

Team # _____

School Name _____

Students: _____

Science Olympiad
Wright State
Invitational
2012
Science Crime
Busters

Crime Scene Scenario at Camp Green Tree

Camp green tree was an eco-friendly camp for teens. The purpose was to encourage teens to be more nature conscious and to recycle. Campers hiked the trails of the state park and gathered garbage along the trails and then recycled when they could. The camp was next to a sanctuary for wildlife with a major river on one side, and a man-made lake with a sandy beach on the other side. The beginning of the summer had a record breaking amount of rainfall. Many trails had been washed out and filled with debris. But the last few days there had been a record breaking heat wave. The hot sun evaporated the waters and hardened the trails. The campers were dehydrated, had no air conditioning and were hot, irritable and lazy.

The camp counselors felt the kids did not want to be at camp and were unmotivated. To build team spirit the counselors decided to have a contest between the north side and south side of the camp. Campers were to be awarded points that in turn could get them out of other chores and a full day to play at the beach. Points were awarded to the teams that recycled the most, made the best meals, or did the best job at assigned camp tasks. The south side campers would be in charge of plastic recyclables #1-3 and the north side campers' #4-6. The contest started out lighthearted but the camp captains did not like each other and had a deep rivalry that turned harmless practical jokes into serious situations. Examples of some of the jokes had been replacing salt for sugar for the north team during the best lemonade contest. The other team had retaliated and replaced cornstarch for baking powder and turned the pancake contest into a flat out disaster. During the best campfire contest sparks were flying when someone added something to the south camp fire that caused some impressive bright silver illuminating bursts. The camp advisors became really concerned when the first aid kit was sabotaged when someone replaced the hydrogen peroxide with alcohol. Danny the south side captain was not a happy camper as he screamed when he had been treated for some minor injuries and scrapes.

The contest was called to a halt when a forest ranger found a devastating crime that they felt was linked to Camp Green Tree. The park ranger was monitoring the wetlands and trails, and found a large concentration of recyclables dumped in a cove along with several dead ducks. Upon examination, the animals appeared otherwise healthy except for the plastic six-pack rings that had entangled them in the cove.

Along with debris was a tree root that tripped the ranger, but led her to discover a powdery fingerprinted note with a camp "to do" list and also some footprints. A large tuft of dark colored hair like fibers was caught in an overhanging branch. Also fibers were found attached to the stub of the tree root. The deep traction treads of footwear were preserved in the now cement like ground laden with non-biodegradable debris that led her back to camp green tree. After talking with the camp counselors the following campers were determined to be possible suspects due to the fact that they were the only ones that had key access to the storage supplies.

The suspects all seemed to be very unhappy. They were also the ones taking the contest to extremes. Upon examination the storage room was not forcefully entered, but the recyclable bins #4-6 that were kept in the storage room had been tampered with and emptied. Who could have done this awful crime that went against all that Camp Green Tree stood for?

This was a case of "Fowl" play: help the Ranger find the criminal and make them realize the damage and harm a prank caused.

The following evidence was collected from cabins and campsite and dump site. And the following information was obtained from the suspects:

Suspect #1:

- North side captain/ Abby
- Age 15 /Light Brown
- Had key access to life vests in storage room
- Hobbies sculpting starfish and sea creatures from molds
- Clothes: only wears flip flops/ bathing suit/ terry cover-up covered in sand
- Works: as a lifeguard
- Drinks from a BPA-free water bottle
- When asked if she liked camp she replied 'I really wanted to go home during all the rain, I was really bored, but now that the beach is open it is more fun.'



and

Suspect #2

- North side co-captain/ Brian
- Age 14 /Blonde hair
- Helps in kitchen had key access to store room to get to pantry items
- Hobbies: loves to bake
- Clothes: Wears linen aprons/cotton khakis/Converse tennis shoes has allergy to animal hair
- Works in the kitchen and dining hall
- Drinks tea with lemon and sugar from ceramic mug
- When asked if he liked camp he replied sadly" No one appreciates the food I make, it hurts my feelings."



