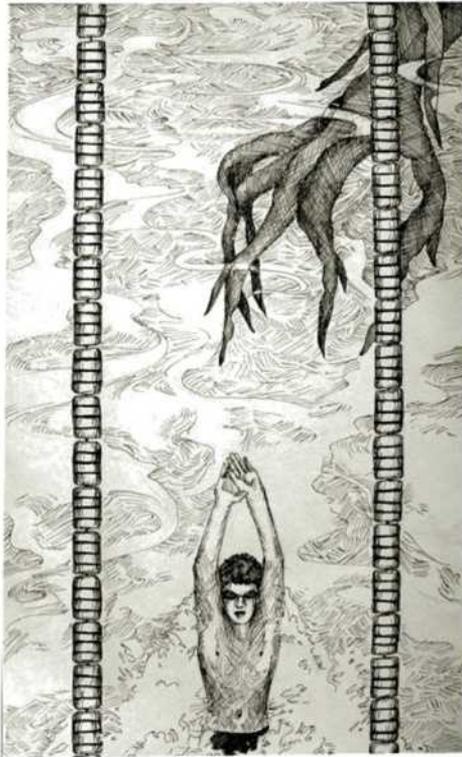


The League of Scientists

Ghost in the Water



Science, Naturally[®]
Washington, DC





CHAPTER 1

As the bell rang, signaling the end of the school day, John headed down the hall and put his books in his locker. Unlike the other students, he was in no rush. Malena had called a League meeting for this afternoon. But instead of meeting at the Lab like they usually did, she was having everyone meet on the fourth floor of the school, in room 14.

The room was dark and empty when John walked in. *Strange*, he thought, *normally, there's a teacher still in here from last period*. He didn't have much time to figure it out because suddenly the lights flickered on. Malena Curtina stood behind him in the doorway, backpack in hand.

“Are you ready to go?” she asked him.

“Go? Go where?”

“Why, to the secret location, of course! Did you really think we would meet in the school? Anyone could be watching,” she said in the most serious tone she could muster. John, however, could see a small smile tugging at her lips and knew that she was trying to scare him.

Walking past Malena and out the door, he asked, “Where are we going?”

“If I told you, then it wouldn’t be a secret, now would it?” she responded, as she dashed past him. “Race you down the stairs!”

John sprinted to catch up, pushing himself to make it to the front entrance before her.

“And the winner is ... JOHN! The crowd is going wild,” John yelled as soon as he made it to the sidewalk. He collapsed on the grass to catch his breath while Malena walked over to him.

“Well it wouldn’t be nice of me to beat you on such a special day,” she huffed.

“Special day?” John asked, confused. “What’s so special about today?”

“You’ll see,” Malena called. “Come on, we don’t want to be late.”

Malena held out her hand. John took it, and she hoisted him to his feet. They walked quietly for a few minutes until John broke the silence. “Is it usually this slow in the case department for the League?” John asked.

“No,” Malena replied, “it’s really strange. It’s almost like someone’s making sure there aren’t any mysteries.”

In a dark room on the fourth floor of East Rapids Middle School, a shadow stood in front of a window. It moved away. It had seen enough. It had heard enough. It had watched enough.

“Surprise!” everyone yelled as John walked into Ruby’s Supreme Frozen Delights with Malena.

Too shocked for words, John just looked around the room at all his friends.

“Welcome, *tomodachi*, to your surprise party!” Natsumi announced, gesturing to the room around her.

“Surprise party? Surprise for what? My birthday’s still six months away.”

“The party’s to mark when you joined the League. It’s your anniversary. It’s been two months,” Kimmey stated proudly.

“Wow, thanks guys!” John said, a grin spreading across his face. “Natsumi, what does *tomodachi* mean?”

“*Tomodachi* means “friend” in Japanese,” Natsumi replied as she got up to get some green tea ice cream. She topped it off with gummy bears and peanut butter pieces, creating her own special *dezaato*.

“Well, you may be a *tomodachi* to her, but you are an *amigo* to me,” Hector laughed, clapping John on the shoulder.

“Are you guys going to eat that ice cream or sit there chatting all day?” Malena teased as she scooped a spoonful of *soursop* sherbet, her favorite flavor, into her mouth.

