Welcome to the Environmental Health Investigations Team!

Dear New Recruit,

Welcome to the Environmental Health Investigations Team at Metro City Public Health Department! We are thrilled to have you join our dedicated group of professionals committed to protecting and improving the health of our community.

Today marks your first day with us, and we have an urgent case that requires your immediate attention. Earlier this morning, we received a distressing letter from the concerned city residents outlining a series of peculiar and alarming events occurring in their community. After reviewing their concerns, we believe that this issue warrants an immediate investigation.

As a new member of our team, you will play a crucial role in this investigation. Your fresh perspective and detective skills will be invaluable in uncovering the root cause of these issues and developing effective solutions.

Attached, you will find a copy of the letter from the concerned residents, an investigation log for your records, and all the evidence we have collected so far. We kindly ask that you familiarize yourself with the case and begin your investigation as soon as possible.

We are confident that your skills and dedication will contribute significantly to the success of this investigation. Once again, welcome aboard! We look forward to seeing the positive impact you will make in your new role.

Best regards,

Loretta Vance

Dr. Loretta Vance
Environmental Health Investigations Team Manager
Metro City Public Health Department

Metro City Public Health Department – Investigation Log

Case File: Metro City Mystery - Environmental Health Investigation

Recruit Name: _____

Date: _____

Instructions:

As new recruits at the Metro City Public Health Department, you'll be solving puzzles to uncover the source of unusual events reported by Concerned Residents. Please record your answers carefully in this log. Dr. Vance will be reviewing your findings!

Puzzle 1: Source of concern

- What is contaminated (options include air, water, soil)? _____

Puzzle 2: Contaminant type

- What is the name of the contaminant? _____

Puzzle 3: Amount of contamination

- Moving diagonally from the top left square to the bottom right square, enter first digit in the column of each empty squre: _____

Final Code Entry: (To be completed after solving all puzzles)

- Final Code: _____
  combine all answers to form one passcode
  [For example, if the answers were (1) tree, (2) square, (3) 12345 your code would be treesquare12345. All letters should be lowercase]

Enter your final code at www.scienceserves.org/metro-city-department-of-public-health to log into the Metro City Department of Public Health System to see if you successfully identified the issue.

Letter from Concerned Residents of Metro City

To: Metro City Public Health Department

Dear Environmental Health Scientists,

We are writing to you with growing concern about a series of unusual events happening in our city. Over the past few months, our community has been experiencing a range of peculiar issues that have left us baffled and seeking expert assistance.

Initially, we dismissed these incidents as isolated occurrences, but the frequency and severity have escalated, prompting us to take action. We believe that there is an underlying cause that needs immediate investigation.

Some of the strange happenings include:

- Local pets are acting strangely – dogs are refusing to drink from their bowls, cats are hiding more than usual. Birds have stopped singing.
- Residents have noticed that plants in their gardens are either growing at an abnormally fast rate or, conversely, wilting and dying despite proper care.
- Some people have noticed their hair is becoming brittle or falling out more than usual. A few residents have mentioned changes in the appearance of their fingernails – unusual ridges or discoloration.

As concerned residents, we cannot ignore these signs any longer. We are turning to you, experts in environmental health, to help us uncover the truth and find a solution.

Your expertise and guidance are crucial in addressing this mystery and ensuring the well-being of our community. We kindly request your assistance in investigating these issues and providing us with the necessary support to resolve this matter.

Thank you for your time and consideration. We look forward to your prompt response.

Sincerely,

Concerned Residents of Metro City

Evidence #1

From: Dr. Loretta Vance

Please handle this note and recovered file with care. Intern Miller's work, while incomplete, may contain valuable insights into the anomalies we are investigating.

The grid puzzle is their final attempt at presenting this data. Please prioritize its completion and report any findings to Dr. Vance upon her return.

August 12th — Project: Anomaly Visualization – Preliminary Draft

I'm trying to create a visual representation of the data Dr. Vance gave me, but it's proving... challenging. The sheer volume is overwhelming, and I'm struggling to find a pattern that makes sense.

I was experimenting with a grid system, assigning numerical values to different indicators. Dr. Vance thought it might be a good way to highlight potential correlations.

Unfortunately, I ran into some serious system errors. The file got corrupted and scattered across multiple backups. I've managed to recover most of the pieces, but it's a mess.

