Lab Reports:
Data Presentation and Sample Calculations

Data Presentation

Data summaries may take one of three forms:

Form	Description	Label location	When is it appropriate?
Text	One or two sentences, with data summarized parenthetically	n/a	• When results are simple Example: Seed production was higher for plants in the full-sun treatment (52.3 ± 6.8 seeds) than for those receiving filtered light (14.7 ± 3.2 seeds, t=11.8, df=55, p<0.001.)
Tables	Lists of numbers or text, organized in columns	Above table	• Presenting raw data • Increasing the readability of large amounts of data • Synthesizing existing literature (review study)
Figures	Graphs, diagrams, photos, maps, or drawings	Below figure	• Ideal for showing trends, patterns, or relationships

Clarity is key!

Any table or figure you present must be sufficiently clear, well-labeled, and described by its legend. It should be able to stand alone, and be understood by your audience without reading the Discussion section.

Strive for simplicity whenever possible:

- Overly complicated tables of figures may be difficult to understanding. If you are unsure about whether your tables or figures meet these criteria, show them to a friend or family member (not in your course) and ask them to interpret your results.
- Figures should NOT duplicate the same information in tables, and vice versa.
- Only include a legend if there are multiple data sets in the same figure.

Using Tables

Table columns and rows should be clearly labelled. Include units, wherever possible.
Table labels go ABOVE the table.

Table 4. Population variation in hatch success (mean percent) of unfertilized eggs for females from populations sampled in1997. N = number of females tested. <--Table caption

Population	mean (%)	Standard deviation	Range	N
Beaver Creek [T]	7.31	13.95	0-53.16	15
Honey Creek [T]	4.33	7.83	0-25.47	11
Rock Bridge Guns Creek [T]	5.66	13.93	0-77.86	38
Cedar Creek [P]	6.56	9.64	0-46.52	64
Grindstone Creek [P]	8.56	14.77	0-57.32	19
Jacks Fork River [P]	5.28	8.28	0-30.96	28
Meramec River [P]	5.49	10.25	0-45.76	45
Little Dixie Lake [L]	7.96	14.54	0-67.66	71
Little Prairie Lake [L]	6.86	7.84	0-32.40	36
Rocky Forks Lake [L]	3.31	4.12	0-16.14	43
Winegar Lake [L]	10.73	17.58	0-41.64	5
Whetstone Lake [L]	7.36	12.93	0-63.38	57

<--Column titles

<--Table body (data)

[T] = temporary stream, [P] = permanent streams, [L] = lakes. <--footnotes

<--Lines demarcating the different parts of the table

Table 1. Physical characteristics of the Doctor in the new series of *Doctor Who.*

	Height	Age (years)
Ninth doctor	6'0"	41
Tenth doctor	6'1"	35
Eleventh doctor	5'11"	25

Using Figures

Figure labels go BELOW the figure.

There are many types of figures that you can use. Select the type of figure you will use based on your data, and on your intended purpose.

Two Types of Variables

Categorical variables are distinct groupings.

For example: species, or country

Continuous variables have a continuous range of numeric values.

For example: mass, or temperature

Bar chart

Use a bar chart when the independent variable is categorical, instead of continuous. These are also useful for illustrating proportions.

There is always space separating the bars.

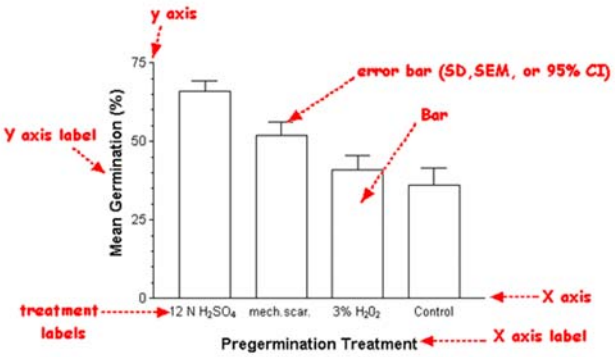


Figure 1. Mean germination (%) (+SD) of gourd seeds following various pregermination treatments. N=10 groups of 100 seeds per treatment and control. Treatments: 12 hour soak in 12 N H_2SO_4, 90 second scarification of seed coat with 80 grit sandpaper, 6 hour soak in 3% H_2O_2.

figure legend

Scatter plot

Use when the independent variable has a range of continuous values.

Only CONNECT the data points if the measurements collected from the SAME SAMPLE, at different points in time.

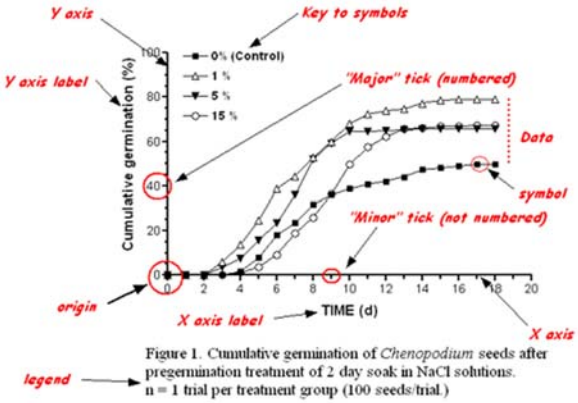


Figure 1. Cumulative germination of *Chenopodium* seeds after pregermination treatment of 2 day soak in NaCl solutions. n = 1 trial per treatment group (100 seeds/trial.)

legend

Histogram

Similar to a bar chart, but the independent variable has numerical values. These are useful for showing the distribution of values in a sample.

