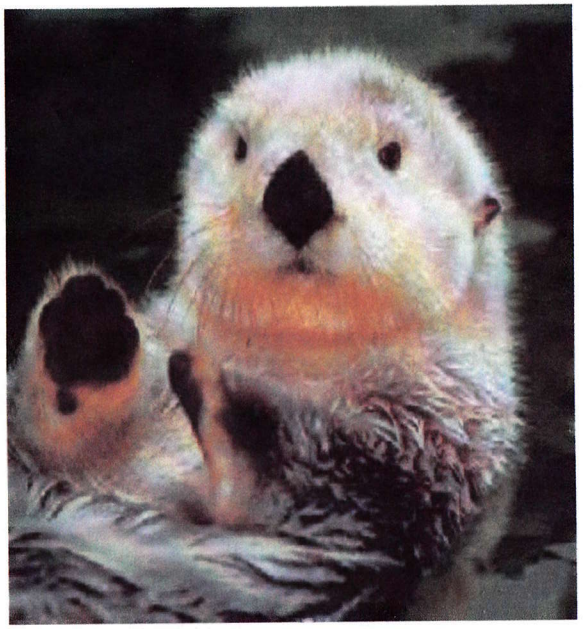
My Water Quality Book

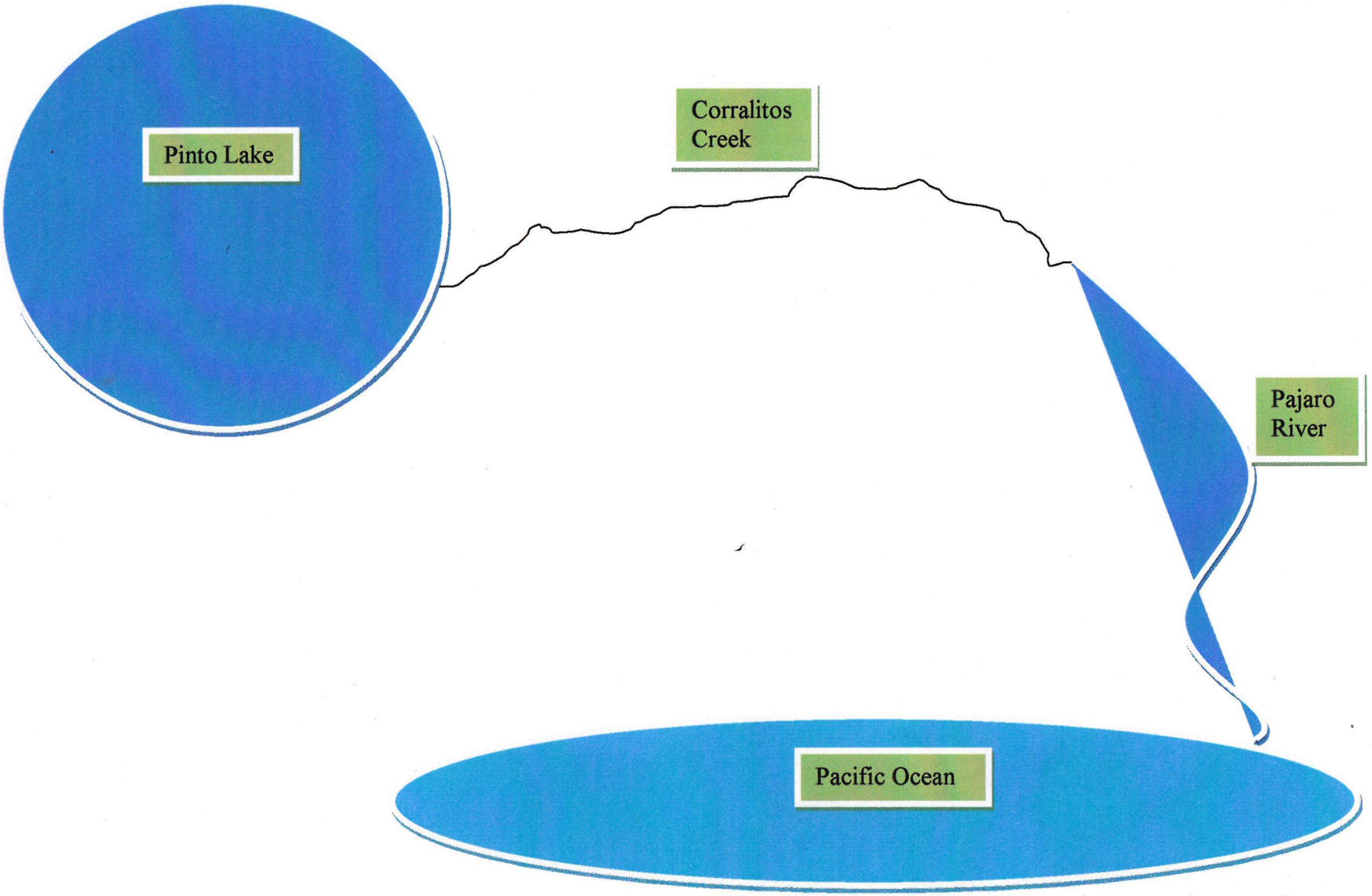


by MaKayla

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.