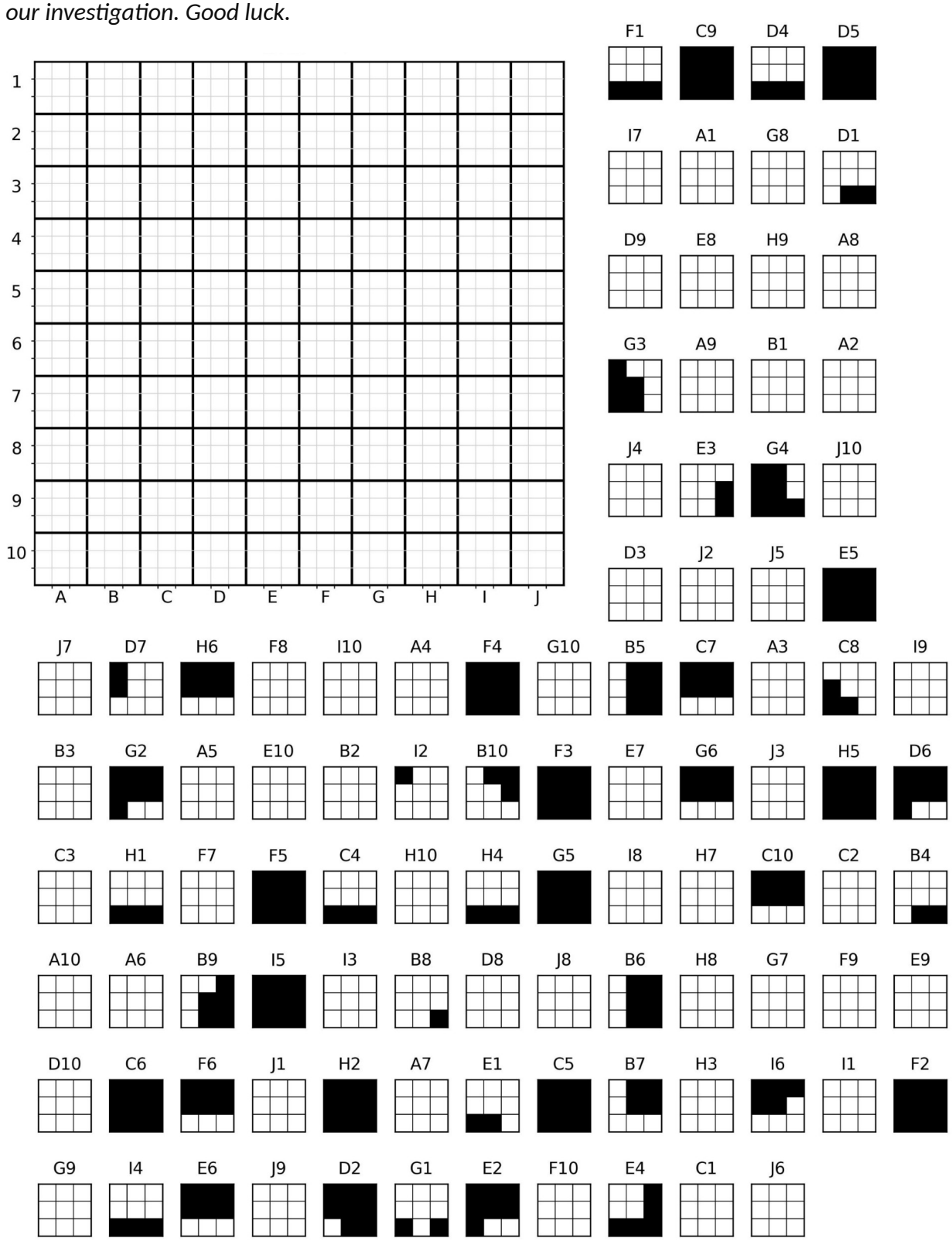
I was hoping Dr. Vance would have time to review this before I left for the summer, but things are hectic here. If you're reading this, please try to complete the grid. The image should reveal what I was trying to show — hopefully it makes more sense to someone else than it does to me.

I really hope this helps...