Usually, the space between bars is minimal.

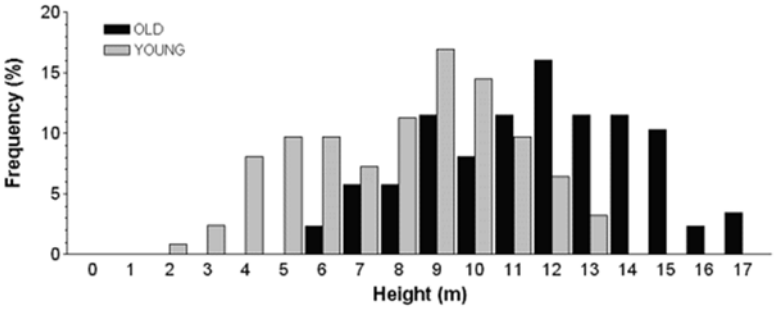


Figure 4. Height distribution in two recruitment cohorts of eastern white pine (Pinus strobus) near the eastern shore of Lake Auburn, Maine, in January 2001. N = 88 OLD and 123 YOUNG trees.

Other types of figures:

- **Pie charts** – Useful for illustrating proportions
- **Drawings, maps, or schematics** – When presenting visual information

Labelling Tables and Figures

- Labels tables above the table, and figures below the figure.
- Every label should have a **number** and a **title.**
- Do NOT include an additional title over your figure. The figure label below is adequate.

Numbers

Number ALL tables and figures, even if you only use one of each.

Number all figures and tables sequentially, and independently.

- If your report contains BOTH figures and tables, it will have Figure 1 AND Table 1, etc.

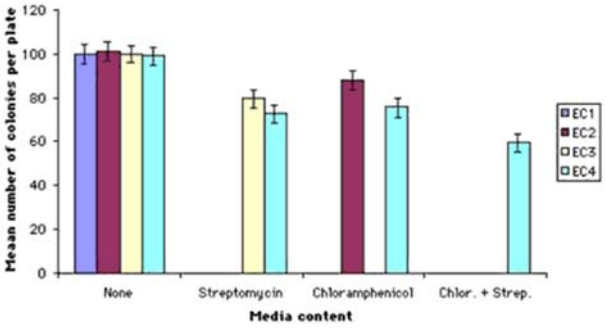
Titles

Keep titles brief but informative. A clear and complete title (also called a caption) is essential. You want to convey as much information as possible about what the table or figure tells the reader:

- what results are being shown
- the organism studied, if applicable
- specific context (experimental treatments applied, sample sizes, other important details)

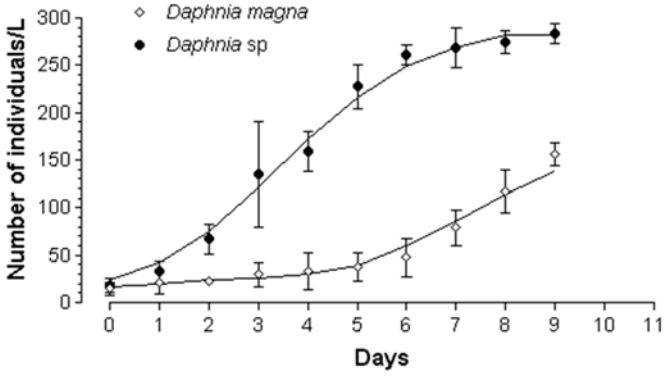
Do NOT simply restate the axis labels and write "versus" in between.

Examples**:**



Inadequate **Figure 1**. Effect of various antibiotics

Good **Figure 1**. Effect of various antibiotic media on growth of four strains of E. coli (EC1, EC2, EC3 and EC4) isolated from diapers of babies at a Toronto hospital. Strains were grown on media containing either no antibiotics (none), 5mg/ml streptomycin, 5mg/ml chloramphenicol or 5mg/ml streptomycin and 5mg/ml chloramphenicol (chlor. + strep.). Bacterial growth was scored as number of colonies present after three days of growth at 37°C. Data is expressed as the mean number of colonies on each medium (n=10). Vertical bars show standard errors of the mean.



Inadequate **Figure 2.** Population density of two species of *Daphnia*

Good **Figure 2**. Mean population density of two species of *Daphnia* following application of organic fertilizer to a small farm pond. Six replicate 1-litre water samples were drawn from 50 cm depth, at 1100 h each day.

Sample Calculations

If your lab report includes mathematical analyses, you will be asked to include at least one thorough example of each calculation.

- Clearly label each type of calculation, by indicating what quantity you are calculating.

Density of substance X

$$\text{Density} = \frac{mass}{volume}$$
$$= \frac{15.62\ g}{8.03\ mL}$$
$$= 1.95\ \text{g/mL}$$

- Show all work, including **units**.
- Use the appropriate number of **significant figures**:
  - Intermediate calculations – Retain one extra significant figure
  - Final calculation – Report to the appropriate number of significant figures

Your instructor may tell you to include your sample calculations at the end of your lab report, in a separate section called an APPENDIX. If this is the case, label all appendices sequentially (Appendix 1, Appendix 2, etc.). In the body of your report, refer to the appendix as Appendix A1 or A2.