Merit

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What is the water quality of the Manawatu River? To answer this question our class did three different investigations using several types of investigation.

The first investigation was pattern seeking, the aim of this investigation was to find trends in nitrogen and phosphorous levels along the Manawatu River. Pattern seeking was an appropriate type of investigation as we were looking for trends and patterns that show if the use of the areas surrounding the river affect the levels of nitrogen and phosphorous within the river. Pattern seeking helped find those trends as we were comparing sample location and levels of nitrogen. To find these patterns we looked at graphs and maps showing the levels of nitrogen and phosphorous and the locations of different water samples. We looked at if there were patterns in levels of nitrogen and phosphorous in each sample, if and how the use of the area surrounding the river affected this. We used this type of investigation as it was the most effective at finding an answer to our question compared to fair testing as we didn't do any test, classify and identify as we weren't grouping things, or any of the other types of investigation. At the end of this investigation, I concluded that there are trends in the levels of nitrogen and phosphorus. One of the trends I found was that throughout the samples from the river there were similar levels of nitrogen and phosphorus almost constantly. Another trend is that river water samples taken near farmland usually had higher levels of nitrogen and phosphorous as these are prominent chemicals in fertilizer which tends to runoff into our rivers. An example of this was sample 1 1, which had the second highest levels of phosphorous and high levels of nitrogen with 0.76mg/l of nitrogen and 0.065mg/l of phosphorous which was taken near farmlands. This investigation answers the overarching question, what is the water quality of the Manawatu River? Because through this investigation I found out that the quality of the river changes throughout the course of the river, at some parts there's more nitrogen and phosphorous then others due to how the area around it is being used, at these parts the quality of the river is worse than other places.

The second investigation was exploring and observing, the aim of this investigation was to find out if there are ions in the Manawatu River. Exploring and observing was an appropriate type of investigation as we were exploring how the different water samples from along the river conducted electricity. We observed the multimeter reading. This investigation type allowed us to get clear results and helped us to fulfill the aim of our investigation. We used the investigation type of exploring and observing as it allowed us to come to a better conclusion then if we were to use another type of investigation, for example we wouldn't use fair testing because we didn't need to change anything with each test. If we wouldn't use modeling as we weren't predicting anything. Looking at all the different types of investigation, observing and exploring seemed the most appropriate choice. Using exploring and observing I was able to conclude that there are ions in the Manawatu River. I know this as I observed that the multimeter readings ranged between 04.-06. Milliamps for all the samples. This means the water samples could conduct electricity, as there must be ions present in the water for it to conduct electricity. This investigation helped me to answer the overarching question as too many ions in a river is bad and could lower the quality of the river. Too many ions within the river could be due to pollution and could be a sign of dangerous chemicals such as phosphates, nitrates, and other metals in our rivers.

The third and last investigation we did was classifying and identifying, the aim of this investigation was to find out what specific ions were present in the Manawatu River. Classifying and identifying was an appropriate type of investigation to answer this question as we looked at which samples contained different ions, put them in groups and identified what samples contained these ions, what ones had low levels, medium levels, and high levels. We used classifying and identifying instead of one of the other types of investigation as this one allowed us to get better and more useful results than if we used a different type of investigation. For example, we wouldn't have used pattern seeking as we weren't looking for patterns or trends and we wouldn't use modeling as we weren't using models. Classifying

and identifying was the most reasonable and effective type of investigation to answer this question. Using classifying and identifying, I concluded that the Manawatu River contains chloride, phosphate, and nitrate and what levels of these ions are present in each sample. All the samples had low levels of nitrate and most samples also contained low levels of phosphate. However, two of these samples, 2 and 5, had higher levels that sat between medium and low. This investigation helped answer the overarching question as it helped me find out which ions are present in the river and what level of them are present.

These three investigations help to answer the overarching question of, what is the water quality of the Manawatu River? As I learnt about different things that could affect the quality of the water such as what ions are in the river and what levels of those ions are present throughout the river. Using several types of investigation allowed me to look at how different things affect water quality and how. After these investigations I have concluded that the quality of the Manawatu River depends on what area of the river you test. The river is filled with ions such as Phosphate, Nitrate, and chloride. Too much of these ions can cause problems with the quality of the river such as causing algae to over grow or to harm or kill invertebrate and fish. Water quality of the Manawatu River isn't great and needs to be improved.