

Water Contamination in Atlanta Area

Kimiya Rezaamiri, Woodward Academy

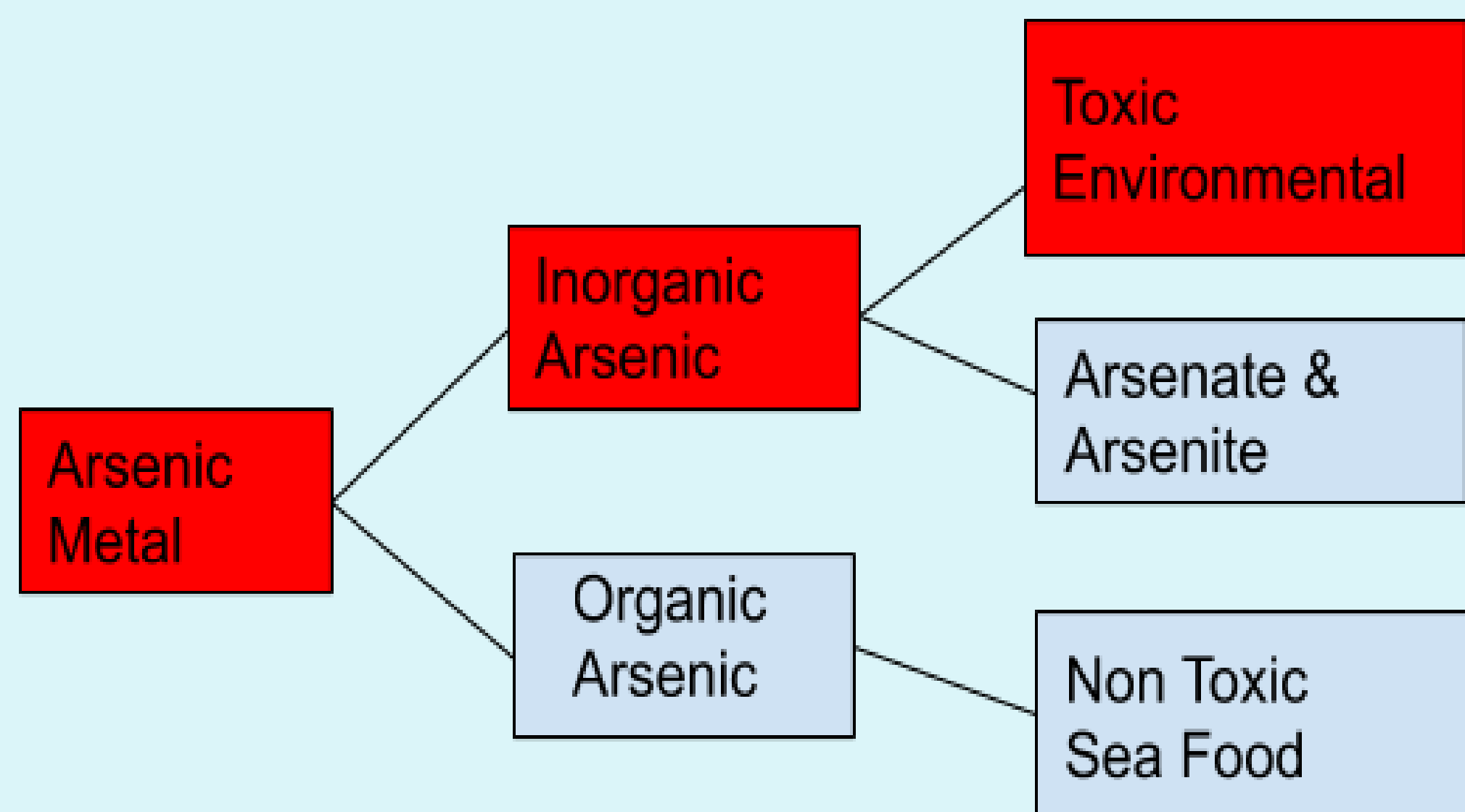
11th grade

OBJECTIVE

This experiment was focused to expand the data available on the local water supply and to determine potential contaminant source around the Atlanta area.

INTRODUCTION

Several recent studies have found evidence of Arsenic in local drinking water, including the water found in Dekalb County and Atlanta prison AREAS. What is Arsenic?



