Water Quality Project Final Report

Field Biology

This report is an individual assignment. It should be written in the PAST TENSE (because you will be completing this report after your project is complete). When you are done, e-mail your work to dan.bregar@corvallis.k12.or.us with the subject line "per *X your name* WQ report".

Introduction:

This section of your report consists of a description of your question and background information about your project. Most of this information should come from your Water Quality Project Proposal.

In one paragraph, explain your "What is the Relationship Between" question. Add some supporting details to clarify the purpose of your study.

In another paragraph, describe the water quality parameter you included in your question. Explain what the parameter is and why it is important for water quality.

In a third paragraph, describe the second factor in your question. Add supporting information explaining the ecological importance of this factor.

Methods:

This section of your report will contain two step-by-step lists of instructions – one for your water quality parameter and one for the second factor in your question.

Make sure that your instructions are clear, detailed, and describe the actual steps you took to make your measurements.

Results:

This section of your report will describe the information you found and include data tables (NOT graphs!) that summarize the measurements and calculations you made.

This section should consist of 2-4 Excel data tables. Two or three of these tables will be the individual daily data that you collected the week before Winter Break and last week. The other table will be a combined data table (if it makes sense to do this with your data). Make sure your units show up in the column headings, not along with your data itself.

Discussion:

In this section of your report, you will use your data to answer your question. This section will include graphs that show the trends in your data along with your interpretation of those graphs and an overall critique of your study.

You will need to have one graph for each of your data tables. That means you will have 2-4 graphs. The graphs should be X-Y scatter plots with your 2nd factor on the X-axis and one water quality parameter on the Y-axis. Use Excel to add a trendline to each graph showing the correlation between the water quality parameter and your 2nd factor. You will need to replace any verbal descriptions with numbers (Excel cannot create scatter plots from words).

For your written analysis, answer the following questions (in paragraph form) for EACH graph:

1. What was the correlation that your data shows – positive (up and to the right); negative (down and to the right); or none (horizontal line)?
2. What does this correlation tell you about the answer to your question for this water quality parameter?
3. What ecological factors do you think might have caused the correlation (or lack thereof) that you see? (You do not need to answer this for daily data graphs that show identical trends.)

Your response to these questions should be about 2-3 sentences in length for each graph in your report.

Here is an example of what your final report should look like:

Water Quality Final Report – Nitrates and Animal Waste

Introduction:

The question I asked for my study was "What is the relationship between nitrate levels of the Willamette River and the amount of animal waste along the shore of the river?" I was interested in seeing if there was any correlation between the amount of visible animal waste and the amount of nitrates (NO_3^-) in the Willamette River. Animal waste is rich in nitrogen, so I thought it might increase the amount of nitrogen in the river.

Nitrates are compounds of nitrogen and oxygen that are created by biological organisms. Nitrogen is essential for life and is a component of DNA. Animals produce nitrates in their waste as a byproduct of metabolism. Nitrates are considered a fertilizer and a pollutant – they can help plants and other organisms grow, but in high quantities, nitrates can cause bacterial blooms in water that deprive other organisms of oxygen.

Animal waste consists of urine and feces produced by organisms. Urine is generally not visible; however, feces takes a while to decompose so it can be detected for several hours or days after it is produced. Animal waste consists of water, nitrates and other nitrogen compounds, undigested or partially digested foods, and intestinal bacteria. When animals generate waste near a river or lake,

there is potential for some of the waste to be washed into the water during rain storms.