“If you put it that way, I guess I’ll eat my ice cream—just as soon as I concoct the perfect combination of toppings,” Hector answered as he poured banana chips, chocolate brownies and macadamia nuts into his bowl of *lúcuma* sorbet, a fruity treat that always made him happy.

“Hey, leave some sprinkles for the rest of us,” Kimmey joked, pushing him out of the way so she could reach the toppings for her ice cream.

“You’re one to talk. Do you really need to add brownies to your Double Chocolate Chip Cookie Dough?” Hector replied, while watching John fill his cup. “John, *mi amigo*, you have awesome taste in friends, but when it comes to ice cream, you are so boring.”

“You just don’t appreciate the delicious simplicity of Vanilla,” John shot back, “Rich. Creamy. Perfect.”

Everyone gathered around, enjoying their ice cream. Soon, each of their faces had splotches of fudge and sprinkles, but none of them cared. As they were finishing up their sundaes, Kimmey’s father arrived and took a picture of them together. It was to replace the old photo back at the Lab.

The next day at school, John was sitting in Mr. Elinger’s Algebra class when, from the corner of his eye, he saw something small and round flying toward his face. In that split-second, John knew both what it was and who it came from. Unfortunately, this knowledge did not prevent the spit wad from slamming into his cheek. Wet and slimy, it slid down John’s face and onto the floor.

John looked down at the disgusting blob and nudged it with his shoe. There was more saliva this time. He looked around the classroom and caught Dowser smiling maliciously from three rows away. John turned back toward the front of the room with a quiet sigh. He wasn’t angry or even upset. He was just tired. Whenever these things happened at his old school, John’s mother would tell him to ignore the bully. “A bully needs a reaction. If you ignore him, he’ll leave you alone.” It was good advice, John had to admit, but not for someone like Dowser.

Dowser was almost double the size of John, and his hands were as big as John's head. He didn't seem very smart, but that may have been because he never paid very much attention in class. On homework assignments and tests, it was more common for Dowser to use his intimidating size to cheat rather than create anything of his own.

The only class Dowser ever paid attention in was the HTML class he had with John during fifth period. Only a couple of weeks after John moved to this new school, his HTML teacher held a competition for the best website. Dowser's was pretty good—in fact, so good the whole class had been speechless. No one knew Dowser had it in him, or that there was something he felt strongly enough about to apply himself.

However, much to his surprise, Dowser didn't win the competition. John did. Ever since, Dowser held a grudge against him. Dowser didn't pay attention in that class anymore. He also took all his hurt and insecurities out on John every chance he got.

When Dowser first started tripping John in the hallways and firing spitballs at him in class, John tried to ignore it. After all, bullies were nothing new to him. Usually, they stopped after awhile or just fired insults whenever they were around their friends. John could handle that. What he couldn't handle, what he couldn't understand, was Dowser's persistence. Sometimes, Dowser even chased John home from school for no other reason than because he could.

John had tried talking to him, but Dowser just snickered. Sometimes, when Dowser was chasing him, John thought about turning around quickly and giving him a big shove. But of course, that would never happen. Dowser was big and athletic, a powerful forward on the East Rapids Middle School basketball team. His spiky blond hair and ropy neck made him even scarier to look at. John, on the other hand, was small and

skinny, his bones and joints jutting out from his body at weird angles.

John knew that someday Dowser's spit wads, shoving, and chasing would come to an end. The question was *how* to make that happen. Dowser was like a simple robot programmed with only one command: *Get John Hawkins*.

"John, are you paying attention?"

John flicked his eyes away from Dowser. Mr. Elinger stood in front of the class, one hand on his hip. His eyes were big and his cheeks were pink. He got that way maybe once a week and today it was John's turn to feel the wrath.

"Yes," John said automatically, his face flushing a deep red.

"Then you can tell me what I just said, right?"

John turned his eyes toward the desk, and began tapping his left leg nervously.

"Um ... You were asking what the first step is to solve the equation $6x + 7y = -9$."

"So what's the answer?"

"Uh ..."

Mr. Elinger breathed out loudly through his nose and sighed, "That's what I thought. See me after class."

