The Science Club at Lake Front School noticed that their lake was suffering from an *algal bloom*. An algal bloom is when algae grow and reproduce at very high rates. These “blooms” can kill off other organisms in the lake. Algal blooms can be caused by adding too many nutrients to a body of water. Fertilizer applied to fields and lawns are one source of these algal bloom-causing nutrients.

There are several farms around Lake Front School. The letters on the map below show where the farms are. The students think that some of these farms may be using too much fertilizer which ends up washing into the streams that flow into the lake. A local scientist visited the Science Club and encouraged the students to measure nitrate levels in the streams at each of the farm sites to determine where the fertilizer pollution is coming from.

Rivers and streams normally contain around 2 mg/l of nitrates. A river polluted with fertilizers can have up to 30 mg/l of nitrates (mg/l = milligrams per liter). The students visited each farm and collected data on nitrates as well as elevation of the farms. Their data are presented in the table below.

**Lake Front School Watershed Map**

**.**



**.**

A

B

D

**.**

**.**

C

**.**

School

Lake

E

**.**

F

DATA TABLE

**Data Collected From Farms Around Lake Front School**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Site  | A | B | C | D | E | F |
| Nitrates (mg/l) | 28 | 1.5 | 13 | 2 | 11 | 1.9 |
| Elevation (ft) | 350 | 212 | 65 | 285 | 79 | 410 |

The Science Club wants to meet with the farmers who are responsible for the fertilizer contamination but want to make sure that they have the right individuals.

Tom, one of the students in the club, presents the following argument: “Farms A and C are the most likely sources of fertilizer pollution. Nitrate measures taken in the streams by their farms (28 mg/l at A and 13 mg/l at C) are the highest recorded values at any of the farms in the area. The high readings in the streams by these two farms indicate that fertilizer is running off of their fields into the streams and ultimately into the lake.”

Another member of the Science Club, Michelle, presents this argument: “Farms C and E are the most likely sources of fertilizer pollution. These two farms have fairly high levels of nitrates (13mg/l at C and 11 mg/l at E) and they are closest to the lake. The other farms are far enough away that their nitrates will not make it to the lake.”

**Directions:** Examine the data in the table, the map, and both Tom’s and Michelle’s arguments. Also, think about what you know about water systems and elevation. Then, write an essay addressed to the Science Club at Lake Front School.Your essay should make a claim identifying the two farms you believe are most likely to be the sources of fertilizer pollution and should include the following components:

* A critique of Tom’s and Michelle’s arguments.
* An argument including the claim of the two farms you believe are the sources of pollution, evidence to support your claim, and reasons why the evidence you use supports your claim.