Methods:

Nitrates –

1. We collected a small sample of water near the shore of the Willamette River
2. In the lab, we attached a nitrate sensor to a laptop computer
3. We calibrated the sensor by using known solutions of 0 mg/L nitrogen and 10 mg/L nitrogen
4. After calibrating the sensor, we tested our calibration on 0 mg/L nitrogen and 10 mg/L nitrogen solutions
5. Finally, we tested the nitrate levels in our sample and recorded them on our data sheet

Animal Waste –

1. At each spot where we collected data, we looked for 10 meters upstream and 5 meters away from the bank for any visible animal waste
2. Any time we spotted animal waste, we estimated the amount (in grams) and tried to identify what kind of animal it came from
3. We spent five minutes searching each site so we had an equal chance of finding animal waste in each spot

Results:

The data tables below summarize our findings:

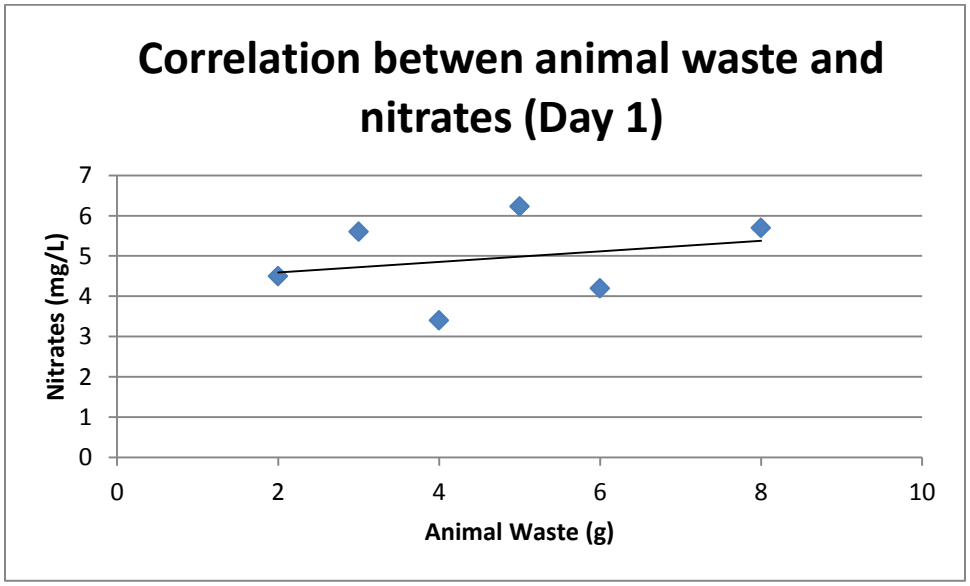
Day 1	
Animal Waste (g)	*Nitrates (mg/L)*
3	5.6
5	6.23
2	4.5
8	5.7
4	3.4
6	4.2

Day 2	
Animal Waste (g)	*Nitrates (mg/L)*
3	0.8
5	0.6
2	0.3
8	0.4
4	0.7
6	0.2

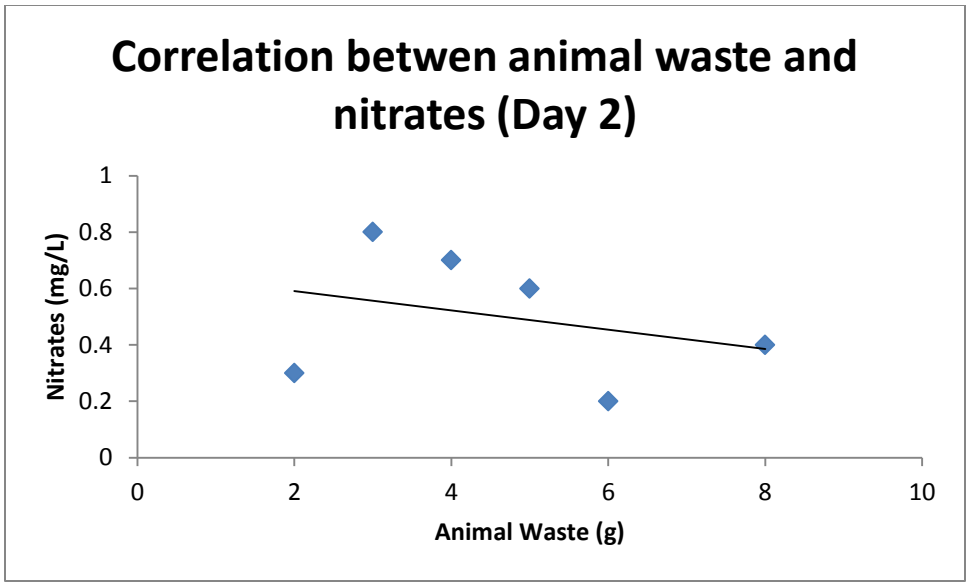
Days 1 and 2 combined	
Animal Waste (g)	*Nitrates (mg/L)*
3	0.8
5	0.6
2	0.3
8	0.4
4	0.7
6	0.2
3	5.6
5	6.23
2	4.5
8	5.7
4	3.4
6	4.2