John had known the answer, but was too humiliated to say anything. As Mr. Elinger turned back to the board, John heard a snort of laughter. Face burning, he didn't lift his head. It wasn't hard to guess who had laughed.

John stayed after class. Mr. Elinger assigned him extra work and gave him a lecture on paying attention, though John's mind started to wander during the scolding itself. He wasn't trying to be rude—it was just the only way he could cope. As he walked out of Mr. Elinger's class, Hector caught up with him.

"¿*Que pasa?* I see Dowser's up to his usual stunts."

“I’m fine,” John muttered. “Sad as it is to say, I’m used to this.”

“You shouldn’t put up with being bullied. Middle school is hard enough as it is,” Hector said as he walked toward his class. “Anyway, I gotta run. *¡Hasta luego!*”

John had to agree. Being bullied was not something he wanted in his day-to-day life. He wouldn’t complain though; because while being at East Rapids meant dealing with Dowser, it also meant that he had actual friends for the first time in years. In the past, John had been a loner. He didn’t have any brothers or sisters and his mom’s shift often didn’t end until just before he went to bed. His dad wasn’t in the picture; he had left when John was still a baby. As a result, John had a hard time getting close to people. He was always afraid of getting left behind. Plus, every time his mother broke up with another boyfriend, she and John would pack up their things and move to a new town. The longest John had ever stayed in one school was three years. After the first couple moves, John gave up trying to make friends. It took a lot of energy and he was tired of saying goodbye. Instead, he spent his free time hidden away in his room tinkering with technology.

There was something nice about his robot kits and electronic gadgets. They only did what they were told, and there was no way for them to leave him behind. Before, he spent most of his time building and tweaking. Now that he had real friends, he still built things, but usually they were for cases the League was working on. Being recruited for the League was one of the best things that ever happened to him. He finally felt like he belonged.

As John rushed to get to Ms. Heida’s class before the bell, he thought back on the day that he met his friends in the League of Scientists and the first case he helped them solve.

It had been a day worse than most. Dowser was being particularly vicious in his attacks, and John was beyond tired of it all. He had to stay behind in Mr. Elinger's class to turn in corrections on an assignment, and it meant that he had to dash to history. John hurried to his locker, bumping against streams of students hurrying to get to class. He didn't want to be late and he still had to get upstairs.

He yanked open his locker, his hands still shaking from the scolding that Mr. Elinger had given him. When he looked at his bookshelf, the shaking stopped.

A folded piece of red paper sat on top of his book pile. From the crumpled edges, it looked like someone had shoved it through his locker's ventilation grille.

John stared at it a moment before looking up and down the hall. In the mass of students, no one was paying attention to him. He grabbed the paper and shoved it inside his backpack. Checking to make sure he had his history book, he ran for the stairs.

Nearly out of breath, he made it to his class just before the bell. He sat in the last row to avoid attention and pulled out his textbook. He left it closed on his table and slid the bright red paper underneath. He wanted more cover before he opened the message.

"Sit down, everyone," called an authoritative voice from the back of the room. John jerked his head up just as Ms. Heida skirted past his desk. She stopped at the projector in front of the chalkboard and turned back around to stare at her students. "Kimmey, will you hit the lights?"

John watched a pretty blonde girl rise from her desk. He noticed that she looked older than a typical seventh grader as she moved towards the light switch. Once the lights were turned off, John's attention was drawn to the glowing projection.

“Today, we’ll be talking about the Egyptian pharaoh Khufu,” Ms. Heida said. “Khufu built the Great Pyramid. You’ve probably seen photographs of it. It’s the largest one in the world.” She clicked her remote and the image of a pyramid dissolved to show its interior. An intricate drawing showing many rooms and passages appeared on the screen.

“Even today, experts don’t know exactly what all the rooms and passages were for. Some held treasure and, yes, maybe a mummy or two. Some might have been passageways allowing the pharaoh’s *Ka*, or spirit, to escape the pyramid after burial.”

John normally loved this stuff, but today he was too busy thinking about the red piece of paper to pay attention. He opened his textbook slowly. Then, holding his breath, he slid the mysterious note out from beneath his textbook, placed it on top of the open book, and began to read:

<u>We need to talk</u>	
001	0001
010	1111
011	0110
100	1010

This was a puzzle—a secret message. Who gave it to him, and why?

