

Instructions

Welcome detectives! A crafty crime has just been committed, and we need your help to find the culprit. Over the next two hours you will be identifying and analyzing evidence found at the crime scene to figure out who the thief is. Good luck!

The Crime

William Will, newly elected Class President and great grandson of the inventor of the Toaster Strudel, is livid. He stands in the hallway, screaming at the top of his lungs and stamping his feet.

“Where is my backpack? Who took my backpack? You better give it back or I will SUE you and your family. That backpack has everything! My computer, my second computer, my wallet, my cell phone, my back up cell phone, and all my homework! I need to turn in that homework! Whoever took it better give it back NOW” He shrieks to the crowd of students, many of whom gaze at him in alarm.

Two hours later in Biology, William, still red in the face and a little teary eyed, comes by your desk at the end of class. He asks if he can hire you for the case, as he knows about your extensive knowledge of both synthetic biology and detective novels. You eagerly agree, and for a price of a sugar cookie, glory, and a chance to apply your knowledge of synthetic biology to real life, get started.

After questioning several witnesses who were near the crime scene when it happened, you conclude there are six main suspects.

Suspect: **Theresa Tumble**

Hobbies: Flyer on the Wildcat Cheersquad, Starbucks peppermint mocha Frappuccino enthusiast, avid Taylor Swift fan. Ran for class president against William Will and lost. Best friends with Victoria Fibonacci

Statement: “He probably left the backpack in the locker room or something. Clearly he’s not as responsible as he claimed to be during the election. Ugh I really thought I was more popular than him, but I guess not. Whatever. It’s fine. I ate lunch with Victoria Fibonacci and we were looking at the election results together.

Suspect: **John Allstar**

Hobbies: Playing soccer, playing fortnite, playing with girls hearts, playing on his phone in class

Statement: “What’s the question again?... Bro, I’m not going to steal this dude’s backpack. I own my own backpack, what would I do with two of them? William Wills should just buy another one. At lunch I was practicing soccer. We have our big championship game coming up, but nobody will come cheer us on because William scheduled the Spring Fling dance at the exact same time as the game and now the entire team is very upset.

Suspect: **Vio Lin**

Hobbies: First chair of Wildcat Orchestra, National Symphony Orchestra, hopes to be the youngest violin player in the world to perform Shostakovich's Violin Concerto. Also, William Will's girlfriend

Statement: "Obviously somebody stole it. I don't know who, but it wasn't me. You would think that a guy smart enough to be class president would know better than to leave his expensive backpack laying around. Sorry I'm a little annoyed with him, but not enough to steal things. Go talk to his best friend Conner I think they were together at lunch maybe"

Suspects: **Brooke Wurm**

Hobbies: Reading obviously. Loves Rick Riordan, Sarrah Dressen, and Cassandra Claire

Statement: "Can you please let me go back to reading? I don't know anything about this lunchbox or backpack. I was in the library all day. Maybe you should ask Vio, his girlfriend. I know that they eat lunch together every day so she has easy access. Also I heard she's mad at him because he cheated off her on a test and did better than her."

Suspect: **Victoria Fibonacci**

Hobbies: Captain of the Wildcat Math team, math tutor, math genius. Some might say she's a little too obsessed with math. Best friends with Theresa Tumble

Statement: "Who are you? What do you want? I'm sorry that William Will is incapable of keeping track of his belongings, but he's also incapable of including the math team in the yearbook—he says there's no room for us or something and that bothers me greatly. At lunch I was with Theresa Tumble—I always eat with her she's my best friend— trying to figure out why these school election numbers don't add up."

Suspect: **Conner Comput**

Hobbies: Trying to hack into the FBI. Has not succeeded (yet).

Statement: "I swear I don't know anything about the election!! What? That wasn't your question? Oh, I don't know anything about the backpack. I have my own super nice P49x computer I used for hacking. I don't want his basic mac. Ugh. Noob. I guess we kind of are friends? Well, not anymore. He knows who I have a crush on and has threatened me that he'll tell that girl if I don't do what he wants.

After you've interviewed all five suspects, you realize they all have a vendetta, or reason to hate William. As you inspect the last place William put down his backpack—the middle of the hallway before he left it to talk to a teacher— you find a strand of hair on the ground in the exact spot the backpack used to be. Unfortunately it is a very fine strand of hair and you cannot tell what color it was.