K. Miller

Intern – Metro City Department of Public Health

Instructions: *Complete the grid according to the provided key. Once filled, the image should reveal a crucial piece of information related to our investigation. Good luck.*



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Evidence #2

From: Dr. Loretta Vance

Excellent work, recruit! You've successfully decoded the image from Intern Miller's file. That was a clever application of logic and observation. I am extremely pleased with your progress!

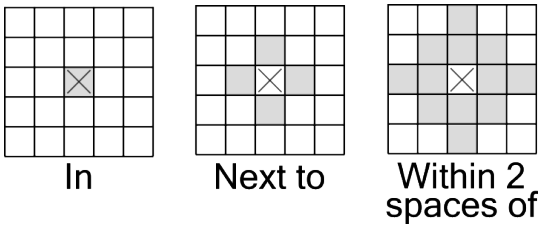
We've received a composite sample from one of the homes of our Concerned Residents – a residence experiencing a concerning overlap of issues: rapidly wilting plants, brittle hair, and discoloration of fingernails. This is a high-priority case, recruits!

The lab is currently analyzing this sample, but the initial results are... perplexing. The advanced contaminant identification processor they use has unfortunately malfunctioned! It's spitting out a series of prompts it uses to identify contaminants, but the output is scrambled.

Your task is to use your skills of deduction to help us figure out which contaminant is the culprit. We need to decipher these prompts and pinpoint the source of this troubling situation.

How to Find the Contaminant: Step by Step Instructions:

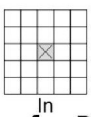
1. **Understand the Grid:** You'll be working with the grid on the next page. Each square represents a specific element from the periodic table that could be your contaminant.
2. **Read the Clues Carefully:** The clues provide information about the location of the contaminant within the grid. These clues will describe its relationship to other squares– for example, "in," "next to," or "within 2 spaces of."
3. **Eliminate Possibilities:** Use the clues to eliminate squares that *cannot* be the target square. For example, if a clue says "It is next to a tile containing '2'," you can eliminate any square that isn't adjacent to a '2'.

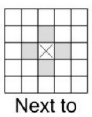


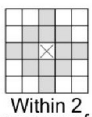
4. **Mark Eliminated Squares:** Clearly mark squares that you've eliminated (with an 'X' or pencil). This will help you keep track of your progress.
5. **Deduce the Location:** As you eliminate possibilities, you'll narrow down the options until only one square remains. That remaining square is where the contaminant is located!
6. **Confirm Your Answer:** Double-check your work against all the clues to ensure that your answer fits every condition.

Samples

	1	2	3	4	5	6	7	8	9	10
A	19 K Potassium 39.098	19 K Potassium 39.098	20 Ca Calcium 40.078	92 U Uranium 238.029	33 As Arsenic 74.922	20 Ca Calcium 40.078	82 Pb Lead 207.2	26 Fe Iron 55.845	20 Ca Calcium 40.078	33 As Arsenic 74.922
B	92 U Uranium 238.029	19 K Potassium 39.098	19 K Potassium 39.098	92 U Uranium 238.029	92 U Uranium 238.029	82 Pb Lead 207.2	11 Na Sodium 22.99	92 U Uranium 238.029	26 Fe Iron 55.845	19 K Potassium 39.098
C	92 U Uranium 238.029	20 Ca Calcium 40.078	33 As Arsenic 74.922	33 As Arsenic 74.922	92 U Uranium 238.029	11 Na Sodium 22.99	26 Fe Iron 55.845	92 U Uranium 238.029	82 Pb Lead 207.2	11 Na Sodium 22.99
D	82 Pb Lead 207.2	26 Fe Iron 55.845	20 Ca Calcium 40.078	20 Ca Calcium 40.078	26 Fe Iron 55.845	82 Pb Lead 207.2	82 Pb Lead 207.2	82 Pb Lead 207.2	82 Pb Lead 207.2	82 Pb Lead 207.2
E	11 Na Sodium 22.99	20 Ca Calcium 40.078	33 As Arsenic 74.922	11 Na Sodium 22.99	92 U Uranium 238.029	11 Na Sodium 22.99	33 As Arsenic 74.922	19 K Potassium 39.098	26 Fe Iron 55.845	33 As Arsenic 74.922
F	33 As Arsenic 74.922	19 K Potassium 39.098	92 U Uranium 238.029	92 U Uranium 238.029	20 Ca Calcium 40.078	26 Fe Iron 55.845	20 Ca Calcium 40.078	20 Ca Calcium 40.078	11 Na Sodium 22.99	82 Pb Lead 207.2
G	26 Fe Iron 55.845	33 As Arsenic 74.922	20 Ca Calcium 40.078	82 Pb Lead 207.2	82 Pb Lead 207.2	20 Ca Calcium 40.078	33 As Arsenic 74.922	20 Ca Calcium 40.078	20 Ca Calcium 40.078	82 Pb Lead 207.2
H	11 Na Sodium 22.99	11 Na Sodium 22.99	19 K Potassium 39.098	20 Ca Calcium 40.078	82 Pb Lead 207.2	11 Na Sodium 22.99	26 Fe Iron 55.845	11 Na Sodium 22.99	26 Fe Iron 55.845	19 K Potassium 39.098
I	33 As Arsenic 74.922	19 K Potassium 39.098	26 Fe Iron 55.845	20 Ca Calcium 40.078	82 Pb Lead 207.2	33 As Arsenic 74.922	92 U Uranium 238.029	82 Pb Lead 207.2	20 Ca Calcium 40.078	11 Na Sodium 22.99
J	20 Ca Calcium 40.078	26 Fe Iron 55.845	19 K Potassium 39.098	19 K Potassium 39.098	92 U Uranium 238.029	82 Pb Lead 207.2	82 Pb Lead 207.2	20 Ca Calcium 40.078	11 Na Sodium 22.99	19 K Potassium 39.098