“We need to talk,” John read quietly and felt a thrill. He looked again at the numbers. Were the numbers themselves a message? The zeros and ones didn’t appear to represent letters.

A substitution cipher? A Caesar cipher? Binary?

Binary.

John loved electronics and building robots. The process was more than just “Bolt wheel A to axle B,” he still had to tell the robot what to do. He’d first begun programming robots with beginner kits. They were easy to figure out—the robots were programmed with a series of pictures. For example, a big green arrow meant “drive forward” and a red “X” meant “stop.”

The first language of all robots and computers was binary. All electronic brains knew binary; for that reason, he’d been working very hard to learn binary.

He squinted at the numbers and bit his pen. Quietly, he slid a notepad from his backpack, glancing up to make sure Ms. Heida hadn’t noticed. She was tracing the path of a pyramid tunnel on the projector, talking about airflow... or something.

“One, two, four, eight, sixteen, thirty-two, sixty-four, one hundred twenty-eight...” John muttered the sequence to himself. Starting from the right side of each group, John assigned each digit a number from that sequence. Then he multiplied each digit by the assigned number and added everything together.

The first group of three numbers, “001,” was easy:

$$(4 \times 0) + (2 \times 0) + (1 \times 1) = 1$$

The second group of three, “010,” was similar:

$$(4 \times 0) + (2 \times 1) + (1 \times 0) = 2$$

Binary has been tricky at first, but it got simpler once you knew the formula and had time to practice it. John did so frequently.

Head down, he furiously scrawled calculations, glancing up occasionally to make sure Ms. Heida wasn’t watching. When he finished, he read the results:

1	1
2	15
3	6
4	10

John stared at the numbers. They still didn't make any sense to him, but something about them seemed familiar.

He began to scribble notes on another piece of paper. After a moment, he looked from his notes to the message and made the connection. He straightened up with a jolt.

The message was his afternoon class schedule. The algebra class he'd come from, where he had been spitball'ed by Dows-er, was on the first floor, in Room 1. Ms. Heida's history class was on the second floor, in Room 15. His last class of the day was science on the third floor, in Room 6.

Floor 1, Room	1
Floor 2, Room	15
Floor 3, Room	6
Floor 4, Room	10

Someone knew where he was. Someone was watching him.

Since John had no reason to be on the fourth floor after his last class on the third floor, he knew that had to be where he was supposed to meet the note's author.

John had no idea who might want to talk to him or why. He'd only been at East Rapids Middle School for a couple of months and he hadn't made any friends. It always struck him as ironic that it was so much easier to make enemies. Making friends was a complicated process; it was hard and it was emotionally risky. Rather than make himself vulnerable, John kept his head down, did his schoolwork, and had fun at home with electronics and robot designs. The fact that someone wanted to talk to him came as a complete surprise.

Is it a prank? Somebody playing a joke? Maybe Dowser?

He didn't think so. It didn't feel like a prank, and Dowser's methods were anything but subtle. At any rate, this was a mystery he really wanted to solve. After his final class ended, he'd sprint up to the fourth floor and see who, or what, was waiting for him in Room 10.

Getting through science class was agony. The subject never interested him very much even though Mr. Steinhacker had sat him down earlier in the semester and explained how living things have a lot in common with robots. Human cells, for example, have their own power supply (the mitochondria) and a control unit (the nucleus); they move around (with flagellum); and like a robot's body, the cell's cytoskeleton and membrane holds everything together.

But John didn't care, especially not right now. He couldn't think about anything except the note. He looked up to make sure no one was watching. As usual, Malena Curtina dominated the questions and answers. She sat in the front row and usually John couldn't see much of her except for her braided black hair and a hand that rose to answer almost every question Mr. Steinhacker tossed out.

Malena was a science genius who could do any work given to her and answer for the rest of the class. The problem, though, was that Mr. Steinhacker knew this. He also knew his job as a teacher wasn't to teach only one student, but rather to teach *all* the students. That meant it was just a matter of time until—

“John, can you tell us the answer?”

