

Environmental Studies FACT SHEET



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Presenting Data: Tables

Question:- Why do we bother drawing results tables, graphs, bar charts etc?

Answer:- To enable the reader to make a near-instant decision about the null hypothesis. The results/implications of the investigation should SHOUT OUT from a good table or graph..

Consider the following examples:

Investigation title: To compare drainage rates in heavily grazed and set –aside land.

Null hypothesis: Grazing will have no effect on drainage rate.

The student suggested that the grazing animals would trample the soil, harming its structure and reducing infiltration capacity and drainage.

However, they also suggested that the animals would add organic matter to the soil via their faeces. This would increase the water – holding capacity of the soil and might improve structure, aiding drainage. Which factor would be most significant?

What the student did: Took 5 soil samples from a grazed field and 5 from a set-aside field. Poured 50cm³ water on top of soil. Measured the time for 20cm³ of water to drain through. Measured retention ie the volume of water that didn't come out the other end. Then they took another 5 samples from each field and measured the organic matter content.

The raw data ie the actual measurements that they took, looked like this:

DRAINAGE SET-ASIDE FIELD			
Sample No.	Time(secs) for 20cm ³ to drain through	Total volume drained after 30mins (cm)	Notes
1	187	43	Gritty sample Had plant roots
2	256	40	
3	230	46	
4	168	39	
5	199	40	

DRAINAGE GRAZED FIELD			
Sample No.	Time(secs) for 20cm ³ to drain through	Total volume drained after 30mins (cm)	Notes
1	363	34	Next to cattle trough
2	244	29	
3	229	35	
4	278	40	
5	190	38	

ORGANIC MATTER - SET ASIDE FIELD				
Sample No.	Starting wt. (g)	Dry Wt (g)	Wt after burning (g)	OM % = difference / dry wt
1	300	206	60	70.8
2	298	178	109	38.7
3	348	226	123	45.5
4	252	177	101	42.9
5	279	230	145	36.9

ORGANIC MATTER - GRAZED FIELD				
Sample No.	Starting wt. (g)	Dry Wt (g)	Wt after burning (g)	OM % = difference / dry wt
1	268	198	56	71.7
2	289	167	68	59.2
3	324	234	108	53.8
4	314	178	79	55.6
5	238	90	68	24.4

Now imagine that you are no longer a student trapped in school or college. You've passed your A levels and got a great degree in Environmental Science. You are working for a government agency looking at whether set-aside has made any difference to soil quality. You have just got the raw data above and your telephone rings. It's your boss. She wants your findings and she wants them now. In one minute's time you are going to have to give a 5 minute verbal report with your main findings.

Look at the raw data. What are your conclusions on the following?

1. Is there any link between grazing and drainage?
2. Is there any link between grazing and organic matter content?

With just the raw data, it's difficult to tell!

Some averages would help. And some kind of statistical analysis.

Here's the actual summary table the student produced.

	Set -aside	Grazed
Average drainage rate cm/sec	0.096	0.076
Total drainage as % of original applied	83.2	70.4
Average OM%	46.9	52.9

With this table, you can quickly report to the boss:

- Grazing seems to have slowed drainage rate and increased water retention
- Grazing seems to have increased OM

But you cannot be certain without doing statistical analysis.

It is at this stage that some students think: What stats should I do? DO NOT BECOME ONE OF THESE STUDENTS!

The time to decide what stats you are going to do is **before** you set foot out of the classroom. In fact, you should have the summary table, perhaps like the one here (or better), already drawn before you leave the classroom. You must decide how many samples you will need for your stats test to be valid – is 5 enough? Unlikely, and the more you do, the more reliable your conclusions from any stats will be.

To summarise:

- Draw your raw results and summary results tables before you do any prac work.
- Make sure that the headings in your table answer the questions in your aim/hypothesis
- Think: If I only have 60 secs to draw conclusions, will my Table help or hinder?

Good Luck!

Exercises

For each of the following investigation abstracts, sketch rough summary results tables

1. The effectiveness of extracts of walnut leaves and laurel leaves as natural herbicides was compared. 3 different concentrations of each extract (10,30 and 50%) were applied to seeds of common weed species. Percentage germination was recorded. It was found that at all concentrations the laurel extracts were more successful germination inhibitors than walnut. Results were significant at the 95% level. Further studies on the effectiveness of combined extracts are needed.
2. The distribution of earthworms with distance from a deciduous woodland was investigated. A 30m belt transect was used to sample earthworm numbers at 5m intervals. Soil organic matter levels and pH were also recorded at these intervals. Earthworm numbers were found to be positively correlated with organic matter content. No relationship was found between pH levels and earthworm numbers.

Tables are just one type of summary technique. Think about other ways that could be used to make the results of these investigations SHOUT OUT.

Distance from woodland (m)	Earthworm numbers/m ²							OM (%)							pH						
	0	5	10	15	20	25	30	0	5	10	15	20	25	30	0	5	10	15	20	25	30

Note: For any particular extract concentration, the numbers you are trying to compare are the Walnut and Laurel. For example, for the 10% extract, you want to be focussing on the 71 and 40. This involves reading numbers vertically. Try redrawing the table so that these two numbers would be side-by-side horizontally. Normally, we read left to right, so it may be easier to compare this way.

Extract concentration (%)	Walnut			Laurel		
	Average	50	30	71	40	21.0
Percentage germination of weed seeds	68.6	67	18	68	18	21.0