

My Water Quality Book

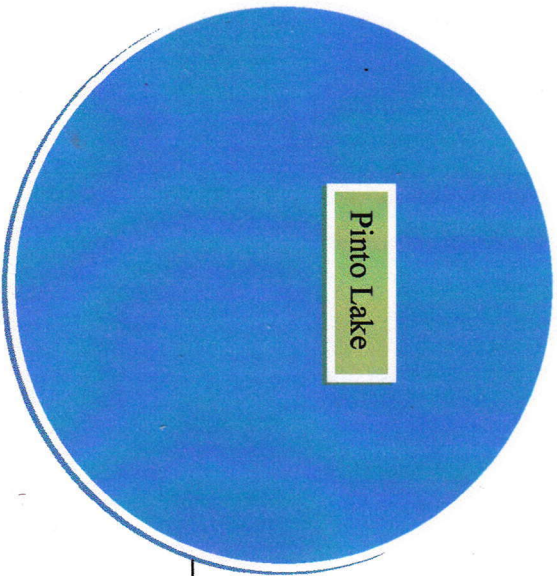
My interests...



I became interested in investigating the water quality of the Pajaro River watershed since it has been discovered that blue-green algae from Pinto Lake, a place where I often spend time with my family, is the cause of several sea otter deaths. This *cause-effect* relationship made me wonder if I could detect additional harmful water quality factors.

by Deyan

Pajaro River watershed



Corralitos
Creek

Pajaro
River



Researching information...

Curious about water quality measurements, I bought a water quality kit which provided information. From this, I discovered some interesting

facts:

1. **Nitrate** is a nutrient needed by all aquatic plants to build protein. The decomposition of dead plants and animals and the excretions of living

animals release **nitrate** into the aquatic system. Excess nitrate increases plant growth and decay, promotes bacterial decomposition and decreases the amount of dissolved oxygen (DO) in the water. Other sources of nitrate are: sewage, fertilizer, and agricultural run-off. An interesting fact about nitrate in our drinking water is that it can

affect the ability of our blood to carry oxygen.

2. **Phosphate** is a nutrient needed for plant and animal growth and is also a fundamental element in metabolic reactions. High levels of this nutrient can lead to overgrowth of plants, increased bacterial activity, and decreased dissolved oxygen (DO) levels. **Phosphate** comes from human and animal excretions, industrial

pollution, and agricultural run-off.

3. The **pH** of clean water is 7, which is neutral. The pH scale ranges from 0 (acidic) to 14 (basic).

4. **Dissolved oxygen (DO)** is the amount of oxygen in the water. This varies based on many factors: water temperature (the colder the water, the more **DO** there is), the amount of vegetation (the more

plants, the more oxygen in the water), etc.

5. **Water temperature** is very important to water quality. Temperature affects the amount of dissolved oxygen in the water, the rate of photosynthesis by aquatic plants, and the sensitivity of organisms to toxic wastes, parasites, and disease. Thermal pollution, the discharge of heated water from

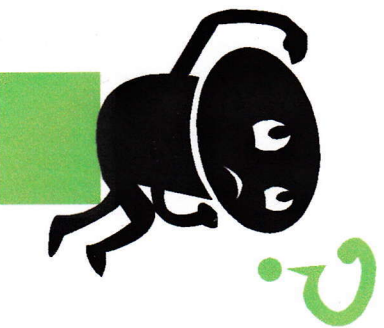
industrial operations, for example, can cause temperature changes that threaten the balance of aquatic systems.

6. The presence of **coliform bacteria** indicates sewage or fecal contamination. It should not be found in well water or other sources of drinking water.

Research question

My research question is: What is the nitrate level at:

- a. School
- b. Filtered
- c. Pinto Lake
- d. Corralitos Creek
- e. Pajaro River



Is my RQ testable?

Since I will be using tools to collect and measure the nitrate level at these four locations, yes, my research question is testable.



Data collection...

To answer my research question, I will need to collect the nitrate level at all sites.

- a. School
- b. Filtered
- c. Pinto Lake
- d. Corralitos Creek
- e. Pajaro River

Type of inquiry...

Of the three types of inquiry:

- (a) observation
- (b) investigation
- (c) experiment

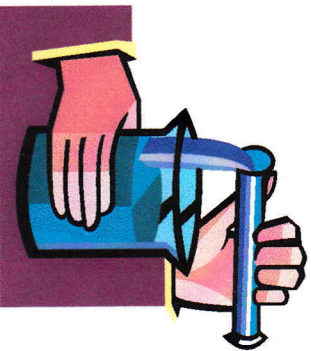
my type of inquiry is an investigation because we are trying to find out if these sites have nitrate in the water.



Tools I need...

I realize that the **tools** I will need are:

Water quality kit
Thermometer
Rubber boots
A datasheet
Pencil



Recording my data...

