

DATA DETECTIVES

Step-by-Step Exercise Sheets

All 6 Episodes · Ages 11–13 · Tableau Public

How to use these sheets:

- Follow the numbered steps while watching or after watching each episode video.
- Write your answers in the answer boxes — there are no wrong observations!
- Try every Challenge — they're designed to make you think like a real data analyst.
- Keep all 6 sheets as a portfolio of your data detective work.

EPISODE 1

What Is Data?

Dataset: ep1_favorite_foods.csv

New Tableau Skill: Connecting to a CSV file,
Dimensions vs Measures

Part 1 — Before Tableau

Answer these questions BEFORE opening Tableau:

Name 3 types of data you encounter every day at school:

What is the difference between a Dimension and a Measure? (Guess first!)

Part 2 — Loading Your Data

- 1 Open Tableau Public on your computer.
- 2 In the Connect panel on the left, click **Text File**.
- 3 Navigate to **ep1_favorite_foods.csv** and click Open.
- 4 Look at the Data Source preview. You should see three columns: Food, Votes, Category.
- 5 Click the **Sheet 1** tab at the bottom of the screen.

■ **Tip:** If you can't find the file, ask your teacher — it may be in a shared folder on your computer.

Part 3 — Building the Chart

- 6 In the left panel, find **Food** under Dimensions. Drag it to the Rows shelf at the top.
- 7 Find **Votes** under Measures. Drag it to the Columns shelf.
- 8 A bar chart appears! Look at the bars. Which food has the longest bar?

Which food got the most votes? How can you tell from the chart?

How is the chart easier to read than the raw table of numbers?

Part 4 — Explore More

9 Drag **Category** from Dimensions to the **Color** box on the Marks card.

10 The bars are now colored by food category. How many categories are there?

What do the colors tell you? What pattern do you notice?

■ **Challenge:** Sort the bars from largest to smallest. Right-click on any bar and look for Sort. What changes?

Vocabulary Check

Data	Information written down as numbers or words
Dimension	A label or category (e.g., Food name, City name)
Measure	A number that can be added or averaged (e.g., Votes, Price)
Row / Column	How data is organized in a table — rows go across, columns go down
Chart	A picture that represents data — makes patterns easy to see

EPISODE 2

Your First Bar Chart

Dataset: ep2_candy_sales.csv

New Tableau Skill: Calculated Fields, Color, Labels, Sort

Part 1 — Loading the Data

- 1 Connect to **ep2_candy_sales.csv**. Click Text File in the Connect panel.
- 2 Look at the Data Source preview. How many candy types are there? How many months?
- 3 Click Sheet 1.

How many rows of candy data are there? What are the column headings?

Part 2 — Creating a Calculated Field

A calculated field lets you do math with your data inside Tableau.

- 4 In the Measures panel, right-click **January** and choose **Create Calculated Field**.
- 5 Name it **Total Sales**.
- 6 In the formula box, type: `SUM([January]) + SUM([February]) + SUM([March]) + SUM([April]) + SUM([May]) + SUM([June]) + SUM([July]) + SUM([August]) + SUM([September]) + SUM([October]) + SUM([November]) + SUM([December])`
- 7 Click OK. 'Total Sales' should now appear in your Measures list.

■ **Tip:** If your formula has a red error, check that every month name exactly matches the column header in your data.

Part 3 — Building the Bar Chart

- 8 Drag **Candy Type** to Rows.
- 9 Drag **Total Sales** to Columns. Your bar chart appears!
- 10 Drag the **Color** (candy wrapper color) field to the Color box on the Marks card.

11 Drag **Total Sales** to the Label box on the Marks card — numbers appear on bars.

12 Click the Sort button in the toolbar — choose Descending.

13 Double-click the chart title and rename it: **Annual Candy Sales by Type**.

Which candy type sold the most? Which sold the least?

Look at the colors. Does the real wrapper color help tell the story? Why or why not?

■ **Challenge:** Build a SECOND sheet. Put months (Jan–Dec) on Rows and SUM of each month's sales on Columns. Which month had the highest total candy sales?

Vocabulary Check

Calculated Field	A custom field you create by writing a formula (math) in Tableau
SUM	Add up all the values in a column
Marks Card	A panel in Tableau where you control Color, Size, Label, and more
Sort	Arrange bars from highest to lowest (descending) or lowest to highest (ascending)
Label	Text shown directly on a chart element showing its exact value

EPISO DE 3

Colors, Filters & Sorting

Dataset: ep3_animal_data.csv

New Tableau Skill: Filter shelf, Show Filter (interactive), Scatter plot, Color encoding

Part 1 — Speed Chart

- 1 Connect to **ep3_animal_data.csv** and click Sheet 1.
- 2 Drag **Animal** to Rows and **Max Speed (mph)** to Columns.
- 3 Sort the chart Descending. Which animal is at the top?
- 4 Drag **Type** (mammal, bird, etc.) to the Color box on the Marks card.