Discussion:

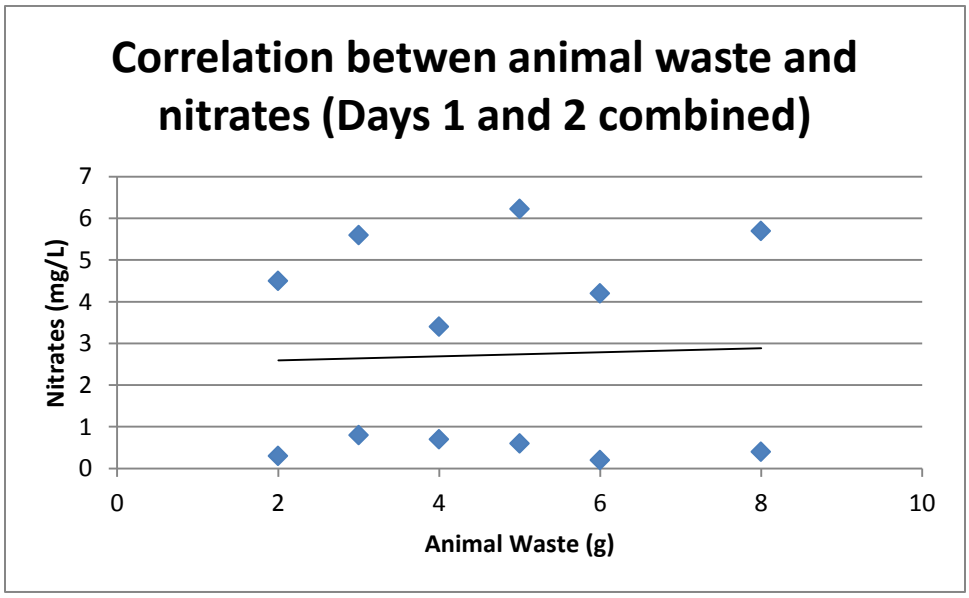
The following graphs show the correlations we observed between the nitrates, conductivity, and visible animal waste.



This graph shows that there is a slight positive correlation between the amount of nitrates we measured and the amount of animal waste in each location on this date. This indicates that as nitrate levels increase, the amount of animal waste increases as well. If this result is accurate, it seems to us that the most likely reason for this is that nitrogen from the animal waste wasted into the river, increasing the nitrate levels in the water.



This graph shows that there is a slight negative correlation between the amount of nitrates we measured and the amount of animal waste in each location on this date. This indicates that as the amount of nitrates in the water increases, the amount of animal waste decreases. If this result is accurate, it could be because the animal waste interacts with some other chemicals in the soil, preventing the soil from releasing nitrates in the water.



This graph shows that all of our data combined shows a very slight positive correlation between the amount of nitrates we measured and the amount of animal waste in each location on this date. This indicates that overall, nitrates increase as the

amount of animal waste increases as well. It seems to us that the most likely reason for this is that the animal waste contains chemical compounds that wash into the water, increasing the amount of nitrates in the water.