

ACTIVITY- GROUNDWATER CONTAMINATION

The problem: While replacing its underground gasoline storage tanks, a gas station discovers that the old tanks had been leaking. You have been hired as environmental consultants to investigate the contamination so it can be cleaned up. Because there is a limited amount of money available, you're going to follow these steps:

- 1) Pick three locations on the map to drill monitoring wells. These wells will tell you the elevation of groundwater (hydraulic head) and the concentration of benzene (a harmful pollutant in gasoline) present at that location. *[When you've decided on locations, bring them to me and I will tell you the results.]* Using the hydraulic head at the three wells, you should be able to tell which direction groundwater is flowing now.
- 2) Using the information you gained in Step 1, decide where to drill three final monitoring wells. *[Again, bring me the locations and I will give you the results.]*
- 3) Mark neatly on the map the direction groundwater is flowing and the estimated extent of the contamination plume (how far the contamination has travelled). This will be given to the gas station owner that hired you to plan cleanup. In addition, you'll need to answer the three questions at the bottom of this page.

Data Table

| | | | | |
|--------|---------|------|------------|------------------------------|
| | | | | <i>(parts per billion)</i> |
| | | | | ↓ |
| Well 1 | Column: | Row: | Head (ft): | Benzene concentration (ppb): |
| Well 2 | Column: | Row: | Head (ft): | Benzene concentration (ppb): |
| Well 3 | Column: | Row: | Head (ft): | Benzene concentration (ppb): |
| Well 4 | Column: | Row: | Head (ft): | Benzene concentration (ppb): |
| Well 5 | Column: | Row: | Head (ft): | Benzene concentration (ppb): |
| Well 6 | Column: | Row: | Head (ft): | Benzene concentration (ppb): |

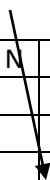
Final Questions

I. What was the highest concentration of benzene you found?

II. Each house in this rural area has its own water well (marked with a "W"). Which one is in the greatest danger of being contaminated? (The maximum allowed concentration of benzene in drinking water is 5 ppb.)

III. When water contaminated with gasoline is present beneath a building, harmful vapors can rise and seep into that building (under certain conditions). Are there any buildings we need to check for vapors?

water well



| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | |
|----|---|---------|---|---|---|------|---|---|---|---------|---|---|---|---|-------------|---|---|---|---|---|---|---|---|---|---|------|--|
| 1 | | | | | | road | | | | | | | | | | | | | | | | | | | | road | |
| 2 | | | | | | | | | | House A | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | House A | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | House A | | | | | W | | | | | | | | | | | | |
| 5 | | | | | | | | | | House A | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | House B | | | | | | | | tanks | | | | | gas station | | | | | | | | | | | | |
| 11 | | House B | | | | | | | | tanks | | | | | gas station | | | | | | | | | | | | |
| 12 | | House B | | | | | | | | tanks | | | | | gas station | | | | | | | | | | | | |
| 13 | | House B | | | | | | | | tanks | | | | | gas station | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | | | W | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | | | | W | | | | |
| 21 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 29 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | House D | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | House D | | | | | W | | | | | | | | | | | | |
| 32 | | | | | | | | | | House D | | | | | | | | | | | | | | | | | |
| 33 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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