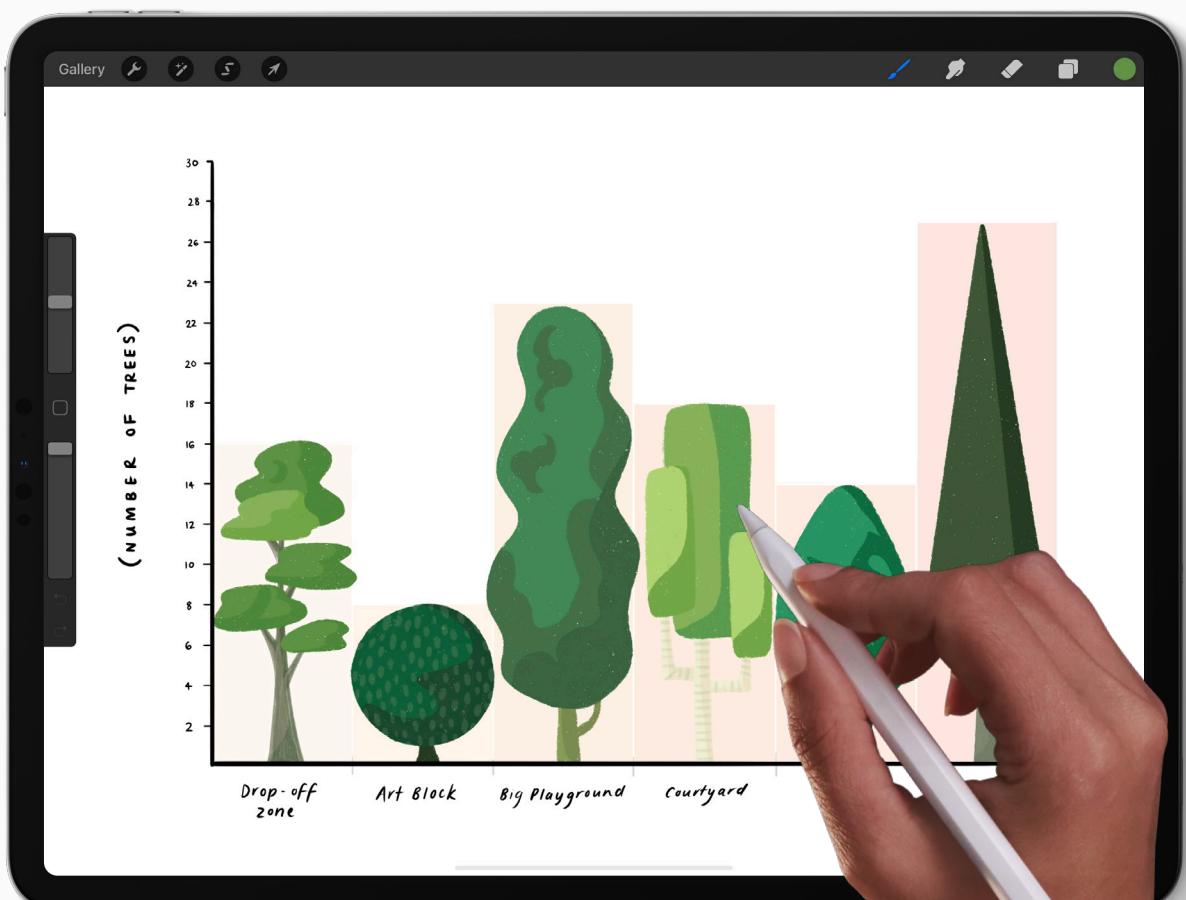
## Refine

Open the *Layers Panel*, and tap the **+** to create another new layer.

Use an inking brush to refine your illustration and add some color.

### DRAWING TIP

Keep it simple – your illustration is there to help explain the data, not make it more difficult to see or read.