I designed my own datasheet to write down (**record**) my water quality measurements.



My datasheet looks like this...

Table 1. *nitrate* level

School	5 ppm
Filtered	2
Pinto Lake	2
Corralitos Creek	3
Pajaro River	40

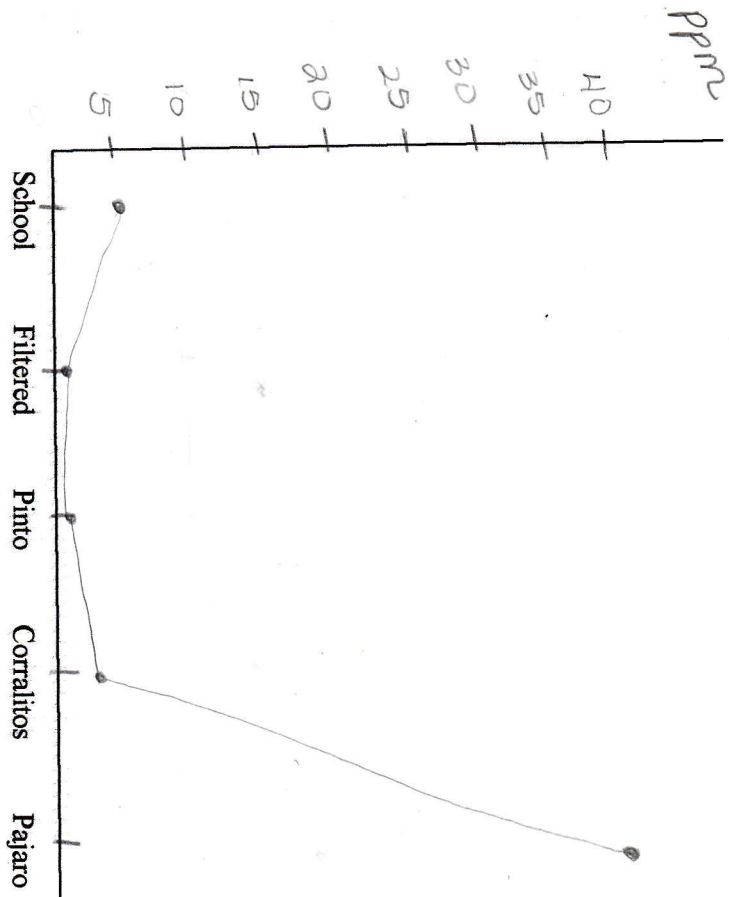
Our class datasheet looks like this:

Table 2. All water quality factors

	Nitrate	Phosphate	pH	DO	Temp	Bacteria
School	5	1.5	7	5	22.5	pos
Filtered	2	2	7	6	20.5	neg
Pinto Lake	2	1	8	5	23	pos
Corralitos Creek	3	2	8	5	22.5	pos
Pajaro River	40	2	8	5	22	pos

- *Nitrate: 5 ppm (low) – 40 ppm (high)
- *Phosphate: 1 ppm (low) – 4 ppm (high)
- *pH: 4-6 (acidic); 7 (neutral); 8-10 (basic)
- *DO: 0 ppm (low) – 8 ppm (high)
- *Temperature: Degrees Celsius
- *Bacteria: negative (red); positive (yellow)

My graph for Table 1 looks like this:



Data Analysis

(a) My interpretation of the data is

the highest nitrate level is at school and Pajaro River.

_____.

(b) Possible explanation as to why?

The school's water pipes are old and dirty. Ms. Lisa collected a water sample at the water treatment plant where the Pajaro river is nearby Strawberry fields.

(c) *An alternative explanation*

is... The students at school put their mouths on the water fountains. The Pajaro River by the water treatment plant is near a huge Strawberry field. Maybe the nitrates from the fertilizer and animal feces ↑ the nitrate level to 40 ppm.

Conclusion...

The evidence suggests that

the nitrate level is higher at school and the Pajaro River. The other locations: Filtered, Pinto, and Corralitos Creek have a lower Nitrate level.

Present findings to the community



Report your findings

Answer questions

Compare your results with other scientists

Collaborate with scientists on another study

Consult with Melissa Miller DVM, who discovered (along with her team), the cause-effect link of blue-green algae and sea otter deaths.

The high nitrate level
(40 ppm) most likely is
contributed to nitrates
added to the fertilizer for
the strawberry fields and
or animal feces.

***My thoughts and feelings
about doing science are...***

I think that it's been
fun because we got to do
things that I haven't done
yet; it was something
new for me. I also like
it because we learned
things but in a nice fun
way.

***How we can all protect our
watershed:***

1. Clean up Pinto Lake!
2. Don't litter, pick up
trash, and recycle.
3. Support organic
farmers.
4. When gardening, use
non-toxic insecticides
and pesticides.