Suspect #3

- South side co-captain/ Connie
- Age 14/Red hair
- Conducts boot camp classes, had access to first aid supplies in store room



- **Hobby: physical fitness**
- **Clothes: Sweat Band/Wears under armor/Nike running shoes with some sand, clay, and grass on bottom of shoe**
- **Takes vitamin supplement to boost immune system and strengthen bones**
- **Often seen drinking water from a Styrofoam cup**
- **Uses Purell on hands a lot/picture of health**
- **When asked if she liked camp she replied angrily “Hardly anyone attends my physical education training sessions, I would rather be working out with my friends at my home gym.”**

Suspect #4

- **South side captain/ Danny**
- **Age 15/Dark brown hair**
- **Had access to storage room to get firewood**
- **Clothes: Cotton flannel shirt, ripped up denim jeans, wool socks, mud caked hiking boots**
- **Works as a handy-man**
- **Hobby: making metal belt buckles**
- **Drinks soda from a can, this often gives him stomach aches**
- **When asked if he liked camp he replied after hobbling and rubbing his bruised head “I would rather be at home working in my Dad’s draft shop, I don’t have any real friends here, no one seems to like me.”**



Science Crime Busters: The Case of "Fowl" Play

School and Team# _____

A. **Qualitative Analysis:** Identify the unknown substances (total worth 50 points)
(found at the crime scene #5, #6, #10, #12 #13, and #14)

#1-10 (3 points each)

- #1 unknown _____
- #2 unknown _____
- #3 unknown _____
- #4 unknown _____
- #5 unknown _____
- #6 unknown _____
- #7 unknown _____
- #8 unknown _____
- #9 unknown _____
- #10 unknown _____

#11-15 (4 points each)

- #11 unknown _____
- #12 unknown _____
- #13 unknown _____
- #14 unknown _____
- #15 unknown _____

B. **Fiber/ Polymer Test:** Identify the following Substances (total worth 10 points)
(found at the crime scene #1, #2 and #5)

#1-5 (worth 2 points each)

- 1) Circle one answer : Human Cat Dog
- 2) Circle one answer: Animal Vegetable Synthetic
- 3) Circle one answer: Animal Vegetable Synthetic
- 4) Circle one answer: PETE HDPE PS LDPE PP PVC /and write out full name of polymer _____
- 5) Circle one answer: PETE HDPE PS LDPE PP PVC /and write out full name of polymer _____

Total points out of _____/60 points

School and Team# _____

C. Chromatography : (total worth 5 points, each correct paper attached chromatograms are worth 1 point each , identify the match to the ink pen sample found at the crime is also worth 1 point)

1st suspect's attached chromatogram:

2nd suspect's attached chromatogram:

3rd suspect's attached chromatogram:

4th suspect's attached chromatogram:

Crime scene note's attached chromatogram & circle the suspect number you believe to match above:

Total points out of -----/5 total

School and Team# _____

D. **Crime Scene Evidence:** (worth total 10 points)

1. Name a different identifying pattern detail (loop, arch, or whorl) on the following fingerprints found at the crime scene and point to the area on the print you are identifying (worth 1 point each)

A) _____ B) _____ C) _____



2. Impressions of fingerprints may be left behind on a surface by the natural secretions of sweat from the _____ glands that are present in friction ridge skin.
3. Which suspect(s) fingerprints were found at the crime scene and identifying pattern (worth 1 point) _____
4. The following composition of soil was found at the crime scene along the river edge: the soil had yellow to brick red color streaks in it. Thus the soil most likely contained what element? _____.
5. The soil when tested had a permeability coefficient less than 10^{-7} . It would be considered _____.
6. Given the above information it also contained some organic material and when rolled in hand formed a ball under pressure. It most likely is what type of soil _____
7. Suspect #4 soil sample taken from shoes contained: 50% clay, 40% sand, and 10% silt. They had what type of soil in their boots? _____
8. Suspect #1 soil sample taken from their shoes contained: 87% sand, 11% silt, and 2% clay. They had what type of soil in their footwear? _____

Total points _____/10 total

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- E. **Analysis of the Crime Scene:** (Total worth 25 points) Describe who is/are the main suspect(s) and who is/are not the suspect(s). Draw conclusions based on the evidence and scenario.

Points__/25