Which animal is the fastest? What TYPE is it? (mammal, bird, reptile, etc.?)

Look at the colors. Are birds generally faster or slower than mammals?

Part 2 — Using Filters

- 5 Drag **Habitat** from Dimensions to the Filters shelf.
- 6 In the dialog, check **Land** and **Ocean**. Click OK.
- 7 Right-click **Habitat** in the Filters shelf and choose **Show Filter**.
- 8 A filter control appears on the right side. Click each habitat to toggle it on and off.
- 9 Add a second filter: drag **Lifespan (years)** to Filters. Choose Range of Values. Set minimum to 20.

With the Lifespan filter set to 20+ years, which animals remain? List them:

What does the filter control allow someone reading your chart to do?

Part 3 — Scatter Plot

- 10 Create a new Sheet (click the + at the bottom).
- 11 Drag **Max Speed (mph)** to Columns and **Weight (lbs)** to Rows.
- 12 Drag **Animal** to the Label box so each dot shows the animal name.
- 13 Drag **Type** to the Color box.

Do heavier animals tend to be slower? Describe the pattern you see in the scatter plot:

■ **Challenge:** Create a third sheet showing which animals are Endangered. Drag Endangered to Color. Which habitats have the most endangered animals?

Vocabulary Check

Filter	A rule that limits which data is shown in your chart
Interactive	A chart that changes when a viewer clicks or adjusts controls
Scatter Plot	A chart where each dot represents one data point with two number axes
Correlation	When two values tend to change together (as one goes up, the other does too)
Encoding	Using a visual property (color, size, shape) to represent a data value

EPI SO DE 4 Line Charts — Tracking Change Over Time

Dataset: ep4_monthly_temps.csv

New Tableau Skill: Pivot (wide→long), Line chart, Multi-line, Annotations

Part 1 — Pivoting the Data

Our temperature data is in 'wide format'. We need to convert it to 'long format' so Tableau can color by city.

- 1 Connect to **ep4_monthly_temps.csv**. Stay on the Data Source tab.
- 2 Click the **New York** column header. Hold Shift and click **Phoenix** to select all 6 city columns.
- 3 Right-click the selected columns and choose **Pivot**.
- 4 Double-click 'Pivot Field Names' and rename it to **City**.
- 5 Double-click 'Pivot Field Values' and rename it to **Temperature (F)**.

Before pivot: how many columns? After pivot: how many columns? Why did it change?

■ **Tip:** After pivoting, make sure the Month column is a Dimension (blue pill) and Temperature is a Measure (green pill).

Part 2 — Building the Line Chart

- 6 Click Sheet 1. Drag **Month** to Columns.
- 7 Drag **Temperature (F)** to Rows.
- 8 In the Show Me panel (top right), click the **Line Chart** icon.
- 9 Drag **City** to the Color box on the Marks card. Six lines appear!
- 10 Hover over the lowest point of the Chicago line. What temperature does it show?

Which city has the highest temperature in July? What is the approximate temperature?

Which city has the **BIGGEST** difference between its coldest and warmest month? Calculate:

Part 3 — Adding Annotations

11 Find the lowest point on the Chicago line (should be around January).

12 Right-click that point and choose **Annotate** → **Point**.

13 Type a fun label like: 'Brrrr! Chicago in January ■'

14 Add a second annotation on Miami's highest point.

In your own words: why are annotations useful in data visualization?

■ **Challenge:** Add a title to your chart: 'Monthly Average Temperatures Across US Cities'. Then publish it to Tableau Public and write the URL here:

Vocabulary Check

Wide Format	Data where each category (e.g., city) is its own column
Long Format	Data where each observation is its own row — ideal for Tableau
Pivot	Transforming data from wide to long format in Tableau
Annotation	A note added directly on a chart to highlight a specific data point
Trend	A general direction that data moves over time (up, down, flat, seasonal)

EPISODE 5

More Chart Types

Dataset: ep5_sports_data.csv

New Tableau Skill: Pie chart, Treemap, Scatter, Bubble chart, Calculated field (Win%)

Part 1 — Pie Chart

- 1 Connect to **ep5_sports_data.csv** and click Sheet 1.
- 2 In the Marks card dropdown, change Automatic to **Pie**.
- 3 Drag **Sport** to the Color box on the Marks card.
- 4 Drag **Boys Participants** to the Angle box. A pie chart forms!
- 5 Drag **Sport** to the Label box to see sport names on each slice.

Which sport takes up the most of the pie? Roughly what percentage does it look like?