John groaned inwardly. Mr. Steinhacker looked up from his notes, his pen pointing toward John. Malena twisted her body in her desk to stare at him. She was grinning, probably because she thought he didn't know the answer. He'd show her—that is, if he could remember the question.

“Uh, could you say that again?”

“A plant sitting in the sun will wilt. The cell structure loses water and can't support the plant's shape. What's the part of the cell that holds water and helps a plant keep its shape?”

John thought frantically, mentally searching through his memorized lists of cell parts.

“The cytoplasm?”

Malena's hand shot up instantly.

“No, not the cytoplasm,” Mr. Steinhacker said, his grey eyes intense behind the rectangle frame of his glasses.

“Remember, the cytoplasm is the jelly-like liquid in the cell that allows all the other parts of the cell, the organelles, to move freely. Anyone else have an idea?”

He looked for other volunteers, trying to avoid Malena's flailing hand. None of the students offered an answer.

“Malena?”

“The vacuole keeps the plant upright. If the plant doesn't get watered enough, the plant sags like a balloon losing air.”

“Exactly,” Mr. Steinhacker said. As he began to discuss vacuoles more in depth, John found himself staring at the clock. Twenty-one minutes left. There were 60 seconds in a minute,

so 60 times 21—John scribbled in the corner of his notebook—1,260. There were 1,260 seconds in 21 minutes, so if he counted slowly, all the way up to 1,260, he'd be able to count his way out of the class. Easy.

One. Two. Three. Four—

He sighed. It was going to be a long class.

After what felt like an eternity, the final bell rang. A thick mass of students flowed from the classrooms to the doors, onto the stairs, all heading towards freedom.

Instead of following them, John headed back up the stairs, pushing through the throng of students headed the other direction. His slow progress against the crowd reminded him of the photos he'd seen of salmon swimming upstream. Once he was on the fourth floor, he headed straight to Room 10. He pushed open the door, breathless. Four beaming faces stared back at him.

“John!” one of the students cried. “You made it!”

The speaker was Malena Curtina.



CHAPTER 2

“We knew you’d figure the code out,” Malena said. “Now, come on!”

She grabbed John’s arm and started to drag him out of the room.

“Aren’t you forgetting something?” called a voice from the other end of the classroom. A boy dressed in black pants and a gray shirt sat on a desk. Black hair stuck out from beneath a black baseball cap. Everything about him was menacing. He jumped down from where he sat and made his way towards them. He was a lot shorter than John had expected. Between his height and the inviting smile spreading across his face, his ominous façade disappeared.

“Sorry, Hector,” Malena said, laughing. She dropped John’s arm and turned to face him. She had pretty, dark eyes that John had never noticed before. “You know who I am, right?”

“Yeah. Malena Curtina.”

“Close. That’s *cur-TEEN-yuh*. My dad’s Jamaican, so he says you’ve gotta say it like that. My core is biology.”

“Your ‘core’?”

“My specialty. What I love to do. What I’m best at. You’ll understand in a minute.” Malena turned to the boy who’d spoken only a moment ago. She gave him a playful punch.

“Oww,” he moaned, but he was grinning. With one hand rubbing his arm, the boy stuck out his other hand to John.

Surprised by the formality, John didn’t take it at first.

“I won’t bite,” the boy chuckled.

John felt himself turning red, and he quickly reached for the extended hand.

“I come from Peru, and now I am friends with you,” he recited with a chuckle, “I am Hector Alejandro Manuel, at your service!” the boy said, shaking it.

“Yeah,” Malena cut in. “But we just call him Hector.”

Hector shrugged and smiled, “Sure, that’s fine too.” Turning to John, he added, “Nice job figuring out the binary code.”

“That was you?” John asked, surprised.

“That was me. We all created the message, and I turned it into binary. Looks like I did it right!”

“I’m Kimmey Pryce,” a girl’s voice cut in. “I’m in 17 percent of your classes.”

A tall blonde girl stood in front of John, hand out. John recognized her instantly. She was also a regular at the front of the classroom, her hand constantly in the air. He understood in an instant why she was friends with Malena—neither of them lacked anything as far as smarts or confidence were concerned. John shook her hand as she continued talking.