Pajaro River watershed



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 dissolved Oxygen & temperature 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 DO & temp level at these four locations, yes, my research question is testable.

Data collection…

To answer my research question, I will need to collect the DO & temperature 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're trying to find out how much oxygen is in the water at each site and we are measuring the temperature at each site.

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. Do & Temp **level**

School	5
Filtered	6
Pinto Lake	5
Corralitos Creek	5
Pajaro River	5

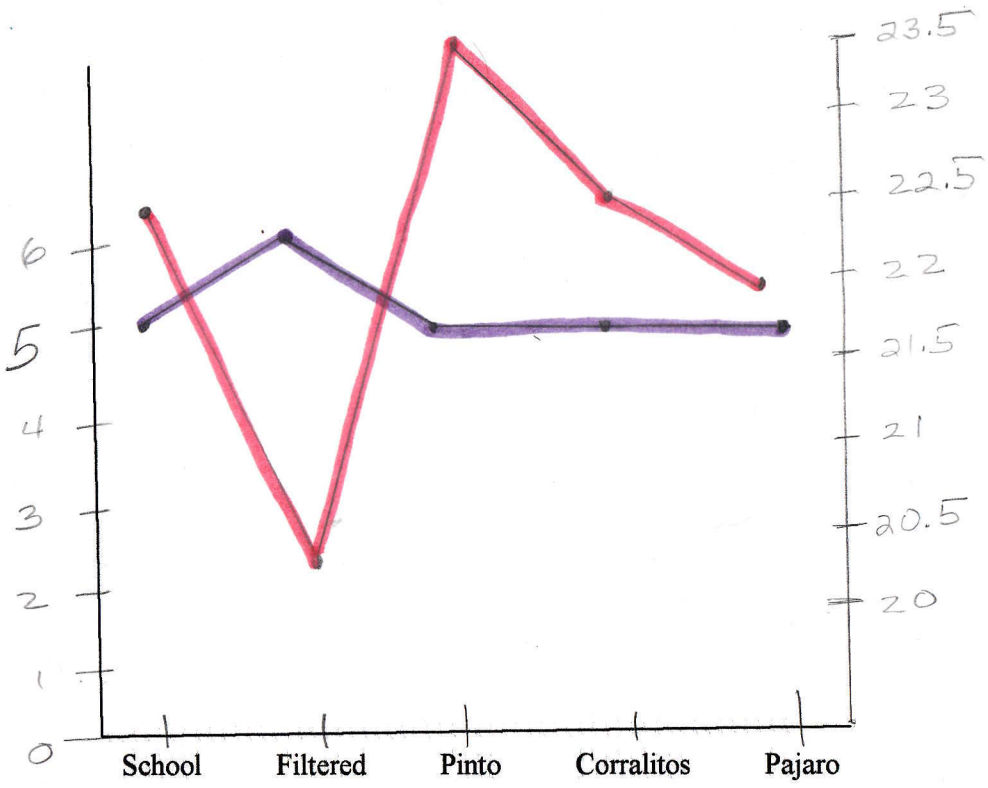
Our class datasheet looks like this:

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	23.5	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:



DO purple
Temp red

Data Analysis

*(a) My **interpretation** of the data is*

the DO level is the highest for filtered water, and also the temp for filtered water is the lowest.

*(b) Possible **explanation** as to why?*

The filtered water was in a metal canteen and that kept the water cool. Since the filtered water is the coolest, the DO is the highest.

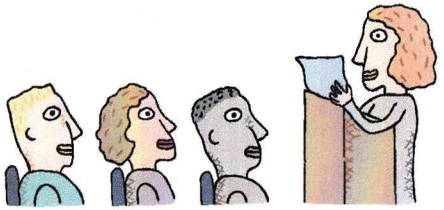
*(c) An **alternative explanation** is...* the dissolved oxygen is 9 at all the other sites because the temperature is pretty much the same at all the other sites.

Conclusion...

The evidence suggests that

when the temperature is lower the dissolved oxygen is higher.

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.

Perhaps the other sites, other than filtered water, were exposed to the sun and this is why their temps were slightly higher & DO slightly lower.

My thoughts and feelings about doing science are…

I think that science is great because you get to learn more experiences. And, you learn a lot of different things to do. But, it is also really fun.

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.