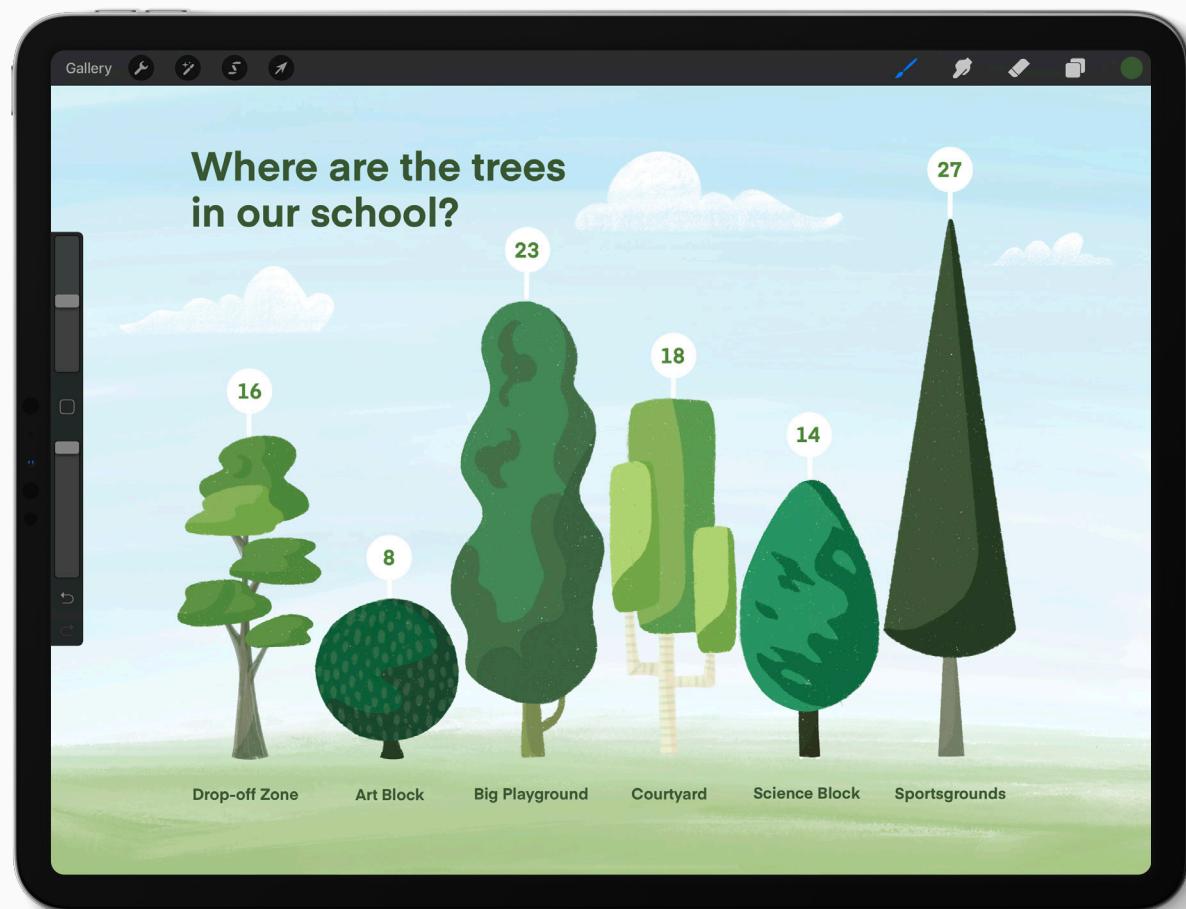
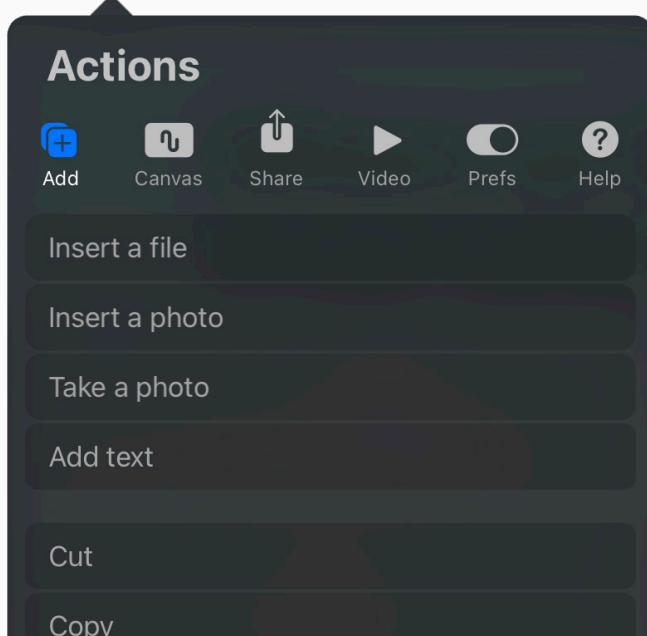


## Add detail

Use the text tool to add labels with key information to your visualisation so that you can hide your graph layers.

### ADDING TEXT

Tap the wrench icon to open the *Actions* menu, tap *Add*, and then *Add Text* to open the Text tool.



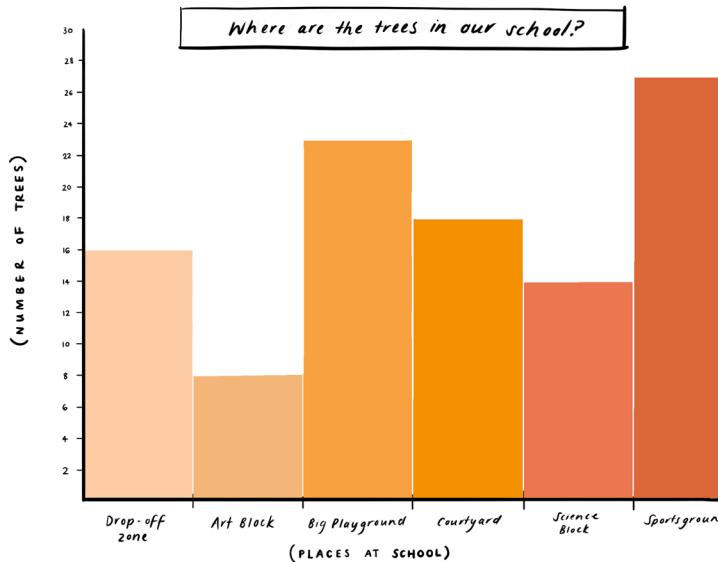
## Two ways to communicate

Now you have both a technical and a graphic representation of your original set of data. Explain your observations to your classmates.

- \* Which version do you think is more accurate?
- \* Which version do you think people would choose to read if they had a choice?
- \* Which version can you understand more quickly?

### BOTH ARE IMPORTANT

Both ways of viewing data are important, but they serve different purposes. A physicist is unlikely to put an illustrative chart in their published thesis, and a pedestrian is unlikely to read a technical chart if it's on the back of a bus – context is everything!



# Take it further

## Run an analysis

Write a summary sentence that explains the general trend you notice from your graph. Or use basic statistical methods to run an analysis on your original data set that can further illuminate the trends shown by your graphs.

## Different kinds of data

Apply the process in this lesson to a different kind of data. There are many publicly available data sets online – see if you can apply the same visualization process to nominal, ordinal, discrete or continuous data.



# Create

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