Inorganic Arsenic is the toxic form. The most common human health effect:

- Carcinoma
- Respiratory diseases
- Skin diseases such as Melanoma.

The Major Source of Arsenic is ground water.



SAMPLING LOCATIONS

Samples were collected from nine rivers and streams within the fifteen-mile radius of Atlanta, Georgia.

1. Yellow River - Yellow River Park
2. Chattahoochee River - Chattahoochee National Park.
3. Flint River
4. South River

5. Nancy Creek Stream
6. Peachtree Creek Stream
7. Sope Creek Stream
8. Lullwater Creek Stream
9. Sweetwater Creek Stream



MATERIALS & METHODS

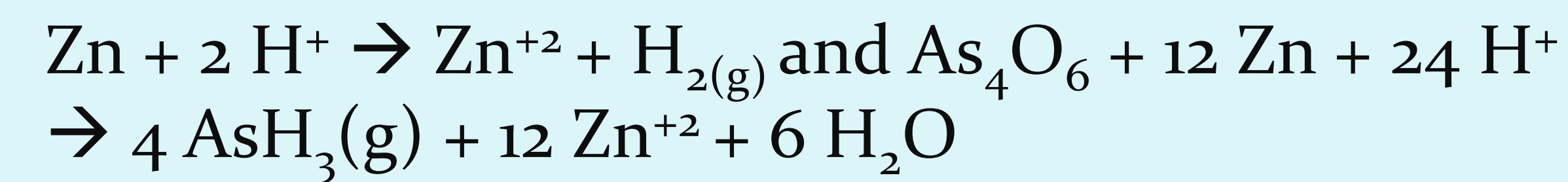
Three samples were collected from each of the nine different rivers over a one-month period and run on the Quick™ rapid Arsenic test kit (#481396-5). The samples were freshly drawn with no preservatives and run within 8 hours after being collected from source. For best results, water temperature was kept between 22 to 28C.

1. About 100 mL of sample was added to the reaction bottle, quickly followed by First Reagent. The bottle was then closed with a yellow cap and shaken vigorously for 15 seconds.
2. Second Reagent MPS was added to the bottle and shaken for 15 seconds, then let sit for 2 minutes.
3. Third Reagent Zinc was added and shaken vigorously for 5 seconds.
4. The yellow cap was then replaced with a white cap that had an arsenic test strip inserted with the red line facing the back of the turret.
5. The bottle was left undisturbed for 10 minutes. After that, the test strip was removed and the color results recorded.



RESULTS

The test kit detect free inorganic arsenic only. The reduction reactions utilized in the kit are as follows:



Location of Sample Collected	First Test	Second Test	Third Test
Yellow River	0 ppb	0 ppb	0 ppb
Chattahoochee River	0 ppb	0 ppb	0 ppb
Flint River	0 ppb	0 ppb	0 ppb
South River	5 ppb	5 ppb	5 ppb
Nancy Creek Stream	0 ppb	0 ppb	0 ppb
Peachtree Creek Stream	0 ppb	0 ppb	0 ppb
Sope Creek Stream	0 ppb	0 ppb	0 ppb
Lullwater Creek Stream	0 ppb	0 ppb	0 ppb
Sweetwater Creek Stream	0 ppb	0 ppb	0 ppb

The kit can reliably measure arsenic level from 0 to 500 ppb when using correctly. Based on the results obtained here, the amount of arsenic in 8 out of 9 rivers studied were found to be free of arsenic at 0 ppb. However, one of the sample collected from the South River, which is by the airport, was found to be slightly positive for the presence of arsenic at 5 ppb. Further monitoring of arsenic level for this river is recommended.

CONCLUSION

The EPA and WHO allows a maximum contamination level of 10 ppb for arsenic in drinking water. This allowed me to conclude that most free public waters in the Atlanta area have a low level of arsenic, but that in the South River, which is by the airport, may require remediation in the future.

REFERENCES

Aziz SN, Boyle KJ, Rahman M. Knowledge of arsenic in drinking-water: risks and avoidance in Matlab, Bangladesh. *J Health Popul Nutr.* 2006;24(3):327-335.