Part 2 — Treemap

- 6 Create a new Sheet 2.
- 7 In the Show Me panel, click the **Treemap** icon.
- 8 Drag **Sport** to Label and **Boys Participants** to Size.
- 9 Drag **Season** to Color.

What does the SIZE of each rectangle represent? What does the COLOR represent?

Part 3 — Scatter Plot & Bubble Chart

- 10 Create Sheet 3. Drag **Boys Participants** to Columns, **Girls Participants** to Rows.
- 11 Drag **Sport** to the Detail box on the Marks card.

12 Drag **Sport** to Label.

13 Drag **Avg Score** to the Size box. Your scatter plot becomes a bubble chart!

Is there a positive correlation between Boys and Girls participation? Describe what you see:

Which sport has the LARGEST bubble? What does that mean?

Part 4 — Calculated Field: Win %

14 Right-click any field in Measures and choose **Create Calculated Field**.

15 Name it **Win %**. Type the formula: $[\text{Wins}] / ([\text{Wins}] + [\text{Losses}] + [\text{Ties}])$

16 Click OK. Build a bar chart: Sport on Rows, Win % on Columns. Sort descending.

Which sport has the highest win percentage? Does that surprise you? Why or why not?

■ **Challenge:** Which chart type — pie or treemap — do you think communicates participation better? Write 2 sentences explaining your choice.

Vocabulary Check

Pie Chart	A circle divided into slices showing parts of a whole
Treemap	Rectangles sized by a value and colored by a category
Bubble Chart	A scatter plot where dot size represents a third variable
Win %	Wins divided by total games played — a percentage between 0 and 1
Positive Correlation	When two values both increase together — dots form a diagonal line

EPISODE 6

Tell a Story with a Dashboard

Dataset: ep6_school_survey.csv

New Tableau Skill: Dashboard canvas, tiled layout, filter actions, publishing

Part 1 — Build 3 Worksheets

Complete ALL three sheets before creating your dashboard.

- 1 **Sheet 1 — Happiness by Subject:** Rows = Favorite Subject, Cols = AVG(Happiness Score). Sort descending.
- 2 Rename Sheet 1 tab: double-click the tab and type 'Happiness by Subject'.
- 3 **Sheet 2 — Sleep vs Happiness:** Create a new sheet. Cols = Sleep Hours Per Night, Rows = Happiness Score. Drag Grade to Color.
- 4 Rename Sheet 2: 'Sleep vs Happiness'.
- 5 **Sheet 3 — Screen Time by Grade:** New sheet. Cols = Grade, Rows = AVG(Daily Screen Time). Grade to Color.
- 6 Rename Sheet 3: 'Screen Time by Grade'.

Before building the dashboard: What question do you think the data will answer?

Part 2 — Assemble the Dashboard

- 7 Click the **New Dashboard** button at the bottom (looks like 4 squares).
- 8 In the left panel, drag **Happiness by Subject** onto the top of the canvas.
- 9 Drag **Sleep vs Happiness** to the bottom-left.
- 10 Drag **Screen Time by Grade** to the bottom-right.
- 11 Add a title: drag a **Text** object from the Objects panel. Type 'Student Happiness Dashboard'.

■ **Tip:** If charts appear as floating boxes, right-click them and select 'Tiled' to make them snap into the grid layout.

Part 3 — Add Filter Actions

- 12 Click on the **Happiness by Subject** chart in your dashboard to select it.
- 13 A small funnel icon appears in the top-right corner of the chart. Click it!
- 14 Now click any subject bar (e.g., Math). Watch the other two charts update!
- 15 Click on 'Art', then 'Science', then 'PE'. Notice how the sleep and screen time patterns change.

Click on 'Math' students. What do you notice about their sleep hours compared to other subjects?

Which subject's students seem to have the most screen time? Does this make sense to you?

Write one conclusion your dashboard reveals about student happiness at this school:

Part 4 — Publish!

- 16 Go to **File** → **Save to Tableau Public**.
- 17 Give your dashboard a name like 'My Student Happiness Dashboard'.
- 18 Click Save. Your visualization is now live on the internet!

Write your Tableau Public URL here so you can share it with your class:

■ **Challenge:** Ask a classmate to explore your dashboard. Watch them use it — do they understand the story it tells? What would you change to make it clearer?

Final Vocabulary Check

Dashboard	A single screen combining multiple charts that all show data from the same topic
Filter Action	Clicking one chart updates all other charts to show matching data

Tiled Layout	Charts arranged in a fixed grid — they don't overlap
AVG	Average — add up all values and divide by how many there are
Publishing	Making your Tableau visualization available for anyone to view online

■ **Congratulations, Data Detective!**

You've completed all 6 exercise sheets. Keep your sheets as a record of everything you've learned — and keep exploring data!