In


Next to


Within 2 spaces of

Clues:

- It is not within 2 spaces of a Potassium.
- It is not in or next to a Uranium.
- It is next to a Iron.
- It is not next to a Lead.
- It is not next to a Potassium.
- It is not next to a Arsenic.
- It is not in or next to a Arsenic.
- It is next to a Sodium.

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Evidence #3

From: Dr. Loretta Vance

Nice work figuring out the contaminant of concern! I don't know what we would have done without you! We are all incredibly grateful for your sharp mind and quick thinking.

While we were waiting for your results, we sent out a team to collect samples from all over the city to see if there might be other potential areas of contamination out there. Initial reports suggested that this issue might be localized, but we can't take any chances when it comes to public health.

The team has compiled the results of their sampling efforts into a grid – a visual representation indicating positive samples found throughout Metro City. However, the data is presented in a rather unusual format…

Your task now is to decipher thes data and identify the areas of Metro City where positive samples were detected. This will help us determine the extent of this contamination and prioritize our response efforts.

Decipering the Data: Step-by-Step Instructions

1. **Understand the Clues:** The numbers along the top and left sides of the grid are your clues. Each number represents a block of consecutive filled-in squares in that row or column.
2. **Start with the Largest Numbers:** Look for rows or columns that have large numbers close to the grid size. These are easiest to start with!
3. **Mark Filled-in Squares:** When you know a square must be filled in, mark it clearly (with an 'X' or pencil).
4. **Mark Empty Squares:** When you know a square cannot be filled in, mark it clearly (with an 'O' or pencil). This is just as important as marking filled-in squares!
5. **Check for Complete Blocks:** If a row or column has a clue that matches the number of squares available, you know those squares must be filled in.
6. **Consider Gaps:** If a row or column has multiple clues, think about how the blocks of filled-in squares must be separated by gaps.
7. **Deduction:** Use logic to eliminate possibilities and fill in more squares. Look for rows or columns where you can definitively determine whether a square is filled or empty.
8. **Repeat:** Keep repeating steps 3-7 until the entire grid is complete!

Tips for Success:

- **Start with the Most Specific Clues:** Look for clues that give you the most precise information.
- **Be Systematic:** Work through each clue carefully, one at a time.
- **Visualize the Grid:** Try to picture how the clues affect the grid and eliminate possibilities accordingly.
- **Don't Guess:** Tile Trek is about logic, not guessing!

Grid of Contaminant Samples from Around Metro City

			15	131	1221	63	2212	62	41	52	312	1311
	4	3										
	2	6										
	2	5										
1	6	1			■	■	■					
2	5	1										
	4	1	■	■	■							
3	1	2										
1	1	2										
1	3	2										
	3	3										