STOP

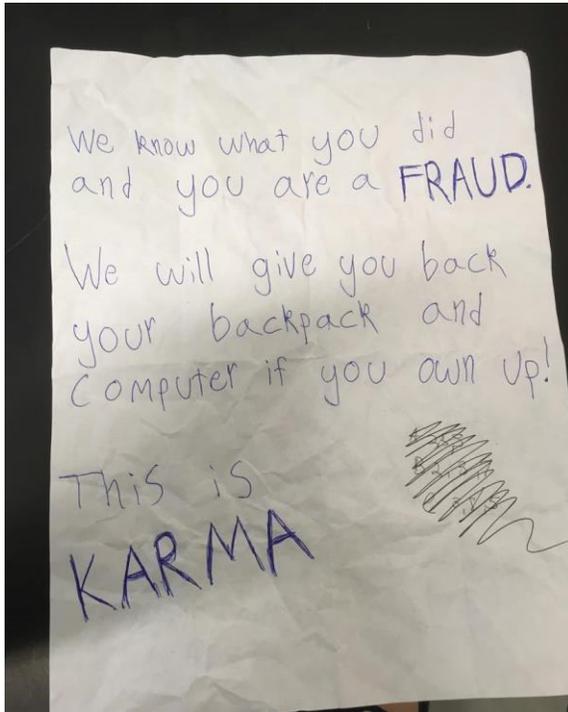
You return to the three suspects, and ask for a piece of each of their hair. They comply, and you return to the bio lab to analyze the hair.

After you run your gel and return to the scene of the crime, you see a small crumb on the ground. As you move down the hallway, you see more breadcrumbs until you find an uneaten sandwich at the top of the trash can. As you pick up the sandwich, you can see that it is clearly covered in green and red mold.



You ask for the lunchboxes of the six suspects to see if you can find more moldy bread in there. However, all the lunch in the boxes has been eaten. You then take a swab of the inside of each lunchbox, with hopes that if the moldy sandwich came from the box, there will be traces of mold inside the lunchbox.

The evidence seems to be pointing to _____ but you still aren't ready to point any fingers. However, the next day, a letter was slipped into William Will's extra backpack.



Luckily for both you and William, you have dabbled in paper chromatography before. Cutting a strip from the paper, you analyze it.

You confront Theresa, Victoria, Joe, Vio, Brooke, and Conner, and ask if you can borrow their favorite pens. They (mostly) willingly oblige,

When the paper chromatography is finished, you leap to your feet and run to William. At last, you know who the culprit(s) is/are.

"Are you sure?" William asks, disbelief written across his face.

"Oh yes" you respond. "And here's why"

STOP

Answer key

Congratulations detectives! You have solved the mystery! As you have correctly identified, the hair belongs to Theresa, the pen is from Victoria, and while the mold could be from both Theresa, Victoria, and Vio's lunchbox, only Theresa has the microscope match.

Annoyed she lost the election, Theresa asked Victoria to eat lunch with her and look at some of the data from the school population. After crunching a few numbers, Victoria realizes that there was no way for William to have won, and he must have cheated somehow. Victoria and Theresa steal the backpack to use as blackmail against William for him to admit he rigged the election. However, after looking through the computer, both girls realize Conner hacked into the system, helping William win.

Instructions for Stephanie and Adam

1. Give children first three pages, let them read (15 minutes)
 - Form groups of 5
2. Talk about PCR- what it is, how we can use it to identify people (45 minutes)
 - Have them load gels. First practice with colors then with PCR
 - Known sample, then 5 others (random) **need to be made then frozen**
 - a. Bread mold. Plates will be in the incubator already.
 - Theresa- green match. Vio- green match (false positive). Victoria- red. Conner- blank. Brook- tan. John- tan.
3. Have them look under the microscope
 - Need to look under the microscope. Have a known sample, match Theresa up, Vio has other type of bacteria.
 - Have kids streak plates (with names on each sample. MAKE SURE THEY REMEMBER WHOSE SAMPLE THEY ARE STREAKING)
4. WHILE looking under microscope, they can start paper chromatography.
 - Have picture of known pen. Make sure to label pens. Each person can run their own pen, have extra strips for people.
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Victorias hair

Theresa mold match (vio false match)

Theresa pen