# Radical Expressions: Polution

If our rivers and oceans are to be preserved for future generations, we need to work to eliminate pollution from our waters. If a river is flowing at 1 meter per second and a pollutant is entering the river at a constant rate, the shape of the pollution plume can often be modeled by the simple equation where y is the width of the plume and x is the distance from the source (both in meters)

A long straight river, 100 meters wide, is flowing at 1 meter per second. A pollutant is entering the river at a constant rate from one of its banks. As the pollutant disperses in the water, it forms a plume that is modeled by the equation , where x is the distance from the source in meters and y is the width of the plume in meters. How far down river from the source of the pollution does the plume reach the other side of the river?

## River Pollution



Photograph by Kaentian Street

Waste filled water is dumped into a river, polluting it for the people and animals who use it as a source for eating and drinking. [[1]](#footnote-1)

1. Complete the table.

|  |  |
| --- | --- |
| x |  |
| 25 |  |
| 49 |  |
| 100 |  |

1. Graph the results to visualize the pollutant plume. Imagine that the river is flowing from left to right, parallel to the x-axis, with the x-axis as one of its banks. The pollutant is entering the river from the bank at (0,0)

Chart, line chart

Description automatically generated

1. How far down river from the source of the pollution does the plume reach halfway across the river?
2. How far down river from the source of the pollution does the plume reach the other side of the river?

For discussion see:

<https://www.sciencefriday.com/videos/breakthrough-bitter-water/>

1. <https://www.nationalgeographic.org/encyclopedia/point-source-and-nonpoint-sources-pollution/> [↑](#footnote-ref-1)